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ABBREVIATIONS AND ACRONYMS

ACLS	:	Advanced Cardiac Life Support
AIDS	:	Acquired Immuno Deficiency Syndrome
APH	:	Ante Partum Haemorrhage
APTT	:	Activated Partial Thromboplastin Time
B-HCG	:	Beta Sub Unit of Human Chorionic Gonadotrophin
BHU	:	Basic Health Unit
BLS	:	Basic Life Support
BP	:	Blood Pressure
CCT	:	Controlled Cord Traction
CPD	:	Cephalo Pelvic Disproportion
CPR	:	Cardio Pulmonary Resuscitation
CVP	:	Central Venous Pressure
DIC	:	Disseminated Intravascular Coagulation
EC	:	Emergency Contraception
ECG	:	Electro Cardiogram
EDTA	:	Ethylenedinitrilo Tetra Acetic Acid
EmOA	:	Emergency Obstetric Anaesthesia
EmOC	:	Emergency Obstetric Care
ER	:	Emergency Room
ERT	:	Emergency Response Team
ESR	:	Erythrocyte Sedimentation Rate
FDP	:	Fibrin Degradation Products
FFP	:	Fresh Frozen Plasma
g	:	Gram
h/o	:	History of
HIV	:	Human Immuno Deficiency Virus
ICU	:	Intensive Care Unit
I/M	:	Intramuscular
IP	:	Infection Prevention
IUCD	:	Intrauterine Contraceptive Device
IU	:	International Units
I/V	:	Intra Venous

Kg	:	Kilogram
L	:	Litre
LHV	:	Lady Health Visitor
mcg	:	Microgram
MCH	:	Mother and Child Health
MDGs	:	Millennium Development Goals
mg	:	Milligram
ml	:	Millilitre
MMR	:	Maternal Mortality Ratio
MVA	:	Manual Vacuum Aspiration
O ₂	:	Oxygen
°C	:	Degrees Centigrade
°F	:	Degrees Fahrenheit
OT	:	Operation Theatre
PEEP	:	Positive End Expiratory Pressure
PIH	:	Pregnancy Induced Hypertension
POC	:	Products of Conception
PPH	:	Post Partum Haemorrhage
PT	:	Prothrombin Time
Rh Factor	:	Rhesus Factor
RHC	:	Rural Health Centre
S/C	:	Subcutaneous
STI	:	Sexually Transmitted Infection
Tab.	:	Tablet
TAH	:	Total Abdominal Hysterectomy
TT	:	Tetanus Toxoid
UNFPA	:	United Nations Population Fund
UNICEF	:	United Nations Children's Fund
WHO	:	World Health Organization

Foreword

Every year in Pakistan, an estimated 30,000 maternal deaths occur which translates to one woman dying every 20 minutes. Many more suffer from temporary or permanent disabilities. With a view to reducing the maternal mortality and morbidity, the National Committee for Maternal Health and UNICEF have produced this Manual for primary, secondary and tertiary levels of health care. This is a product of 18 months of participatory work and exhaustive deliberations at provincial workshops throughout Pakistan.

The Manual addresses five major causes of maternal deaths in Pakistan: haemorrhage, sepsis, hypertensive disorders of pregnancy including eclampsia, obstructed labour / ruptured uterus and septic abortion. It contains comprehensive modules on general principles of emergency obstetric care, the requisite skills of obstetric anaesthesia, newborn care and patient management. A list of essential drugs and equipment is also added to facilitate implementation.

The key causes of maternal mortality are the “three delays” which can occur: at home; during transport to the hospital or clinic; and at the hospital itself. The text provides practical guidance to avoid these delays. This becomes particularly important when close to eighty percent deliveries are conducted without a skilled birth attendant.

The work draws extensively from well-researched documents and training resources from reputed organizations and professional bodies. It provides simplified protocols and management regimes for obstetric complications to help establish the standardization of procedures, emergency preparedness and improvement in the quality of care. It is a useful tool for training, self-learning and reference.

NCMH is making this Manual available to all groups in Pakistan who are engaged in obstetric and midwifery education and service provision. It is hoped that it will serve as an important resource to cope with the enormous challenge of averting maternal deaths and disabilities in Pakistan.

Ibrahim Jabr
UNICEF Representative a.i.

Acknowledgement

One of the by products of this Manual is the discovery of interested and committed individuals willing to give time to worthwhile activities related to safe motherhood. The National Committee for Maternal and Neonatal Health (NCMNH) felt fortunate in being surrounded by such persons. They contributed in many ways according to their area of specialization and interests. To mention them by name would have filled many a page. We owe a debt of gratitude to each and every one of those who have participated in the compilation of this Manual by providing written material, attending group and / or provincial meetings, discussing the content, offering critique and making suggestions for its improvement.

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Preface

The first edition of the Manual for Emergency Obstetric Care and its accompanying pocket book published in 2003 were very well received. Over 4000 copies, including those printed for pre-testing in the field and for receiving feedback, have been distributed throughout Pakistan and a few in other countries as well. There was a very positive response.

The Manual, together with the pocket book is being used both in the Public and the Private sectors for training in various programmes and projects related to Maternal and Neonatal Health and as a ready reference manual by service providers. The availability of these two documents in Urdu has added to their popularity.

A large demand for more copies has necessitated reprinting. This gave us an opportunity to revise both the Manual and the pocket book. In the present version among other things data on Maternal and Neonatal Health status has been updated and information about the Millennium Development Goals included. In the module on Postpartum Haemorrhage the emerging trends in its management have been incorporated.

Due to revision a few pages had to be added. They have not been assigned new page numbers but treated as addition the relevant pages and marked (a) (b) etc.

We hope that the second revised edition will be used as extensively as the first edition for providing competent care to the mothers and the newborns.

Dr Sadiqua N Jafarey
Dr Azra Ahsan
Mrs Imtiaz Kamal

Manual on Emergency Obstetric Care

Preface to the First edition

The challenge of averting maternal death and disability is enormous. Strategies to meet this challenge are varied and multidisciplinary. These require involvement of not only the health sector but other sectors like education and transport as well. The ideal way of reducing maternal deaths would be to predict and, where possible, prevent the complications which kill women. In the absence of being able to do so, and making the best use of limited resources, provision of timely and adequate care for an estimated 15% of women who develop serious complications will save a number of lives both of the mother and of the child – hence the focus on Emergency Obstetric Care (EmOC).

This strategy is based on the premise that all pregnant women are at risk of developing serious obstetric complications, and that not all of these complications can be predicted or prevented. Grouping women into categories of high risk and low risk does not necessarily identify which particular woman will have complications. A woman in the low risk group may develop complications like postpartum haemorrhage, which may threaten or take her life, whereas one in the high-risk group may not. Most women with complications can however be successfully treated if quality EmOC is provided to them in time.

EmOC should be readily available so that time is not lost. Three levels of care are required:

- **Obstetric First Aid** by competent midwifery or medical personnel at the basic health care level.
- **Basic EmOC** by physicians with limited obstetric skills.
- **Comprehensive EmOC** by specialists in obstetric care.

Obstetric First Aid:

Interventions, which could be carried out in the community i.e. in the homes, or in the Basic Health Units (BHUs), Mother & Child Health (MCH) Centres and Rural Health Centres (RHCs).

These interventions include, administration of:

- Parenteral Oxytocic Drugs (Oxytocin/ Ergometrine)
- Parenteral Antibiotics
- Parenteral Sedatives / Anticonvulsants
- Intravenous Infusions

Basic EmOC Services:

A well-equipped RHC or Tehsil hospital, which has skilled health care providers and is properly equipped are necessary for this. The interventions are:

- All those included in Obstetric First Aid
- Manual Removal of Placenta
- Evacuation of Retained Products of Conception in case of Abortion
- Assisted Vaginal Delivery (Vacuum Extraction, Forceps)
- Basic Investigations

Comprehensive EmOC Services:

District or Tehsil hospitals that have skilled health care providers including anaesthetists and are properly equipped for surgery, anaesthesia and blood transfusion can provide these services.

The interventions at this level include:

- All those included in basic EmOC
- Surgery (e.g. Caesarean Section, Curettage, etc.)
- Blood Transfusion
- Greater range of Investigations

This **Manual** has been developed to provide guidance for the management of the major complications at various levels of health care. It is based on documents entitled “Integrated Management of Pregnancy and Childbirth” (WHO, UNFPA, UNICEF and World Bank); and on “Emergency Obstetric Care” (WHO – 1999). Documents from different countries were also studied and help taken wherever appropriate. The Manual addresses the five major causes of maternal deaths in Pakistan i.e. **Haemorrhage, Sepsis, Hypertensive disorders of pregnancy including Eclampsia, Obstructed Labour / Ruptured uterus and Abortion**. It is designed for different cadres of health care providers i.e. **midwives, lady health visitors (LHVs), nurse-midwives, doctors** and for different levels of health care – from the **home to the district hospital / tertiary health care facility**.

In the preparation of this Manual, input has been taken from individuals and through meetings from a large number of obstetricians, anaesthetists, paediatricians, doctors in postgraduate training, nurses and midwives from all the provinces of Pakistan. Workshops with the number of participants ranging from 25 to 54 were held in Peshawar, Lahore and Karachi and the draft of the Manual was discussed in detail. Feedback received from the participants has been incorporated in the Manual.

Dissemination and Orientation workshops were then held in the four provincial capitals and any further alterations suggested by the participants were also incorporated.

In addition to the modules on the 5 major causes of maternal death, the Manual contains modules on general principles of emergency obstetric care, the skills required to provide normal and emergency obstetric care, emergency newborn care, emergency obstetric anaesthesia and list of essential drugs and equipment & state of readiness to provide EmOC.

Protocols based on the Manual have also been developed. These are meant to be displayed clearly, so that they can serve as a tool for ready reference. Interventions in gray coloured boxes indicate the need of a facility providing comprehensive emergency care.

It is hoped that this Manual will be used for formal training as well as for self-learning and reference. It is also hoped that it will be used widely and will have some impact on averting maternal deaths and disabilities. It must be emphasized however, that the Manual is not meant to replace the standard textbooks. Furthermore, its effective use will depend on supervised training.

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Introduction

General Principles of Emergency Obstetric Care (EmOC)

Vaginal Bleeding in Early Pregnancy (Abortion)

Vaginal Bleeding in Later Pregnancy and Labour (APH)

Vaginal Bleeding After Child Birth (PPH)

Elevated Blood Pressure With Headache / Blurred Vision / Convulsion Or Loss of Consciousness (PIH)

Unsatisfactory Progress of Labour (Obstructed Labour)

Fever After Child Birth (Sepsis)

Skills Required to provide Normal and EmOC

Anaesthesia and Analgesia for Emergency Obstetrics

Emergency Newborn Care

Essential Drugs, Equipment and State of Readiness

Protocols

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ABBREVIATIONS AND ACRONYMS

ACLS	:	Advanced Cardiac Life Support
AIDS	:	Acquired Immuno Deficiency Syndrome
APH	:	Ante Partum Haemorrhage
APTT	:	Activated Partial Thromboplastin Time
B-HCG	:	Beta Sub Unit of Human Chorionic Gonadotrophin
BHU	:	Basic Health Unit
BLS	:	Basic Life Support
BP	:	Blood Pressure
CCT	:	Controlled Cord Traction
CPD	:	Cephalo Pelvic Disproportion
CPR	:	Cardio Pulmonary Resuscitation
CVP	:	Central Venous Pressure
DIC	:	Disseminated Intravascular Coagulation
EC	:	Emergency Contraception
ECG	:	Electro Cardiogram
EDTA	:	Ethylenedinitrilo Tetra Acetic Acid
EmOA	:	Emergency Obstetric Anaesthesia
EmOC	:	Emergency Obstetric Care
ER	:	Emergency Room
ERT	:	Emergency Response Team
ESR	:	Erythrocyte Sedimentation Rate
FDP	:	Fibrin Degradation Products
FFP	:	Fresh Frozen Plasma
g	:	Gram
h/o	:	History of
HIV	:	Human Immuno Deficiency Virus
ICU	:	Intensive Care Unit
I/M	:	Intramuscular
IP	:	Infection Prevention
IUCD	:	Intrauterine Contraceptive Device
IU	:	International Units
I/V	:	Intra Venous

Kg	:	Kilogram
L	:	Litre
LHV	:	Lady Health Visitor
mcg	:	Microgram
MCH	:	Mother and Child Health
MDGs	:	Millennium Development Goals
mg	:	Milligram
ml	:	Millilitre
MMR	:	Maternal Mortality Ratio
MVA	:	Manual Vacuum Aspiration
O ₂	:	Oxygen
°C	:	Degrees Centigrade
°F	:	Degrees Fahrenheit
OT	:	Operation Theatre
PEEP	:	Positive End Expiratory Pressure
PIH	:	Pregnancy Induced Hypertension
POC	:	Products of Conception
PPH	:	Post Partum Haemorrhage
PT	:	Prothrombin Time
Rh Factor	:	Rhesus Factor
RHC	:	Rural Health Centre
S/C	:	Subcutaneous
STI	:	Sexually Transmitted Infection
Tab.	:	Tablet
TAH	:	Total Abdominal Hysterectomy
TT	:	Tetanus Toxoid
UNFPA	:	United Nations Population Fund
UNICEF	:	United Nations Children's Fund
WHO	:	World Health Organization

Maternal Mortality and Morbidity

Definitions

Maternal Death: Death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.

Causes of Maternal deaths may be direct or indirect:

Direct: Those deaths that result from obstetric complications of the pregnant state (pregnancy, labour and puerperium), from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above. Deaths due to Haemorrhage, Sepsis, Pregnancy Induced Hypertension, Obstructed Labour, Abortion and complications of Anaesthesia all fall into this category.

Indirect: Those deaths that result from previous existing disease or disease that developed during pregnancy (not those due to direct causes) but which, was aggravated by physiologic effects of pregnancy e.g. deaths due to Anaemia, Heart disease, Diabetes Mellitus etc.

Co-incidental: Deaths from unrelated causes during pregnancy or the puerperium.

Maternal Mortality Ratio (MMR) The number of maternal deaths per 100,000 live births.

Maternal Mortality Rate The number of maternal deaths per 100,000 women between the ages of 15-49 years.

Risk of Dying This is measured by the ratio of maternal deaths to live births e.g. if the MMR is 700 per 100,000 live births, the women's risk of dying is 1 in 143.

Life Time Risk of Dying This depends also on the number of times a woman becomes pregnant e.g. if a woman with a 1 in 143 chance of dying becomes pregnant 6 times, her lifetime risk of dying is 1 in 24.

Maternal Morbidity

Short- or long-term illness in a woman who has been pregnant (regardless of the site or duration of pregnancy) from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes, the most serious being obstetric fistula.

Safe Motherhood

Creating the circumstances within which a woman is enabled to choose:

- Whether she will become pregnant.
- When pregnant:
 - Ensuring that she receives care for prevention and treatment of pregnancy complications.
 - Has access to skilled birth assistance.
 - Has access to emergency obstetric care if she needs it.
 - And care after birth.

So that death or disability from complications of pregnancy and childbirth are avoided.

INTRODUCTION

Situation of Maternal Health in Pakistan

The health status of Pakistani women and their newborns is poor with a high ratio of maternal and neonatal morbidity and mortality. This is the result of major factors given below:

- There are an estimated 37.9 million (nearly 4 crore) women in the reproductive age group i.e. 15-49 years. (1)
- Over half the adult population is literate – 50%, 63% males and 36% females (2000-2004) (2)
- More than 40% of **ALL** women are anaemic.
- Just over 1/3 (36%) couples use contraception (1)
- The gap between contraceptive use and the desire to limit births is one of the largest in the world (38%) (3)
- The total fertility rate is high – 4 i.e. a Pakistani woman will on an average bear 4 children by the end of her reproductive life (1)
- An estimated 4.2 million births occur annually (1)
- Over three fourth (76.7%) of the births take place at home (3)
- Of the home deliveries, 95% are conducted by untrained and illiterate traditional birth attendants (TBAs), family members and neighbours lacking skills for safe and clean delivery and care of the newborn. (3)
- 31% women are assisted by a skilled health provider at birth (2)
- About 37% pregnant women are anaemic (Hb levels below 12 gm %) (4)
- 16% lactating mothers are malnourished. Daily caloric intake among pregnant and lactating women is 87% and 74% of the recommended calories respectively.
- Less than 30% of the pregnant women receive any antenatal care.
- Just over half (57%) pregnant women are fully immunized against tetanus. (5)
- About a quarter of the delivered women receive any postnatal care (1)
- Households spend less on women than on men in event of illness.

In this environment a large number of women and neonates die or suffer morbidity as a result of pregnancy related complications:

- The maternal mortality ratio (MMR) is estimated at 500 per 100,000 live births (1)
- The indirect estimate given by NIPS was 533 per 100,000 live births (3)
- An estimated 30, 000 maternal deaths occur annually i.e. one woman dies every 20 minutes.
- Several thousand more suffer from temporary or permanent disability.
- Lifetime risk of maternal death in Pakistan is 1 in 38 as compared to 1 in 230 in Sri Lanka, 1 in 5100 in the United Kingdom and 1 in 6000 in Sweden. (5)
- The infant mortality rate (IMR) is 77. (1)
- About 25% of babies born are of low birth weight i.e. less than 2.5kg (5¹/₂ lbs). This is an indication of maternal malnutrition and anaemia.
- The perinatal mortality rate is 85 - 90 per 1000 total live births. About 400,000 to 500,000 babies are either stillborn or die within the first week of life - again a reflection of poor maternal health as well as poor health care (3)

Pakistan is a signatory to the Millennium Development Goals (Table 1) agreed upon by 189 Countries at the UN Summit Meeting in 2000. Three of the eight goals are directly related to health (4, 5 & 6). Goal 5 requires that by the year 2015 the Maternal Mortality Ratio be reduced by three fourths from the level in 1990. This means that in the next ten years the MMR is to be brought down to 140 from an estimated figure of over 500 in 1990 (Table II).

Table I:

Millennium Development Goals (MDGs)

- | | |
|----------------|---|
| Goal 1: | Eradicate extreme poverty and hunger |
| Goal 2: | Achieve Universal Primary Education |
| Goal 3: | Promote gender equality and empower women |
| Goal 4: | Reduce child mortality |
| Goal 5: | Improve maternal health |
| Goal 6: | Combat HIV/AIDS, tuberculosis, malaria and other diseases |
| Goal 7: | Ensure environment sustainability |
| Goal 8: | Develop a global partnership for development |

Table: II

The Targets & Indicators for maternal and child health

Goal	Target	Indicators
Goal 4: Reduce child mortality	Reduce by two-thirds between 1990 and 2015, the under-five mortality rate (U5MR)	<ul style="list-style-type: none">• Under-five mortality rate• Infant mortality rate• Proportion of 1-year-old children immunized against measles
Goal 5: Improve maternal health	Reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio	<ul style="list-style-type: none">• Maternal mortality ratio• Proportion of births attended by skilled health personnel

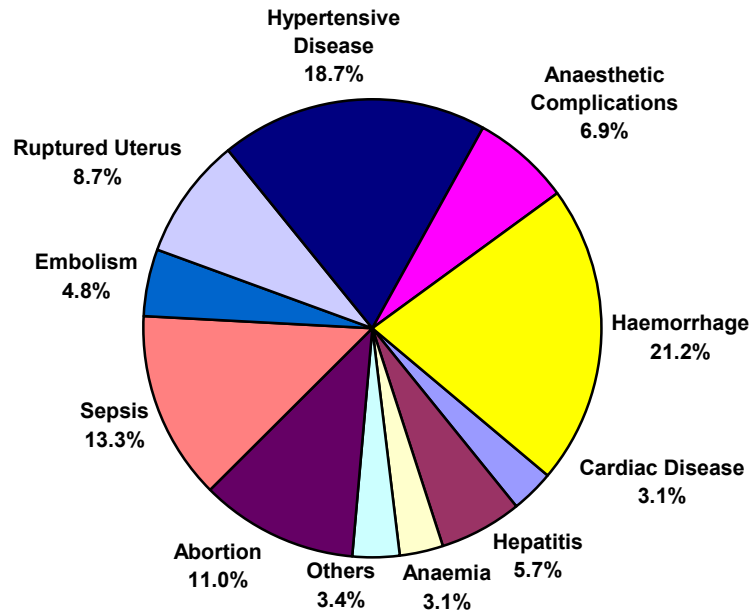
Efforts to meet these targets are being made. These include old initiatives as well as new ones.

In the National Maternal and Neonatal Health Programme among other interventions, the focus is on increasing skilled attendance at birth and providing Emergency Obstetric and Newborn Care (EmONC).

References:

1. Population Growth and its Implications. National Institute of Population Studies Islamabad (NIPS) 2005
2. The State of the World's Children UNICEF 2007
3. Pakistan Reproductive and Family Planning Survey, National Institute of Population Studies (NIPS), 2001
4. National Nutrition Survey (NNS), Planning Commission of Pakistan/UNICEF 2001-2002
5. The State of the World's Children UNICEF 2005
6. Maternal Mortality in 1995 – Estimates developed by WHO, UNICEF, UNFPA, 2001.

The **medical causes** of maternal deaths are shown below. Nearly 82% of the deaths are due to **direct** causes. There are many other factors leading to a woman’s death. These are social, economic and cultural and need to be addressed simultaneously.



Reference: Jafarey, S.N. Maternal Mortality in Pakistan – An Overview in Maternal and Perinatal Health in Pakistan. Proceedings of Asian and Oceanic Federation of Obstetrics and Gynaecology Workshop, Karachi, November 1991. TWEL Publishers, Karachi 1992.

The Three Delays Resulting in Maternal Deaths

- 1st Phase of Delay:** Deciding to seek professional care.
- 2nd Phase of Delay:** Identifying and reaching an appropriate Medical Facility.
- 3rd Phase of Delay:** Receiving Adequate, and Appropriate Treatment at the Facility.

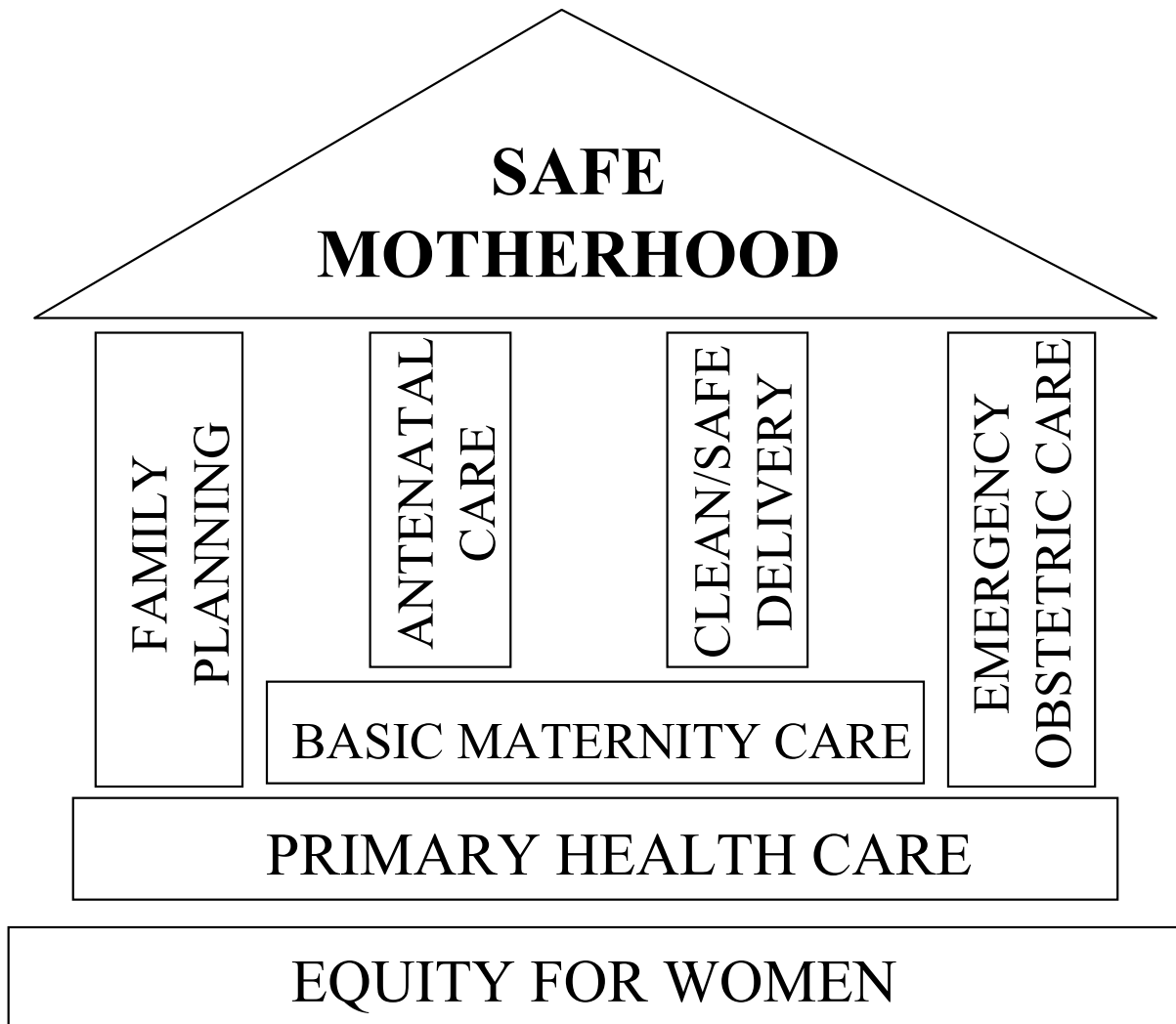
Recently the three delays have been reclassified into **four***

- 1st Delay:** Delay in identifying a complication
- 2nd Delay:** Delay in making a decision to seek treatment
- 3rd Delay:** Delay in getting the woman to the health care center
- 4th Delay:** Delay in receiving quality treatment

*www.unicef.org

WHO Strategies for Safe Motherhood

For making motherhood safe WHO has recommended four strategic interventions (four pillars), which should be delivered through the primary health care on the foundation of equity for women. The four pillars are:



Reference: Mother Baby Package, WHO

ABOUT THE MANUAL

This Manual contains 12 modules, which have been developed according to the symptoms with which a woman presents herself to the health care provider. The modules are as follows:

1. General Principles of EmOC
2. Vaginal Bleeding in Early Pregnancy
3. Vaginal Bleeding in Later Pregnancy and Labour
4. Vaginal Bleeding After Child birth
5. Elevated Blood Pressure with Headache / Blurred Vision / Convulsions or Loss of Consciousness
6. Unsatisfactory Progress of Labour
7. Fever After Child Birth
8. Skills Required to Provide Normal and Emergency Obstetric Care
9. Anaesthesia and Analgesia for Emergency Obstetrics
10. Emergency Newborn Care
11. List of Essential Drugs and Equipment, and State of Readiness to Provide EmOC
12. Protocols

Module 2 – 7 comprise:

- Definitions
These include definitions of the condition and related terms for a clearer understanding.
- Causes of the Problem
 - The causes are given as a flow chart within boxes.
 - The life threatening conditions are in pink boxes.
- Assessment of the Woman's Condition.
- Identification of the Problem (Diagnosis).
- General Management.
- Specific Management. The pages describing management of life threatening conditions have a red flag.
- Skills required for Management.
 - Skills specific for the management of each identified problem are described within the module.
 - Skills, which are common for the management of more than one condition are described in a separate module on skills e.g. caesarean section.

Significance of the LINES in the Management of Obstetrical Emergencies

In the pages that describe the management of the emergencies, the text outlines ACTION. This action is interrupted by a single and / or by a double line.

THESE LINES SIGNIFY THE LEVEL OF EMERGENCY OBSTETRIC CARE AVAILABLE at a particular place, given by a particular person.

Above the single line is the OBSTETRICAL FIRST AID.

Between the single and the double line is the BASIC EmOC.

After the double line is the COMPREHENSIVE EmOC.

These levels of care, the place where it can be given and the person by whom it can be given are:

LEVEL OF CARE	PLACE	PERSON
• Obstetrical first aid	Home, BHU	Midwife/junior doctor
• Basic EmOC	RHC/THQ	Doctor with OB/GYN experience
• Comprehensive EmOC	Well equipped facility	EmOC team with OB/GYN Specialist

The LEVELS depend on TWO factors

1. The ability / competence of the service provider.
2. The work situation i.e. the resources available to the service provider to work with.

It is possible that in one situation only one level of EmOC is possible. After that the patient has to be referred to the next level of care. Therefore the LINES ALSO REPRESENT THE POINT WHERE REFERRAL TO THE NEXT LEVEL OF CARE IS REQUIRED because of the absence of one or both of the above factors.

THE LINES ARE MOVEABLE UP or DOWN and REMOVABLE e.g. If an RHC/THQ has a person trained in OB/GYN and the facilities to give Comprehensive EmOC are available then there is no need to refer the patient, so the double line is not needed. Similarly if a BHU does not have a midwife or a doctor then the Single line can be moved up to a limit what can be done at a BHU or an MCH Center.

VAGINAL BLEEDING IN EARLY PREGNANCY (ABORTION / MISCARRIAGE)

DEFINITIONS

Bleeding from the vagina in early pregnancy could be due to abortion, ectopic pregnancy or molar pregnancy.

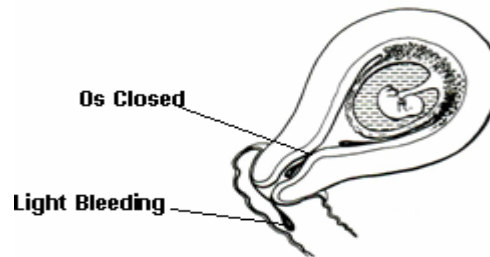
Abortion / Miscarriage

Loss of pregnancy during the first 24 weeks of pregnancy (WHO defines it as “before 22 weeks of pregnancy”).

- **Spontaneous Abortion**
Loss of pregnancy due to natural process.
- **Induced Abortion**
When the pregnancy is terminated for social or medical reasons.
- **Safe Abortion**
When a trained person terminates the pregnancy in a safe environment.
- **Unsafe Abortion**
When induced abortion is performed by either a person lacking necessary skills, or in an environment lacking minimal medical standards or both.

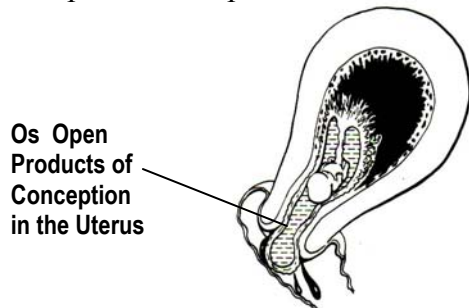
Different **stages / types** of spontaneous or induced abortion include:

- **Threatened Abortion:** There is a threat to abort, but pregnancy may continue.

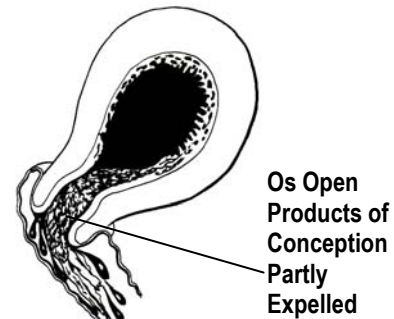


Threatened Abortion

- **Inevitable Abortion:** Pregnancy will not continue and will proceed to either incomplete or complete abortion.

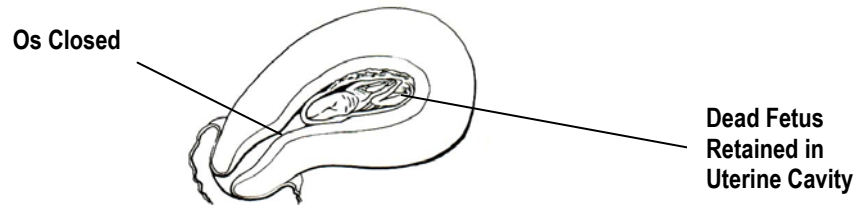


Inevitable Abortion



Incomplete Abortion

- **Incomplete Abortion:** Products of conception are partially expelled
- **Complete Abortion:** Products of conception are completely expelled.
- **Missed Abortion:** When the fetus dies in the uterus but the products of conception are not expelled spontaneously.



Missed Abortion

- **Septic Abortion**

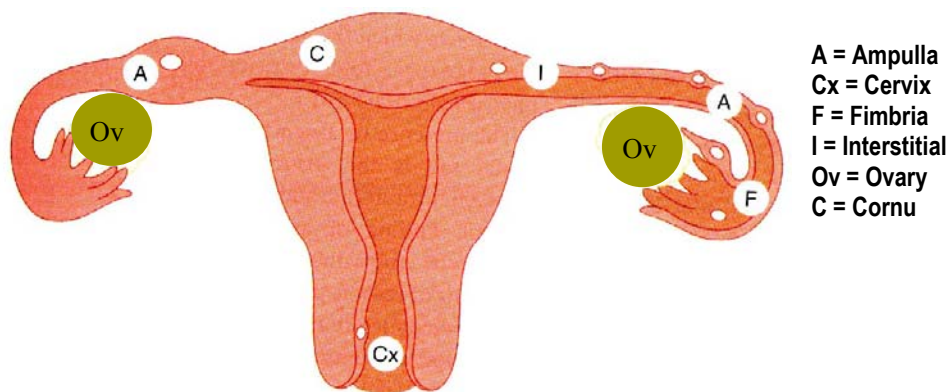
Any abortion complicated by infection. Sepsis is more likely to occur if there are retained products of conception.

- **Habitual Abortion (Recurrent Abortion)**

Three or more consecutive pregnancies ending up in spontaneous abortion.

- **Ectopic Pregnancy**

A pregnancy, which is implanted outside the uterine cavity, the most common site being the fallopian tube. Tubal pregnancy may be disturbed or undisturbed.



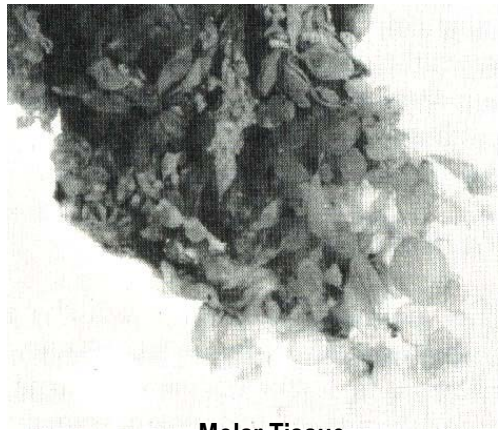
Different Possible Sites of an Ectopic Pregnancy

- **Disturbed Ectopic Pregnancy: Tubal Abortion / Ruptured Ectopic Pregnancy**

- **Tubal Abortion:** when the process of abortion starts and products of conception are expelled out of the fimbrial end of the tube into the peritoneal cavity.

- **Ruptured Ectopic Pregnancy:** Fallopian tube containing the pregnancy ruptures and may lead to heavy bleeding inside the abdomen (intra peritoneal haemorrhage).
- **Undisturbed (Unruptured) Ectopic Pregnancy:** Fallopian tube containing the pregnancy is intact. There is a great risk of rupture of the fallopian tube or tubal abortion.
- **Molar Pregnancy (Hydatidiform Mole)**

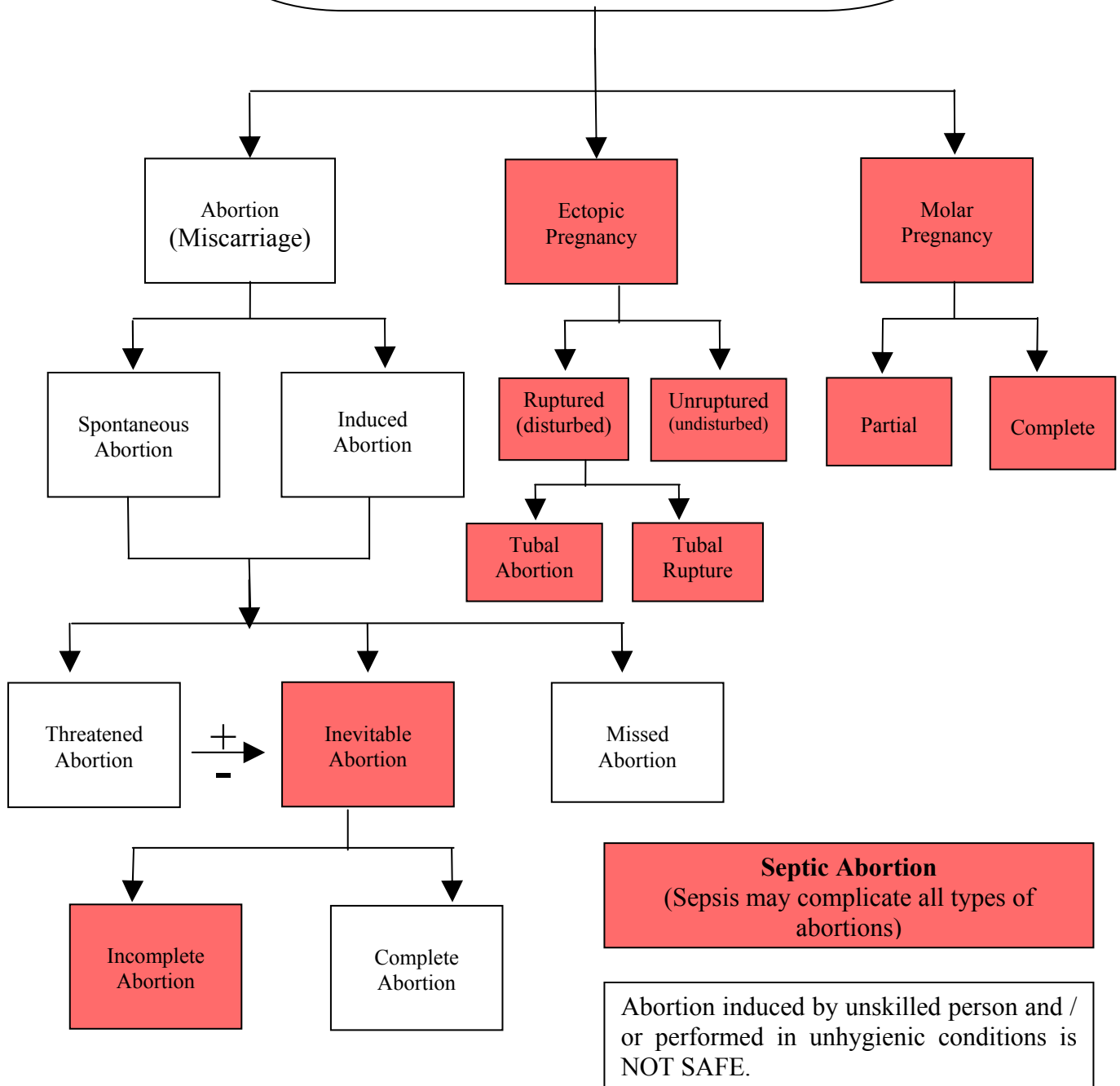
Abnormal proliferation of chorionic villi, resulting in development of molar tissue. The appearance of the products of conception is like a bunch of grapes.



Molar Tissue

- **Complete Molar Pregnancy:** When no fetus is identified along with molar tissue.
- **Partial Molar Pregnancy:** When in addition to molar tissue a fetus is also identified.

VAGINAL BLEEDING IN EARLY PREGNANCY



Pink Blocks Indicate Life-Threatening Conditions

Assessing the Patient

Guidelines for Clinical Assessment of Patients with Vaginal Bleeding in Early Pregnancy

Clinical Assessment	
History	<p>Inquire and record the following information:</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px 0;">Simultaneously provide emergency care and record history.</div> <ul style="list-style-type: none"> • Amenorrhoea (how long ago did she have her last menstrual period). • Bleeding (duration and amount). • Cramping abdominal pain (duration and severity) and / or shoulder pain. • Fever, with or without rigors. • Passage of products of conception / foetus / blood clot / grape like structures. • Foul smelling vaginal discharge / bleeding. • Fainting • If abortion was induced, by whom?
General Physical Exam	<ul style="list-style-type: none"> • Check and record vital signs (temperature, blood pressure, pulse and respiration). • Note general health of woman (malnourished, anaemic, toxic looking, dehydrated, general poor hygiene). • Examine lungs, heart, abdomen and extremities. • In abdominal examination, check: <ul style="list-style-type: none"> - If the pregnant uterus is palpable / size of the uterus. - For the presence, location and severity of tenderness. - If the abdomen is distended or rigid (tense and hard). - If there is rebound tenderness. - Bowel sounds present / absent.
Pelvic Exam	<ul style="list-style-type: none"> • Per Speculum (P / S) and Vaginal examination: <ul style="list-style-type: none"> - Note the amount / source of bleeding. - Note whether foul-smelling blood / discharge. - Check whether the cervix is open or closed to determine the type / stage of abortion. - Look for products of conception in the vaginal canal or cervical os. - Look for foreign body in the vagina. - Look for tears in the vagina or cervix in cases of induced abortion. - Estimate the size of the uterus. - Check for any other pelvic masses. - Check pelvic pain: severity, location, causes of pain (touch and pressure, movement of the cervix, continuous).
Investigations (where facilities exist)	<ul style="list-style-type: none"> • Haemoglobin, Total Leucocyte Count, Platelet Count, Random Blood Sugar. • Blood group and Rhesus (Rh) factor. • Other tests may be needed in cases with complications.

Identifying the Problem

Vaginal Bleeding in Early Pregnancy

Symptoms	Signs	Probable Diagnosis
LIFE THREATENING CONDITIONS		
Amenorrhoea and Heavy Bleeding¹ With or Without Shock		
<ul style="list-style-type: none"> • Cramping / lower abdominal pain. • No expulsion of products of conception. 	<ul style="list-style-type: none"> • Dilated cervix. • Uterus corresponds to dates. • Tender uterus. 	Inevitable Abortion
<ul style="list-style-type: none"> • Cramping / lower abdominal pain. • Partial expulsion of products of conception. 	<ul style="list-style-type: none"> • Dilated cervix. • Uterus smaller than dates. 	Incomplete Abortion
<ul style="list-style-type: none"> • Nausea / vomiting. • Cramping / lower abdominal pain. • Expulsion of products of conception, which resemble grapes. • Or there may be no expulsion of products of conception. 	<ul style="list-style-type: none"> • Dilated / closed cervix. • Uterus larger than dates. • Uterus softer than normal. • +Bilateral ovarian cysts. • Early onset pre-eclampsia. • Usually no evidence of a fetus. 	Molar Pregnancy (Aborting)
Amenorrhoea and Light to Heavy Bleeding With or Without Shock		
<ul style="list-style-type: none"> • Foul-smelling vaginal discharge / bleeding. • May or may not give h/o passing products of conception. • Lower abdominal pain. • Fever with or without rigors. • Malaise • ± h/o induced abortion. 	<ul style="list-style-type: none"> • May or may not be in shock. • Restless / anxious / toxic looking / dehydrated. • Rebound abdominal tenderness. • Tender, soft uterus. • Purulent cervical discharge. • Cervical motion tenderness. 	Septic Abortion
<ul style="list-style-type: none"> • H/O induced abortion. • Cramping / abdominal pain. • Shoulder pain. • Fever ± chills. • Nausea / vomiting. 	<ul style="list-style-type: none"> • Abdominal distension. • Rigid (tense and hard) abdomen. • Rebound tenderness. • Bowel sounds may be absent. 	Uterine, Vaginal or Bowel Injuries
Amenorrhoea and Light Bleeding² With or Without shock		
<ul style="list-style-type: none"> • Abdominal / shoulder pain. • Fainting 	<ul style="list-style-type: none"> • Shock • Pallor • Abdominal distension. • Free fluid in abdomen. • Rebound tenderness. • Uterus slightly larger and softer than normal. • Closed cervix. • Cervical motion tenderness. • Tender adnexal mass ± 	Ruptured Ectopic Pregnancy

Identifying the Problem

Vaginal Bleeding in Early Pregnancy

Symptoms	Signs	Probable Diagnosis
<ul style="list-style-type: none"> • May or may not have cramping / lower abdominal pain. • H/O fainting attacks. 	<ul style="list-style-type: none"> • Rebound tenderness± • Uterus slightly larger and softer than normal. • Closed cervix. • Cervical motion tenderness. • Tender adnexal mass. 	Unruptured Ectopic Pregnancy *
CONDITIONS WHERE THERE IS NO IMMEDIATE RISK TO LIFE		
Amenorrhoea and Light Bleeding		
<ul style="list-style-type: none"> • May or may not have cramping / lower abdominal pain. 	<ul style="list-style-type: none"> • Uterus corresponds to dates. • Uterus softer than normal. • Closed cervix. 	Threatened Abortion
<ul style="list-style-type: none"> • Light cramping / lower abdominal pain. • History of expulsion of products of conception. 	<ul style="list-style-type: none"> • Uterus smaller than dates. • Uterus softer than normal. • Closed cervix. 	Complete Abortion
<ul style="list-style-type: none"> • Little or no cramping. • No expulsion of products of conception. 	<ul style="list-style-type: none"> • Uterus smaller than dates. • Uterus softer than normal. • Closed cervix. 	Missed Abortion

Heavy Bleeding¹: Blood seen to be flowing actively out of the vagina resulting in complete soakage of the vulval pad within minutes.

Light Bleeding²: Superficial staining of the vulval pad even after several hours of use.

* In case of tender adnexal mass, examine gently because if it is an unruptured ectopic pregnancy, it can rupture with rough handling.

GENERAL MANAGEMENT

- If shock is present or anticipated, immediately begin treatment (page 22). Even if signs of shock are not present, keep shock in mind as you evaluate the woman further, because her condition may worsen rapidly.
 - Assess the amount of blood loss.
 - If the woman is in shock without obvious heavy bleeding consider ectopic pregnancy.
 - If bleeding heavily or in cases of suspected ectopic pregnancy, insert two large bore I/V cannulas (16 gauge or the largest available), at different sites.
 - From one of the cannula, first collect blood for estimation of Haemoglobin (Hb), and blood Grouping and cross matching.
 - Infuse Normal Saline or Ringer's Lactate solution. Infuse rapidly if in Shock.
 - If in pain, give Pethidine, 50-100 mg, I/M **OR** Nalbuphine Hydrochloride (Nubain), 10-20 mg, I/M **OR** Diclofenac, 75 mg, I/M **OR** Diclofenac, 100 mg, rectal suppository.
 - Examine to determine the type of Abortion (Table on page 59) & manage accordingly.
 - Exclude the presence of complications.
 - Perform bedside clotting test (page 23) in cases with suspicion of coagulopathy and manage as on page 102.
 - If clinically indicated & facilities are available, perform ultrasound scan to confirm diagnosis.
-
- Arrange 2-4 units of blood, if bleeding heavily.
 - Transfuse blood if indicated. In emergencies and life saving situations, consider transfusing uncross matched O negative blood or ABO group specific uncross matched blood (page 14).

If the woman is stable, not bleeding heavily and there are no life threatening complications, oxygen and I/V fluids are **not** required.

- If possible, check woman's blood group to determine Rhesus (Rh) status in all cases of abortion. If she is Rh – (negative) and pregnancy is less than 20 weeks, give 250 i.u. of anti D immunoglobulins, I/M, within 72 hours of abortion. (After 20 weeks, give 500 i.u). This will prevent formation of Rh antibodies, which can have harmful effects on subsequent babies.
- Arrange follow up (Annexure-1, page 86).
- If appropriate, advise regarding family planning (page 48), including emergency contraception (page 49).

SPECIFIC MANAGEMENT

INEVITABLE ABORTION

Symptoms

- History of amenorrhoea.
- Usually heavy vaginal bleeding.
- Cramping / lower abdominal pain.
- No expulsion of products of conception.

Signs

- Shock may or may not be present / pallor.
- Heavy bleeding.
- Dilated cervix.
- Uterus corresponds to dates.
- Tender uterus.

Investigations (Where Possible)

- Haemoglobin.
- Blood group and Rhesus (Rh) factor.

Management

If pregnancy is **less than 12–14 weeks** arrange for evacuation of uterus. Meanwhile:

- Give Ergometrine, 0.2 mg, I/M **OR** Ergometrine, 0.2 mg + Syntocinon, 5 units, (Syntometrine), I/M.
- If bleeding continues start Syntocinon, 40 units added to 1 litre of Normal Saline or Ringer's Lactate, I/V infusion at 40 drops/min **or** give Misoprostol (available as Cytotec), 400 mcg (4 tabs of 100 mcg or 2 tabs of 200 mcg each), orally / rectally. Repeat once in 4 hours if needed.
- If products of conception (POC) are seen or felt in the vagina or cervix, remove it with fingers or sponge forceps.

-
- Perform evacuation of uterus (page 76 & 80).
 - If facilities to perform evacuation of uterus do not exist, transfer to a facility providing comprehensive EmOC.

If pregnancy is **more than 12–14 weeks**

- Give Ergometrine, 0.2 mg, I/M **OR** Ergometrine, 0.2 mg + Syntocinon, 5 units, (Syntometrine), I/M.
- Await expulsion of products of conception. To help expulsion of products of conception, start Syntocinon

infusion as described above **or** give Misoprostol, 200 mcg (2 tabs of 100 mcg each or 1 tablet of 200 mcg), orally / rectally (repeat in 4-6 hours if needed to a maximum of 800mcg).

- If needed, evacuate the uterus to remove any remaining products of conception.

SPECIFIC MANAGEMENT

INCOMPLETE ABORTION

Symptoms

- History of amenorrhoea.
- Usually heavy vaginal bleeding.
- Cramping / lower abdominal pain.
- Partial expulsion of products of conception.

Signs

- Shock may or may not be present / pallor.
- Heavy vaginal bleeding.
- Dilated cervix.
- Uterus smaller than dates.

Investigations (Where Possible)

- Haemoglobin.
- Blood group and Rhesus (Rh) factor.

Management

In addition to general measures assess vaginal bleeding and arrange to evacuate the uterus.

- Give Ergometrine, 0.2 mg, I/M **OR** Ergometrine, 0.2 mg + Syntocinon, 5 units, (Syntometrine), I/M.
- If bleeding is heavy, start Syntocinon infusion (Add 40 units of Syntocinon to a litre of Normal Saline or Ringer's Lactate and start at 40 drops/min) **or** give Misoprostol, 400 mcg (4 tabs of 100mcg each or 2 tabs of 200mcg each), (available as Cytotec), orally / rectally. Repeat once in 4 hours if needed.
- If products of conception are seen or felt in vagina or cervix, remove it with fingers or sponge forceps.

-
- Evacuate the uterus to remove products of conception, preferably by manual vacuum aspiration (page 76) or by sponge forceps and if necessary curettage (page 80).

SPECIFIC MANAGEMENT

SEPTIC ABORTION

Symptoms

- Amenorrhoea / \pm h/o induced abortion.
- Foul-smelling vaginal discharge / bleeding.
- Fever with or without rigors.
- Lower abdominal pain.
- May or may not give h/o passing products of conception.
- Malaise

Signs

- Shock may or may not be present.
- Restless / anxious / toxic looking / dehydrated.
- Tender / rigid abdomen.
- Rebound abdominal tenderness.
- Tender, soft uterus.
- Purulent cervical discharge / os may be open.
- Tenderness in the fornices and on moving the cervix.

Investigations (Where Possible)

- Haemoglobin, Total Leucocyte Count, Platelet Count, Random Blood Sugar.
- Blood group and Rhesus (Rh) factor.
- Pelvic and Abdominal Ultrasound.
- Culture and sensitivity of High Vaginal Swab (HVS) / Cervical Swab / Urine.
- In cases of severe infection, blood should also be sent for culture and sensitivity.

Management

- Give treatment of shock if present or anticipated.
- Simultaneously obtain relevant history specially history of induced abortion and by whom.
- If bleeding is heavy, give Ergometrine, 0.2 mg, I/M **OR** Ergometrine, 0.2 mg + Syntocinon, 5 units, (Syntometrine), I/M and start Syntocinon infusion (Add 40 units of Syntocinon to a litre of Normal Saline or Ringer's Lactate and start at 40 drops/min).

-
- Look for evidence of retained products of conception (clinical / ultrasound). Remove if seen or felt in the vagina or cervical os.

- Look for the presence of foreign body in the vagina e.g. herbs, local medications and caustic substances, remove the foreign body and clean the vagina with antiseptics, like Chlorhexidine solution.
- Look for evidence of injury to genital tract, bowels, urinary bladder etc.

In cases of mild infection, prescribe oral antibiotics for 5-7 days:

- Co-Amoxiclav, (Augmentin), 375 mg, every 8 hours

PLUS

- Metronidazole, 400 mg, every 8 hours

- If there is evidence of severe infection, start I/V antibiotics such as:

- Ampicillin, 1g, I/V, every 6 hours

PLUS

- Gentamycin, 80 mg, I/V, every 8 hours

PLUS

- Metronidazole, 500 mg, I/V, every 8 hours

Continue I/V antibiotics till fever free for 48 hours, and then continue oral antibiotics for the next 5-7 days.

- If there is a possibility that the woman was exposed to tetanus, and there is uncertain history of vaccination give Tetanus Toxoid (TT), 0.5 ml, I/M **and** Anti tetanus serum, 1500 units, I/M. (Repeat TT after 4 weeks for future protection).
- Perform evacuation of uterus after stabilizing the patient and giving I/V antibiotics (page 76 & 80).
- Repair any cervical or vaginal tears (page 265 & 266).
- In cases with suspicion of Gas gangrene, refer to a tertiary health facility.

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-
- If there is evidence of injury to the uterus, urinary bladder or bowels, laparotomy should be done in the health facility, where the help of a surgeon, if needed, is available to deal

with injuries of the bowels, bladder etc. Suction evacuation of the uterus should be done at the same time.

- If the couple's family is complete, discuss and perform tubal ligation. (page 262), at the time of laparotomy.
- If uterus is necrotic or beyond repair perform subtotal / total hysterectomy (page 276). Conserve the ovaries if healthy.

If Unsafe Abortion is suspected, examine for signs of infection or uterine, vaginal or bowel injury.
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SPECIFIC MANAGEMENT

THREATENED ABORTION

Symptoms

- History of amenorrhoea.
- \pm Cramping / lower abdominal pain / backache.
- Slight vaginal bleeding.

Signs

- Uterus corresponds to dates.
- Uterus softer than normal.
- Closed cervix.

Investigations (Where Possible)

- Haemoglobin
- Blood Group and Rhesus (Rh) factor.
- Confirm diagnosis by Ultrasound scan, if available.

Management

- Advise the woman to:
 - Avoid strenuous activity, but bed rest is not necessary.
 - Avoid sexual intercourse.
- If bleeding stops, advise follow up in antenatal clinic.
- Prescribe Folic Acid tablets, 5 mg, daily, by mouth (available as 5 mg tablets, although 400 mcg daily is recommended).
- Advise to have a balanced diet (milk, lassi, meat, eggs, dal, fresh vegetables, fruits and bread / rice etc).
- If bleeding recurs, reassess the situation.
- If bleeding persists, assess for fetal viability or ectopic pregnancy (ultrasound). Persistent bleeding, particularly in the presence of a uterus larger than expected, may indicate multiple pregnancy (twins, etc.) or molar pregnancy.

Do not give medications such as hormones (e.g. Oestrogens or Progestins) or tocolytic agents (e.g. Salbutamol or Indomethacin), as they will not prevent miscarriage.

SPECIFIC MANAGEMENT

COMPLETE ABORTION

- Evacuation of the uterus is not necessary.
- If bleeding becomes heavy, reassess to check if there are products of conception still present in the uterine cavity and then manage as Incomplete Abortion (page 64).

MISSED ABORTION

- Confirm diagnosis by history & ultrasound scan.
- Await spontaneous expulsion of products of conception.

-
- If products of conception are not expelled by 4 weeks of diagnosis, plan evacuation of uterus.
 - Try medical evacuation of products of conception by using Misoprostol, (available as Cytotec), 200 mcg (1 tablet of 200 mcg or 2 tabs of 100 mcg each), vaginally. Repeat in 4 – 6 hours, to a maximum of 800mcg. This usually results in complete evacuation of uterine cavity.
 - If some products of conception remain in the uterine cavity evacuate the uterus by suction evacuation or curettage (page 76 & 80).

Note: Tab. Misoprostol also helps to soften the cervix, so that if there is a need to dilate the cervix during evacuation of the uterus, the risk of cervical tears and perforation of the uterus is minimized.

Disseminated Intravascular Coagulation (DIC) is rare, although listed as a possible complication of missed abortion.

HABITUAL ABORTION

Needs to be dealt with by the specialist and requires expensive diagnostic tests. Such patients should be referred to experts for judicious investigation and treatment and proper management in next pregnancy.

SPECIFIC MANAGEMENT

ECTOPIC PREGNANCY (RUPTURED / UNRUPTURED)

Symptoms

- History of amenorrhoea.
- Slight vaginal bleeding.
- Abdominal / shoulder pain.
- ±Fainting / syncope.

Signs

- ±Shock
- Pallor
- ±Abdominal distension / Free fluid in abdomen.
- Rebound abdominal tenderness.
- Uterus slightly larger and softer than normal.
- Closed cervix.
- Cervical motion tenderness.
- ±Tender adnexal mass (examine gently as unruptured ectopic pregnancy might rupture).

Investigations (Where Possible)

- Haemoglobin, Random Blood Sugar.
- Blood group and Rhesus (Rh) factor.
- Serum B- Human Chorionic Gonadotrophin (B-HCG) / Urine pregnancy test.
- Pelvic and Abdominal Ultrasound.
- Culdocentesis

Management

Immediate Management:

- Cross-match blood and arrange for immediate laparotomy.

Do not wait for blood before performing surgery.

- At surgery, inspect both ovaries and fallopian tubes:
 - If there is **extensive damage to the tubes**, perform **salpingectomy** (the bleeding tube and the products of conception are excised together). This is the treatment of choice in most cases (page 83).
 - If there is **little tubal damage**, perform **salpingostomy**, the products of conception can be removed and the tube conserved (page 84). This should be done only when

the conservation of fertility is very important to the woman, as the risk of another ectopic pregnancy is high.

Normal ovaries should not be removed.

Subsequent Management and Follow Up:

- Prior to discharge counsel the woman about:
 - Prognosis for fertility.
 - Increased risk of future ectopic pregnancy.
 - Family planning (page 48 & 49).
- Correct anaemia with Ferrous Sulfate **or** Ferrous Fumerate, 60 mg, by mouth, daily, for 6 months.

Schedule a follow-up visit at 4 weeks.

Ectopic pregnancy is a great deceiver. In any woman of reproductive age with unusual abdominal complaints, “think ectopic”.

SPECIFIC MANAGEMENT

MOLAR PREGNANCY

Symptoms

- Amenorrhoea
- Light or heavy vaginal bleeding.
- Cramping / lower abdominal pain.
- Expulsion of products of conception which resemble grapes / Or there may be no expulsion of products of conception.
- Nausea / vomiting.

Signs

- Uterus larger than dates.
- Uterus softer than normal.
- Dilated / closed cervix.
- May have bilateral ovarian cysts.
- Early onset of pre-eclampsia.
- Usually no evidence of a fetus.

Investigations (Where Possible)

- Haemoglobin, Total Leucocyte Count, Platelet Count, Random Blood Sugar.
- Blood group and Rhesus (Rh) factor.
- Quantitative urine pregnancy test / Serum B-Human Chorionic Gonadotrophin (B-HCG).
- Pelvic Ultrasound Scan.

Management

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-
- If the diagnosis of molar pregnancy is certain, evacuate the uterus:
 - If cervical dilatation is needed, use a paracervical block (page 74).
 - Use vacuum aspiration (page 76). Manual vacuum aspiration is safer and associated with less blood loss. More than one syringe will be required to aspirate the contents quickly. Great care should be taken to prevent perforation of uterus, if aspiration is done with a metal cannula and electric suction.
 - Infuse Oxytocin, 20 units in 1litre I/V fluids (Normal Saline or Ringer's Lactate), at 60 drops per minute, to prevent haemorrhage, once evacuation is under way.

Subsequent Management and Follow Up:

- Recommend a hormonal family planning method for at least 1 year, to prevent pregnancy. Tubal ligation may be offered, if the woman has completed her family.

Follow up every 8 weeks for at least 1 year with urine pregnancy tests / Serum B-HCG because of the risk of persistent trophoblastic disease or choriocarcinoma. If the urine pregnancy test is not negative, or serum B-HCG is not within normal limits after 8 weeks, or becomes positive again within the first year, refer the woman to a tertiary care centre for further follow-up and management.

SKILLS REQUIRED TO MANAGE VAGINAL BLEEDING IN EARLY PREGNANCY

- Paracervical Block (page 74).
 - Manual Vacuum Aspiration (page 76).
 - Dilatation and Curettage (page 80).
 - Repair of Cervical and Vaginal Tears (page 265 & 266).
-
-
- Culdocentesis (page 281).
 - Laparotomy to perform:
 - Repair of Injury to the Uterus, Bowels, Urinary Bladder, etc.
 - Salpingectomy (page 83).
 - Salpingostomy (page 84).
 - Tubal Ligation (page 262).
 - Hysterectomy (Total / Subtotal) (page 276).

PARACERVICAL BLOCK

Indications and Precautions for Paracervical Block

Indications	Precautions
<ul style="list-style-type: none">• Dilatation and Curettage• Manual Vacuum Aspiration	<ul style="list-style-type: none">• Make sure there are no known allergies to Lignocaine or related drugs.• Do not inject into a vessel.• Maternal complications are rare but may include haematoma.

- Review general care principles (page 6).
- Prepare 20 ml 0.5% Lignocaine solution without Adrenaline (Box 1, page 28).
- Use a 3.5 cm, 22-gauge or 25-gauge needle to inject the Lignocaine solution.
- **If using a tenaculum to grasp the cervix**, first inject 1 ml of 0.5% Lignocaine solution into the anterior or posterior lip of the cervix, which has been exposed by the speculum (the 10 o'clock, 12 o'clock or 6 o'clock position is usually used). This will prevent pain on grasping the cervix.

Note: With incomplete abortion, a ring (sponge) forceps is preferable, as it is less likely than the tenaculum to tear the cervix with traction and does not require the use of Lignocaine for placement.



Paracervical Block

- With the tenaculum or ring forceps on the cervix vertically (one tooth in the external os, the other on the face of the cervix), use slight traction and movement, to help **identify the area between the smooth cervical epithelium and the vaginal tissue**. This is the site for insertion of the needle around the cervix.

- Insert the needle just under the epithelium.
- **A tip that usually works:** Place the tip of the needle just over the site selected for insertion and ask the woman to cough. This will "pop" the needle just under the surface of the tissue.
- Aspirate (pull back on the plunger) to be sure that no vessel has been penetrated. **If blood is returned in the syringe with aspiration**, remove the needle. Recheck the position carefully and try again. Never inject if blood is aspirated. **The woman can suffer convulsions and death if Lignocaine gets injected in a vein.**
- Inject 2 ml of Lignocaine solution just under the epithelium, not deeper than 3 mm, at 4 sites – 3, 5, 7 and 9 o'clock. Optional injection sites are at 2 and 10 o'clock. When correctly placed, a swelling and blanching of the tissue can be noted.
- At the conclusion of the set of injections, wait 2 minutes and then pinch the cervix with forceps. If the woman feels the pinch, wait 2 more minutes and then retest.

Anaesthetize early to provide sufficient time for effect.

MANUAL VACUUM ASPIRATION (MVA)

- Review indications (Inevitable Abortion before 12-14 weeks, Incomplete Abortion, Molar Pregnancy when uterine size is not more than 16 weeks of pregnancy, or Delayed PPH due to retained placental fragments).
- Review general care principles (page 6).
- Provide emotional support and encouragement to the woman.
- Give Paracetamol, 30 minutes before the procedure. Rarely, a paracervical block may be needed (page 74).
- Prepare the MVA syringe:
 - Assemble the syringe.
 - Close the pinch valve.
 - Pull back on the plunger until the plunger arms lock.
- Even if bleeding is slight, give Syntocinon, 10 units, I/M **or** Ergometrine, 0.2 mg, I/M, before the procedure, to make the myometrium firmer and reduce the risk of perforation.
- Perform a bimanual pelvic examination, to assess the size and position of the uterus and the condition of the fornices.
- Apply antiseptic solution to the vagina and cervix (especially the os) (page 9).
- Check the cervix, for tears or protruding products of conception. If **products of conception are present in the vagina or cervix**, remove them using ring / sponge forceps.
- **If using a tenaculum to grasp the cervix**, first inject 1 ml of 0.5% Lignocaine solution into the anterior or posterior lip of the cervix, which has been exposed by the speculum (the 10 o'clock or 12 o'clock position is usually used) (page 74 & 75).
- Gently grasp the anterior lip of the cervix with a vulsellum or single-toothed tenaculum.

Note: With incomplete abortion, a ring / sponge forceps is preferable as it is less likely than the tenaculum to tear the cervix with traction and does not require the use of Lignocaine for placement.
- Dilatation is needed only in cases of missed abortion or when products of conception have remained in the uterus for several days:

- Gently introduce the widest gauge suction cannula.
 - Use graduated dilators only if the cannula will not pass. Begin with the smallest dilator and end with the largest dilator that ensures adequate dilatation (usually 8-10 mm) (Fig. 2, page 81).
 - Take care not to tear the cervix or to create a false opening.
- While gently applying traction to the cervix, insert the cannula through the cervix into the uterine cavity just past the internal os (Fig. 1, below). Rotating the cannula while gently applying pressure often helps the tip of the cannula to pass through the cervical canal.

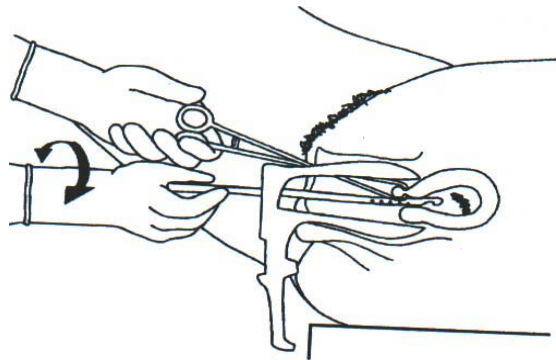


Fig. 1: Inserting the Cannula

- Slowly push the cannula into the uterine cavity until it touches the fundus, but not more than 10 cm. Measure the depth of the uterus by markings visible on the cannula and then withdraw the cannula slightly.
- Attach the prepared MVA syringe to the cannula by holding the vulsellum (or tenaculum) and the end of the cannula in one hand and the syringe in the other.
- Release the pinch valve(s) on the syringe to generate vacuum and hence ensure suction of contents through the cannula from the uterine cavity.
- Evacuate remaining contents by gently rotating the syringe from side to side (10 to 12 o'clock) and then moving the cannula gently and slowly back and forth within the uterine cavity (Fig. 2, below).

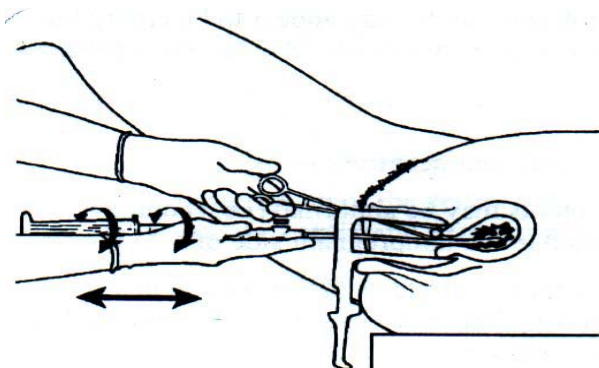


Fig. 2: Evacuating the Contents of the Uterus

Have two to three syringes cocked and ready for use during the evacuation. The uterine contents are copious and it is important to evacuate them rapidly.

Note: To avoid losing the vacuum, do not withdraw the cannula opening past the cervical os. If the **vacuum is lost** or if the **syringe is more than half full**, empty it and then re-establish the vacuum.

Note: Avoid grasping the syringe by the plunger arms while the vacuum is established and the cannula is in the uterus. If the plunger arms become unlocked, the plunger may accidentally slip back into the syringe, pushing material back into the uterus.

- Check for signs of completion:
 - Red or pink foam, but no more tissue is seen in the cannula.
 - A grating sensation is felt as the cannula passes over the surface of the evacuated uterus.
 - The uterus contracts around (grips) the cannula.

- Withdraw the cannula. Detach the syringe and place the cannula in decontamination solution.
- With the valve open, empty the contents of the MVA syringe into a strainer by pushing on the plunger.

Note: Place the empty syringe on a disinfected tray or container until you are certain the procedure is complete.

- Quickly inspect the tissue removed from the uterus:
 - For quantity and presence of products of conception.
 - To assure complete evacuation.
 - To check for a molar pregnancy (rare).
- Perform a bimanual examination to check the size and firmness of the uterus.
- In case of suspicion of molar tissue, specimens should be sent to the laboratory for histopathological examination (if resources allow, all tissues obtained should be sent for histopathology).
- **If no products of conception** are seen, consider the following:
 - The uterine cavity may appear to be empty but may not have been emptied completely. Repeat the evacuation.

- Ectopic Pregnancy

- The vaginal bleeding may not have been due to an incomplete abortion (e.g. breakthrough bleeding, as may be seen with hormonal contraceptives or uterine fibroids).
- Rarely the uterus may be abnormal (i.e. cannula may have been inserted in the non-pregnant side of a double uterus).
- If the **uterus is still soft and not smaller** or if there is **persistent, brisk bleeding**, gently insert a speculum into the vagina, examine for bleeding and repeat the evacuation.

Note: Absence of products of conception in a woman with symptoms of pregnancy raises the strong possibility of ectopic pregnancy (page 61).

Post-Procedure Care

- Watch for vaginal bleeding.
- Give Paracetamol, 500 mg, by mouth, 4 to 6 hourly as needed.
- Encourage the woman to eat, drink and walk about as she wishes.
- Offer other health services, if possible, including tetanus prophylaxis, counseling or a family planning method (page 48 & 49).
- If no complications occur, the woman can go home in 2 – 4 hours.
- Upon discharge, advise the woman to watch for symptoms and signs requiring immediate attention:
 - Prolonged cramping (more than a few days).
 - Bleeding more than normal menstrual bleeding.
 - Prolonged bleeding (more than 2 weeks).
 - Severe or increased pain.
 - Fever, chills or malaise.
 - Fainting
- Advise the couple to:
 - Avoid pregnancy for at least **3** months and offer a suitable method of contraception if **desired** and available, otherwise refer to source of family planning services.
 - Avoid sexual intercourse **until the bleeding has stopped**.

DILATATION AND CURETTAGE

The preferred method of evacuation of the uterus is by manual vacuum aspiration (page 76). **Dilatation and curettage should be used only if manual vacuum aspiration is not available.**

- Review indications (page 76).
- Review general care principles (page 6).
- Provide emotional support and encouragement.
- Give Pethidine, 50-100 mg, I/M or I/V **OR** Nalbuphine Hydrochloride (Nubain), 10 mg, I/V, before the procedure. If necessary, use a paracervical block (page 74).
- Administer Syntocinon, 10 units, I/M **or** Ergometrine, 0.2 mg, I/M, before the procedure, to make the myometrium firmer and reduce the risk of perforation.
- Perform a bimanual pelvic examination to assess the size and position of the uterus and the condition of the fornices.
- Apply antiseptic solution to the vagina and cervix (especially the os) (page 9).
- With speculum check the cervix for tears or protruding products of conception. If **products of conception are present in the vagina or cervix**, remove them using ring / sponge forceps.
- Gently grasp the anterior lip of the cervix with a vulsellum or single-toothed tenaculum or ring / sponge holding forceps (Fig. 1, below).

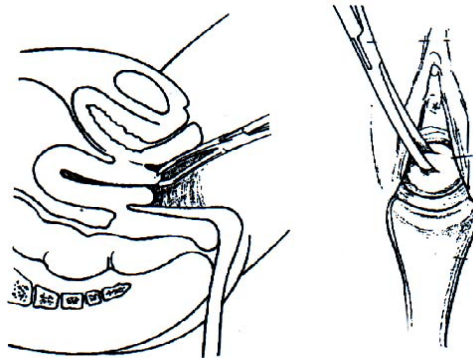


Fig. 1: Inserting a Retractor and Holding the Anterior Lip of Cervix

Note: With incomplete abortion, a ring / sponge forceps is preferable, as it is less likely than the tenaculum to tear the cervix with traction and does not require the use of Lignocaine for application of ring / sponge forceps, to grasp the cervix.

- **If using a tenaculum to grasp the cervix**, first inject 1 ml of 0.5% Lignocaine solution into the anterior lip of the cervix, which has been exposed by the speculum (the 10 o'clock or 12 o'clock position is usually used).
- Dilatation is needed only in cases of missed abortion or when some retained products of conception have remained in the uterus for several days:
 - Gently introduce the widest gauge cannula or curette.
 - Use graduated dilators only if the cannula or curette will not pass. Begin with the smallest dilator and end with the largest dilator that ensures adequate dilatation (usually 8-10 mm) (Fig. 2, below).

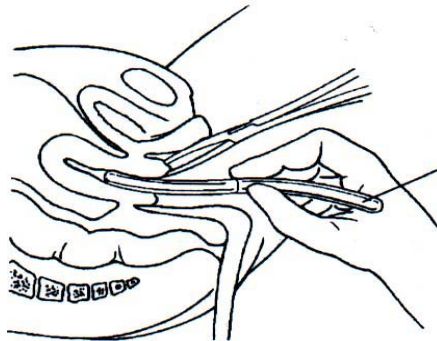


Fig. 2: Dilating the Cervix

- Take care not to tear the cervix or to create a false opening.

The uterus is very soft in pregnancy and can be easily injured during the dilatation of cervix.

- Evacuate the contents of the uterus with ring / sponge forceps or a large curette. Gently curette the walls of the uterus until a grating sensation is felt (Fig. 3, below).

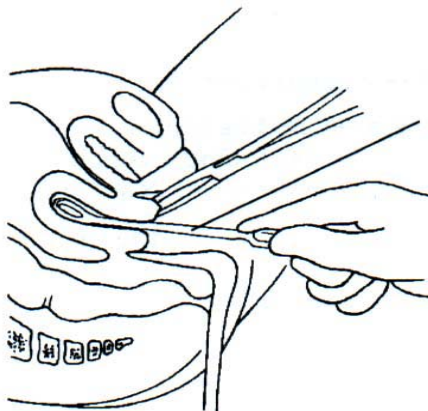


Fig. 3: Curetting the Uterus

- Perform a bimanual pelvic examination to check the size and firmness of the uterus.
- Examine the evacuated material and send it for histopathological examination, if required.

Post-Procedure Care

- **Watch for vaginal bleeding.**
- Give Paracetamol, 500 mg, by mouth, 4 – 6 hourly as needed.
- Encourage the woman to eat, drink and walk about as she wishes.
- Offer other health services, if possible, including tetanus prophylaxis, counseling or a family planning method (page 48 & 49).
- If no complications occur, the woman can go home in 2 – 4 hours.
- Upon discharge, advise the woman to watch for symptoms and signs requiring immediate attention:
 - Prolonged cramping (more than a few days).
 - Bleeding more than normal menstrual bleeding.
 - Prolonged bleeding (more than 2 weeks).
 - Severe or increased pain.
 - Fever, chills or malaise.
 - Fainting
- Advise the couple to:
 - Avoid pregnancy for at least 6 months and offer a suitable method of contraception if available, otherwise refer to source of family planning services.
 - Avoid sexual intercourse for at least 4 weeks.

SALPINGECTOMY FOR ECTOPIC PREGNANCY

Review for indications.

- Review surgical care principles (page 35) and start an I/V infusion (page 9).
- Give prophylactic antibiotics (page 44) and continue for at least 5 days.
 - Ampicillin, 1g, I/V, every 6 hours
- OR**
- Cefazolin, 1 g, I/V, every 6 hours
- **Open the abdomen** (page 254).
- Do not waste time aspirating blood and blood clots.
- Immediately put in a hand, identify and bring to view the fallopian tube with the ectopic gestation and its ovary.
- Apply traction forceps (e.g. Babcock), to increase exposure and clamp the mesosalpinx to stop haemorrhage.

- Apply gauze moistened with warm saline to pack off the bowel and omentum from the operative field.

- Divide the mesosalpinx using a series of clamps (Fig. 1, below). Apply each clamp close to the tubes to preserve blood supply to the ovaries.

**Fallopian Tube
Distended with
Ectopic
Pregnancy**

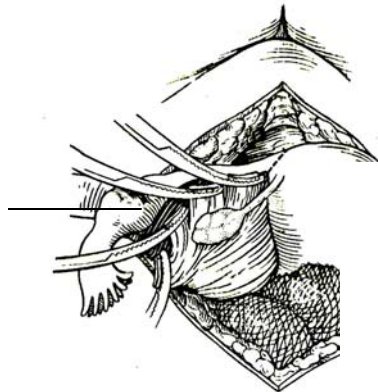


Fig. 1: Clamping and Dividing Mesosalpinx

- Transfix and tie the divided mesosalpinx with 2-0 chromic catgut (or polyglycolic) suture before releasing the clamps.
- Place a proximal suture around the tube at its isthmic end and excise the tube.
- Aspirate blood from the lower abdomen and remove blood clots.

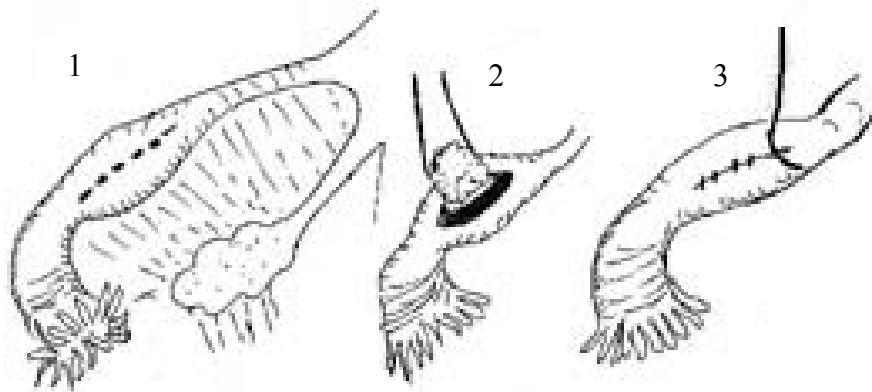
Normal ovaries should not be removed.

- Close the abdomen (page 258).

SALPINGOSTOMY

Rarely, when there is little damage to the tube, the gestational sac can be removed and the tube conserved. The tube should be saved, only in cases, where the reasons to have another child are very strong. It should be explained to the couple, that she is at risk for another ectopic pregnancy.

- Open the abdomen and expose the appropriate ovary and fallopian tube (page 83).
- Apply traction forceps (e.g. Babcock) on either side of the unruptured tubal pregnancy and lift to view.
- Use a scalpel to make a linear incision through the serosa on the side opposite to the mesentery and along the axis of the tube, but do not cut the gestational sac.
- Use the scalpel handle to slide the gestational sac out of the tube.



1. Incision on the tube
2. Removing the pregnancy sac
3. Closing the incision

- Ligate bleeding points.
- If there is no bleeding from the incision site, closing the incision on the fallopian tube is not required.
- If there is bleeding from the incision site on the fallopian tube, close the incision with interrupted sutures.
- Return the ovary and fallopian tube to the pelvic cavity.

Do not remove normal ovaries.

- Close the abdomen (page 258).

Post-Procedure Care

- Review postoperative care principles (page 40).

If there **are signs of infection** or the woman **currently has fever**, give a combination of antibiotics for at least 5 days (page 44), or until she is fever-free for 48 hours:

- Ampicillin, 1 g, I/V, every 6 hours

PLUS

- Gentamicin, 80 mg, I/V, every 8 hours

PLUS

- Metronidazole, 500 mg, I/V, every 8 hours.

- Give appropriate analgesic drugs (page 34).
- After a **salpingostomy**, inform the woman about the risk of another ectopic pregnancy and advise / offer family planning services (page 48 & 49).

Annexure

FOLLOW UP OF WOMEN WHO HAVE HAD AN ABORTION

Before discharge:

- Tell a woman who has had a spontaneous abortion that spontaneous abortion is common and occurs in at least 15% of clinically recognized pregnancies.
- Reassure the woman that the chances for a subsequent successful pregnancy are good unless:
 - A cause of the abortion is identified which may have an adverse effect on future pregnancies (this is rare).
 - There has been sepsis (which may block the tubes resulting in infertility).
- Advise couple to:
 - Avoid pregnancy for at least 6 months and offer a suitable method of contraception if available, otherwise refer to source of family planning services.
 - Avoid sexual intercourse for at least 4 weeks.

GENERAL PRINCIPLES OF EMERGENCY OBSTETRIC CARE

Emergency

An emergency by definition is an event, which occurs suddenly and unexpectedly e.g. post partum haemorrhage after a normal pregnancy and normal birth of the baby.

Emergencies can occur due to neglect and / or mismanagement e.g. convulsions in a woman due to pregnancy induced hypertension, which could have been prevented with regular monitoring and treatment during pregnancy.

Nevertheless, we know that in spite of antenatal care, obstetrical emergencies do occur.

Not all obstetrical emergencies can be prevented or predicted but they can be treated, provided skilled personnel and proper facilities are available.

All the individuals and institutions involved in providing care to the pregnant woman through out the maternity cycle must remain prepared at all times to deal with obstetrical emergencies.

Responding to an Obstetrical Emergency

Responding to an emergency requires that:

- Every health care provider at the **community** level knows her / his roles and its boundary lines in providing maternity care. This includes TBA, auxiliary midwife, professional midwife, doctors with limited midwifery skills and Obstetricians.
- Obstetrical first aid is provided at the community level before referring the women to a higher level facility.
- At the **primary health care** units (MCH Centre, BHU and RHC) staff should provide only obstetrical first aid and refer immediately, unless qualified personnel and properly equipped facilities are available.
- At the **secondary and tertiary health institution** every member of the clinical EmOC team knows his / her role and responsibility regarding management of each emergency. This includes:
 - Clinical competence in diagnosing and treating.
 - Knowledge of drugs, their use and side effects.
 - Skills in using emergency equipment.

Remember TIME is of utmost importance in responding to an emergency.

Responding to an Emergency

Responding to an emergency promptly and effectively requires that members of the clinical team know their roles and how they as a team should function to respond most effectively to emergencies.

The ability of a facility to deal with emergencies should be assessed and reinforced by frequent practice emergency drills.

Initial **steps** in dealing with an emergency:

- **Stay calm.** Think logically and focus on the needs of the woman.
- Do not leave the woman unattended.
- Take charge. Avoid confusion by having one person in charge.
- **CALL FOR HELP.** Ask one person to get help and another person to gather emergency equipment and supplies (e.g. oxygen cylinder, emergency kit).
- Talk to the woman and help her to stay calm. Ask what happened and what symptoms she is experiencing.
- Perform a quick examination including vital signs (blood pressure, pulse, respiration, temperature) and skin colour. Estimate the amount of blood lost and assess symptoms and signs.
- If shock is suspected, immediately begin treatment (page 22). Even if signs of shock are not present, keep shock in mind as you evaluate the woman further because her status may worsen rapidly. If shock develops, it is important to begin treatment immediately. Keep the women's feet elevated.
- Position the unconscious woman lying down on her side. Loosen tight clothing.
- If the **woman is unconscious**, assess the airway, breathing and circulation.

QUICK INITIAL ASSESSMENT

When a woman of childbearing age presents with a problem a rapid assessment of her condition should be done to determine the severity of illness and recognize the specific problem so that treatment is initiated promptly.

Assessment is required of:

- ☞ AIRWAY AND BREATHING
- ☞ STATE OF CIRCULATION (SIGNS OF SHOCK)
- ☞ STATE OF CONSCIOUSNESS – UNCONSCIOUS / CONVULSING
- ☞ VAGINAL BLEEDING
- ☞ ABDOMINAL PAIN
- ☞ FEVER

Also note: If pregnant, duration of pregnancy.
If delivered or aborted, duration since delivery or abortion.

INITIAL ASSESSMENT

Assess	History, Symptoms and Signs	Possible Causes
Airway and Breathing	<ul style="list-style-type: none"> • Dyspnoea (breathlessness) • Cyanosis (blueness) • Lung: wheezing or crepitations 	<ul style="list-style-type: none"> • Severe Anaemia. • Other medical conditions like Heart failure, Pneumonia, Asthma.
Circulation	<ul style="list-style-type: none"> • Skin: cool and clammy • Pulse: fast (110 or more) and weak • Blood pressure: low (systolic less than 90 mm Hg) 	<p>Shock</p> <ul style="list-style-type: none"> • Hypovolaemic – due to loss of blood (or other body fluids). • Septicaemic – due to severe infection.
Unconscious or Convulsing	<ul style="list-style-type: none"> • Pregnant or recently delivered • Blood pressure: high (diastolic 90 mm Hg or more) • High temperature 	<p>See page 21</p> <ul style="list-style-type: none"> • Eclampsia • Epilepsy • Malaria • Tetanus <p>See Convulsions or Loss of Consciousness (page 139)</p>

Assess	History, Symptoms and Signs	Possible Causes
Vaginal Bleeding	<ul style="list-style-type: none"> • If pregnant: duration of pregnancy • If delivered: <ul style="list-style-type: none"> – Duration since delivery – Type of delivery – Amount of bleeding – Placenta delivered / retained – Obvious vaginal or perineal tears – Uterus: contracted / not contracted – Bladder: full / empty • AT INITIAL CHECK UP IN LATE PREGNANCY AND LABOUR, DO NOT DO A VAGINAL EXAMINATION 	<ul style="list-style-type: none"> • Abortion • Ectopic Pregnancy • Molar Pregnancy <p>See Vaginal Bleeding in Early Pregnancy (page 54)</p> <ul style="list-style-type: none"> • Abruptio Placentae • Placenta Praevia • Ruptured Uterus <p>See Vaginal Bleeding in Later Pregnancy and Labour (page 87)</p> <ul style="list-style-type: none"> • Atonic Uterus • Tears of Cervix and Vagina • Retained Placenta • Inverted Uterus <p>See Vaginal Bleeding After Childbirth (page 106)</p>
Severe Abdominal Pain	<ul style="list-style-type: none"> • Site of pain: upper abdomen / lower abdomen • Nature of onset: sudden or gradual • If pregnant: <ul style="list-style-type: none"> – Duration of pregnancy – In labour – Not in labour • If delivered: <ul style="list-style-type: none"> – Duration since delivery – Type of delivery – Associated vaginal bleeding 	<ul style="list-style-type: none"> • Ectopic Pregnancy • Complications of Abortion • Abruptio Placentae • Ruptured Uterus • Puerperal Sepsis • Impending Eclampsia • Surgical or Gyneacological Emergencies e.g. Appendicitis, Torsion of Ovarian Cyst etc. These conditions may be seen in a woman who is neither pregnant, nor recently delivered.
High Grade Fever	<ul style="list-style-type: none"> • Recently delivered / aborted • Temperature: 38°C (100.4°F) or more • Fever with chills • Weak, lethargic • Frequent, painful urination • Unconscious • Neck: stiffness • Breasts: tender • Lungs: shallow breathing, consolidation • Abdomen: severe tenderness • Vulva: purulent discharge 	<ul style="list-style-type: none"> • Genital Tract Infection (Puerperal Sepsis) • Septic Abortion • Urinary Tract Infection • Breast Infection • Pelvic Abscess • Peritonitis • Malaria, Typhoid, Pneumonia, Meningitis etc. <p>See Fever After Childbirth (page 192)</p>

The above signs and symptoms do not include all the possible problems that a woman may face in a pregnancy or the puerperal period. It is meant to identify those problems that put the woman at greater risk of maternal morbidity and mortality.

Prompt Attention and Treatment is also needed by a pregnant or a recently delivered woman if she has any of the following signs:

- Pallor
- Weakness
- Fainting
- Severe headaches
- Blurred vision
- Vomiting

In addition, if not yet delivered:

- Blood-stained mucoid vaginal discharge (show) with palpable uterine contractions.
- Ruptured membranes.

For **implementing** a rapid initial assessment scheme, the following is required:

- Training all staff for their roles – including clerks, guards, gate-keepers or switchboard operators – to react in an agreed upon fashion ("sound the alarm", call for help), when a woman arrives at the facility with an obstetric emergency, or pregnancy complication, or when the facility is notified that a woman is being referred.
- Clinical or emergency drills with staff to ensure their readiness at all levels and at all times.
- Ensuring that access is not blocked (keys are available) and equipment is in working order (daily checks) and staff are properly trained to use it.
- Having norms and protocols (and knowing how to use them) to recognize a genuine emergency and know how to react immediately.
- Clearly identifying which women in the waiting room – even those waiting for routine consultations – warrant prompt or immediate attention.
- Agreeing on schemes by which women with emergencies can be exempted from payment, at least temporarily (local insurance schemes, health committee, emergency funds etc).

GENERAL CARE PRINCIPLES

INFECTION PREVENTION

Infection Prevention (IP) has two primary objectives:

- Prevent major infections when providing services.
- Minimize the risk of transmitting serious diseases such as Hepatitis B and HIV/AIDS to the woman and to service providers and staff, including cleaning and housekeeping personnel. Vaccinate the health personnel against Hepatitis B.

The recommended IP practices are based on the following principles:

- Every person (patient or staff) must be considered potentially infectious.
- Hand washing is the most practical procedure for preventing cross-contamination.
- Wear gloves before touching anything wet – broken skin, mucous membranes, blood or other body fluids (secretions or excretions).
- Use barriers (protective goggles, face mask and apron) if splashes and spills of any body fluids (secretions or excretions), are anticipated.
- Use safe work practices, such as not recapping or bending needles, proper instrument processing and proper disposal of medical waste.

Hand Washing

- Vigorously rub together all surfaces of the hands lathered with plain or antimicrobial soap. Wash for 15-30 seconds and rinse with a stream of running or poured water.
- Wash hands:
 - Before and after examining the woman (or having any direct contact).
 - After exposure to blood or any body fluids (secretions or excretions), even if gloves were worn.
 - After removing gloves because the gloves may have holes in them.
- To encourage hand washing, programme managers should make every effort to provide soap and a continuous supply of clean water, either from the tap or a bucket, and tissue paper. **Do not use shared towels to dry hands.**
- To wash hands for surgical procedures, see page 36.

Gloves and Gowns

- Wear gloves:
 - When performing a procedure.
 - When handling soiled instruments, gloves and other items.
 - When disposing of contaminated waste items (cotton, gauze or dressings).
- A separate pair of gloves must be used for each woman to avoid cross-contamination.
- Disposable gloves are preferred, but where resources are limited, surgical gloves can be reused if they are:
 - Decontaminated by soaking in 0.5% Chlorine Solution for 10 minutes, washed and rinsed (Annex 1, page 51).
 - Sterilized by autoclaving (eliminates all microorganisms), or disinfected by steaming or boiling (eliminates all microorganisms, except some bacterial endospores).
- Always use sterile gloves for surgical procedures.

If single-use disposable surgical gloves are reused, they should not be reused more than three times because invisible tears may occur.

- Do not use gloves that are cracked, peeling or have detectable holes or tears.
- A clean, but not necessarily sterile, gown should be worn during all delivery procedures:
 - If the gown has long sleeves, the gloves should be put over the gown sleeve to avoid contamination of the gloves.
 - Ensure that gloved hands are held above the level of the waist and do not come into contact with the gown.

Handling Sharp Instruments and Needles

Operating Theatre and Labour Ward

- Do not leave sharp instruments or needles ("sharps") in places other than "safe zones" (page 39).
- Warn other workers before passing sharps.

Hypodermic Needles and Syringes

- Use each needle and syringe only once.
- Do not disassemble needle and syringe after use. Do not recap, bend or break needles prior to disposal.
- Dispose off needles and syringes in a puncture-proof container. Make hypodermic needles unusable by burning them.

Where disposable needles are not available and recapping is practiced, use the **"one-handed"** recap method:

- Place the cap on a hard, flat surface.
- Hold the syringe with one hand and use the needle to "scoop up" the cap.
- When the cap covers the needle completely, hold the base of the needle and use the other hand to secure the cap.

Waste Disposal

- The purpose of waste disposal is to:
 - Prevent the spread of infection to hospital personnel who handle the waste.
 - Prevent the spread of infection to the local community; protect those who handle waste from accidental injury.
 - Noncontaminated waste (e.g. paper from offices, boxes) poses no infectious risk and can be disposed off according to local guidelines.
- Proper handling of contaminated waste (blood- or body fluid- contaminated items) is required to minimize the spread of infection to hospital personnel and the community. Proper handling means:
 - Wearing utility gloves.
 - Transporting solid contaminated waste to the disposal site in covered containers.
 - Disposing of all sharp items in puncture-resistant containers.
 - Carefully pouring liquid waste down a drain or flushable toilet.
 - Burning or burying contaminated solid waste.
 - Washing hands, gloves and containers after disposal of infectious waste.

Starting an I/V Infusion

- Start an I/V infusion (two, if the woman is in shock) using a large-bore (16-gauge or largest available) cannula or needle.
- Infuse I/V fluids (Normal Saline or Ringer's Lactate) at a rate appropriate for the woman's condition.

If the woman is in shock, avoid using plasma substitutes (e.g. Dextran). There is no evidence that plasma substitutes are superior to Normal Saline in the resuscitation of a shocked woman and Dextran can be harmful in large doses.

- If a peripheral vein cannot be cannulated, perform a venous cut-down (Fig. 2, page 23).

Basic Principles for Procedures

Before any simple (non operative) procedure, it is necessary to:

- Gather and prepare all items. Missing items can disrupt a procedure.
- Explain the procedure and the need for it to the woman and obtain consent.
- Provide adequate medication to relieve pain according to the extent of the procedure planned. Estimate the length of time for the procedure and provide pain medication accordingly (Table 4, page 33).
- Place the patient in a position appropriate for the procedure being performed. The most common position used for obstetric procedures is the lithotomy position (Fig. 1, below).



Fig. 1: Lithotomy Position

- Wash hands with soap and water (page 36) and put on gloves.

- **If the vagina and cervix need to be prepared with an antiseptic for the procedure** (e.g. Manual Vacuum Aspiration):
 - Wash the woman's lower abdomen and perineal area with soap and water, if necessary.
 - Gently insert a disinfected or sterile speculum or retractor(s) into the vagina.
 - Apply antiseptic solution (e.g. Chlorhexidine) three times to the vagina and cervix using sterile ring forceps and a cotton or gauze swab.

- **If the skin needs to be prepared with an antiseptic for the procedure** (e.g. Caesarean Section):
 - Wash the area with soap and water, if necessary.
 - Apply antiseptic solution (e.g. Chlorhexidine) three times to the area using disinfected or sterile ring forceps and a cotton or gauze swab. If the swab is held with a gloved hand, care must be taken not to contaminate the glove by touching unprepared skin.
 - Begin at the centre of the area and work outward in a circular motion away from the area.
 - At the edge of the sterile field discard the swab.
 - Never go back to the middle of the prepared area with the same swab. Keep your arms and elbows high and surgical dress away from the surgical field.

REPLACEMENT FLUIDS: SIMPLE ALTERNATIVES TO TRANSFUSION

Replacement fluids are used to replace abnormal losses of blood, plasma or other extra cellular fluids by increasing the volume of the vascular compartment. They are used principally in:

- Management of women with established hypovolaemia (e.g. haemorrhagic shock).
- Maintenance of normovolaemia in women with on-going fluid losses (e.g. surgical blood loss).

Intravenous Replacement Therapy

Intravenous replacement fluids are first-line treatment for hypovolaemia. Initial treatment with these fluids may be life saving and can provide some time to control bleeding and obtain blood for transfusion if it becomes necessary. The fluids available are either crystalloids or colloids.

Crystalloid Fluids

Normal Saline (Sodium Chloride 0.9%) or balanced salt solutions that have a similar concentration of sodium as in plasma, are effective replacement fluids. These should be available in all hospitals where I/V replacement fluids are used.

Crystalloid replacement fluids (e.g. Normal Saline / Ringer's Lactate):

- Contain a similar concentration of sodium as in plasma.
- Cannot enter cells because the cell membrane is impermeable to sodium.
- Pass from the vascular compartment to the extracellular space (normally only a quarter of the volume of crystalloid infused remains in the vascular compartment), hence a larger volume of fluid is required to correct hypovolaemia.
- To restore circulating blood volume (intravascular volume), infuse crystalloids in a volume at least three times the volume lost. Beware of overloading the circulation. Auscultate the lungs regularly.

Dextrose (glucose) only solutions are poor replacement fluids. Do not use them to treat hypovolaemia unless there is no other alternative.
--

Colloid Fluids

Colloid replacement fluids e.g. Albumin, Dextrans, Gelatins, Hydroxyethyl Starch Solutions. These are:

- Composed of a suspension of particles that are larger than crystalloids. Colloids tend to remain in the blood where they mimic plasma proteins to maintain or raise the colloid osmotic pressure of blood.
- Usually given in a volume equal to the blood volume lost. In many conditions where the capillary permeability is increased (e.g. trauma, sepsis), leakage out of the circulation will occur and additional infusions will be necessary to maintain blood volume.

Points to Remember:

- There is no evidence that colloid solutions have advantages over Normal Saline or balanced salt solutions for resuscitation.
- There is evidence that colloid solutions may have an adverse effect on survival.
- Colloid solutions are much more expensive than Normal Saline and balanced salt solutions.
- Human plasma should not be used as a replacement fluid. All forms of plasma carry a similar risk as whole blood of transmitting infection, such as HIV and Hepatitis.

Caution:

- **Plain water should never be infused intravenously. It will cause haemolysis and will probably be fatal.**

There is a limited role for colloids in resuscitation.

SAFETY before giving any I/V infusion:

- Check that the seal of the infusion bottle or bag is not broken.
- Check the expiry date.
- Check that the solution is clear and free from visible particles.

Maintenance Fluid Therapy

Maintenance fluids are crystalloid solutions, such as Dextrose or Dextrose in Normal Saline, used to replace normal physiological losses through skin, lungs, rectum and bladder. If it is anticipated that the woman will receive I/V fluids for 48 hours or more, infuse a balanced electrolyte solution (e.g. Ringer’s Lactate). The volume of maintenance fluids required by a woman will vary, particularly if the woman has fever or with high room temperature, when losses will increase.

Other Routes of Fluid Administration

There are other routes of fluid administration in addition to the I/V route. These are:

Oral and Nasogastric Administration

- This route can often be used for women who are mildly hypovolaemic and for women who can receive oral fluids.
- Oral and nasogastric administration should **not** be used if:
 - The woman is severely hypovolaemic.
 - The woman is unconscious.
 - There are gastrointestinal lesions or reduced gut motility (e.g. obstruction).
 - Imminent surgery with general anaesthesia planned.

Rectal Administration

- Advantages of rectal administration include:
 - It allows the ready absorption of fluids.
 - Absorption ceases and fluids are ejected when hydration is complete.
 - It is easily administered through a plastic or rubber enema tube inserted into the rectum and connected to a bag or bottle of fluid.
 - The fluid rate can be controlled by using an I/V set, if necessary.
 - The fluids do not have to be sterile. A safe and effective solution for rectal rehydration is 1 L of clean drinking water to which a teaspoon of table salt is added.

Rectal administration of fluids is not suitable for severely hypovolaemic women.

Subcutaneous Administration

- Subcutaneous administration can occasionally be used when other routes of administration are unavailable.
- Sterile fluids are administered through a cannula or needle inserted into the subcutaneous tissue (the abdominal wall is a preferred site).
- It is unsuitable for severely hypovolaemic women.

Solutions containing dextrose should not be given subcutaneously, as they can cause tissue death.

CLINICAL USE OF BLOOD AND BLOOD PRODUCTS

Obstetric care may require blood transfusions. It is important to use blood, blood products and replacement fluids **appropriately** and to be aware of the principles designed to assist health workers in deciding when (and when not) to transfuse.

The appropriate use of blood products is defined as “The transfusion of safe blood products to treat a condition leading to significant morbidity or mortality that cannot be prevented or managed effectively by other means”.

Conditions that may require blood transfusion include:

- Haemorrhage leading to shock.
- Loss of a large volume of blood at operative delivery.
- Severe anaemia, especially in later pregnancy or if accompanied by cardiac failure.

For anaemia in early pregnancy, treat the cause of anaemia and provide haematinics.

Hospitals should be prepared for the urgent need for blood transfusion. It is mandatory for obstetric units to keep stored blood available, especially **type 0 negative** blood and fresh frozen plasma, as these can be life saving.

Full cross match takes 45 minutes. **In emergency, type specific blood** (typing takes 5-10 minutes) **or O negative blood can be given without cross match. The risk of haemolytic reaction in type specific blood is 1:1000.**

There are many known blood group systems. Clinically important are ABO and Rh grouping. Blood grouping of both patient and donor has to be done and before transfusion a cross match has to be done to ensure compatibility and avoid haemolytic reactions.

Unnecessary Use of Blood Products

Used correctly, blood transfusion can save lives and improve health. As with any therapeutic intervention, it may however, result in acute or delayed complications and it carries the risk of transmission of infectious agents. It is also expensive, and uses scarce resources.

- Transfusion is often unnecessary because:
 - Early treatment or prevention programmes e.g. giving Iron and Folate to pregnant women can often prevent conditions like anaemia, which may eventually require transfusion.
 - Transfusions of whole blood, red cells or plasma are often given to prepare an anaemic woman quickly for planned non emergency surgery, or to allow earlier discharge from the hospital. Other treatments, such as Iron tablets or injection, are often cheaper, safer and equally effective.

- Unnecessary transfusion can:
 - Expose the woman to unnecessary risks.
 - Cause a shortage of blood and blood products for women in real need.

Risks of Transfusion

Before prescribing blood or blood products for a woman, it is essential to consider the risks of transfusing against the risks of not transfusing.

Whole Blood or Red Cell Transfusion

- The transfusion of red cell products carries a risk of incompatible transfusion and serious haemolytic transfusion reactions.
- Blood products can transmit infectious agents-including HIV, Hepatitis B, Hepatitis C, Syphilis and Malaria to the recipient.
- Any blood product can become bacterially contaminated and very dangerous if it is prepared or stored incorrectly.

Plasma Transfusion

- Plasma can transmit most of the infections present in whole blood.
- Plasma can also cause transfusion reactions.
- There are very few clear indications for plasma transfusion (e.g. coagulopathy) and the risks very often outweigh any possible benefit to the woman.

Blood Safety

The risks associated with transfusion can be reduced through quality assurance programmes whereby the following take place:

- Appropriate blood donor selection (Non professional donors).
- Screening for infections, transmitted by blood, in the blood donor population (e.g. HIV/AIDS and Hepatitis).
- High quality blood grouping, compatibility testing, component separation and storage and transportation of blood products.
- Appropriate clinical use of blood and blood products.

Screening for Infectious Agents

- Every unit of donated blood should be screened for transfusion-transmissible infections using the most appropriate and effective tests, in accordance with both national policies and the prevalence of infectious agents in the potential blood donor population.
- Where possible, all donated blood should be screened for the following:
 - Hepatitis B surface antigen (HBsAg)
 - Hepatitis C
 - Malaria, in low-prevalence countries when donors have traveled to malarial areas.
 - HIV
 - Treponema pallidum antibody (Syphilis)

In areas with a high prevalence of Malaria, blood transfusion should be accompanied by prophylactic antimalarials.

- No blood or blood product should be released for transfusion until all required tests are shown to be negative.
- Compatibility tests should be performed on all blood components transfused even if, in life-threatening emergencies, the tests are performed after the blood products have been issued.

Blood that has not been obtained from appropriately selected donors and that has not been screened for transfusion-transmissible infectious agents (e.g. HIV, hepatitis), in accordance with national requirements, should not be issued for transfusion, other than in the most exceptional life-threatening situations.

Principles of Clinical Transfusion

The fundamental principle of the appropriate use of blood or blood product is that transfusion is only one element of the woman's management. When there is a sudden, rapid loss of blood due to haemorrhage, surgery or complications of childbirth, the most urgent need is usually the rapid replacement of the fluid lost from circulation.

Transfusion of red cells may also be vital to restore the oxygen-carrying capacity of the blood.

Minimize "wastage" of a woman's blood (to reduce the need for transfusion) by:

- Using replacement fluids for resuscitation.
- Minimizing the blood taken for laboratory use.

- Using the best anaesthetic and surgical techniques to minimize blood loss during surgery.

- Before transfusion, ask yourself the following question:

If this blood was for my child, or myself would I accept the transfusion in these circumstances?

Checks Before Starting a Blood Transfusion

It is very important to check that the blood pack is for the patient for whom it has been ordered. Every hospital and blood bank should have protocols to prevent clerical errors. The clinician should be familiar with these protocols:

After collecting blood sample from patient it should be immediately labeled and as names may be similar, at least one more identifying information, should be given. The same person should collect the sample, label and complete the requisition form.

- The blood report sent by the blood bank with the blood unit should match with the label on the blood pack. Check name of patient, bottle number and blood group.
- Check the date of collection of blood. Blood stored for more than 3 weeks should not be used.
- Check the blood pack for clots and haemolysis (normally plasma in the blood pack is straw coloured, pinkish colour indicates haemolysis).
- If blood is cold (blood is stored at 4°C), blood warmer should be used to warm it to body temperature. Do not put blood pack in hot water, as it will cause haemolysis.

Monitoring the Transfused Woman

For each unit of blood transfused, monitor the woman at the following stages:

- Before starting the transfusion.
- At the onset of the transfusion.
- 15 minutes after starting the transfusion.
- At least every hour during the transfusion.
- At 4-hour intervals after completing the transfusion for the next 24 hours or later until the woman is in stable condition.

Closely monitor the woman during the first 15 minutes of the transfusion and regularly thereafter, to detect early symptoms and signs of adverse effects.

At each of these stages, record the following information on the woman's chart:

- General appearance
- Temperature
- Pulse
- Blood pressure
- Respiration
- Fluid balance (oral and I/V fluid intake, urinary output)

In addition, record:

- The time transfusion is started.
- The time transfusion is completed.
- The volume and type of all products transfused.
- The identification numbers of all products transfused.
- Any adverse effects.
- **WATCH for transfusion reactions.**

Transfusion reactions may range from a minor skin rash to anaphylactic shock.

These include:

- Acute Haemolytic reaction: agitation; fever (often within minutes of starting transfusion); low BP; abdominal or chest pain; bleeding from puncture sites; flushing; DIC.
- Anaphylaxis: bronchospasm; cyanosis; low blood pressure; soft tissue swelling.
- Nonhaemolytic febrile transfusion reaction: shivering and fever, usually 30 – 60 minutes after starting transfusion.
- Allergic reactions: skin rash and itch.
- Fluid overload: dyspnea; hypoxia; tachycardia; raised JVP and basal crepitations.

Responding to a Transfusion Reaction

- **Stop** the transfusion.
- Keep the I/V line open with I/V fluids (Normal Saline or Ringer's Lactate), while making an initial assessment of the acute transfusion reaction and seeking advice.
- If the reaction is minor, give Promethazine, 10 mg, by mouth and observe.

Manage Anaphylactic Shock from Mismatched Blood Transfusion as:

- Manage as for shock (page 22) and give:
 - Adrenaline, 1:1000 solution (0.1 ml in 10 ml Normal Saline or Ringer's Lactate), I/V slowly.
 - Promethazine, 10 mg, I/V.
 - Hydrocortisone, 1 g, I/V, every 2 hours as needed.
- If bronchospasm occurs, give Aminophylline, 250 mg in Normal Saline or Ringer's Lactate 10 ml, I/V slowly.
- Combine resuscitation measures as above until stabilized.
 - Monitor renal (urinary output), pulmonary and cardiovascular functions.
 - Transfer to referral centre when stable.
- **SIMULTANEOUSLY**, take the following samples of blood and urine, and send with a request form to the blood bank and to the laboratory for investigations.
 - Immediate post-transfusion blood samples of the patient, as under:
 - 1 clotted sample
 - 1 anticoagulated (EDTA / sequestrene) from the vein opposite the infusion site.
 - The blood unit and I/V set containing red cell and plasma residues from the transfused blood.
 - The first specimen of the woman's urine following the reaction.
- If septic shock is suspected due to a contaminated blood unit, take a blood culture in a special blood culture bottle.
- Fill a transfusion reaction report form.

- After the initial investigation of the transfusion reaction, send the following blood and urine samples to the blood bank and laboratory for investigations:
 - Blood samples at 12 hours and 24 hours after the start of the reaction:
 - 1 clotted sample
 - 1 anticoagulated (EDTA/sequestrene) taken from the vein opposite the infusion site.
 - All urine for at least 24 hours after the start of the reaction (document amount of urine passed).
- Immediately report all acute transfusion reactions, with the exception of mild skin rashes, to a medical officer and to the blood bank that supplied the blood.
- Record the following information on the woman's chart:
 - Type of transfusion reaction.
 - Length of time after the start of transfusion that the reaction occurred.
 - Volume and type of blood products transfused.
 - Identification numbers of all products transfused.

SHOCK

Shock is characterized by failure of the circulatory system to maintain adequate perfusion of the vital organs. Shock is a **life-threatening condition** that requires **immediate and intensive treatment**.

Suspect or anticipate shock if at least one of the following is present:

- Bleeding in early pregnancy, due to Abortion, Ectopic or Molar pregnancy.
- Bleeding in late pregnancy or labour, due to Placenta Praevia, Abruption Placentae, Ruptured Uterus.
- Bleeding after childbirth, due to Uterine Atony, Tears of Genital Tract, Retained Placenta / Placental Fragments or Ruptured Uterus.
- Infection, due to Unsafe or Septic Abortion, Amnionitis, Infection of Genital Tract following delivery, Pyelonephritis.
- Trauma, due to injury to Uterus or Bowel during Abortion, Ruptured Uterus, Tears of Genital Tract.

Symptoms and Signs

Diagnose shock if the following symptoms and signs are present:

- Fast, weak pulse (110 per minute or more).
- Low blood pressure (systolic less than 90 mm Hg).

Other symptoms and signs of shock include:

- Pallor (especially of inner eyelid, palms or around mouth).
- Sweatiness or cold clammy skin.
- Rapid breathing (rate of 30 breaths per minute or more).
- Anxiousness, confusion or unconsciousness.
- Scanty urine output (less than 30 ml per hour).

Management

Immediate Management

- **CALL FOR HELP.** Urgently mobilize all available personnel.
- Monitor vital signs (pulse, blood pressure, respiration, temperature).
- Turn the woman onto her side to minimize the risk of aspiration if she vomits and to ensure that an airway is open.
- Keep the woman warm but do not overheat her as this will increase peripheral circulation and reduce blood supply to the vital centres.
- Elevate the legs to increase return of blood to the heart (if possible, raise the foot end of the bed).

Specific Management

- Start an I/V infusion (two if possible) using a large-bore (16-gauge or largest available) cannula or needle. Collect blood for estimation of Haemoglobin, immediate cross-match and bedside clotting (see below), just before infusion of fluids.
 - Rapidly infuse I/V fluids (Normal Saline or Ringer's Lactate) initially at the rate of 1 L in 15-20 minutes.

Note: Avoid using plasma substitutes (e.g. Dextran, as it can be harmful in large doses). There is no evidence that plasma substitutes are superior to Normal Saline in the resuscitation of a shocked woman.
 - Give at least 2 L of these fluids in the first hour. This is over and above fluid replacement for ongoing losses.

Note: A more rapid rate of infusion is required in the management of shock resulting from bleeding. Aim to replace 2-3 times the estimated fluid loss.

Do not give fluids by mouth to a woman in shock.

If a peripheral vein cannot be cannulated, perform a venous cut-down (Fig. 2, page 23).

- Continue to monitor vital signs (every 15 minutes) and blood loss.
- Catheterize the bladder and monitor fluid intake and urine output.
- Give oxygen at 6-8 L per minute, by mask or nasal cannulae.

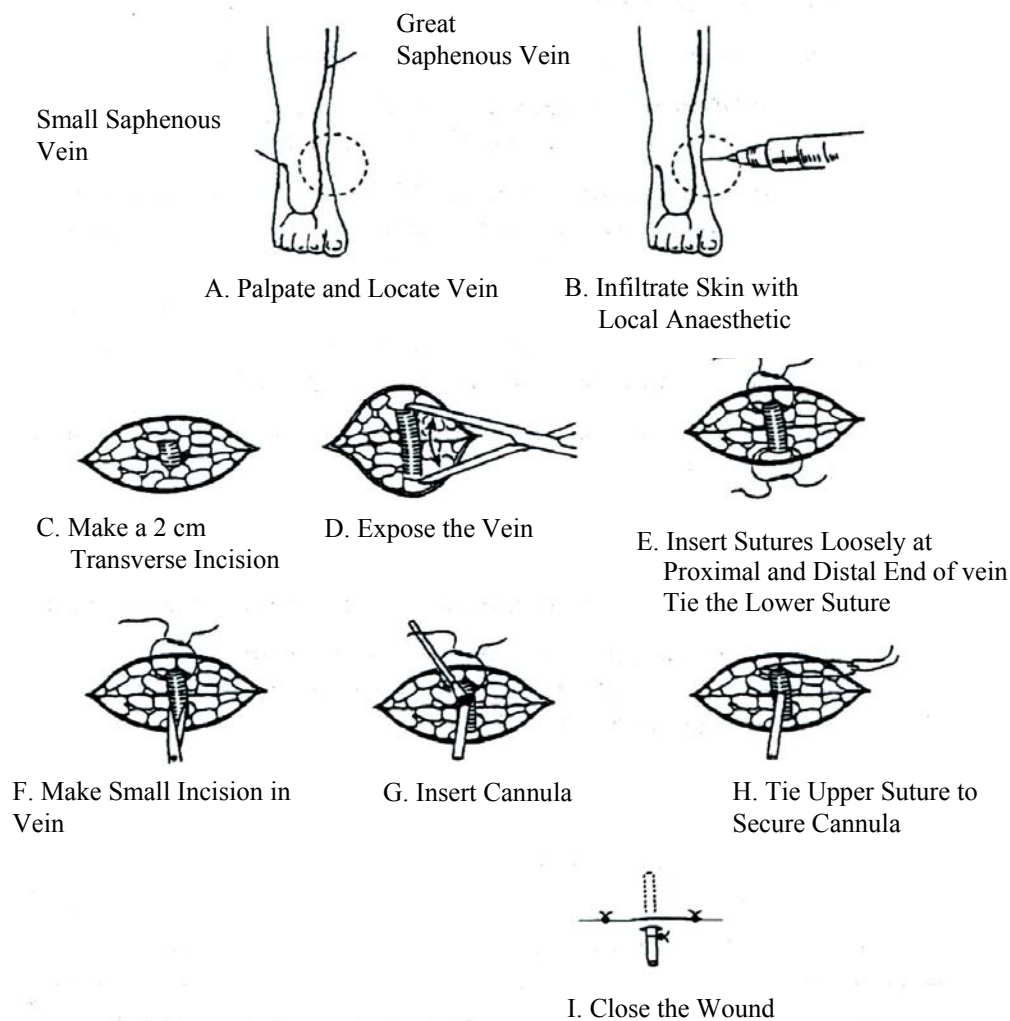


Fig. 2: Venous Cut Down

Bedside Clotting Test (If coagulopathy is suspected)

- Assess clotting status using this **bedside clotting test**:
 - Take 2 ml of venous blood into a small, dry, clean, plain glass test tube (approximately 10 mm x 75 mm), or a small bottle like washed empty vials of antibiotics.
 - Ask someone not actively involved in managing the patient to hold the tube in closed fist to keep it warm (37°C).
 - After 4 minutes, tip the tube slowly to see if a clot is forming. Then tip it again every minute until the blood clots and the tube can be turned upside down.
 - Failure of a clot to form after 7 minutes, or a soft clot that breaks down easily, suggests coagulopathy.

Determining and Managing the Cause of Shock

Determine the cause of shock after the woman is stabilized.

- **If heavy bleeding** is suspected as the cause of shock:
 - Take steps simultaneously to stop bleeding (e.g. oxytocics, uterine massage, bimanual compression, aortic compression, preparations for surgical intervention).
 - Transfuse as soon as possible to replace blood loss (pages 12 – 20).
 - Determine the cause of bleeding and manage:
 - **If bleeding occurs during first 28 weeks of pregnancy**, suspect Abortion, Ectopic or Molar Pregnancy (page 54).
 - **If bleeding occurs after 28 weeks or during labour but before delivery**, suspect Placenta Praevia, Abruptio Placentae or Ruptured Uterus (page 87).
 - **If bleeding occurs after childbirth**, suspect Uterine Atony, Tears of Genital Tract, Retained Placenta / Placental Fragments or Ruptured Uterus (page 106).
 - Reassess the woman's condition for signs of improvement (page 25).
 - **If infection is suspected** as the cause of shock:
 - Collect appropriate samples (blood, urine, pus) for microbial culture before starting antibiotics (if facilities are available).
 - Give the woman a combination of I/V antibiotics to cover aerobic and anaerobic infections and continue until she is fever-free for 48 hours (page 44).
 - Penicillin G, 2 million units, I/V, every 4 hours
 - OR**
 - Ampicillin, 1 g, I/V, every 6 hours
 - PLUS**
 - Gentamicin, 80 mg, I/V, every 8 hours
 - PLUS**
 - Metronidazole, 500 mg, I/V, every 8 hours

Do not give antibiotics by mouth to a woman in shock.

 - Reassess the woman's condition for signs of improvement.
- **If trauma or inversion of uterus is suspected** as the cause of shock, prepare for surgical intervention.

Reassessment

- Reassess the woman's response to fluids within 30 minutes to determine if her condition is improving. Signs of improvement include:
 - Stabilizing pulse (rate of 90 per minute or less).
 - Increasing blood pressure (systolic 100 mm Hg or more).
 - Improving mental status (less confusion or anxiety).
 - Increasing urine output (30 ml per hour or more).
- If the woman's **condition improves**:
 - Adjust the rate of infusion of I/V fluids, to 1 L in 6 hours.
 - Continue management for the underlying cause of shock (page 24).
- If the woman's condition **fails to improve or stabilize**, she requires further management (see below).

Further Management

- Continue to infuse I/V fluids, adjusting the rate of infusion to 1 L in 6 hours and maintain oxygen at 6-8 L per minute.
- Closely monitor the woman's condition.
- Consider and arrange transfer, if intensive care facilities do not exist.
- Perform laboratory tests including Haematocrit, Blood Sugar, Blood Grouping and Rh typing and cross-match. If facilities are available, check Serum Electrolytes, Blood Urea, Serum Creatinine and Blood pH.

ANAESTHESIA AND ANALGESIA

Pain relief is often required during labour and is required during and after operative procedures. Methods of pain relief discussed below include analgesic drugs and methods of support during labour, local anaesthesia, general principles for using anaesthesia and analgesia and postoperative analgesia.

Analgesic Drugs During Labour

- The perception of pain varies greatly with the woman's emotional state. Supportive care during labour provides reassurance and decreases the perception of pain (page 216).
- If the **woman is distressed by pain**, allow her to walk around or assume any comfortable position. Encourage her companion to massage her back or sponge her face between contractions. Encourage the use of breathing techniques and allow the woman to take a warm bath or shower if she chooses. If necessary, give:
 - Pethidine, 1 mg/kg body weight (but not more than 100 mg), I/M or I/V very slowly, every 4 hours as needed.
 - Promethazine, 25 mg, I/M or I/V, if vomiting occurs.
 - **OR if Pethidine is not available**, give Tramadol, 50-100 mg, I/M or I/V slowly in 2-3 minutes, every 4-6 hours.

Barbiturates and sedatives should not be used to relieve anxiety in labour.

Danger

If Pethidine is given to the mother, the baby may suffer from respiratory depression. Naloxone is the antidote.

Note: Do not administer Naloxone to newborns whose mothers are suspected of having recently abused narcotic drugs.

- If there are signs of **respiratory depression** in the newborn, begin resuscitation immediately:
 - After vital signs have been established, give Naloxone, 0.1 mg/kg bodyweight, I/V to the newborn (Box 2, page 322).
 - If the **infant has adequate peripheral circulation after successful resuscitation**, Naloxone can be given I/M. Repeated doses may be required to prevent recurrent respiratory depression.
- If there are **no signs of respiratory depression** in the newborn, but **Pethidine or Morphine was given within 4 hours of delivery**, observe the baby closely for signs of respiratory depression and treat as above if they occur.

Local Anaesthesia

Local anaesthesia (Lignocaine with or without Adrenaline) is used to infiltrate tissue and block the sensory nerves.

- As a woman with local anaesthesia remains awake and alert during the procedure, it is especially important to ensure:
 - Counselling to increase cooperation and minimize her fears.
 - Good communication throughout the procedure as well as reassurance from the provider.
 - Time and patience as local anaesthetics do not take effect immediately.
- The following conditions are required for the safe use of local anaesthesia:
 - All members of the operating team must be knowledgeable and experienced in the use of local anaesthetics.
 - Emergency drugs and equipment (suction, oxygen, resuscitation equipment) should be readily available, and should be in usable condition and all members of the operating team trained in their use.

Premedication

Premedication is required for procedures that last longer than 30 minutes. The dose must be adjusted to the weight and condition of the woman and to the condition of the fetus (when present).

A popular combination is Pethidine and Diazepam:

- Give Pethidine, 1 mg/kg body weight (but not more than 100 mg), I/M or I/V very slowly.
- Give Diazepam, in increments of 1 mg, I/V and wait at least 2 minutes before giving another increment. A safe and sufficient level of sedation has been achieved when the woman's upper eyelid droops and just covers the edge of the pupil. Monitor the respiratory rate every minute. If the **respiratory rate falls below 10 breaths per minute**, stop administration of all sedative or analgesic drugs.

Do not administer Diazepam with Pethidine in the same syringe as the mixture forms a precipitate. Use separate syringes.

Lignocaine

Lignocaine preparations are usually 2% or 1% and require dilution before use (Box 1, page 28). For most obstetric procedures, the preparation is diluted to 0.5%, which gives the maximum effect with the least toxicity.

Box 1: Preparation of Lignocaine 0.5% Solution

Combine:

- Lignocaine 2%, 1 part
- Normal Saline or Sterile Distilled Water, 3 parts (do not use glucose solution as it increases the risk of infection).

Or

- Lignocaine 1%, 1 part
- Normal Saline or Sterile Distilled Water, 1 part.

Adrenaline

Adrenaline causes local vasoconstriction. Its use with Lignocaine has the following advantages:

- Less blood loss.
- Longer effect of anaesthetic (usually 1-2 hours).
- Less risk of toxicity because of slower absorption into the general circulation.

If the **procedure requires a small surface to be anaesthetized** e.g. for repair of episiotomy which **requires about 10 – 15 ml Lignocaine**, Adrenaline is not necessary. For larger surfaces, however, especially when more than 40 ml of 0.5% strength is needed, for example in Caesarean section or repair of extensive perineal tears, Adrenaline is required to reduce the absorption rate and thereby reduce toxicity.

The best concentration of Adrenaline is 1:200,000 (5 mcg/ml). This gives maximum local effect with the least risk of toxicity from the Adrenaline itself (Table 1, below).

Note: It is critical to measure Adrenaline carefully and accurately using a syringe such as a BCG or Insulin syringe. Mixtures must be prepared observing strict infection prevention practices (page 6).

Sometimes Lignocaine and Adrenaline come premixed, CHECK before USE.

Table 1: Formulas for Preparing 0.5% Lignocaine Solutions Containing 1:200,000 Adrenaline

Desired Amount of Local Anaesthetic Needed	Normal Saline	Lignocaine 2%	Adrenaline 1:100
20 ml	15 ml	5 ml	0.1 ml
40 ml	30 ml	10 ml	0.2 ml
100 ml	75 ml	25 ml	0.5 ml
200 ml	150 ml	50 ml	1.0 ml

Complications

Prevention of Complications

All local anaesthetic drugs are potentially toxic. Major complications from local anaesthesia are, however, extremely rare. The best way to avoid complications is to prevent them:

- Avoid using concentrations of Lignocaine stronger than 0.5%.
- If **more than 40 ml of the anaesthetic solution is to be used**, add Adrenaline to delay dispersion.
- Use the lowest effective dose.
- Observe the maximum safe dose. For an adult, this is 4 mg/kg body weight of Lignocaine without Adrenaline and 7 mg/kg body weight of Lignocaine with Adrenaline. The anaesthetic effect should last for at least 2 hours. Doses can be repeated if needed after 2 hours (Table 2, below).

Table 2: Maximum Safe Dose of Local Anaesthetic Drugs

Drug	Maximum Dose (mg/kg of body weight)	Maximum Dose for 60 kg Adult (mg)
Lignocaine	4	240
Lignocaine + Adrenaline 1:200 000 (5 mcg/ml)	7	420

- Inject slowly.
- Avoid accidental injection into a vessel. There are three ways of doing this:
 - Moving needle technique (preferred for tissue infiltration): The needle is constantly in motion while injecting, this makes it impossible for a substantial amount of solution to enter a vessel.
 - Plunger withdrawal technique (preferred for nerve block when considerable amounts are injected into one site): The syringe plunger is withdrawn before injecting, if blood appears, the needle is repositioned and attempted again.
 - Syringe withdrawal technique: The needle is inserted and the anaesthetic is injected as the syringe is being withdrawn.

Box 2: To Avoid Lignocaine Toxicity

- Use a dilute solution.
- Add Adrenaline when more than 40 ml will be used.
- Use lowest effective dose.
- Do not exceed maximum dose.
- Avoid I/V injection.

Diagnosis of Lignocaine Allergy and Toxicity

Table 3: Symptoms and Signs of Lignocaine Allergy and Toxicity

Allergy	Mild Toxicity	Severe Toxicity	Life Threatening Toxicity (very rare)
<ul style="list-style-type: none">• Shock• Redness of skin• Skin rash• Bronchospasm• Vomiting• Serum sickness	<ul style="list-style-type: none">• Numbness of lips and tongue• Metallic taste in mouth• Dizziness/light headedness• Ringing in ears• Difficulty in focusing eyes	<ul style="list-style-type: none">• Sleepiness• Disorientation• Muscle twitching and Shivering• Slurred speech	<ul style="list-style-type: none">• Tonic-clonic convulsions• Respiratory depression or arrest• Cardiac depression or arrest

Management of Lignocaine Allergy

- Give Adrenaline, 1:1000, 0.5 ml, I/M, repeated every 10 minutes if necessary.
- In acute situations, give Hydrocortisone, 100 mg, I/V, every hour.
- To prevent recurrence, give Diphenhydramine, 50 mg, I/M or I/V slowly, then 50 mg, by mouth, every 6 hours.
- Treat bronchospasm with Aminophylline, 250 mg in Normal Saline 10 ml, I/V slowly.
- Laryngeal oedema may require immediate tracheostomy. For shock, begin standard shock management (page 22).
- Severe or recurrent signs may require corticosteroids (e.g. Hydrocortisone, 2 mg/kg body weight, I/V, every 4 hours until condition improves). In **chronic situations** give Prednisone, 5 mg, or Prednisolone, 10 mg, by mouth, every 6 hours until condition improves.

Management of Lignocaine Toxicity

Symptoms and signs of toxicity (Table 3, page 30) should alert the practitioner to immediately stop injecting and prepare to treat severe and life-threatening side effects. **If symptoms and signs of mild toxicity are observed**, wait a few minutes to see if the symptoms subside, check vital signs, talk to the woman and then continue the procedure, if possible.

Convulsions

- Turn the woman to her left side, insert an airway and aspirate secretions.
- Give oxygen at 6-8 L per minute by mask or nasal cannulae.
- Give Diazepam, 1-5 mg, I/V, in 1 mg increments. Repeat if convulsions recur.

Note: The use of Diazepam to treat convulsions may cause respiratory depression.

Respiratory Arrest

- If the woman is **not breathing**, assist ventilation using an Ambu bag and mask or via endotracheal tube; give oxygen at 4-6 L per minute.

Cardiac Arrest

- Hyperventilate with oxygen.
- Perform cardiac massage.
- If the woman has **not yet delivered**, immediately deliver the baby by caesarean section (page 254) using general anaesthesia.
- Give Adrenaline, 1:10,000, 0.5 ml, I/V.

Adrenaline Toxicity

- Systemic Adrenaline toxicity results from excessive amounts or inadvertent I/V administration and results in:
 - Restlessness
 - Sweating
 - Hypertension
 - Cerebral Haemorrhage
 - Rapid Heart Rate
 - Ventricular Fibrillation
- Local Adrenaline toxicity occurs when the concentration is excessive and results in ischaemia at the infiltration site with poor healing.

General Principles for Anaesthesia and Analgesia

The keys to pain management and comfort of the woman are:

- Supportive attention from staff before, during and after a procedure (helps reduce anxiety and lessen pain).
- A provider who is comfortable working with women who are awake and who is trained to use instruments gently.
- The selection of an appropriate type and level of pain medication.
- Tips for performing procedures on women who are awake include:
 - Explain each step of the procedure before performing it.
 - Use adequate premedication in cases expected to last longer than 30 minutes.
 - Give analgesics or sedatives at an appropriate time before the procedure (30 minutes before for I/M and 60 minutes before for oral medication) so that maximum relief will be provided during the procedure.
 - Use diluted solutions in adequate amounts.
 - Check the level of anaesthesia by pinching the area with forceps. If the woman feels the pinch, wait 2 minutes and then retest.
 - Wait a few seconds after performing each step or task for the woman to prepare for the next one.
 - Move slowly, without jerky or quick motions.
 - Handle tissue gently and avoid undue retraction, pulling or pressure.
 - Use instruments with confidence.
 - Avoid saying things like "this won't hurt" when, in fact, it will hurt; or "I'm almost finished" when you are not.
 - Talk with the woman throughout the procedure.
- The need for supplemental analgesic or sedative medications (by mouth, I/M or I/V) will depend on:
 - The emotional state of the woman.
 - The procedure to be performed (Table 4, page 33).
 - The anticipated length of the procedure.
 - The skill of the provider and the assistance of the staff.

Table 4: Analgesia and Anaesthesia Options

Procedure	Analgesia / Anaesthesia Options
Breech Delivery	<ul style="list-style-type: none"> • General Methods of Labour Support (page 216) • Pudendal Block (page 245)
B-Lynch Suture	<ul style="list-style-type: none"> • General Anaesthesia (page 293)
Caesarean Section	<ul style="list-style-type: none"> • Local Anaesthesia (page 263) • Spinal Anaesthesia (page 302) • Ketamine (page 298) • General Anaesthesia (page 293)
Cervical Tears (Extensive)	<ul style="list-style-type: none"> • Pethidine and Diazepam (page 27) • Ketamine (page 298)
Colpotomy / Culdocentesis	<ul style="list-style-type: none"> • Local Anaesthesia (page 27)
Craniotomy / Craniocentesis	<ul style="list-style-type: none"> • Emotional Support and Encouragement • Diazepam (page 27) • Pudendal Block (page 245)
Dilation and Curettage	<ul style="list-style-type: none"> • Pethidine (page 27) • Paracervical Block (page 74)
Episiotomy	<ul style="list-style-type: none"> • Local Anaesthesia (page 27) • Pudendal Block (page 245)
Forceps Delivery	<ul style="list-style-type: none"> • Emotional Support and Encouragement (page 216) • Pudendal Block (page 245)
Labour and Childbirth	<ul style="list-style-type: none"> • Pethidine and Promethazine (page 26)
Laparotomy	<ul style="list-style-type: none"> • General Anaesthesia (page 293) • Spinal Anaesthesia (page 302)
Manual Removal of Placenta	<ul style="list-style-type: none"> • Pethidine and Diazepam (page 27) • Ketamine (page 298)
Manual Vacuum Aspiration	<ul style="list-style-type: none"> • Paracervical Block (page 74)
Perineal Tears (First and Second Degree)	<ul style="list-style-type: none"> • Local Anaesthesia (page 27) • Pudendal Block (page 245)
Perineal Tears (First to Fourth Degree)	<ul style="list-style-type: none"> • Pudendal Block (page 245) • Ketamine (page 298) • Local Anaesthesia plus Pethidine and Diazepam (page 27)
Uterine Inversion (correction of)	<ul style="list-style-type: none"> • Pethidine and Diazepam (page 27) • General Anaesthesia (page 293)
Vacuum Extraction	<ul style="list-style-type: none"> • Emotional Support and Encouragement (page 216) • Pudendal Block (page 245)

Postoperative Analgesia

Adequate postoperative pain control is important. A woman who is in severe pain does not recover well.

Note: Avoid over sedation, as this will limit mobility, which is important during the postoperative period, and interferes with breast feeding and bonding.

Good postoperative pain control regimens include:

- Non-narcotic analgesics e.g. Diclofenac, 75 mg, I/M, every 12 hours if needed **or** Diclofenac, 75 – 150 mg, rectal suppository, in divided doses (maximum daily dose by any route is 150 mg) **or / and** mild analgesics such as Paracetamol, 0.5-1.0 g, by mouth, every 4-6 hours, (max 4 g daily) as needed.
- Narcotics such as Pethidine, 1 mg/kg body weight (but not more than 100 mg), I/M or I/V, very slowly **or** Nalbuphine Hydrochloride (available as Nubain / Kinz) 10 to 20 mg, I/V or I/M or S/C, every 3-6 hours as needed.
- Combinations of lower doses of narcotics with Paracetamol.

Note: If the **woman is vomiting**, narcotics may be combined with anti-emetics such as Promethazine (available as Phenergan), 25 mg, I/M or I/V, every 4 hours as needed.

SURGICAL CARE PRINCIPLES

During any procedure the woman is the primary focus of the physician / midwife and nurse. The surgical or scrub nurse has her attention focused on the procedure and the needs of the physician / midwife performing the procedure.

Pre-operative Care Principles

Preparing the Operating Theatre

Ensure that:

- The operating theatre is clean (it should be cleaned after every procedure).
- Necessary supplies and equipment are available, including drugs and an oxygen cylinder.
- Emergency equipment is available and in working order.
- There is adequate supply of theatre dresses for the anticipated members of the surgical team.
- Clean, sterile linens are available.
- Sterile supplies (gloves, gauze, instruments) are available and not beyond expiry date.

Preparing the Woman for a Surgical Procedure

- Explain the procedure to be performed and its purpose to the woman. If the woman is unconscious, explain the procedure to her family.
- Obtain informed consent for the procedure.
- Assist the woman and her family to prepare emotionally and psychologically for the procedure.
- Review the woman's medical history and check for any possible allergies.
- Send a blood sample for Haemoglobin or Haematocrit and blood Group and screen (if resources and facilities exist).
- Order blood for possible transfusion. Do not delay transfusion if needed.
- Wash the area around the proposed incision site with soap and water, if necessary.

- It is not necessary to shave the woman's pubic hair as this increases the risk of wound infection. The hair may be trimmed.
- Monitor and record vital signs (blood pressure, pulse, respiratory rate and temperature).
- Administer premedication appropriate for the anaesthesia to be used (page 27).
- Give an antacid (30 ml of 0.3% molar Sodium Citrate) to reduce acid content of the stomach, in case there is inhalation of gastric contents (page 307). Or give Metoclopropamide (Maxolon) 10 mg, I/V, stat, this improves lower oesophageal sphincter tone and helps in preventing vomiting and regurgitation of stomach contents.
- Catheterize the bladder if necessary and monitor urine output.
- Ensure that all relevant information is passed on to other members of the team (doctor / midwife, nurse, anaesthetist, assistant and others).

Intra-operative Care Principles

Position

- Place the woman in a position appropriate for the procedure to allow:
 - Optimum exposure of the operative site.
 - Access for the anaesthetist.
 - Access for the nurse to take vital signs and monitor I/V drugs and infusions.
 - Safety of the woman by preventing injuries and maintaining circulation.
 - Maintenance of the woman's dignity and modesty.

If the woman has not delivered, have the operating table tilted to the left or place a pillow or folded linen under her right lower back to decrease supine hypotension syndrome.

Surgical Hand Scrub

- Remove all jewellery.
- Hold hands above the level of the elbow, wet hands thoroughly and apply soap.
- Use a brush if available to clean under the finger nails.

- Begin at the fingertips and lather and wash, using a circular motion.
 - Wash between all fingers.
 - Move from the fingertips to the elbows of one hand and then repeat for the second hand.
- Rinse each arm separately, fingertips first, holding hands above the level of the elbows.
- Wash for 3-5 minutes.
- Use a sterile towel to dry each hand. Wipe from the fingertips to the elbow and then discard the towel.
- Ensure that scrubbed hands do not come into contact with objects (e.g. equipment, protective gown) that are not disinfected or sterile. If the **hands touch a contaminated** surface, repeat surgical hand scrub.

Preparing the Incision Site

- Prepare the skin with an antiseptic (e.g. Chlorhexidine / Pyodine):
 - Apply antiseptic solution three times to the incision site using a disinfected ring forceps and cotton or gauze swab. If the **swab is held with a gloved hand**, do not contaminate the glove by touching unprepared skin.
 - Begin at the proposed incision site and work outward in a circular motion away from the incision site.
 - At the edge of the sterile field discard the swab.
- Never go back to the middle of the prepared area with the same swab. Keep your arms and elbows high and surgical dress away from the surgical field.
- Drape the woman immediately after the area is prepared to avoid contamination:
 - If the drape has a window / slit, place it first directly over the incision site.
 - Unfold the drape away from the incision site to avoid contamination.

Monitoring

- Monitor the woman's condition regularly throughout the procedure.

- Monitor vital signs (blood pressure, pulse, respiratory rate), level of consciousness and blood loss.
- Record the findings on a monitoring sheet to allow quick recognition if the woman's condition deteriorates.
- Maintain adequate hydration throughout surgery.

Managing Pain

Maintain adequate pain management throughout the procedure (page 26). Women who are comfortable during a procedure are less likely to move and cause injury to themselves. Pain management can include:

- Emotional Support and Encouragement.
- Local Anaesthesia.
- Regional Anaesthesia (e.g. Spinal).
- General Anaesthesia.

Antibiotics

Give prophylactic antibiotics before starting the procedure. If the **woman is going to have a caesarean section**, give prophylactic antibiotics **after** the baby is delivered (page 44).

Making the Incision

Make the incision only as large as necessary for the procedure. Make the incision with great care and proceed one layer at a time.

Handling Tissue

- Handle tissue gently.
- When using clamps, close the clamp only one ratchet (click), when possible. This will minimize discomfort and reduce the amount of dead tissue that remains behind at the end of the procedure, thus decreasing the risk of infection.

Haemostasis

- Ensure haemostasis throughout the procedure.

- Women with obstetrical complications often have anaemia. Therefore, keep blood loss to a minimum.

Instruments and Sharps

- Start and finish the procedure with a count of instruments, sharps and sponges.
 - Perform the count every time before a body cavity (e.g. uterus or abdomen) is closed.
 - Document in the woman's record that the surgical counts were correct.
- Use instruments, especially sharps, carefully to reduce the risk of injury. Use "safe zones" when handling and passing instruments and sharps:
 - Use a pan, such as a kidney basin, to carry and pass sharp items and pass suture needles on a needle holder.
 - Alternatively, pass the instrument with the handle, rather than the sharp end, pointing toward the receiver.

Drainage

- Always leave an abdominal drain in place, if:
 - Oozing persists after the surgical procedure.
 - Clotting disorder is suspected.
 - Infection is present or suspected.
- A closed drainage system can be used by placing a naso gastric tube / plastic urine catheter (18 French) / suction catheter (18 French) through the abdominal wall or pouch of Douglas and connecting to a sterile plastic bag (the bag for collecting urine can be used).
- Remove the drain once the infection has cleared or when no pus or bloodstained fluid has drained for 48 hours.

Suture

- Select the appropriate type and size of suture for the tissue (page 40). Sizes are reported by a number of "O"s:
 - Smaller suture has a greater number of "0"s [e.g. 000 (3-0) suture is smaller in diameter than 00 (2-0) suture], suture labeled as "1" is larger in diameter than "0" suture.

- A suture that is too small will be weak and may break easily; a suture that is too large in diameter will tear through tissue.

Recommended Suture Types

Suture Type	Tissue	Recommended Number of Knots
Plain catgut	Fallopian tube	3*
Chromic catgut	Muscle, fascia	3*
Polyglycolic	Muscle, fascia, skin	4
Nylon	Skin	6
Silk	Skin, bowel	3*

* These are natural sutures, do not use more than three knots as this will abrade the suture and weaken the knot.

Dressing

At the conclusion of surgery, cover the surgical wound with a sterile dressing (page 41).

Postoperative Care Principles

Initial Care

- Place the woman in the recovery position:
 - Position the woman on her side with her head slightly extended, to ensure a clear airway.
 - Place the upper arm in front of the body for easy access to check blood pressure.
 - Place legs so that they are flexed, with the upper leg slightly more flexed than the lower to maintain balance.
- Assess the woman's condition immediately after the procedure:
 - Check vital signs (blood pressure, pulse, respiratory rate) and temperature every 15 minutes during the first hour, then every 30 minutes for the next hour.
 - Assess the level of consciousness every 15 minutes until the woman is alert.
 - Check the vaginal blood loss every 15 minutes.
 - Check the drains and urine output every 15 minutes.

Note: Ensure that the woman has constant supervision until conscious.

- Ensure a clear airway and adequate ventilation. Transfuse if necessary (page 14).
- **If vital signs become unstable despite transfusion**, quickly return to the operating theatre because bleeding may be the cause. (Where possible measurement of haematocrit will help in making a decision).

Gastrointestinal Function

Gastrointestinal function typically returns rapidly for obstetrical patients. For most uncomplicated procedures, bowel function should be normal within 12 hours of surgery.

- If the **surgical procedure was uncomplicated**, give the woman a liquid diet when she is fully alert, usually 4-6 hours after surgery.
- If there **were signs of infection**, or if the **caesarean section was for obstructed labour or uterine rupture**, wait until bowel sounds are heard before giving liquids.
- When the **woman is passing gas** through rectum, begin giving her solid food.
- If the **woman is receiving I/V fluids**, they should be continued until she is taking liquids well.
- If you **anticipate that the woman will receive I/V fluids for 48 hours or more**, infuse a balanced electrolyte solution (e.g. Ringer's Lactate).
- Maintain fluid balance chart as long as the woman is on I/V fluids. Record fluid intake (Oral and I/V fluids) and output (urine / vomit / excretion through drains).
- If the **woman receives I/V fluids for more than 48 hours**, monitor electrolytes every 48 hours. Prolonged infusion of I/V fluids can alter electrolyte balance.
- Ensure that the woman is eating a regular diet prior to discharge from hospital.

Dressing and Wound Care

The dressing provides a protective barrier against infection while a healing process known as "re-epithelialization" occurs. Keep the dressing on the wound for the first day after surgery to protect against infection while re-epithelialization occurs. Thereafter, a dressing is not necessary but should be kept on for a longer time if the personal hygiene of the woman is not satisfactory.

- **If blood or fluid is leaking through the initial dressing**, do not change the dressing:

- Reinforce the dressing.
- Monitor the amount of blood / fluid lost by outlining the bloodstain on the dressing with a pen.
- **If bleeding increases or the bloodstain covers half the dressing or more,** remove the dressing and inspect the wound. If there is active bleeding, resuturing may be required. If not, replace with another sterile pressure dressing.
- If the stain does not increase in size, just reinforce the dressing.
- If the dressing **comes loose**, reinforce with more tape rather than removing the dressing. This will help maintain the sterility of the dressing and reduce the risk of wound infection.
- If it becomes necessary to change the dressing, use non touch sterile technique.
- The wound should be clean and dry, without evidence of infection or seroma prior to the woman's discharge from the hospital.

Analgesia

Adequate postoperative pain control is important (page 34). A woman who is in severe pain does not recover well.

Note: Avoid over sedation, as this will limit mobility, which is important during the postoperative period. Over sedation also interferes with breast feeding and bonding.

Bladder Care

A urinary catheter may be required in some procedures. Early catheter removal decreases the chance of infection and encourages the woman to walk.

- If the **urine is clear**, remove the catheter 8 hours after surgery or after the first postoperative night.
- If the **urine is not clear**, leave the catheter in place until the urine is clear.
- Wait 48 hours after surgery before removing the catheter if there was:
 - Uterine Rupture
 - Prolonged Labour
 - Massive Perineal Oedema
 - Puerperal Sepsis with Pelvic Peritonitis.

Note: Ensure that the urine is clear before removing the catheter.

- If the **bladder** was **injured** (either from uterine rupture or during caesarean section or laparotomy) or if the labour was **obstructed**, in order to prevent vesico vaginal fistula:
 - Leave the catheter in place for continuous drainage for a minimum of 14 days and until the urine is clear.
 - If the **woman is not currently receiving antibiotics**, give Nitrofurantoin, (available as Furadantin), 100 mg, by mouth, once daily, until the catheter is removed, for prophylaxis against cystitis.

Antibiotics

- If there were **signs** of infection or the **woman currently has** fever, continue antibiotics until the woman is fever-free for 48 hours (page 44).

Suture Removal

Major support for abdominal incisions comes from the closure of the fascial layer. If the incision was Pfannensteil / transverse, remove skin sutures 5 days after surgery. If the incision was midline subumbilical / vertical, remove sutures after 7 days.

Fever

- Fever (temperature 38°C/100.4°F or more) that occurs postoperatively should be evaluated (page 4).
- Ensure the woman is fever-free for a minimum of 24 hours prior to discharge from hospital.

Ambulation

Ambulation enhances circulation, encourages deep breathing and stimulates return of normal gastrointestinal function. Encourage foot and legs exercises in bed and mobilize as soon as possible, usually within 24 hours.

ANTIBIOTIC THERAPY

Uterine infection following an abortion or childbirth is a major cause of maternal death. Infection during pregnancy and the postpartum period may be caused by a combination of organisms, including aerobic and anaerobic cocci and bacilli. Broad-spectrum antibiotics are often required to treat these infections. Antibiotics should be started based on clinical condition of the woman. If possible, send pus / urine / vaginal discharge as appropriate for culture prior to starting the antibiotic. This may help in choosing the right antibiotics. In addition, blood culture may be done if septicaemia (bloodstream invasion) is suspected. Consider repeating the cultures if there is no clinical response. In cases of unsafe abortion and non-institutional delivery, anti-tetanus prophylaxis should also be provided (page 66).

Providing Prophylactic Antibiotics

Performing certain obstetrical procedures (e.g. caesarean section, manual removal of placenta) increases a woman's risk of infection. This risk can be reduced by:

- Following recommended infection prevention practices (page 6).
- Providing prophylactic antibiotics at the time of the procedure.

Prophylactic antibiotics are given to help prevent infection. If a woman is suspected to have or is diagnosed as having an infection, therapeutic antibiotics are more appropriate.

When possible, give prophylactic antibiotics 30 minutes before the start of a procedure, to allow adequate blood levels of the antibiotic at the time of the procedure. An exception to this is caesarean section, for which prophylactic antibiotics should be given when the cord is clamped after delivery of the baby. One dose of prophylactic antibiotics is sufficient and is no less effective than three doses or 24 hours of antibiotics in preventing infection. If the **procedure lasts longer than 6 hours or blood loss is 1500 ml or more**, give a second dose of prophylactic antibiotics to maintain adequate blood levels during the procedure. **If the infection prevention practices cannot or have not been followed strictly, antibiotics may be given for 3-5 days.**

Providing Therapeutic Antibiotics

As a first defense against serious infections, give a combination of antibiotics:

- Ampicillin, 1 g, I/V, every 6 hours

PLUS

- Gentamicin, 80 mg, I/V, every 8 hours

PLUS

- Metronidazole, 500 mg, I/V, every 8 hours

Note: If the infection is not severe, Amoxicillin, 500 mg, by mouth, every 8 hours, can be used instead of Ampicillin. Metronidazole can be given by mouth, instead of I/V.

- **If the clinical response is poor after 48 hours, ensure:**
 - Adequate dosages of antibiotics are being given.
 - Thoroughly re-evaluate the woman for other sources of infection.
 - Consider altering treatment according to reported microbial sensitivity (or adding an additional antibiotic, like Metronidazole, to cover anaerobes, if not yet given).

- **If culture facilities are not available OR if fever continues:**
 - Re-examine for pus collection, especially in the pelvis.
 - Re-examine for non-infective causes such as deep vein and pelvic vein thrombosis.
 - Consider the possibility of infection due to the organisms being resistant to the antibiotics or combination of antibiotics being used by the patient.
 - **If Staphylococcal infection is suspected, add:**
 - Cloxacillin, (available as Orbenin), 1 g, I/V, every 4 hours
 - OR**
 - Vancomycin, 1 g in 200 ml of 5% Dextrose or Normal Saline, I/V, every 12 hours, infused over 1 hour
 - **If Clostridial infection or Group A haemolytic Streptococci is suspected, add** Penicillin, 2 million units, I/V, every 4 hours.
 - If neither of the above two i.e. Staphylococcal or Clostridial infections are possibilities, add Ceftriaxone (available as Rocephin), 2 g, I/V, every 24 hours.

To avoid phlebitis, the infusion site should be changed every 3 days or at the first sign of inflammation.

For the treatment of genital tract infection, combinations of antibiotics are usually continued, until the woman is fever-free for 48 hours. Women with blood-stream infections, however, will require antibiotics for at least 7 days, even if she is fever free for more than 48 hours.

IMPROVING REFERRAL PATTERNS

When there is a need to refer a patient to a higher level of care, the following protocol should be followed:

PREREQUISITE TO ALL REFERRALS: Information about facilities willing / capable to receive referral.

A. BEFORE Referral

1. Stabilize the patient:
 - Insert 16 gauge I/V cannula and run I/V fluids (page 11).
 - If convulsing, control fits (page 152).
 - If Post partum haemorrhage, use oxytocics (page 113).
 - If septic shock is suspected, give antibiotics (page 44).
2. Provide information to the family:
 - Need for referral.
 - Health facility where referred.
3. Get your assistant to deal with the logistics e.g.
 - Arrange transport.
 - If the need for blood transfusion is anticipated, counsel at least two blood donors and instruct them to accompany the patient.
 - Advise, to carry money with them.
 - If possible inform the referral health facility in advance (telephone), giving details of the condition requiring EmOC.

B. THE REFERRAL

Each woman who is referred to any higher-level health facility, should be given a standard referral slip containing the following information:

- General patient information (name, age, address).
- Obstetrical history (parity, gestational age, complications in the antenatal period).
- Relevant past obstetrical complications (previous caesarean section, postpartum haemorrhage).
- The specific condition for which referral is being made.
- Action already taken to deal with the emergency. Include ALL medications given and procedures carried out.
- Blood group and Rh factor, if known.
- Allergies, if known.

If possible, try to address the hospital administrator and / or the obstetrician by name; this makes the referrals more effective.

- C. If possible, accompany the patient or provide a map and telephone number of the health facility being referred to.

D. Request Feed Back

- The hospital, to which the patient is referred, should send a **note back with the outcome of referral to the referring facility** with the woman or person who brought her.
- Both the referred hospital and the referring facility should keep a record of all referral as a quality assurance mechanism.
 - Referring facilities can assess the success and appropriateness of their referrals.
 - The receiving hospital can review the records for patterns indicating that a provider or facility needs additional technical training or support.

FAMILY PLANNING METHODS

Type of Contraceptive	Advise to Start After Abortion or Delivery
Hormonal (Pills, Injections, Implants)	<ul style="list-style-type: none"> • Preferably after 6 weeks.
Condoms	<ul style="list-style-type: none"> • Immediately
Intrauterine Contraceptive Device (IUCD)	<ul style="list-style-type: none"> • Preferably after 4-6 weeks. • If infection is present or suspected, delay insertion until it is cleared. • If Hb is less than 7g/dl, delay until anaemia improves. • Provide an interim method (e.g. condoms).
Tubal Ligation	<ul style="list-style-type: none"> • Immediately • If infection is present or suspected, delay surgery until it is cleared. • If Hb is less than 7 g/dl, delay until anaemia improves. • Provide an interim method (e.g. condom).

Also identify any other reproductive health services that a woman may need. For example some women may need:

- Tetanus prophylaxis or tetanus booster.
- Treatment for sexually transmitted diseases (STDs).
- Cervical cancer screening.

EMERGENCY CONTRACEPTION

Emergency Contraception (EC) refers to the contraceptive methods that can be used by women in the first few days following unprotected intercourse to prevent an unwanted pregnancy. It is estimated that 40 to 60 million abortions are performed each year. If emergency contraceptives were available and used, unwanted pregnancies and abortions could be averted.

The available methods for emergency contraception are:

- Increased doses of combined oral contraceptives containing Ethinylestradiol and Levonorgestrel.
- High doses of Progestogen only pills containing Levonorgestrel.
- Copper releasing Intrauterine Contraceptive Devices (IUCD).

Pills have to be started within 72 hours of unprotected intercourse, while IUDs can be inserted up to 5 days following such an event.

The failure rate of emergency contraceptive pills, ranges from 1 to 3 per hundred, and of IUDs, is below 1 per hundred.

Emergency Contraceptive Pills

- Emergency contraceptive pills should not be used regularly because of higher possibility of failure compared to regular contraceptives and the increased risk of side effects.
- The majority of women will have their period on time or slightly early after taking emergency contraceptive pills. If there is a delay in menstruation of more than one week, a pregnancy test should be done.
- There is no harm to a pregnant woman or fetus if emergency contraceptive pills are inadvertently used during early pregnancy.
- If vomiting occurs within two hours of taking emergency contraceptive pills, the dose should be repeated. In cases of **severe vomiting**, the repeat dose of pills may be administered vaginally. Prophylactic administration of an anti-emetic has been shown to reduce nausea in some women. Taking the pills with food or at bedtime may help.

Copper Releasing IUCDs as Emergency Contraception

In addition to the general indications for emergency contraception, the IUCD is specially indicated when:

- More than 72 hours have elapsed after unprotected intercourse.
- The client is considering using an IUCD for continuous, long-term contraception.

Emergency Contraceptive Pills are a better choice for Nulliparous women.

Who may need Emergency Contraception?

- After voluntary sexual intercourse but with no contraceptive protection.
- After accidental failure, or incorrect, or inconsistent, use of a regular contraceptive method.
- When a woman is a victim of a sexual assault and has had no contraceptive protection.

Formulation and Dose Required for Emergency Contraception

Options Available in Pakistan

	Formulation Per Dose	Common Brand Names	Tablets required per Dose	Doses	Timing of Administration
Combined Pill Regimen	Ethinyl Estradiol 50ug + dl-Norgestrel 500ug	<ul style="list-style-type: none"> • Ovrал 	2	2	First Dose within 72 hours of unprotected sex. Second Dose 12 hours later
	Ethinyl Estradiol 30ug + Levonorgestrel 150ug	<ul style="list-style-type: none"> • Nordette • Nova • Famila 28 	4	2	”
Progestogen only regimen	Levonorgestrel 750ug	<ul style="list-style-type: none"> • Postinor 	1	2	”

Source: Emergency Contraception: A Guide for service delivery
WHO / FRH / FPP / 98.19

Annexure 1

PREPARING A 0.5 % CHLORINE SOLUTION

To decontaminate items, use a 0.5% chlorine solution or a solution made from another acceptable disinfectant. Chlorine is the cheapest, most universally available disinfectant.

How to Make a 0.5% Chlorine Solution

A solution that is too weak (less than 0.5% active chlorine) may not adequately kill microorganisms during the recommended time for soaking. A solution that is too strong (more than 0.5% active chlorine) may increase the cost of supplies by using more bleach than necessary and may damage instruments, other items, and environmental surfaces.

Because of their low cost and wide availability, chlorine solutions prepared from liquid or powdered bleach are recommended. A chlorine solution can be made from:

1. **Liquid Household Bleach** (Sodium Hypochlorite)
2. **Bleach Powder** (Chlorine compounds available in powder form (Calcium Hypochlorite or Chlorinated Lime)
3. **Chlorine-releasing Tablets** (Sodium Dichloroisocyanurate)

Chlorine-containing compounds are described as having a certain percentage of “active” (or available) chlorine. It is the active chlorine in these products that kills microorganisms. The amount of active chlorine is usually described as a percentage, and differs from one product to another. This is important so that a chlorine solution with 0.5% “active” chlorine can be prepared.

About Chlorine

Chlorine is one of the oldest and most common compounds used as a disinfectant because:

- **It is a proven and powerful killer of microorganisms.**
- **It deodorizes.**
- **It is not poisonous to humans in the concentrations in which it is used.**
- **It leaves no poisonous residue.**
- **It is colorless, easy to handle, and economical to use.**

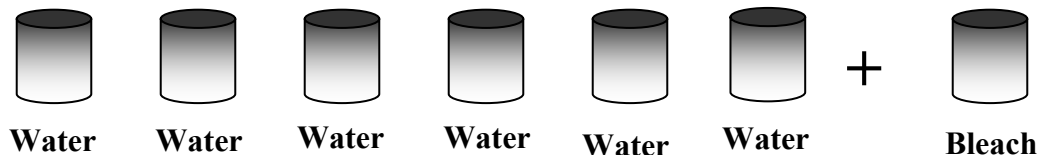
1. Using Liquid Household Bleach

Chlorine in bleach comes in different concentrations. You can use any type of bleach, no matter what the concentration, to make a 0.5% chlorine solution by using the following formula:

$$[\% \text{ active chlorine in liquid bleach} \div 0.5\%] - 1 = \text{Parts of water for each part bleach}$$

Note that “parts” can be used for any unit of measure (e.g. ounce, litre or gallon) and need not even represent a defined unit of measure (e.g. a pitcher or container may be used).

Example: To make 0.5% chlorine a solution from bleach with 3.5% active chlorine, you must use 1 part bleach and 6 parts water:



$$[3.5\% \div 0.5\%] = [7] - 1 = 6 \text{ parts water for each part bleach}$$

2. Using Bleach Powder

If using bleach powder, calculate the ratio of bleach to water using the following formula:

$[0.5\% \div \% \text{ active Chlorine in bleach powder}] \times 1000 = \text{grams of powder for each litre of water}$

Example: To make a 0.5% Chlorine solution from Calcium Hypochlorite powder containing 35% available Chlorine:

$$[0.5\% \div 35\%] \times 1000 = [0.0143] \times 1000 = 14.3 \text{ grams}$$

Therefore, you must dissolve 14.3 grams of Calcium Hypochlorite powder in 1 litre of water in order to get a 0.5% chlorine solution.

Note that when bleach powder is used, the resulting chlorine solution is likely to be cloudy (milky).

3. Using Chlorine-releasing Tablets

Follow the manufacture’s instructions, since the percentage of active chlorine in these products varies. If the instructions are not available with the tablets from your supply source, ask for the product’s instruction sheet or contact the manufacturer.

Annexure 2

TT Vaccination Schedule

All pregnant women attending antenatal care clinic should be assessed and given tetanus toxoid according to immunization status:

1. If any lady received 3 doses of DPT in infancy, comes for TT vaccination, then these 3 doses will be counted as 2 doses of Tetanus Toxoid, give her 3 more doses. 1 in first contact or 1st pregnancy and other 2 in succeeding pregnancies or after one year each.
2. If the lady received 3 DPT in infancy and one booster after 15-18 months, these will be counted as 3 doses of TT. Give her only 2 more doses of TT at the interval of one year i.e. one at present pregnancy and 1 in 2nd pregnancy or after 1 year.
3. If any lady received 5 doses of DPT i.e. 3 DPT at infancy, one booster after 15-18 months and one booster at school entry, then give her only one dose.
4. If the lady received 6 doses of DPT i.e. 3 DPT at infancy, one booster after 15-18 months and one booster at school entry and one at school leaving, she does not need any TT vaccination, but it is subjected to the production of card.

If the lady has never received any TT vaccination, then the recommended 5 doses schedule is shown in the box below. The 5 doses of 0.5 ml, once completed will provide **lifelong protection**.

TT1: At first contact, or as early as possible during pregnancy

TT2: At least 4 weeks after TT1

TT3: At least 6 months after TT2, or during next pregnancy

TT4: At least 1 year after TT3, or during next pregnancy

TT5: At least 1 year after TT4, or during next pregnancy

VAGINAL BLEEDING IN LATER PREGNANCY AND LABOUR (ANTEPARTUM /INTRAPARTUM HAEMORRHAGE)

DEFINITIONS

ANTEPARTUM HAEMORRHAGE (APH)

Vaginal bleeding after 24 weeks of pregnancy (WHO defines it as “after 22 weeks of pregnancy”), before the delivery of the baby.

This bleeding could be due to Heavy Show, Abruptio Placentae, Placenta Praevia or Ruptured Uterus.

- **Show**

Blood stained mucous discharge at the onset of labour. Sometimes there may be fresh bleeding which may be heavy.

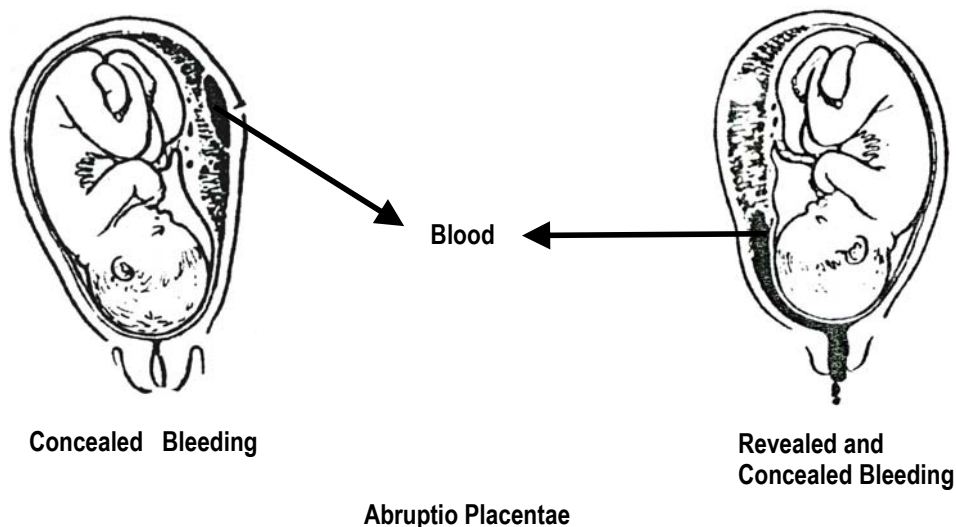
Causes of APH

- **Abruptio Placentae / Accidental Haemorrhage**

Bleeding due to separation of a **normally situated placenta** from the wall of the uterus before the delivery of the baby. Bleeding may be:

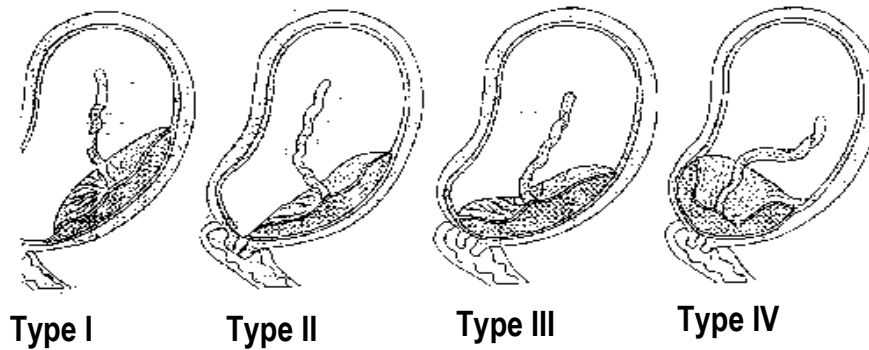
- **Concealed / Hidden:** when in spite of the separation of the placenta there is no visible vaginal bleeding and this may result in delay in diagnosis.
- **Revealed / Visible:** visible vaginal bleeding as a result of placental separation.
- **Combined (Concealed and Revealed):** part of the blood loss remains hidden and some blood is seen flowing out of the vagina.

Couvelaire Uterus occurs in Abruptio Placentae. Blood is forced between the muscle fibres of the uterus as a result of separation of the placenta, and the uterus becomes swollen and discoloured. This can be seen during Caesarian section.



- **Placenta Praevia**

Vaginal bleeding due to separation of **placenta, situated in the lower part of the uterus**, and may cover the cervical os. Placenta praevia may be of different degrees (type I - IV) depending on how low the placenta is situated. Type I and II are considered minor degrees and Type III and IV are major degrees of placenta praevia.



Types of Placenta Praevia

Placenta Accreta / Increta / Percreta, a deeply adherent placenta: This abnormal implantation of placenta is more likely to occur in placenta praevia, but can also occur in a normally situated placenta. A normal placenta does not penetrate beyond the endometrium (lining of the uterine cavity). When there is deep implantation of the placenta into the wall of the uterus reaching and penetrating the myometrium (muscle layer of the uterine wall), the placenta cannot be easily separated, from the wall of the uterus. This results in retained placenta.

- **Ruptured Uterus**

The uterus may tear / give way due to:

- Prolonged / Obstructed Labour.
- Injudicious use of Syntocinon (oxytocics) especially in a multiparous woman.
- If there is a scar on the uterus due to previous surgery (Caesarean Section / Myomectomy etc).

- **Incidental Causes of APH**

Cervical Polyp, Severe Cervicitis, or rarely Cancer of the Cervix can lead to light or heavy vaginal bleeding during pregnancy.

- **Coagulopathy**

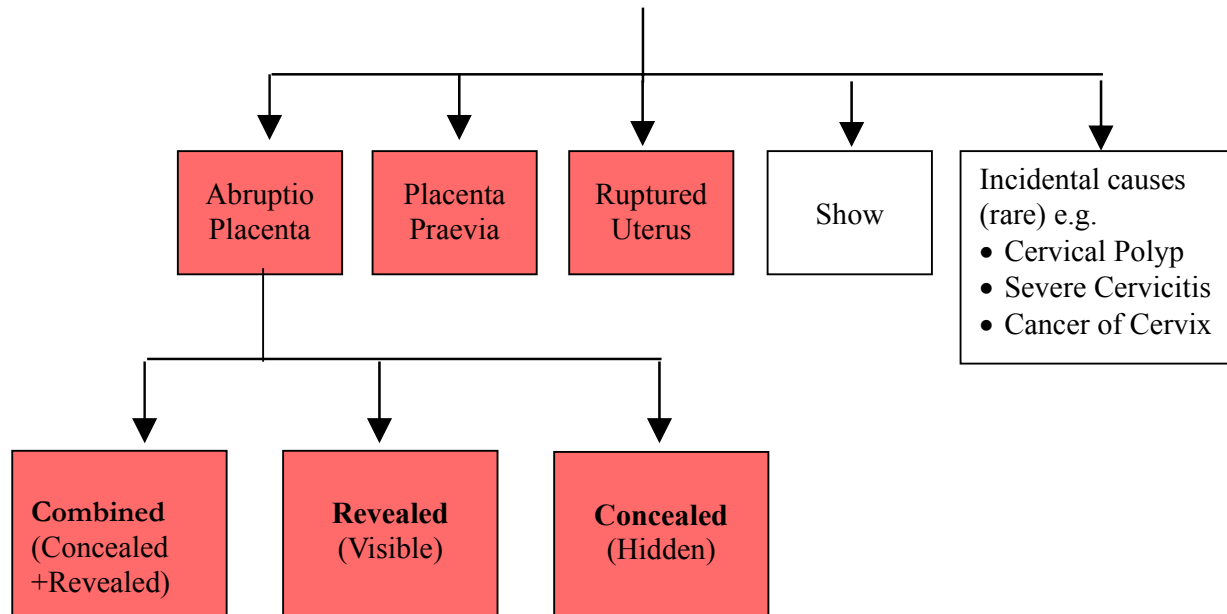
Failure of the blood to clot due to a deficiency / consumption of clotting factors in the blood.

Coagulopathy may be a result of:

- Massive Obstetric Haemorrhage
- Abruption Placentae
- Fetal Death in-Utero
- Eclampsia
- Septicaemia
- Amniotic Fluid Embolism
- Hydatidiform Mole
- Many other causes can trigger it.

This is usually detected by bruising / bleeding from all needle puncture sites, or blood in urine (haematuria), or the patient may have no symptoms and the condition may only be detected by bedside clotting test (page 23), or laboratory testing (page 102).

**VAGINAL BLEEDING IN LATER PREGNANCY AND LABOUR
(ANTEPARTUM /INTRAPARTUM HAEMORRHAGE)**



Coagulopathy can be a cause as well as a result of massive obstetric haemorrhage.

Any Vaginal bleeding needs EmOC.

Pink Blocks Indicate Life – Threatening Conditions

Assessing the Patient

Guidelines for Clinical Assessment of Patients with Vaginal Bleeding in Later Pregnancy and Labour

CLINICAL ASSESSMENT	
History	<p>Inquire from the patient or accompanying person and record the following information:</p> <ul style="list-style-type: none"> • Amenorrhoea (how long ago did she have her last menstrual period). • Bleeding (duration and amount). • Abdominal pain (constant / intermittent, duration and severity). • Fetal movements (present / absent / reduced). • Injury (domestic violence / fall / road traffic accident). • Oxytocics used? • Previous surgery on the uterus. • Hypertension in current or previous pregnancy. <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-top: 10px;">Simultaneously provide emergency care and record history</div>
General Physical Exam	<ul style="list-style-type: none"> • Check and record vital signs (blood pressure, pulse, respiration and temperature). • Note general health of woman (anaemic, malnourished). • Examine lungs, heart, abdomen and extremities. • In abdominal examination check: <ul style="list-style-type: none"> - If the size of the uterus is equal to the period of gestation. - If the uterus is tense and hard or relaxed and soft. - If there is localized area of tenderness on the uterus. - Lie and presentation of fetus. - Presenting part is free / high or engaged / gone inside the pelvis. - Fetal parts are easily felt. - Fetal heart sounds are present or absent. - If the abdomen is distended, free fluid (consider ruptured uterus).
Pelvic Exam	<ul style="list-style-type: none"> • Do not do a vaginal examination at this stage. • Assess the amount of bleeding. <p>If heavy bleeding, or fetal distress, or term pregnancy, examine in double set up (page 98).</p> <p>If bleeding has stopped or slight and pregnancy is preterm, defer examination.</p> <ul style="list-style-type: none"> • If patient is in labour, and delivery has been attempted by forceps / vacuum extraction, check for cervical or vaginal lacerations.
Investigations (where facilities exist)	<ul style="list-style-type: none"> • Hb, Total Leucocyte Count, Platelets, Random Blood Sugar, Urea, Creatinine and Electrolytes. • Blood group and Rhesus (Rh) factor. • Bedside clotting test, if coagulopathy is suspected (page 23). • Ultrasound to check placental site, fetal maturity etc. if the bleeding is not life threatening. • Other tests may be needed in cases with complications.

Identifying the Problem

Vaginal Bleeding In Later Pregnancy And Labour

Symptoms	Signs	Probable Diagnosis
<ul style="list-style-type: none"> Vaginal bleeding mixed with mucus. 	<ul style="list-style-type: none"> Signs of early labour. Mild / irregular uterine contractions. 	Show
<ul style="list-style-type: none"> Vaginal bleeding after 28 weeks gestation (may be retained in the uterus). Intermittent or constant abdominal pain. Decreased / absent fetal movements. There may be h/o high blood pressure, external version or trauma to the abdomen. 	<ul style="list-style-type: none"> Shock may be out of proportion to the amount of visible blood loss. Tense / tender uterus. Fetal presenting part may be engaged. Fetal distress or absent fetal heart sounds. 	Abruptio Placentae
<ul style="list-style-type: none"> Vaginal bleeding after 28 weeks gestation. Usually there is no pain. h/o previous small “warning bleeds”. Bleeding may be precipitated by intercourse. 	<ul style="list-style-type: none"> Shock in proportion to the amount of visible blood loss. Relaxed soft, non tender uterus. Fetal presenting part not in the pelvis / lower uterine pole feels empty. Fetus may be in oblique / transverse lie. Usually normal fetal condition. 	Placenta Praevia
<ul style="list-style-type: none"> Vaginal bleeding (usually not heavy). Strong intermittent uterine contractions replaced by continuous pain. h/o caesarean section. Prolonged / obstructed labour in current pregnancy. h/o being given oxytocic drugs. ± h/o of being managed by unskilled health care provider. 	<ul style="list-style-type: none"> Shock may be out of all proportion to the amount of visible blood loss (because of intra abdominal bleeding). Abdominal distension / free fluid. Abnormal uterine shape. Tender abdomen. Easily palpable fetal parts. Fetal distress / Absent fetal heart sound and fetal movements. Haematuria. 	Ruptured Uterus
<ul style="list-style-type: none"> Vaginal bleeding after 28 weeks gestation. May have no other symptoms. 	<ul style="list-style-type: none"> Blood fails to clot. Easy bruising. Bleeding from needle puncture sites. Haematuria. Underlying conditions like Eclampsia / Abruptio Placentae / Intrauterine Death / Septicaemia / Amniotic Fluid Embolism / Hydatidiform Mole may be present. 	Coagulopathy (Clotting Failure)

GENERAL MANAGEMENT

- **Get all possible help.** Urgently mobilize all available personnel, as team management improves patient care.
- Rapidly evaluate general condition of the woman including blood pressure, pulse, respiration, and temperature. Assess the fetal condition and estimate the amount of blood loss (visible / hidden).

Do not do a vaginal examination at this stage.

- If **Shock is present or anticipated**, immediately begin treatment. Remember her status may worsen rapidly.
 - Insert two large bore I/V cannula (gauge 16 or more), each at different site.
 - From one of the cannula, first collect blood for estimation of Hb, Random Blood Sugar, Blood Group and cross match.
 - Perform bedside clotting test (page 23) if coagulopathy is suspected.
 - Infuse I/V fluids like Normal Saline or Ringer's Lactate (page 9). Infuse rapidly if in shock.
 - If in pain give Pethidine, 50-100 mg, I/M **OR** Nalbuphine Hydrochloride (Nubain), 10-20 mg, I/M.
 - If bleeding is heavy, pass a Foley's catheter and monitor urine output.
 - Keep a record of the infused fluids and maintain a strict fluid balance chart.
 - If any surgical intervention is anticipated, do not allow any fluids or food orally.
 - Monitor blood pressure, pulse, respiration, temperature, fetal condition and the amount of blood loss every 15-30 minutes.
 - If there is heavy bleeding or evidence of fetal distress, urgent delivery will be necessary.
 - If comprehensive EmOC facilities are not available, **Refer.**
 - Counsel donors for blood transfusion.
-
- Arrange at least 2 – 4 units of blood, if there is heavy bleeding.

Transfuse blood if indicated. In emergencies and life saving situation, consider transfusing uncross matched O negative blood or ABO group specific uncross matched blood (page 14).

SPECIFIC MANAGEMENT

ABRUPTIO PLACENTAE

Symptoms

- Vaginal bleeding after 28 weeks gestation.
- Intermittent or constant abdominal pain.
- Decreased / absent fetal movements.
- There may be h/o high blood pressure, external version or trauma to the abdomen.

Signs

- Shock may be out of proportion to the amount of visible blood loss.
- Tense / tender uterus.
- Fetal presenting part may be engaged.
- Fetal distress or absent fetal heart sounds.

Investigations (where possible)

- Hb, Platelets, Random Blood Sugar, Urea, Creatinine and Electrolytes.
- Blood group and Rhesus (Rh) factor.
- Urine for protein & sugar.
- Ultrasound to check placental site, fetal maturity etc. if the bleeding is not life threatening.
- Other tests may be needed in cases with complications.
- Assess clotting status using a bedside clotting test. Failure of a clot to form after 7 minutes, or a soft clot that breaks down easily suggests coagulopathy (page 23).

Management

- Transfuse as necessary.

☞ **If bleeding is heavy / moderate** (visible or hidden), delivery should take place as soon as possible (baby is usually dead):

- If the patient is obviously in **second stage** of labour with presenting part on the perineum, deliver by vacuum extraction or forceps.

- **If she does not seem to be in labour:**

- Examine in the operation theatre in the presence of a team who can perform caesarean section.

- **If the patient is in labour:**
 - If the **cervix is fully dilated**, deliver by vacuum extraction / forceps (page 248 / 251).
 - If the cervix is not fully dilated, rupture the membranes and augment labour with Syntocinon infusion (page 236).
 - **If patient is not in labour**, but ARM is possible, rupture the membranes using Kocher forceps or an amnihook, if available. Augment labour with Syntocinon infusion (page 236).
- Deliver by caesarean section, if:
 - The patient continues to bleed heavily.
 - Progress of labour is not satisfactory.
 - The cervix is unfavourable (rupture of membranes not possible).

Examination of the placenta after its expulsion shows a zone in which the clot remains fixed to the maternal surface and is older in appearance than the fresh clot that forms during the delivery of the baby.

- ☞ **If bleeding is light** (the mother is not in immediate danger), the course of action depends on the fetal heart sounds and whether the cervix is favourable or unfavourable:
 - If fetal **heart rate is** normal or absent and the cervix is favourable or even if unfavourable, but ARM is possible, rupture the membranes with a Kocher clamp or an amnihook, if available (page 235).
 - **If contractions are poor**, augment labour with Syntocinon infusion.

-
- If the **cervix is unfavourable** (firm, thick, closed) and ARM is not possible, deliver by caesarean section.

- **If fetal heart rate is abnormal** (less than 100 or more than 160 beats per minute):
 - Perform rapid vaginal delivery.
 - If vaginal **delivery is not** possible, deliver by immediate caesarean section.

In every case of Ante Partum Haemorrhage (APH), anticipate and be prepared to deal with Post Partum Haemorrhage (PPH).

APH weakens and PPH kills

Complications of Abruption Placentae:

- Haemorrhagic Shock
- Clotting Defect
- Kidney Failure
- Maternal Death
- Fetal Asphyxia and Death

SPECIFIC MANAGEMENT

PLACENTA PRAEVIA

Symptoms

- Vaginal bleeding after 28 weeks gestation.
- Usually there is **No** pain.
- H/o previous small “warning bleeds”.
- Bleeding may be precipitated by intercourse.

Signs

- Shock in proportion to the amount of visible blood loss.
- Relaxed soft, non tender uterus.
- Fetal presenting part not in the pelvis / lower uterine pole feels empty.
- Fetus may be in oblique / transverse lie.
- Usually there is no fetal distress.

Investigations (where possible)

- Hb, Random Blood Sugar.
- Blood group and Rhesus (Rh) factor.
- Bedside clotting test if coagulopathy is suspected.
- Ultrasound to check placental site, fetal maturity etc. if the bleeding is not life threatening.
- Other tests may be needed in cases with complications.

Management

Warning:

- **Do not perform a vaginal examination, unless facilities for caesarean section exist and preparations have been made for immediate caesarean section.**
- If placenta praevia is diagnosed or suspected, **refer** to a health care facility providing comprehensive EmOC.
- Once placenta praevia is excluded and bleeding has stopped, a careful speculum examination may be performed to rule out other causes of bleeding such as cervicitis, trauma, cervical polyps or cervical malignancy. The presence of these, however, does not rule out placenta praevia.
- Assess the amount of bleeding:

-
- **If bleeding is heavy and continuous**, arrange for caesarean delivery irrespective of fetal maturity.
 - **If bleeding is light or if it has stopped** and the **fetus is alive but premature** (less than 37 weeks of gestation), consider **expectant management** until delivery or heavy bleeding recurs.

Expectant Management

- Keep the woman in the hospital until delivery.
- Correct anemia with Ferrous Sulfate **or** Ferrous Fumerate, 60 mg, by mouth, daily.
- Ensure that 2 pints of screened and cross-matched blood is available at all times for transfusion, if required.
- If the fetus is less than 34 weeks of gestation, to improve fetal lung maturity, give Dexamethasone, 12 mg, I/M, and repeat in 12 hours (2 doses only).
- **If bleeding recurs**, decide management after weighing benefits and risks for the woman and fetus of further expectant treatment versus delivery.
- When the baby is mature, reassess and deliver according to the management guidelines as given below.

Confirming the Diagnosis

- If a **reliable ultrasound examination** can be performed, localize the placenta. **If Placenta Praevia (type III or IV) is confirmed and the fetus is mature**, perform caesarean section. **If type I or II Placenta Praevia is confirmed** examine in **double set up** as below and manage accordingly.
- If **ultrasound is not available** or the report is unreliable and the **pregnancy is less than 37 weeks**, manage as placenta praevia until 37 weeks (expectant management).
- If **ultrasound is not available** or the report is unreliable and the **pregnancy is 37 weeks or more**, examine under **double set-up** to exclude placenta praevia.

The double set-up prepares for either vaginal or caesarean delivery, as follows:

- I/V lines are running and cross-matched blood is available.
- The woman is in the operating theatre with the surgical team present.
- A sterile vaginal speculum is used to see the cervix.
- If the **cervix is partly dilated and placental tissue is visible** (rarely seen), placenta praevia is confirmed, perform caesarean section.
- If the **cervix is not dilated**, cautiously palpate the vaginal fornices:
 - **If the feeling is “spongy”**, placenta praevia is confirmed, perform caesarean section.
 - **If a firm fetal head is felt**, major placenta praevia is ruled out and proceed to deliver by induction of labour (page 232).
- If a **diagnosis of placenta praevia is still in doubt, and the cervix is partly dilated** cautiously insert the fingers in the cervical os.
 - If **soft tissue is felt within the cervix**, placenta praevia is confirmed, perform caesarean section.

- **If membranes and fetal parts are felt** both centrally and marginally, rule out placenta praevia and proceed to deliver by induction.

There is no place for expectant management in a health centre, where facilities for blood transfusion and caesarean section do not exist.

Delivery

- **Plan delivery if:**

- The fetus is mature.
- The fetus is dead or has an anomaly not compatible with life (e.g. anencephaly).
- The woman's life is at risk because of excessive blood loss.

- If there is **low placental implantation (Type I, II)** and bleeding is **light**, vaginal delivery may be possible. Otherwise, deliver by caesarean section.

Women with placenta praevia are at a high risk of having placenta accreta / increta / percreta, (common at the site of a previous caesarean scar). Be prepared for severe PPH and perform hysterectomy if required.

- **If delivered by caesarean section and there is bleeding from the placental site, the following actions can be taken:**

- Under-run the bleeding sites with sutures.
- Give Ergometrine, 0.2 mg, I/M **and** / **or** Syntocinon, 10 units, I/M or slow I/V.
- Infuse Syntocinon, 20-30 units in 1 L I/V fluids (Normal Saline or Ringer's Lactate), at 60 drops per minute.
- Inject Syntocinon, 10 units, directly into the myometrium.
- Inject Prostin F2 alpha (Dinoprost), 5 mg, I/M or directly into the myometrium.
- Insert Misoprostol (Cytotec), 1000 mcg, (5 tabs of 200 mcg) rectally.
- Insert Prostaglandin E2 (Dinoprostone) vaginal pessary, 3 mg, rectally (available as Prostin / Glandin).

The above Oxytocics can be used simultaneously or one after the other.

- Pack the uterine cavity with gauze pack, taking care not to include it in the sutures.
- If bleeding does not stop, uterine / internal iliac artery ligation (page 136), or hysterectomy (page 276) may be necessary.
- If bleeding occurs during the postpartum period, initiate appropriate management. This may include use of Oxytocics as above and uterine / utero-ovarian / internal iliac artery ligation or hysterectomy.

SPECIFIC MANAGEMENT

RUPTURED UTERUS

Symptoms

- Vaginal bleeding.
- Strong intermittent uterine contractions replaced by continuous pain.
- Prolonged / obstructed labour in current pregnancy.
- \pm h/o inappropriate use of oxytocic drugs.
- \pm h/o of being managed by an untrained health care provider.
- May give history of previous caesarean section.

Signs

- Shock may be out of proportion to the amount of visible blood loss.
- Abdominal distension / free fluid.
- Abnormal uterine shape.
- Tender abdomen.
- Easily palpable fetal parts.
- Absent fetal movements and fetal heart sound.

Investigations (where possible)

- Hb, Total Leucocyte Count, Platelets, Random Blood Sugar, Urea, Creatinine and Electrolytes, Urine for albumin & sugar.
- Blood group and Rhesus (Rh) factor.
- Bedside clotting test if coagulopathy is suspected.
- Other tests may be needed in cases with complications.

Management

Bleeding from a ruptured uterus may occur vaginally, unless the fetal head blocks the birth canal. Bleeding may also occur intra-abdominally and blood may be present in the urine. Rupture of the lower uterine segment into the broad ligament, however, will not release blood into the abdominal cavity.

- If suspected, **stabilize** and **refer immediately** to a health care facility providing comprehensive EmOC.

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- When stable, immediately perform laparotomy and deliver baby and placenta.
 - If possible **repair the uterus, as this involves less operative time and blood loss** than hysterectomy (page 272).
 - If the **edges of the tear are necrotic**, excise the necrotic areas and repair the uterus. If there are big necrotic areas and excision is not possible, perform hysterectomy (page 276).

After the uterus is repaired, there is an increased risk of uterine rupture in subsequent pregnancies and labour. The option of tubal ligation should be discussed with the woman before surgery.

- If the **uterus cannot be repaired**, perform subtotal / total hysterectomy. If the **tear extends through the cervix**, total hysterectomy will be required.

Do not remove normal ovaries.

- Tubal ligation should be performed in a multiparous woman after counseling the woman (if conscious) and the husband (page 262). If tubal ligation is not performed, it may be performed as an interval procedure later.
- If tubal ligation is not performed, in subsequent pregnancies, the woman should be delivered by elective caesarean section, in a tertiary health care facility.

SPECIFIC MANAGEMENT

COAGULOPATHY (CLOTTING FAILURE)

Symptoms

- Vaginal bleeding after 28 weeks of pregnancy.

Signs

- Blood fails to clot.
- Easy bruising.
- Bleeding from needle puncture sites.
- Haematuria

Investigations (where possible)

- Bedside clotting test.
- Hb, Platelets, Random Blood Sugar, Urea, Creatinine and Electrolytes, Urine for albumin & sugar.
- Blood group and Rhesus (Rh) factor.
- Prothrombin Time (PT), Activated Partial Thromboplastin Time (APTT), Fibrin Degradation Products (FDP).
- Ultrasound to check placental site, fetal maturity etc. if the bleeding is not life threatening.
- Other tests may be needed in cases with complications.

Management

-
-
- Treat the possible cause of coagulation failure e.g:
 - Abruptio Placentae
 - Eclampsia
 - Intrauterine Death
 - Hydatidiform Mole

In many cases of acute blood loss, the development of coagulopathy can be prevented if blood volume is restored promptly by infusion of I/V fluids (Normal Saline or Ringer's Lactate).

- Use blood products to help control haemorrhage:
 - Give **fresh** whole blood, if available (screened if possible), to replace clotting factors and red cells.
 - If fresh **whole blood is not available**, choose one of the following **depending on availability**:

- Fresh Frozen Plasma, for replacement of clotting factors (15 ml/kg body weight).
- Packed (or sedimented) red cells, for red cell replacement.
- Cryoprecipitate, to replace fibrinogen.
- Platelet concentrates (if bleeding continues and the platelet count is less than 20,000).

In conditions leading to coagulopathy, laboratory tests if available, will show:

- Reduced coagulation factors (so all clotting tests are prolonged).
- Low fibrinogen.
- Low platelet count.
- Fragmented red cells on the blood film.

SPECIFIC MANAGEMENT

SHOW

- Confirm labour.
- Manage labour according to protocol.

INCIDENTAL CAUSES

- Exclude life-threatening causes of antepartum haemorrhage.
- Once the bleeding settles perform speculum examination to look for local causes of bleeding e.g. severe cervicitis, cervical polyp or cancer of the cervix.
- Refer for appropriate treatment.

SKILLS REQUIRED TO MANAGE ANTE PARTUM HAEMORRHAGE

- Bedside Clotting Test (page 23)
- Artificial Rupture of Membranes (page 235)
- Induction of Labour (page 232)
- Instrumental Delivery
 - Vacuum Extraction (page 248)

-
- Forceps (page 251)
-
-

- Caesarean Section (page 254)
- Repair of Ruptured Uterus (page 272)
- Subtotal / Total Hysterectomy (page 276)
- Uterine / Utero Ovarian Artery Ligation (page 136)

VAGINAL BLEEDING AFTER CHILD BIRTH (POST PARTUM HAEMORRHAGE)

DEFINITIONS

- **Post Partum Haemorrhage (PPH)**

Vaginal bleeding in excess of 500 ml (approximately 2 cupful) after childbirth, irrespective of placenta being delivered or not. **It is the most common cause of Maternal Death in Pakistan.**

- **Immediate Post Partum Haemorrhage (Primary PPH)**

Post Partum Haemorrhage, which occurs within the first 24 hours after childbirth.

- **Delayed Post Partum Haemorrhage (Secondary PPH)**

Post Partum Haemorrhage, which occurs after the first 24 hours until 6 weeks after childbirth.

- Estimates of blood loss are usually inaccurate, often less than the actual loss, as blood is mixed with amniotic fluid and sometimes with urine and is dispersed on sponges, towels and linens, in buckets and on the floor.
- Bleeding may occur at a slow rate over several hours and the condition may not be recognized, until the woman suddenly enters shock.

The degree of danger of a given volume of blood loss varies with the woman's haemoglobin level. A woman with a normal haemoglobin level will tolerate blood loss that could be fatal for an anemic woman.

- **Atonic Post Partum Haemorrhage**

Excessive bleeding (PPH) due to failure of uterus to contract.

- **Traumatic Post Partum Haemorrhage**

Excessive bleeding (PPH) due to injury of the genital tract during the process of childbirth.

- **Retained Placenta**

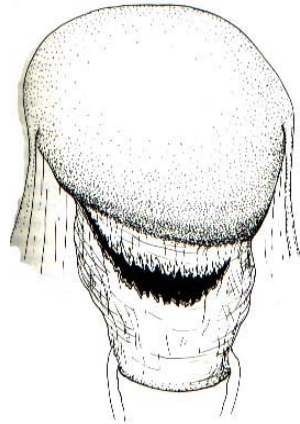
When the placenta is not expelled within 30 minutes after the birth of the baby.

- **Retained Placental Fragments**

When a portion of placenta is retained.

- **Post Partum Haemorrhage Due to Ruptured Uterus**

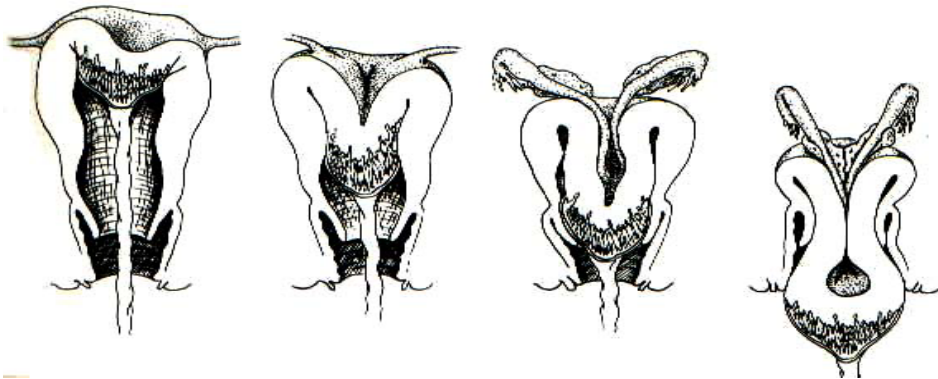
The uterus may tear / give way during childbirth but excessive bleeding occurs usually after the baby is born.



Ruptured Uterus

- **Inversion of Uterus**

The uterus is turned inside out, and may be seen bulging out of the vagina.

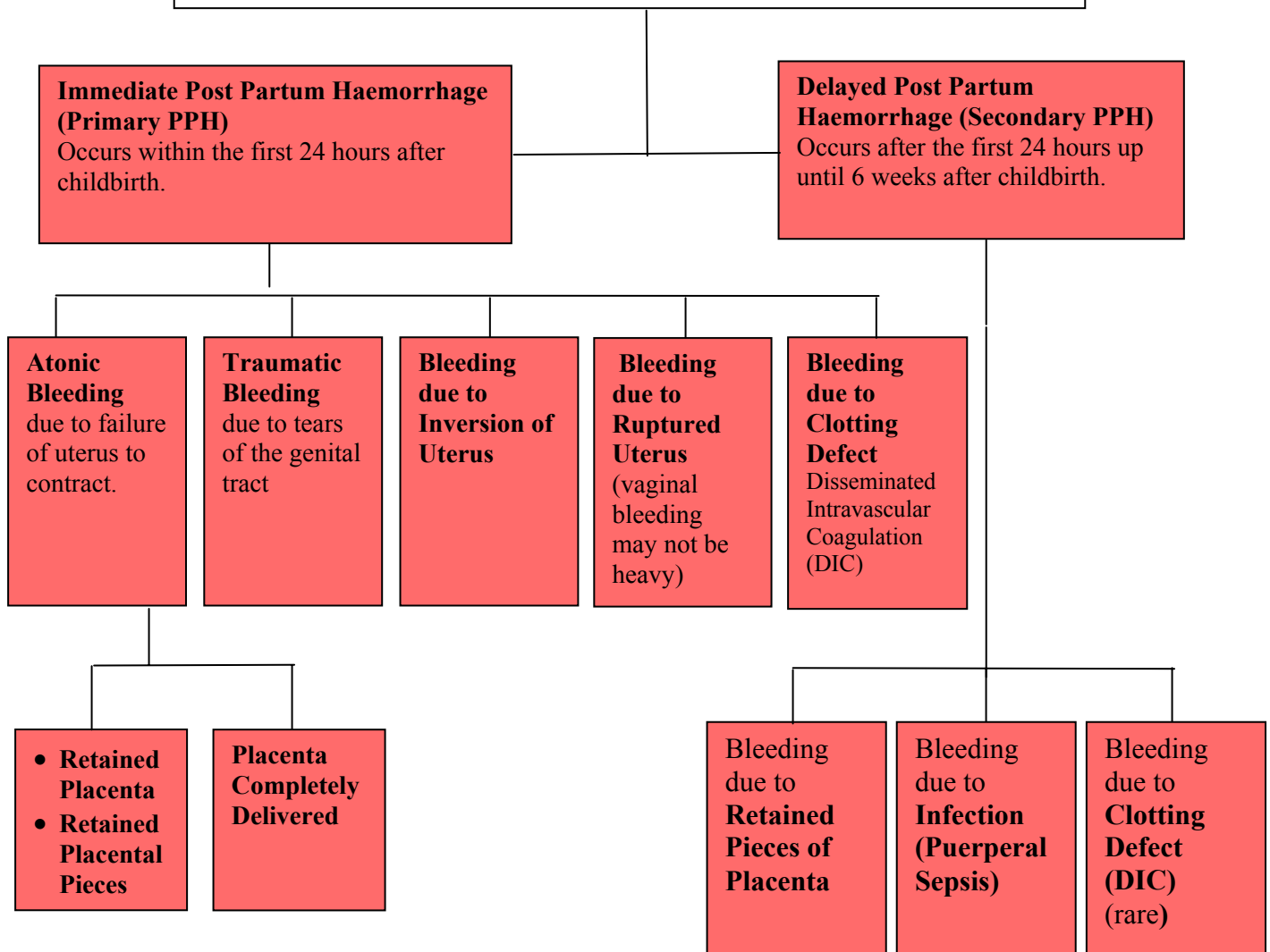


Inversion of the Uterus (Different Degrees)

- **Disseminated Intravascular Coagulation (DIC)**

Excessive bleeding (PPH) due to deficiency of clotting factors in the blood.

**VAGINAL BLEEDING AFTER CHILDBIRTH
POST PARTUM HAEMORRHAGE (PPH)**



Every woman should be under constant observation during the first 4-6 hours after childbirth. Slow but prolonged bleeding is as dangerous as sudden and heavy bleeding.

Pink Blocks Indicate Life-Threatening Conditions

Guidelines for Clinical Assessment of Patients with Vaginal Bleeding After Childbirth

Clinical Assessment	
History	<p>Inquire and record the following information:</p> <ul style="list-style-type: none"> • Bleeding (duration and amount). • Date / time / place of delivery. • Mode of delivery (normal / forceps / vacuum / caesarean). • Placenta not delivered / delivered (complete / incomplete, if known). • Duration of labour / use of Oxytocin. • Previous caesarean section / myomectomy etc. • Conditions leading to Disseminated Intravascular Coagulation (massive haemorrhage / PIH / fetal death / puerperal sepsis etc). <p>In cases of delayed PPH inquire and record:</p> <ul style="list-style-type: none"> • Passage of pieces of placental tissue per vaginum. • Foul smelling blood / discharge from the vagina.
General Physical Exam	<ul style="list-style-type: none"> • Check and record vital signs (blood pressure, pulse, respiration and temperature). • Note general health of woman (anaemic, malnourished). • Examine lungs, heart, abdomen and extremities. • In abdominal examination check: <ul style="list-style-type: none"> - Size of the uterus. - Uterus whether relaxed or contracted. - Fundus of the uterus felt or not (suspect inversion of uterus). - Abdomen distended / free fluid (ruptured uterus).
Pelvic Exam	<p>Examine the placenta, if available, to ensure that it is complete.</p> <ul style="list-style-type: none"> • Per speculum and bimanual examination: <ul style="list-style-type: none"> - Note the amount / colour of bleeding. - Whether the cervix is open or closed. - Check for cervical / vaginal / perineal lacerations. - Estimate the size of the uterus. - Check for inversion of uterus. • In cases of delayed PPH, check: <ul style="list-style-type: none"> - Whether cervix is open or closed. - If foul-smelling discharge / blood is present. - If any tissue is present in the vagina? Retained placental pieces.
Investigations (where facilities exist)	<ul style="list-style-type: none"> • Bedside clotting test. • Hb, Total Leucocyte Count, Platelet Count, Random Blood Sugar. • Blood group and Rhesus (Rh) factor. Other tests may be needed in cases with complications.

Treatment and assessment should be done simultaneously.

Identifying the Problem

Vaginal Bleeding After Childbirth

Symptoms and Signs	Probable Diagnosis	Caution
Immediate PPH		
<ul style="list-style-type: none"> • Uterus soft, not contracted. • Uterus bigger than expected. • Placenta may be undelivered or delivered partially or completely. 	Atonic Uterus	External bleeding may be light if a clot blocks the cervix.
<ul style="list-style-type: none"> • Bleeding is bright red. • Complete placenta. • Uterus contracted. 	Tears of Cervix or Vagina or Perineum	High vaginal or cervical tears may be difficult to visualize.
<ul style="list-style-type: none"> • Placenta not expelled within 30 minutes after childbirth. • Uterus usually not well contracted. 	Retained Placenta	Hastening placental separation by pulling on the cord may rupture the cord.
<ul style="list-style-type: none"> • Portion of placenta is missing or torn membranes with vessels. • Uterus may or may not be contracted. 	Retained Placental Fragments	Casual examination of placenta cannot identify missed pieces of placenta and membranes.
<ul style="list-style-type: none"> • Uterine fundus not felt on abdominal palpation. • Slight or intense pain. • Inverted uterus may or may not be seen at vulva. 	Inversion of Uterus	There may be no bleeding with complete inversion. Shock may be out of proportion to the amount of blood loss.
<ul style="list-style-type: none"> • Bleeding is intra abdominal and / or vaginal. • Abdominal pain. • h/o obstructed labour / previous caesarean section / instrumental delivery. • Tender abdomen. • Haematuria • <u>+</u> Shock 	Ruptured Uterus	Blood might not be seen at the vulva. In cases of previous caesarean section, uterine rupture may be silent.
Immediate or Delayed PPH		
<ul style="list-style-type: none"> • Blood fails to clot 	Bleeding due to Coagulation Defect (Disseminated Intravascular Coagulation)	This might be the cause or result of PPH.
Delayed PPH		
<ul style="list-style-type: none"> • Uterus softer & larger than expected. • May or may not have foul smelling discharge. 	<ul style="list-style-type: none"> • Retained Products of Conception • <u>±</u> Infection 	Treat early to prevent septicemia.

GENERAL MANAGEMENT

- **CALL FOR HELP.** Urgently mobilize all available personnel.
 - **All actions should be taken simultaneously.**
 - Make a rapid evaluation of the general condition of the woman, including vital signs (pulse, blood pressure, respiration, temperature), colour, consciousness, uterine tone and estimate of blood already lost.
 - If shock is present or anticipated, immediately begin treatment.
 - Massage the uterus to expel blood and blood clots. Blood clots trapped in the uterus will inhibit effective uterine contractions.
 - Insert 2 large bore I/V cannula (gauge 16 or more), at two different sites.
 - From one of the cannula, collect blood to check Haemoglobin, Platelet count, Random Blood Sugar, blood Group, Rhesus factor and urgent cross match.
 - Start an I/V infusion and infuse rapidly (e.g. Dextrose Saline / Normal Saline / Ringer's Lactate).
 - **Give Ergometrine 0.2 mg I/M / Syntocinon 10 units I/M or slow I/V / Misoprostol 1000 µg rectally or orally / Prostaglandin F2a 0.25mg I/M (These can be used simultaneously or one after the other).**
 - Add 20-30 units of Syntocinon to 1 litre of Dextrose Saline / Ringer's Lactate and infuse at 60 drops per minute.
 - Check to see if the placenta has been expelled and **examine the placenta if available to ensure that it is complete** (page 224).
 - If bleeding continues in spite of a well-contracted uterus examine the cervix, vagina and perineum for tears.
 - Catheterize the bladder, if unable to pass urine.
 - Monitor level of consciousness, blood loss, blood pressure, pulse, urinary output and fluid intake.
 - Maintain strict fluid balance chart.
 - Keep accurate records of vital signs, medications & fluids given and urine output.
-
- Anticipate early the need for blood and transfuse as necessary. In matters of life and death consider transfusing uncross matched O negative or group specific ABO blood.
 - 24 hours **after** the bleeding is controlled, check Haemoglobin or Haematocrit.

SPECIFIC MANAGEMENT

ATONIC UTERUS

An Atonic Uterus fails to contract after delivery

After the placenta is expelled, vessels at the site of placental implantation are constricted by the uterine contraction, favouring the blood to clot. Contraction of the uterus stops bleeding, relaxation permits it to continue. Any condition that interferes with uterine contraction, such as a retained placenta, uterine over distension e.g. due to multiple pregnancy and hydramnios leading to poor contractility of uterus will predispose to atonic bleeding.

Symptoms

- Excessive vaginal bleeding within the first 24 hours after childbirth.

Signs

- Patient may be in shock.
- Uterus soft, not contracted.

Investigations (Where possible)

- Hb, Platelet Count.
- Blood group and Rhesus (Rh) factor.
- Bedside clotting test (if needed).

Management

- Continue to massage the uterus.
- Try putting the baby to breast or use nipple stimulation if the baby will not suckle.
- Use oxytocic drugs, which can be given together, or one after the other (Table 1, page 113).

TABLE 1: DOSAGE OF OXYTOCIC DRUGS

	Oxytocin (Available as Syntocinon)	Ergometrine/ Methyl- ergometrine	15- methyl Prostaglandin F_{2a}	Misoprostol (Cytotec)
Dose and Route	10 units, I/M or slow I/V* I/V: Infuse 20 – 30 units in 1 L I/V fluids, at 60 drops per minute.	0.2 mg, I/M*	0.25 mg, I/M*	1000 mcg, (5 tablets of 200 mcg each), orally/rectally/ Sublingually
Continuing Dose	I/V: Infuse 20 -30 units in 1 L I/V fluids, at 40 drops per minute.	Repeat 0.2 mg, I/M, after 15 minutes if required. Repeat 0.2 mg, I/M or I/V slowly if required, every 4 hours.	0.25 mg, every 15 minutes	
Maximum Dose	Not more than 3 L of I/V fluids containing Oxytocin.	5 doses (Total 1.0 mg)	8 doses (Total 2 mg)	
Precautions/ Contraindications	Do not give as fast I/V bolus	Pre-eclampsia, Hypertension, Heart disease	Asthma	

* If this doesn't work, then same dose can be given directly in the myometrium.

Prostaglandins should not be given intravenously. They may be fatal.

- **If the uterus fails to contract and bleeding continues** in spite of above management:
 - Perform Bimanual Compression of the Uterus.
 - External Bimanual Compression (page 126).
 - Internal Bimanual Compression (page 126).
 - Alternatively, Compress the Aorta (page 127).

- **If bleeding continues:**

- Assess clotting status using a bedside clotting test. Failure of a clot to form after 7 minutes or a soft clot that breaks down easily suggests coagulopathy (page 23) and manage as on page 102.
 - Check placenta again for completeness (page 224).
 - If there are **signs of retained placental fragments** (absence of a portion of maternal surface or torn membranes with vessels), explore the uterus to remove remaining placental tissue.
-
-

- **If bleeding still continues:**

- Pack the uterine cavity and the vagina. Before packing the uterus, ensure that the placenta is completely delivered and there are no blood clots in the uterine cavity (page 128). Sterile vaginal packs should be ready at all times.

- **If bleeding still continues:**

- Perform B-Lynch Suture (page 136(a & b))

- **If bleeding still continues:**

- Perform uterine and utero - ovarian artery ligation / bilateral internal iliac artery ligation, seek help of a general surgeon, if required (page 136).
- If **life-threatening bleeding continues** after ligation of arteries, perform subtotal / total hysterectomy (page 276).

SPECIFIC MANAGEMENT

TEARS OF CERVIX, VAGINA OR PERINEUM

Tears of the birth canal are the second most frequent cause of PPH. Tears may coexist with atonic uterus. Postpartum bleeding with a contracted uterus is usually due to a cervical or vaginal tear.

Symptoms

- Excessive vaginal bleeding within the first 24 hours after childbirth. This occurs usually immediately after delivery.

Signs

- Bleeding is bright red.
- Uterus is contracted.
- Complete placenta.

Investigations (Where possible)

- Hb, Platelet Count.
- Blood group and Rhesus (Rh) factor.
- Bedside clotting test (if needed).

Management

- Examine the perineum, vagina and cervix carefully and **repair tears** wherever identified (page 265 & 266).

High vaginal and cervical tears may require referral to high-level facility.

- If **bleeding continues**, assess clotting status using a bedside clotting test. Failure of a clot to form after 7 minutes or a soft clot that breaks down easily suggests coagulopathy (page 23) and is managed as on page 102.

Tears of genital tract may coexist with an atonic uterus.

SPECIFIC MANAGEMENT

RETAINED PLACENTA

Symptoms

- Excessive vaginal bleeding after childbirth (Bleeding will not be excessive if the placenta is not separated).
- Placenta is not expelled.

Signs

- Placenta not expelled within 30 minutes after childbirth.
- Uterus usually not well contracted.

Investigations (Where possible)

- Hb, Platelet Count.
- Blood group and Rhesus (Rh) factor.
- Bedside clotting test (if needed).

Management

There will be no bleeding with retained placenta if the placental separation has not started.

- If **you can see the placenta** at the vulva, ask the woman to push it out. If **you can feel the placenta** in the vagina, remove it.
- Ensure that the bladder is empty. Catheterize the bladder, if necessary.
- If the **placenta is not expelled**, give Syntocinon, 10 units, I/M **or** slowly I/V, if not already given for active management of the third stage. Start Syntocinon infusion as (Table1, page 113).

Do not give Ergometrine because it causes tonic uterine contraction, which may delay expulsion.

- If the **placenta is undelivered after 30 minutes of Oxytocin** stimulation and the **uterus is contracted**, attempt controlled cord traction (CCT) (page 223). Attempt CCT early if there is heavy bleeding.

Note: Avoid forceful cord traction and fundal pressure as they may cause uterine inversion.

- If controlled **cord traction is unsuccessful**, perform **Pipingas technique for removal of retained placenta** (page 130 a)
- If **Pipingas technique is unsuccessful**, perform manual removal of placenta (page 130).

Note: Very adherent tissue may be placenta accreta. Efforts to extract a placenta that does not separate easily may result in heavy bleeding or uterine perforation, which usually requires hysterectomy.

- If **bleeding continues after complete removal of placenta**, assess clotting status using a bedside clotting test. Failure of a clot to form after 7 minutes or a soft clot that breaks down easily suggests coagulopathy (page 23) and is managed as on page 102.
- If **there are signs of infection** (fever, foul-smelling vaginal discharge), give antibiotics (page 44).

SPECIFIC MANAGEMENT

RETAINED PLACENTAL FRAGMENTS

When a portion of the placenta – one or more lobes – is retained, it prevents the uterus from contracting effectively. It can cause both primary and secondary PPH.

Symptoms

- Excessive vaginal bleeding anytime within the first 6 weeks after childbirth.

Signs

- Portion of placenta is missing or torn membranes with vessels indicating a missing lobe of placenta.
- Uterus may or may not be contracted.

Investigations (Where possible)

- Hb, Platelet Count.
- Blood group and Rhesus (Rh) factor.
- Bedside clotting test (if needed).

Management

In case of Primary PPH:

- Feel inside the uterus for placental fragments. Manual exploration of the uterus is similar to the technique described for removal of the retained placenta (page 130).
- Remove placental fragments by hand, sponge forceps or large curette.

Note: Very adherent tissue may be placenta accreta. Efforts to extract fragments that do not separate easily may result in heavy bleeding or uterine perforation, which usually requires hysterectomy (page 276).

- If **bleeding continues**, assess clotting status using a bedside clotting test. Failure of a clot to form after 7 minutes or a soft clot that breaks down easily suggests coagulopathy (page 23) and is managed as on page 102.

In case of Secondary PPH, refer, as evacuation of uterus is required.

There may be no immediate bleeding with retained placental fragments.

SPECIFIC MANAGEMENT

INVERSION OF UTERUS

The uterus is inverted when it turns inside out during delivery of the placenta. The uterus may or may not be seen at the vulva and therefore vaginal examination is necessary to exclude uterine inversion. **Repositioning of the uterus should be performed immediately by the person conducting the delivery.** With the passage of time the constricting ring around the inverted uterus becomes more rigid and the uterus more engorged with blood and hence repositioning of the uterus becomes difficult and requires general anaesthesia.

Symptoms

- Excessive vaginal bleeding within the first 24 hours after childbirth (At times there may be very little bleeding).
- Shock may be out of proportion to the amount of bleeding.

Signs

- Uterine fundus not felt on abdominal palpation.
- Slight or intense pain.
- Inverted uterus may or may not be seen at vulva.

Investigations (Where possible)

- Hb, Platelet Count, Random Blood Sugar.
- Blood group and Rhesus (Rh) factor.
- Bedside clotting test (if needed).

Management

- If the **woman is in severe pain**, give Pethidine, 50-100 mg, I/M or I/V, slowly **or** give Nalbuphine Hydrochloride (Nubain), 10-20 mg, I/M or I/V, slowly.

Note: Do not give oxytocic drugs until the inversion is corrected.

- Reposition the uterus (page 133).
- If **bleeding continues**, assess clotting status using a bedside clotting test. Failure of a clot to form after 7 minutes or a soft clot that breaks down easily suggests coagulopathy and is managed as on page 102.
- Give prophylactic antibiotics (page 44) for at least 5 days after correcting the inverted uterus:
 - Ampicillin, 1 g, I/V **PLUS** Metronidazole, 500 mg, I/V
 - OR**
 - Cefazolin, 1 g, I/V **PLUS** Metronidazole, 500 mg, I/V
- If **there are signs of infection** (fever, foul-smelling vaginal discharge), give antibiotics in therapeutic doses (page 44).

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- In neglected cases if **necrosis is suspected**, perform vaginal hysterectomy. This will require referral to a tertiary care health facility.

SPECIFIC MANAGEMENT

RUPTURED UTERUS

Bleeding is usually intra-abdominal and **may or may not be associated with excessive vaginal bleeding**. There may be severe pain with impending rupture of uterus and once the uterus ruptures the pain may decrease. In obstructed labour the strong intermittent pain due to strong uterine contractions is replaced by continuous pain after rupture. **Think of ruptured uterus in women with prolonged / obstructed labour, previous surgery on the uterus e.g. Caesarean Section and inappropriate use of the oxytocic drugs.**

Symptoms

- Vaginal bleeding within the first 24 hours after childbirth, it may or may not be excessive.
- Abdominal pain, may be severe.

Signs

- Bleeding is intra abdominal and / or vaginal.
- Abdominal distension / Evidence of free fluid in the peritoneal cavity.
- Pallor
- Tender abdomen
- + Shock
- Haematuria

Investigations (Where possible)

- Hb, Platelet Count, Random Blood Sugar.
- Blood group and Rhesus (Rh) factor

Management

-
-
- Perform laparotomy.
 - Repair the uterus if possible (page 272). Perform tubal ligation (page 262) if indicated.
 - Alternatively perform subtotal / total hysterectomy. If the tear extends low down in the cervix perform total hysterectomy (page 279)

Do not remove normal ovaries.

SPECIFIC MANAGEMENT

BLEEDING DUE TO COAGULATION DEFECT (DISSEMINATED INTRA VASCULAR COAGULATION - DIC)

Failure of the blood to clot due to deficiency of clotting factors in the blood. This may be due to massive obstetric haemorrhage, pregnancy induced hypertension, eclampsia, prolonged fetal death, amniotic fluid embolism etc.

Symptoms

- Excessive vaginal bleeding immediately or anytime until 6 weeks after childbirth.

Signs

- Blood fails to clot.
- Bleeding from needle puncture sites.
- Bruising
- \pm Haematuria

Investigations (Where possible)

- Bedside clotting test.
- Hb, Total Leucocyte Count, Platelet Count, Random Blood Sugar.
- Blood group and Rhesus (Rh) factor.
- If facilities exist check:
 - Prothrombin Time (PT)
 - Activated Partial Thromboplastin Time (APTT)
 - Fibrinogen
 - Fibrin Degradation Products (FDP's)
- Perform bedside clotting test (page 23)

Management

- Transfuse blood, Fresh Frozen Plasma (FFP), Platelet concentrate as and when necessary.

In many cases of acute blood loss, the development of coagulopathy can be prevented if blood volume is restored promptly by infusion of I/V fluids (Normal Saline or Ringer's Lactate).

- Use blood products to help control haemorrhage:

- Give **fresh** whole blood, (screened if possible), if available, to replace clotting factors and red cells.
- If fresh whole blood is not available, choose one of the following based on availability:
 - Fresh frozen plasma, for replacement of clotting factors (15 ml/kg body weight).
 - Packed (or sedimented) red cells, for red cell replacement.
 - Cryoprecipitate, to replace fibrinogen.
 - Platelet concentrates (if bleeding continues and the platelet count is less than 20,000).

In conditions leading to coagulopathy laboratory tests if available, will show:

- Reduced coagulation factors (so all clotting tests are prolonged).
- Low fibrinogen
- Low platelet count
- Fragmented red cells on the blood film.

SPECIFIC MANAGEMENT

DELAYED (“SECONDARY”) POSTPARTUM HAEMORRHAGE

Bleeding may be slight or heavy, continuous or irregular. Discharge may be foul smelling. Uterus is soft and larger than expected. Normally, after delivery the uterus is at the level or just below the umbilicus; by the end of first week, it is felt just above the symphysis pubis, at 14 days it is not palpable per abdomen and at six weeks it is back to normal size.

Symptoms

- Excessive vaginal bleeding after first 24 hours and until 6 weeks after childbirth.

Signs

- Uterus softer & larger than expected.
- Uterus may be tender.
- Foul smelling discharge, may or may not be present.

Investigations (Where possible)

- Hb, Total Leucocyte Count, Platelet Count, Random Blood Sugar.
- Blood group and Rhesus (Rh) factor.
- High Vaginal Swab / Cervical Swab / Blood for Culture and Sensitivity.
- Ultrasound to exclude retained products of conception.
- Bedside clotting test (page 23).

Management

- If **anaemia is severe** (haemoglobin less than 7 g/dL or haematocrit less than 20%), arrange for blood transfusion.
- If **there are signs of infection** (fever, foul-smelling vaginal discharge), give antibiotics as for puerperal sepsis (page 200).

Delayed PPH or persistent bleeding may be a sign of Puerperal Sepsis.

- Give oxytocic drugs (Table 1, page 113).
- If the **cervix is dilated**, explore by hand to remove large clots and placental fragments. Manual exploration of the uterus is similar to the technique described for removal of the retained placenta (page 130).

- If the **cervix is not dilated**, dilate the cervix and evacuate the uterus to remove placental fragments.
- If trophoblastic disease is suspected check serum B-Human Chorionic Gonadotrophin (B-HCG).

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-
- Rarely, if **bleeding continues**, consider uterine, utero-ovarian and internal iliac artery ligation (page 136) or hysterectomy (page 276).
 - Wherever possible, send curettings or hysterectomy specimen, for histologic examination, to rule out trophoblastic tumour.

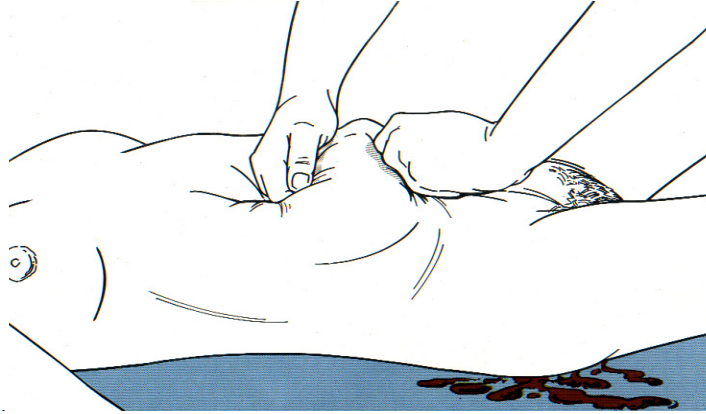
SKILLS REQUIRED TO MANAGE VAGINAL BLEEDING AFTER CHILDBIRTH

- Management of Shock (page 22)
 - Bedside Clotting Test (page 23)
 - Controlled Cord Traction (page 223)
 - Checking for the Completeness of Placenta (page 224)
 - Bimanual Compression of Uterus (External & Internal) (page 126)
 - Manual Compression of Aorta (page 127)
 - Pipingas technique for removal of retained placenta (page 130 a)
 - Manual Removal of Placenta (page 130)
 - Immediate Repositioning of Inverted Uterus (page 133)
 - Repair of Vaginal, Cervical and Perineal Tears (page 265 & 266)
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- Dilatation & Curettage (page 80)
-
-
- Manual Repositioning of Inverted Uterus Under General Anaesthesia (page 133)
 - Packing of Uterus (page 128)
 - Laparotomy for:
 - B-Lynch Suture (page 136 (a & b))
 - Uterine, Utero-Ovarian and Bilateral Internal Iliac Arterial Ligation (page 136)
 - Repair of Ruptured Uterus (page 272)
 - Sub- total / Total Hysterectomy (page 276)
 - Abdomino – Vaginal Correction of Inverted Uterus (page 134)

SKILLS REQUIRED TO MANAGE POST PARTUM HAEMORRHAGE

BIMANUAL COMPRESSION OF UTERUS

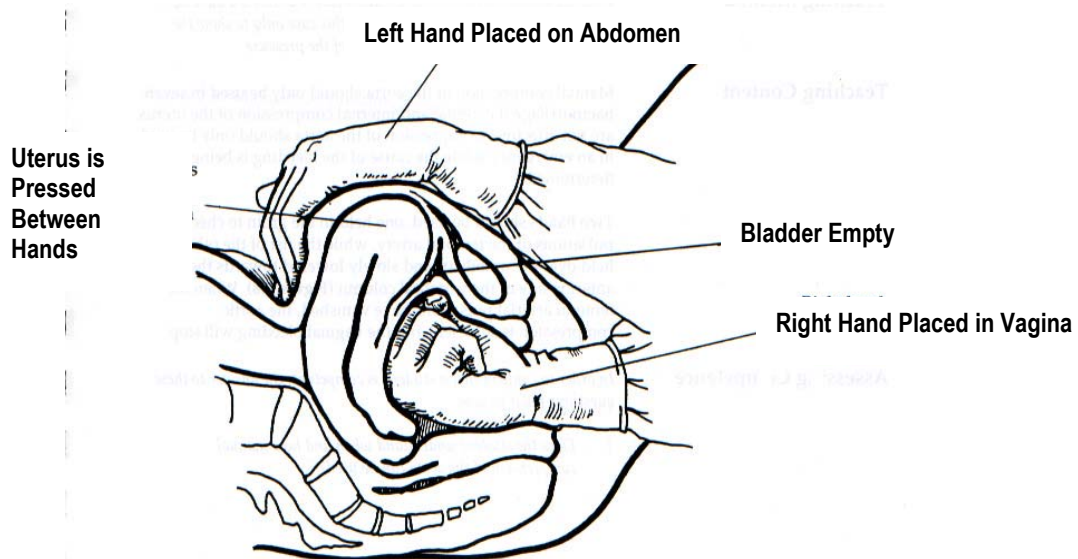
External Bimanual Compression



External Bimanual Compression

- Place the left hand on the fundus and make it go down as far as possible behind the uterus.
- Place the right hand flat on the abdomen between the umbilicus and symphysis pubis.
- Press the hands towards each other in order to compress the blood vessels at the placental site.

Internal Bimanual Compression

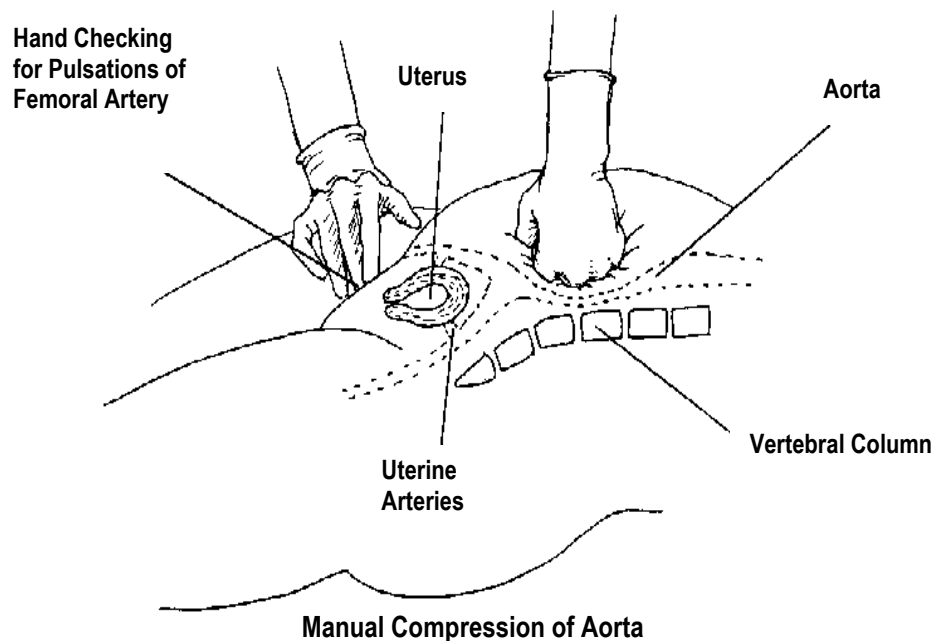


Internal Bimanual Compression

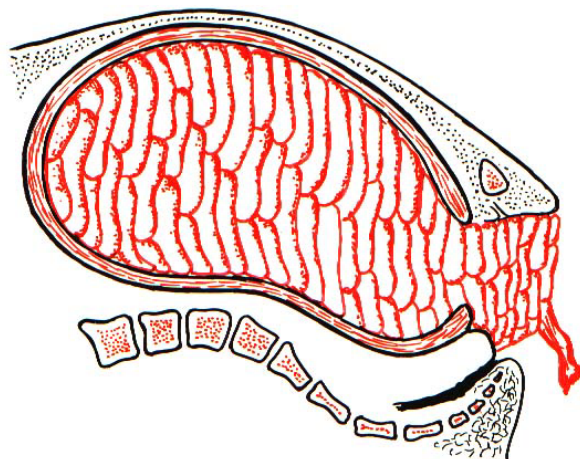
- Wearing sterile gloves, insert a hand into the vagina and form a fist.
- Place the fist into the anterior fornix and apply pressure against the anterior wall of the uterus.
- With the other hand, press deeply into the abdomen behind the uterus, applying pressure against the posterior wall of the uterus.
- Maintain compression until bleeding is controlled and the uterus contracts.

MANUAL COMPRESSION OF THE ABDOMINAL AORTA

- Apply downward pressure with a closed fist, over the abdominal aorta, directly through the abdominal wall.
- The point of compression is just above the umbilicus and slightly to the left.
- Aortic pulsations can be felt easily through the anterior abdominal wall, in the immediate postpartum period.
- With the other hand, palpate the femoral pulse to check the adequacy of compression.
- If the **pulse is palpable during compression**, the pressure exerted by the fist is inadequate.
- If the **femoral pulse is not palpable**, the pressure exerted is adequate.
- Maintain compression until bleeding is controlled.



PACKING OF THE UTERUS



Packing of Uterine Cavity

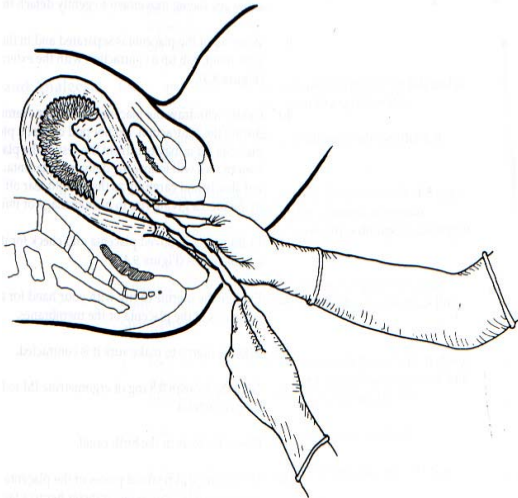
- Review indications.
- Review general care principles (page 6) and start an I/V infusion.
- Provide emotional support and encouragement.
- Give Pethidine, 50 mg (maximum 100 mg), I/M **OR** Nalbuphine Hydrochloride (Nubain), 10-20 mg and Diazepam, 10 mg, I/V slowly (do not mix in the same syringe) **OR** use Ketamine (page 298).
- Give prophylactic antibiotics (page 44):
 - Ampicillin, 1 g, I/V **PLUS** Metronidazole, 500 mg, I/V, every 8 hours
- OR**
- Cefazolin, 1 g, I/V **PLUS** Metronidazole, 500 mg, I/V, every 8 hours
- **Ensure that uterine cavity is empty**, there should be no placental pieces or blood clots.
- Insert vaginal speculum and gently hold the anterior lip of cervix with a sponge holding forceps.
- Take sterile ribbon gauze and start packing the uterine cavity with the help of a long handle sponge forceps.
- Ask the assistant to place a hand over the abdomen and steady the uterine fundus during the procedure.

- Pack the uterine cavity firmly, starting at the fundus and then gradually come downwards.
- If more than one pack is used, tightly knot them together.
- Once the uterine cavity is tightly packed, pack the vagina as well.
- Leave about 6 inches of ribbon gauze hanging outside the vagina.
- Fold the ribbon gauze over the vulva and put a sterile vulval pad in place.
- Keep on monitoring the blood loss and check BP and Pulse regularly.
- Remove the pack in 24-48 hours. At the time of removal of the pack the operation theatre should be in a state of readiness, in case the woman bleeds again.
- Continue I/V antibiotics till the pack remains in the uterine cavity, and then switch to oral antibiotics for another 3-5 days.

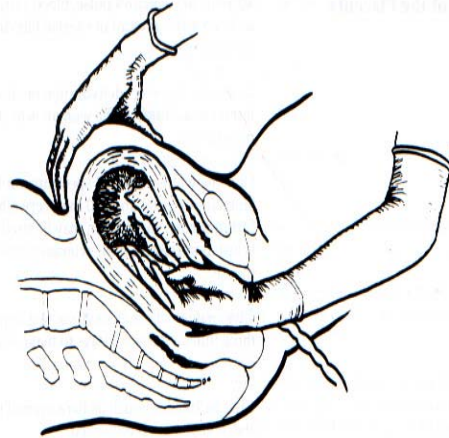
At least **2 rolls** of **sterile** ribbon gauze, about 3 inches wide and 5-6 meters in length, should be available for use at all times.

MANUAL REMOVAL OF PLACENTA

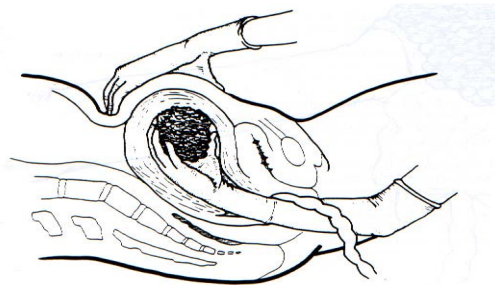
- Review indications.
 - Review general care principles (page 6) and start an I/V infusion.
 - Provide emotional support and encouragement.
 - Give Pethidine, 50 mg (maximum 100 mg), I/M **OR** Nalbuphine Hydrochloride (Nubain), 10-20 mg and Diazepam, 10 mg, I/V slowly (do not mix in the same syringe) **OR** use Ketamine (page 298).
 - Give a single dose of prophylactic antibiotics (page 44)
 - Ampicillin, 1 g, I/V **PLUS** Metronidazole, 500 mg, I/V
- OR**
- Cefazolin, 1 g, I/V **PLUS** Metronidazole, 500 mg, I/V



**Introducing One Hand into the Vagina
Along Cord**



**Supporting the Fundus While
Detaching the Placenta**



**Withdrawing the Hand From the
Uterus**

Manual Removal of Placenta

- Hold the umbilical cord with a clamp. Pull the cord gently until it is parallel to the floor.
- Wearing sterile gloves, insert the other hand into the vagina and up into the uterine cavity.
- Let go of the cord and move the hand up over the abdomen in order to support the fundus of the uterus and to provide counter traction during removal to prevent inversion of the uterus.
- Move the fingers of the hand laterally until the edge of the placenta is located.
- If the **cord has been detached previously**, insert a hand into the uterine cavity. Explore the entire cavity until a line of cleavage is identified between the placenta and the uterine wall.
- Detach the placenta from the implantation site by keeping the fingers tightly together and using the edge of the hand to gradually make a space between the placenta and the uterine wall.
- Proceed slowly all around the placental bed until the whole placenta is detached from the uterine wall.
- Hold the placenta and slowly withdraw the hand from the uterus, bringing the placenta with it.
- With the other hand, continue to provide counter-traction to the fundus by pushing it in the opposite direction of the hand that is being withdrawn.
- After the removal of the placenta, explore the inside of the uterine cavity to ensure that all placental tissue has been removed.
- Give Oxytocin, 20 units, in 1 L I/V fluids (Normal Saline or Ringer's Lactate), at 60 drops per minute.
- Have an assistant massage the fundus of the uterus to encourage a tonic uterine contraction.
- If there is **continued heavy bleeding**, give Ergometrine, 0.2 mg, I/M **or** Prostaglandins (Table 1, page 113).
- Examine the uterine surface of the placenta to ensure that it is complete. If any **placental lobe or tissue is missing**, explore the uterine cavity to remove it.
- Examine the woman carefully and repair any tears to the cervix or vagina, or repair episiotomy.

- If the **placenta does not separate from the uterine surface** by gentle lateral movement of the fingertips at the line of cleavage, suspect placenta accreta. Laparotomy and possible subtotal hysterectomy may be required. If the patient is **not** bleeding conservative management may be justified at times.

Problems

- If the **placenta is retained due to a constriction ring or if hours or days have passed since delivery**, it may not be possible to get the entire hand into the uterus. Extract the placenta in fragments using two fingers, sponge / ring forceps or a wide curette.

Post-Procedure Care

- Observe the woman closely until the effect of I/V sedation has worn off.
- Check for excessive lochia.
- Monitor the vital signs (pulse, blood pressure, respiration) every 30 minutes, for the next 6 hours or until stable.
- Palpate the uterine fundus to ensure that the uterus remains contracted.
- Continue infusion of Syntocinon (Table 1, page 113), and I/V fluids. If uterus remains contracted and lochia is normal, discontinue after 4-6 hours.
- Transfuse as necessary.

CORRECTING UTERINE INVERSION

- Review indications.
- Review general care principles and start an I/V infusion.
- Give Pethidine, 50 mg (maximum 100 mg), I/M **OR** Nalbuphine Hydrochloride (Nubain), 10-20 mg and Diazepam, 10 mg, I/V slowly (do not mix in the same syringe). If necessary, use general anaesthesia.
- Thoroughly cleanse the inverted uterus using antiseptic solution. (Not necessary if repositioning is done immediately).
- Apply compression to the inverted uterus with a moist, warm sterile towel until ready for the procedure.

Immediate repositioning of the uterus prevents the onset of shock.

Immediate Manual Correction

- Wearing sterile gloves, grasp the uterus and push it through the cervix towards the umbilicus to its normal position, using the other hand on the abdomen to confirm replacement of the uterus. If the **placenta is still attached**, perform manual removal **after** correction.
- Sometimes it may be difficult to reposition the uterus with the placenta attached, in such cases placenta may be removed before pushing the uterus up.

It is important that the part of the uterus that came out last (the part closest to the cervix), goes in first.

If above procedure fails or if patient reaches facility a few hours after delivery then following should be carried out:

Hydrostatic Correction

- Place the woman in deep Trendelenburg position (lower her head about 0.5 metres below the level of the perineum).
- Prepare a sterile douche system with large nozzle and long tubing (2 metres) and a warm water reservoir (3 to 5 L).

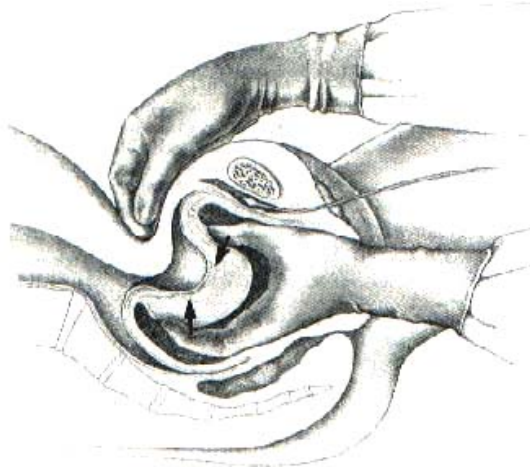
Note: This can also be done using warmed Normal Saline and an ordinary I/V administration set.

- Identify the posterior fornix. This is easily done in partial inversion when the inverted uterus is still in the vagina. In other cases, the posterior fornix is recognized by where the rugose vagina becomes the smooth vagina.

- Place the nozzle of the douche in the posterior fornix.
- At the same time, with the other hand, hold the labia sealed over the nozzle and use the forearm to support the nozzle.
- Ask an assistant to start the douche with full pressure (raise the water / saline reservoir to at least 2 metres). Water will distend the posterior fornix of the vagina gradually so that it stretches. This relieves cervical constriction, which facilitates in repositioning of the inverted uterus.

Manual Correction Under General Anaesthesia

- **If hydrostatic correction is not successful**, try manual repositioning under general anaesthesia, using halothane. Halothane is recommended because it relaxes the uterus.
- Grasp the inverted uterus and push it through the cervix in the direction of the umbilicus to its normal anatomic position. If the **placenta is still attached**, perform a manual removal **after** correction.



Manual Correction of Inversion of Uterus

Combined Abdomino-Vaginal Correction

Abdomino-vaginal correction under general anaesthesia may be required if the above measures fail.

- Review indications.
- Review operative care principles.
- **Open the abdomen** as (page 254).
- Dilate the constricting cervical ring digitally.

- Place Allis' forceps / a tenaculum through the cervical ring and grasp the inverted fundus.
- Apply gentle continuous traction to the fundus while an assistant attempts manual correction vaginally.
- **If traction fails**, incise the constricting cervical ring posteriorly (where the incision is least likely to injure the bladder or uterine vessels) and repeat digital dilatation, tenaculum and traction steps.
- Repair the cervical incision in 2 layers.
- **If correction is successful, close the abdomen** (page 258).

Post-Procedure Care

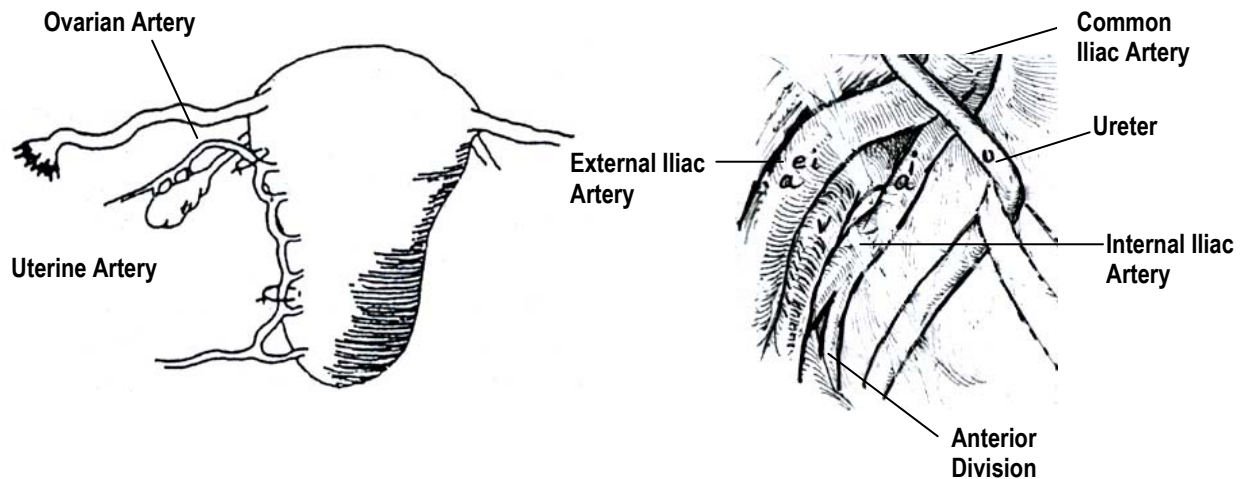
- Once the inversion is corrected, infuse Syntocinon, 20 units in 500 ml I/V fluids (Normal Saline or Ringer's Lactate), at 10 drops per minute.
 - **If haemorrhage is suspected**, increase the infusion rate to 60 drops per minute.
 - If the **uterus does not contract after Syntocinon**, give Ergometrine, 0.2 mg **or** Prostaglandins (Table 1, page 113).
- Give prophylactic antibiotics (page 44) for 5-7 days after correcting the inverted uterus.
 - Ampicillin, 1 g, I/V, every 6 hours **PLUS** Metronidazole, 500 mg, I/V, every 8 hours
 - OR**
 - Cefazolin, 1 g, I/V, every 6 hours **PLUS** Metronidazole, 500 mg, I/V, every 8 hours
- **If combined abdomino-vaginal correction** was used, follow postoperative care principles (page 40).
- If there are **signs of infection** or the woman **currently has fever**, give a combination of antibiotics until she is fever-free for 48 hours:
 - Ampicillin, 1 g, I/V, every 6 hours
 - PLUS**
 - Gentamicin, 80 mg, I/V, every 8 hours
 - PLUS**
 - Metronidazole, 500 mg, I/V, every 8 hours
- Give appropriate analgesic drugs (page 34).

UTERINE, UTERO-OVARIAN AND INTERNAL ILIAC ARTERY LIGATION

- Review indications.
- Review surgical care principles (page 35) and start an I/V infusion.

For ligation of Uterine and Utero-Ovarian arteries:

- Open the abdomen (page 254).
- Pull on the uterus to expose the lower part of the broad ligament.
- Feel for pulsations of the uterine artery near the junction of the uterus and cervix.
- Using 0 chromic catgut (or polyglycolic) suture on a large needle, pass the needle around the artery and through 2-3 cm of myometrium (uterine muscle) at the level where a transverse lower uterine segment incision would be made. Tie the suture securely.



Sites for Ligating Uterine, Utero-Ovarian and Internal Iliac Arteries

- Place the sutures as close to the uterus as possible, as the ureter is generally only 1 cm lateral to the uterine artery.
- Repeat on the other side.
- If the **artery has been torn**, clamp and tie the bleeding ends.
- Ligate the utero-ovarian artery just below the point where the ovarian suspensory ligament joins the uterus.
- Repeat on the other side.
- Observe for continued bleeding or formation of haematoma.
- Close the abdomen (page 258).

- **For ligation of Internal Iliac artery:**
- Open the lateral pelvic peritoneum over the brim of the pelvis.
- Beware of the ureter, which lies on the medial aspect of the peritoneum.
- Identify the common iliac artery and its bifurcation into internal and external iliac arteries.
- Ligate the internal iliac artery below its origin.
- It is preferable to ligate the anterior division of the internal iliac artery, if easily identified.
- Repeat on the other side.

Care must be taken not to damage the ureter and the internal iliac veins.

Post-Procedure Care

- Review postoperative care principles (page 40).
- If there **are signs of infection** or the woman **currently has fever**, give a combination of I/V antibiotics until she is fever-free for 48 hours or at least 5 days:
 - Ampicillin, 1 g, I/V, every 6 hours
 - PLUS**
 - Gentamicin, 80 mg, I/V, every 8 hours
 - PLUS**
 - Metronidazole, 500 gm, I/V, every 8 hours
- Give appropriate analgesic drugs (page 34).
- If there are no signs of infection, remove the abdominal drain after 48 hours.

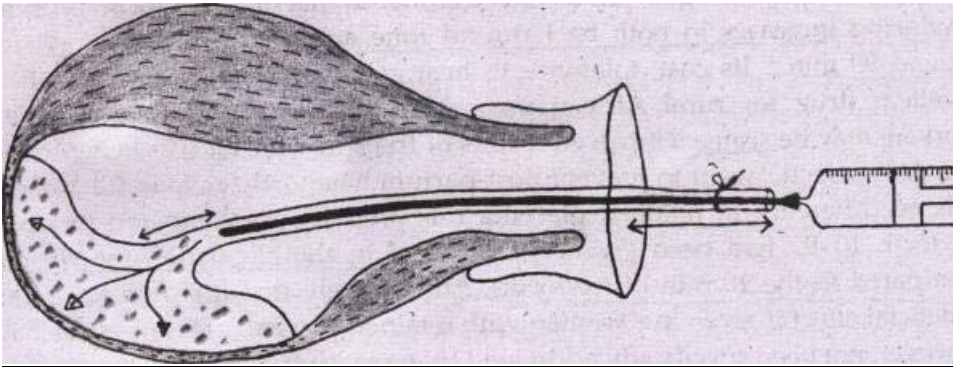
ANNEXURE

ANTICIPATING POST PARTUM HAEMORRHAGE

It is difficult to effectively predict as to which women will have PPH. **Active management of the third stage** (page 223), **should be practiced on all women in labour since it reduces the incidence of PPH due to uterine atony.** All postpartum women must be closely monitored for 4-6 hours to diagnose PPH early. Women at high risk of PPH include:

- Placenta Praevia
- Hydramnios
- Multiple Pregnancy
- History of Ante-Partum Haemorrhage in current pregnancy.
- History of Postpartum Haemorrhage in previous pregnancy.
- Big baby / difficult instrumental delivery.

PIPINGAS TECHNIQUE FOR REMOVAL OF RETAINED PLACENTA



- Recut the cord in order to achieve a clean end for insertion of the nasogastric tube.
- Thread an infant (size 10) nasogastric tube down the umbilical vein until resistance is felt
- Withdraw the nasogastric tube by 5 cm & tie firmly with umbilical cord
- Inject 10 – 20 units (can be upto 100 units) of Syntocinon in 30 ml of saline down the catheter (results in optimal filling of placental bed capillaries)
- Wait for signs of placental separation & perform control cord traction (page 223)
- If this is unsuccessful after 30 minutes, then manual removal should be carried out under antibiotic cover (page 130)

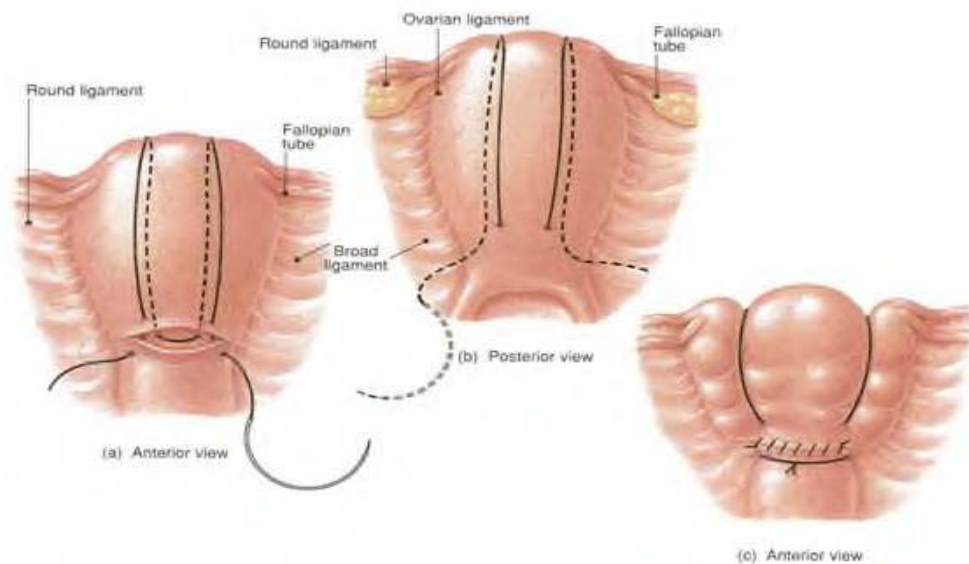
B-LYNCH SUTURE

- Give the patient general anaesthesia.
- Catheterize the patient.
- Place in the Lloyd Davies position for access to the vagina to assess the control of bleeding objectively by swabbing.



Lloyd Davis position

- Open the abdomen by an appropriate sized Pfannenstiel incision or if the patient has had caesarean section following which she bled, re-open the same incision.
- On entering the abdomen either make a lower segment incision after dissecting off the bladder, or remove sutures of a recent caesarean section and enter the cavity.
- Evacuate, examine and swab out the uterine cavity.
- Exteriorize the uterus and recheck to identify any bleeding point.
- If the bleeding is diffuse such as in cases of uterine atony or coagulopathy, profuse placenta bed bleeding, placenta accrete or increta where no obvious bleeding point is observed then first try bi manual compression to assess the potential chance of success of the B-Lynch suturing technique.
- Swab the vagina to confirm adequate control of bleeding.
- If vaginal bleeding is controlled apply B-Lynch sutures. For a left handed surgeon or the surgeon electing to stand on the left side of the patient, the procedure is as follows:
 - Puncture the uterus 3 cm from the right lower edge of the uterine incision and 3 cm from the right lateral border with a 70 mm round bodied hand needle on which a No.2 chromic catgut suture is mounted.
 - Thread through the uterine cavity to emerge at the upper incision margin 3 cm above and approximately 4 cm from the lateral border (because the uterus widens from below upwards).
 - Pass over the mounted No. 2 chromic catgut now visible to compress the uterine fundus. Keep the chromic catgut approximately 3-4 cm from the right cornual border.



B-Lynch Suture

- Feed the catgut posteriorly and vertically to enter the posterior wall of the uterine cavity at the same level as the upper anterior entry point.
- Ask the assistant to pull the chromic catgut under moderate tension.
- Pass back the length of the catgut posteriorly through the same surface marking as for the right side, the suture lying horizontally.
- Feed the catgut through posteriorly and vertically compressing the fundus to lie anteriorly and vertically compressing the fundus on the left side as on the right.
- Pass the needle in the same fashion as on the left side through the uterine cavity and out approximately 3 cm anteriorly and below the lower incision margin on the left side.
- Pull the two lengths of catgut taught assisted by bi-manual compression to minimize trauma and to achieve or aid compression. During such compression check the vagina to ensure that the bleeding is controlled.
- Tie a secure knot (double throw) followed by two or three further throws. Ensure that good haemostasis is secured while the uterus is being compressed by an experienced assistant.
- Close the lower transverse uterine incision in the normal way, in two layers, with or without closure of the lower uterine segment peritoneum.
- For a major placenta praevia place an independent figure of eight suture at the beginning anteriorly or posteriorly or both depending on the site of placental implantation, prior to the application of the B-Lynch suture.

ELEVATED BLOOD PRESSURE with HEADACHE / BLURRED VISION / CONVULSIONS OR LOSS OF CONSCIOUSNESS

DEFINITIONS

Hypertensive disorders of pregnancy, especially Eclampsia, are a major cause of Maternal Mortality.

Hypertension

Raised blood pressure measured on two occasions, at least 6 hours apart.

Blood pressure is considered to be raised when there is:

- Blood pressure of 140/90 mmHg or more
OR
- An increase of the systolic pressure by 30 mmHg or more from the pre pregnancy / booking level, if known.
OR
- An increase of the diastolic pressure by 15 mmHg or more from the pre pregnancy / booking level, if known.

Note: An increase in the diastolic pressure is more significant because it is not affected by posture or excitement.

Proteinuria

Presence of protein in urine:

- Protein concentration of 0.3 g/L of urine in a 24-hour specimen, or 0.1 g/L in a random specimen is significant proteinuria.
- A woman developing pre-eclampsia usually has a rise in her blood pressure before she develops proteinuria.
- Proteinuria with a normal blood pressure could be due to urinary tract infection, kidney disease, contamination of the specimen, or after prolonged standing.
- Only clean-catch mid-stream specimens should be used for testing for proteinuria

Oedema

Excessive collection of fluid in the body tissues resulting in swelling of the affected part.

- Swelling of the feet is commonly seen in normal pregnancy, particularly in the evening and is therefore not a reliable sign of pre-eclampsia.
- Oedema of the hands and / or face may be a sign of pre-eclampsia.
- Oedema may be hidden and manifest itself only by sudden weight gain, i.e. a weight gain of 1kg or more in a week (normal weight gain is about 0.5 kg/week). This can be indicative of pre-eclampsia.

The Hypertensive Disorders of Pregnancy include:

- **Chronic Hypertension:** Elevation of the blood pressure before 20 weeks of pregnancy. The woman may be known to have high blood pressure even before she gets pregnant. This could be essential hypertension, or due to kidney disease, or other rare conditions.
- **Pregnancy Induced Hypertension (PIH):** Rise in blood pressure after 20 weeks of pregnancy.
- **Hypertension Superimposed by Pre-Eclampsia:** When chronic hypertension is complicated by proteinuria.

Pregnancy Induced Hypertension (PIH)

Pregnancy induced hypertension may progress from mild disease to a more serious condition.

Pregnancy induced hypertension may be:

- Hypertension without proteinuria or oedema
- Mild to Severe pre-eclampsia
- Eclampsia

In Pregnancy Induced Hypertension, there may be no symptoms and the only sign may be elevated blood pressure.

Pre-eclampsia

Pre-eclampsia is a condition specific to pregnancy, arising after the 20th week of pregnancy, characterized by hypertension and proteinuria with or without oedema. It may range from mild to moderate to severe.

The presence of proteinuria in a woman with hypertension is a warning sign and **changes** the diagnosis from pregnancy induced hypertension to pre-eclampsia.

Findings (All may or may not be present in every case)	Mild Pre-eclampsia	Moderate to Severe Pre-eclampsia
Elevated diastolic blood pressure	Rises 15-20 mm Hg from pre pregnancy or early pregnancy level Or absolute level is >90 but <100 mm Hg	Rises >20 mm Hg from pre pregnancy or early pregnancy level Or absolute level is >100 mm Hg
Proteinuria	Trace	1+ or greater persistently
Generalised oedema (significantly of face and hands)	±	Present
Severe persistent headache	Absent	May be Present
Visual disturbances (e.g. blurred vision)	Absent	May be Present
Upper abdominal pain	Absent	May be Present
Oliguria (diminished urine output –less than 30 ml/hour)	Absent	May be Present

Impending Eclampsia

Impending eclampsia means that an eclamptic fit is likely to occur very soon. Signs of impending eclampsia or **danger signals** are:

- Severe headache
- Nausea / Vomiting
- Epigastric pain
- Visual disturbances (e.g. blurred vision, flashes of light)
- A sharp rise in blood pressure
- Drowsiness
- Mental confusion
- Decreasing urinary output
- Increasing proteinuria
- Brisk reflexes

Eclampsia

- **Fits / convulsions** in a woman with pre-eclampsia.
- Pre-eclampsia and eclampsia are part of the same disorder, eclampsia being the severe form of the disease.
- Eclampsia like pre-eclampsia is a condition seen only during pregnancy, labour or in a recently delivered woman.
- **Fits** are usually followed by prolonged coma.
- Pre-eclampsia almost always precedes eclampsia. Not all cases follow an orderly progression from mild disease to severe and some women develop severe pre-eclampsia / fulminant pre-eclampsia or eclampsia suddenly.
- The fits may occur during pregnancy (antepartum), during labour (intrapartum), or after childbirth (postpartum). Postpartum fits usually occur within the first 48 hours after child birth.

Other conditions that may cause fits / convulsions or coma include epilepsy, complicated malaria, head injury, meningitis, encephalitis, hysteria etc.

Fulminating Pre-eclampsia

Sometimes severe pre-eclampsia can occur suddenly without passing through the stage of mild pre-eclampsia. The woman can rapidly develop eclampsia. This is an obstetric emergency and management should be started immediately.

HELLP Syndrome

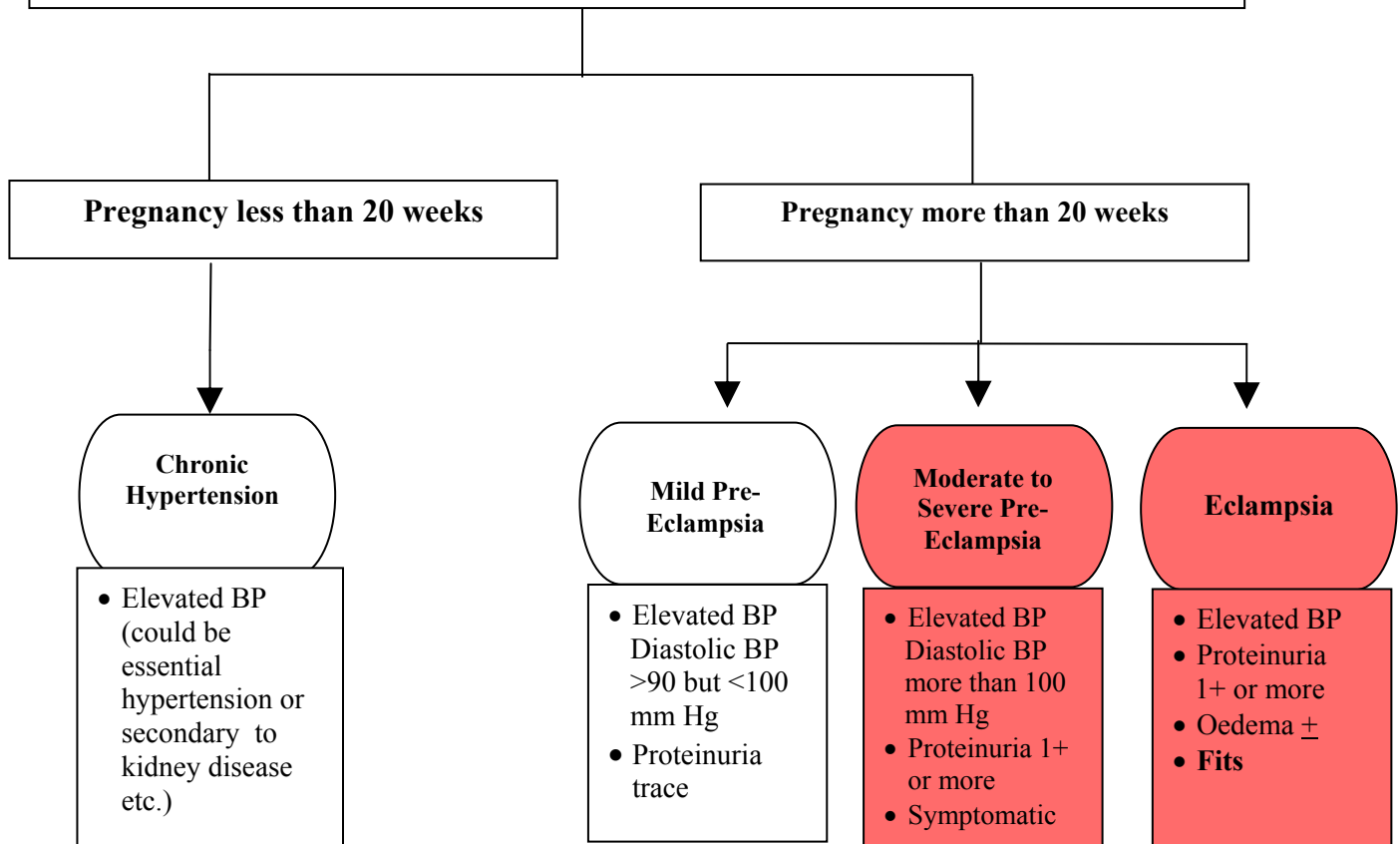
In this condition, blood examination reveals **H**aemolysis, **E**levated **L**iver enzymes, **L**ow **P**latelets.

The condition indicates worsening of pre-eclampsia. The patient is seriously ill and needs urgent attention.

HYPERTENSION IN PREGNANCY

- Hypertension is a blood pressure of 140 / 90 mmHg or more
OR
- An increase of the systolic pressure by 30 mmHg or more (if the pre pregnancy / booking level is known).
OR
- An increase of the diastolic pressure by 15 mmHg or more (if the pre pregnancy / booking level is known).

Note: Blood pressure should be measured on two occasions, 6 hours apart (except in cases of severe pre-eclampsia or eclampsia).



Proteinuria can complicate pre-existing hypertension at any gestational age.

Pink Blocks Indicate Life-Threatening Conditions

Assessing the Patient

Guidelines for Clinical Assessment of Patients with Elevated Blood Pressure / Headache / Blurred Vision / Convulsions / Loss of Consciousness

Clinical Assessment	
History	<p>Inquire from the patient / accompanying person and record the following information:</p> <ul style="list-style-type: none"> • Duration of pregnancy if in labour. • Is she in labour? • Fits in current or previous pregnancy. • Headache, nausea & vomiting, blurring of vision. • Upper abdominal pain (epigastrium or right hypochondrium). • Swelling of the face and hands (are the rings or shoes tighter). • Diminished or absent foetal movements. • Previous h/o chronic hypertension / pregnancy induced hypertension / eclampsia, kidney disease etc. <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 10px;"> Simultaneously provide emergency care and record history </div>
General Physical Exam	<ul style="list-style-type: none"> • Check whether conscious / drowsy / unconscious. • Check whether having fits. • Check and record (blood pressure, pulse, respiration, temperature, oedema, specially of hands and face). • Note general health of woman (malnourished / anaemic / general poor hygiene / bitten tongue). • Examine: <ul style="list-style-type: none"> - Lungs (Basal crepitations & air entry). - Heart (heart sounds & murmurs). - Abdomen (Uterine contractions, height of fundus, lie, presentation, engagement of presenting part, fetal heart). - Extremities (swelling, tendon reflexes, clonus).
Pelvic Exam (In cases of eclampsia defer till the fits are controlled)	<p>Vaginal (P/V) examination:</p> <ul style="list-style-type: none"> • Assess the cervix for induction of labour and check: <ul style="list-style-type: none"> - Consistency of cervix (soft / firm). - Effacement (length of cervix). - Position of cervix (Posterior / Mid / Anterior). - Dilatation of cervical os. - Station of presenting part in the pelvis. - Adequacy of pelvis. - Bleeding / show. - Membrane present / absent, if absent colour of liquor.
Investigations (where facilities exist)	<ul style="list-style-type: none"> • Hb, Total Leucocyte Count, Platelets, Serum Uric Acid, Urine Analysis (specially to check proteinuria). • Blood group and Rhesus (Rh) factor. • Bedside clotting test, PT, APTT, FDPs, if coagulopathy is suspected. • Urea, Creatinine & Electrolytes, Liver Function Tests in cases of severe pre-eclampsia / eclampsia. • Ultrasound to check fetal maturity, viability, presentation & placental site (Omit in eclampsia as will cause delay). • Other tests may be needed in cases with complications.

Identifying the Problem

Elevated Blood Pressure With Headache / Blurred Vision / Convulsions or Loss of Consciousness

Symptoms	Signs	Probable Diagnosis
Pregnancy less than 20 weeks		
<ul style="list-style-type: none"> Usually none. May have h/o hypertension. 	Diastolic BP 90 mm Hg or more.	Chronic Hypertension
Pregnancy more than 20 weeks		
<ul style="list-style-type: none"> Usually no specific symptoms. 	<ul style="list-style-type: none"> Hypertension No proteinuria. 	Pregnancy Induced Hypertension
<ul style="list-style-type: none"> Usually no specific symptoms. 	<ul style="list-style-type: none"> Diastolic BP 90-100 mm Hg. Proteinuria up to trace. 	Mild Pre-Eclampsia
<ul style="list-style-type: none"> Headache, (unrelieved by regular analgesics). Nausea, vomiting. Blurring of vision / flashes of light. Upper abdominal pain (epigastric pain or pain in right upper quadrant). Oliguria (passing less than 400 ml urine/24 hours or less than 30 ml/hour). Oedema specially of hands and face. 	<ul style="list-style-type: none"> Diastolic BP more than 100 mm Hg. Proteinuria 1+ or more. Hyperreflexia (exaggerated tendon reflexes). Clonus Pulmonary oedema (collection of fluid in the lungs). <p>Note: All signs may or may not be present in every case.</p>	Moderate to Severe Pre-Eclampsia
<ul style="list-style-type: none"> H/O fits. All or some of the symptoms of severe pre eclampsia may be present. 	<ul style="list-style-type: none"> All or some of the signs of severe pre eclampsia may be present. Convulsions. 	Eclampsia

Chronic hypertension may be super imposed by Pre-eclampsia at any gestational age.

Identifying the Problem

Elevated Blood Pressure With Headache / Blurred Vision / Convulsions or Loss of Consciousness

Symptoms	Signs	Probable Diagnosis
Other Causes of Convulsions in Pregnancy / Abortion / Postpartum		
<ul style="list-style-type: none"> • Trismus / lockjaw (difficulty in opening mouth and chewing). • There may be a history of injury, recent delivery or abortion. 	<ul style="list-style-type: none"> • Spasms of face, neck and trunk. • Arched back. • Board-like abdomen. • Spontaneous violent spasms. 	Tetanus
<ul style="list-style-type: none"> • Past history of convulsions. 	<ul style="list-style-type: none"> • Normal BP • Convulsions 	Epilepsy
<ul style="list-style-type: none"> • Headache • Fever, Chills • Muscle / joint pains • Rigors 	<ul style="list-style-type: none"> • Anaemia • Enlarged and tender spleen. • Convulsions • Jaundice 	Complicated Malaria
<ul style="list-style-type: none"> • Fever • Headache • Drowsiness • Confusion 	<ul style="list-style-type: none"> • Neck rigidity • Convulsions 	Meningitis or Encephalitis
Other Causes of Head Ache in Pregnancy		
<ul style="list-style-type: none"> • Headache • Blurred vision • Vomiting • Previous h/o headache 	<ul style="list-style-type: none"> • Usually normal BP. 	Migraine

Any fit in pregnancy, during labour and / or early post partum period should be treated as eclampsia, unless diagnosed otherwise.

SPECIFIC MANAGEMENT

MILD PRE-ECLAMPSIA

Symptoms

- Usually no specific symptoms.

Signs

- Diastolic BP > 90 but <100 mm Hg.
- No proteinuria / trace proteinuria.

Investigations (Where possible)

- Hb, Platelets, Serum Uric Acid.
- Urine analysis (specially to check proteinuria).
- Blood group and Rhesus (Rh) factor.
- Ultrasound to check fetal maturity, viability, presentation & placental site.
- Other tests may be needed in cases with complications.

Management

☞ Pregnancy less than 37 weeks

Manage on an outpatient basis and counsel the woman and her family about **danger signals** indicating pre-eclampsia or eclampsia.

Weekly monitor:

- Blood pressure, weight, oedema (specially of the hands and face).
- Urine (for proteinuria).
- Fetal condition.

-
- **If blood pressure worsens**, manage as moderate to severe pre-eclampsia (page 149).

-
- **If urinary protein level increases**, manage as severe pre-eclampsia (page 149).

- If there are signs of severe fetal **growth restriction or fetal compromise / distress:**

- Admit the woman to the hospital for assessment and possible early delivery.

- If the **maternal and fetal condition remains stable**, allow to proceed with normal labour and childbirth.
- If there are **signs of growth restriction**, consider early delivery.
- If delivery is indicated before 34 weeks of gestation give steroids to the mother to improve fetal lung maturity. (Dexamethasone, 12 mg, 2 doses, I/M, 12 hours apart).
- If early delivery is not indicated, continue hospitalization until term.

In mild pre-eclampsia, medications do not improve maternal or fetal outcome.

☞ **Pregnancy more than 37 complete weeks**

-
- If there are signs of **fetal compromise**, assess the cervix (page 232) and expedite delivery.
 - If the **cervix is favourable** (soft, thin, partly dilated), rupture the membranes with a Kocher clamp or an amniotic hook, if available and induce labour using Oxytocin or Prostaglandins (page 233 & 236).
 - If the **cervix is unfavourable** (firm, thick, closed):
 - Ripen the cervix using Prostaglandins or a Foley catheter (page 233 / 234)

OR

- Deliver by caesarean section (page 254).

SPECIFIC MANAGEMENT

MODERATE TO SEVERE PRE-ECLAMPSIA

Symptoms

- Headache, (unrelieved by analgesics).
- Nausea, vomiting.
- Blurring of vision.
- Upper abdominal pain (epigastrium or right upper quadrant).
- Oliguria (passing less than 400 ml urine/24 hours or less than 30 ml/ hour).
- Oedema specially of hands and face.

Note: All symptoms / signs may or may not be present in all cases.

Signs

- Diastolic BP more than 100 mm Hg
- Proteinuria 1+ or greater persistently.
- Hyperreflexia (exaggerated tendon reflexes).
- Clonus
- Pulmonary oedema (collection of fluid in the lungs).

Investigations (Where possible)

- Hb, Platelets, Serum Uric Acid.
- Urine analysis (specially to check Proteinuria)
- Blood group and Rhesus (Rh) factor.
- Urea, Creatinine & Electrolytes, Liver Function Tests.
- Bedside clotting test, PT, APTT, FDPs if coagulopathy is suspected.
- Ultrasound to check fetal maturity, viability, presentation & placental site.
- Other tests may be needed in cases with complications.

Management

The Strategies for Management are:

- Prevent convulsion.
- Control hypertension to prevent complications (page 155).
- Deliver as soon as possible, either vaginally or by caesarean section.
- If there are symptoms or signs such as headache, blurred vision, vomiting, upper abdominal pain, oliguria (less than 400 ml/24 hours or less than 30 ml/hour) or exaggerated deep tendon reflexes, manage as under Eclampsia (page 151).
- If there is none of the above symptoms or signs and the pregnancy is less than 37 weeks **expectant management** may be considered until the fetus is mature (37 weeks).

Expectant Management

- Give antihypertensives to the mother to reduce the diastolic blood pressure to 90 – 100 mm Hg.
- Give steroids to the mother to improve fetal lung maturity. (Dexamethasone, 12 mg, 2 doses, I/M, 12 hours apart).
- Stop expectant management if the maternal condition worsens and expedite delivery.

Diuretics are harmful in pregnancy, the only indications for their use in pre-eclampsia are:

- **Pulmonary Oedema**
- **Congestive Heart Failure**
- **Acute Renal Failure**

SPECIFIC MANAGEMENT

ECLAMPSIA

Symptoms

- History of **fits**.
- All or some of the symptoms of severe pre-eclampsia may be present.

Signs

- All or some of the signs of severe pre-eclampsia may be present.
- **Convulsions**

Investigations (Where possible)

- Hb, Total Leucocyte Count, Platelets, Serum Uric Acid.
- Urine analysis (specially to check proteinuria).
- Urea, Creatinine & Electrolytes, Liver Function Tests.
- Blood group and Rhesus (Rh) factor.
- Bedside clotting test, PT, APTT, FDPs if coagulopathy is suspected.
- Other tests may be needed in cases with complications.

Management

Severe pre-eclampsia and eclampsia are managed similarly with the exception that delivery should occur within 12 hours of onset of convulsions in eclampsia.

The strategies in managing a case of Eclampsia include:

- To stop convulsions and prevent further convulsions.
- Control hypertension.
- Stabilize the patient.
- Deliver as soon as possible, either vaginally or by caesarean section.

In a community setting if a patient has convulsions and is in coma:

- Turn her on her side.
- Insert a handle of the spoon covered with cloth in the mouth to prevent the tongue falling back.
- Give Diazepam, 10 mg, I/M, stat.
- Transfer to the hospital urgently.

In hospital settings, if comprehensive EmOC facilities are not available, stabilize the patient and **refer** within 2 hours of admission.

General Measures

- Admit the woman to the hospital for observation and further management.
- If a woman is unconscious or convulsing, CALL FOR HELP. Urgently mobilize all available personnel.
- Rapidly evaluate the general condition of the woman, including vital signs (blood pressure, pulse, respiration), while simultaneously inquiring about the history of her present and past illnesses, either from her, or from persons accompanying the patient.
- Gather equipment (airway, suction, mask and bag, oxygen)
- If she is **not breathing or her breathing is shallow**:
 - Check airway.
 - Assist ventilation using Ambu bag and facemask.
 - Give oxygen by facemask, at 4-6 L per minute.
 - Intubate if required and give oxygen at 4-6 L per minute, via endotracheal tube.
- If she is **breathing**:
 - Give oxygen at 4-6 L per minute, by mask or nasal cannula.
- If she is **unconscious**:
 - Insert airway (or use handle of the spoon covered with cloth) in the mouth to prevent the tongue falling back.
 - Check airway.
 - Position her on her left side.
 - Check temperature.
 - Check for neck rigidity.
- If she is **convulsing**:
 - Position her on her side to reduce the risk of aspiration of secretions, vomit and blood.
 - Insert an I/V cannula and infuse I/V fluids (page 9).
 - If severe pre-eclampsia or eclampsia is diagnosed (Table on page 140), give Magnesium Sulfate (Box 1, page 154).
 - Catheterize the bladder to monitor urine output and to check proteinuria. **If urine output is less than 30 ml per hour**, withhold Magnesium Sulfate and infuse I/V fluids (Dextrose Saline or Ringer's Lactate) at the rate of 1 L in 8 hours.

If the **cause of convulsions has not been determined**, manage as eclampsia and continue to investigate other causes.

- Monitor the amount of fluids administered and urine output to ensure that there is no fluid overload.
- Maintain a strict fluid balance chart.
- Monitor for the development of pulmonary oedema. Auscultate the lung bases hourly for crepitations indicating pulmonary oedema. If crepitations are heard, withhold fluids and give Frusemide, 40 mg, I/V, once.
- **Never leave the woman alone.** A convulsion followed by aspiration of vomit may cause death of the woman and fetus.
- Nurse the woman in a quiet well-lit area and **NOT** in a dark room, so that she can be monitored constantly.
- Observe vital signs, reflexes and fetal heart rate every 30 minutes or more frequently if required.
- Assess clotting status with a bedside clotting test (page 23).
- Protect her from injuries (fall), but do not tie her hands and feet to the bed.
- After every convulsion, aspirate the mouth and throat as necessary.

Controlling Fits

Anticonvulsive Drugs

- A key factor in anticonvulsive therapy is adequate administration of anticonvulsive drugs.
- Convulsions in hospitalized women are most frequently caused by under-treatment.
- **Magnesium Sulfate is the drug of choice for preventing and treating convulsions in severe pre-eclampsia and eclampsia.** Administration is outlined in **Box** on page 154.
- If Magnesium Sulfate is **not** available, Diazepam may be used, although there is a greater risk for neonatal respiratory depression because Diazepam passes the placenta freely.
 - A single dose of Diazepam to abort a convulsion, seldom causes neonatal respiratory depression.
 - Long-term continuous I/V administration increases the risk of respiratory depression in babies who may already be suffering from the effects of utero-placental ischaemia and preterm birth.

Protocol for Magnesium Sulfate should be followed strictly.

Box 1:

Magnesium Sulfate Schedules for Severe Pre-eclampsia and Eclampsia

Loading Dose:

- Magnesium Sulfate 20% solution, 4 g, I/V, over 5 minutes (8 ml of 50% Magnesium Sulfate solution + 12 ml of Distilled Water).
- Follow promptly with Magnesium Sulfate 50% solution, 10 g, [5 g (10 ml)], in each buttock as deep I/M injection with Lignocaine 2%, 1 ml in the same syringe. Ensure that aseptic technique is practiced when giving Magnesium Sulfate deep I/M injection. Warn the woman that a feeling of warmth will be felt when Magnesium Sulfate is given.
- If **convulsions recur after 15 minutes**, give Magnesium Sulfate, 2 g (4 ml of 50% solution), I/V, over 5 minutes.

Maintenance Dose:

- Magnesium Sulfate 50% solution, 5 g (10 ml) + Lignocaine 2%, 1 ml, I/M every 4 hours into alternate buttocks.
- Continue maintenance dose of Magnesium Sulfate for 24 hours after delivery or the last convulsion, whichever occurs last.

Before Repeat Administration, Ensure That:

- Respiratory rate is at least 16 per minute.
- Patellar reflexes are present.
- Urinary output is at least 30 ml per hour over preceding 4 hours.

WITHHOLD OR DELAY DRUG IF:

- Respiratory rate falls below 16 per minute.
- Patellar reflexes are absent.
- Urinary output falls below 30 ml per hour over preceding 4 hours.

Keep Antidote Ready

- In case of respiratory arrest:
 - Assist ventilation (mask and bag, intubation, anaesthesia apparatus).
 - To antagonize the effects of Magnesium Sulfate give Calcium Gluconate, 1g, (10 ml of 10% solution), I/V, slowly until respiration begins.

Diazepam Schedules for Severe Pre-eclampsia and Eclampsia

Note: Use Diazepam ONLY if Magnesium Sulfate is NOT available.

Intravenous Administration

Loading Dose:

- Diazepam, 10 mg, I/V, slowly over 2 minutes.
- **If convulsions recur**, give Diazepam, 5 – 10 mg, I/V slowly, over 2 minutes.

Maintenance Dose:

- Diazepam, 40 mg in 500 ml I/V fluids (Normal Saline or Ringer's Lactate), titrated to keep the woman sedated but arousable.
- Maternal respiratory depression may occur when dose exceeds 30 mg in 1 hour:
 - Assist ventilation (bag and mask, anaesthesia apparatus, intubation), if necessary.
 - Do not give more than 100 mg in 24 hours.

Rectal Administration

- Give Diazepam, rectally when I/V access is not possible. The loading dose is 20 mg, filled in a 10 ml syringe. Remove the needle, lubricate the barrel and insert the syringe into the rectum to half its length. Discharge the contents and leave the syringe in place, holding the buttocks together for 10 minutes to prevent expulsion of the drug. Alternatively, the drug may be instilled in the rectum through a catheter.
- **If convulsions are not controlled within 10 minutes**, administer an additional 10 mg per hour or more, depending on the size of the woman and her clinical response.

Controlling Hypertension

Antihypertensive Drugs

If the **diastolic pressure is 110 mm Hg or more**, give antihypertensive drugs. The goal is to keep the diastolic pressure between 90 mm Hg and 100 mm Hg to prevent cerebral haemorrhage. **Hydralazine (Available as Apresoline)** is the drug of choice.

- Give Hydralazine, 5mg, I/V slowly, every 5 minutes until blood pressure is lowered. Repeat hourly as needed or give Hydralazine, 12.5 mg, I/M, every 2 hours as needed.
- **If Hydralazine is not available**, give:
 - **Labetolol (Available as Trandate)**, 10 mg, I/V:
 - If response is **inadequate** (diastolic blood pressure remains above 110 mm Hg) after 10 minutes, give Labetalol, 20 mg, I/V.
 - Increase the dose to 40 mg and then 80 mg if satisfactory response is not obtained after 10 minutes of each dose.

OR

- **Nifedipine (available as Adalat)**, 5 mg, under the tongue:
(Puncture the capsule and administer the drops under the tongue.)
- **If response is inadequate** (diastolic pressure remains above 110 mm Hg) after 10 minutes, give an additional 5 mg, under the tongue.

Note: There is concern regarding a possibility for an interaction with Magnesium Sulfate that can lead to hypotension.

- **Methyldopa (available as Aldomet)**. In case the above drugs to control hypertension are **not** available, Methyldopa may be used, though it is not as effective and is slow to act (4 hours).
- 250-500 mg in 100 ml of Dextrose Water, given as slow I/V infusion over 30-60 minutes. Repeat after 6 hours, if necessary.

Stabilize the Patient

Once the fits are controlled and the diastolic blood pressure is between 90-100 mm of Hg, make appropriate plans to deliver the patient **or refer** to a facility providing comprehensive EmOC.

Delivery

Delivery should take place as soon as the woman's condition has stabilized. Delaying delivery to increase fetal maturity will risk the lives of both the woman and the fetus. Delivery should occur regardless of the gestational age.

In severe pre-eclampsia, delivery should occur within 24 hours of the onset of symptoms. In eclampsia, delivery should occur within 12 hours of the onset of convulsions.

- Assess the cervix (page 232).
- If the **cervix is favourable** (soft, thin, partly dilated), rupture the membranes with a Kocher clamp or an amniotic hook if available and induce labour by Oxytocin or Prostaglandins (page 233 & 236).
- **Deliver by Caesarean Section** (page 254), **IF:**
 - There is a slow progress of labour and **if vaginal delivery is not anticipated** within 12 hours (for eclampsia) or 24 hours (for severe pre-eclampsia).
 - There are **fetal heart rate abnormalities** (less than 100 or more than 160 beats per minute).
 - The **cervix is unfavourable** (firm, thick, closed) and the **fetus is alive**.
- **Aim for Vaginal Delivery:**
 - If safe anaesthesia is not available for caesarean section.
 - If the fetus is dead or too premature for survival.

- If the **cervix is unfavourable** (firm, thick, closed), and the aim is to deliver vaginally, ripen the cervix using Misoprostol / Prostaglandins / Foley’s catheter (page 230 / 234).

Do not give Ergometrine to women with pre-eclampsia, eclampsia or high blood pressure because it increases the risk of convulsions and cerebrovascular accidents.

Note: If caesarean section is performed, ensure that:

- Coagulopathy has been ruled out.
- Safe general anaesthesia is available.

Note: Do not use local anaesthesia or Ketamine in women with pre-eclampsia or eclampsia.

Postpartum Care:

Continue to monitor the woman intensively for at least 48 hours after delivery.

- Anticonvulsive therapy should be maintained for 24 hours after delivery or the last convulsion, whichever occurs last.
- Continue antihypertensive therapy as long as the diastolic pressure is 110 mm Hg or more.
- Continue to monitor urine output.
- Repeat some investigations as required.

Referral for Tertiary Level Care

Consider referral of women who have:

- Oliguria that persists for 48 hours after delivery.
- Coagulation failure (page 102), or HELLP Syndrome (**H**aemolysis, **E**levated **L**iver enzymes and **L**ow **P**latelets).
- Persistent coma lasting more than 24 hours after convulsion.

Complications of Pregnancy Induced Hypertension

Complications may cause adverse perinatal and maternal outcomes. Because complications are often difficult to treat, efforts should be made to prevent them by early diagnosis and proper management. Health care providers should be aware that management can also lead to complications. Manage complications as follows:

- **If fetal growth restriction is severe**, expedite delivery.

- If there is **increasing drowsiness** or coma, suspect cerebral haemorrhage:
 - Reduce blood pressure slowly to reduce the risk of cerebral haemorrhage.
 - Provide supportive therapy.
- If heart, kidney or liver failure is suspected, provide therapy and observe.
- If a clotting test shows failure of a clot to form after or a soft clot that breaks down easily, suspect coagulopathy and manage as on page 102.
- If the **woman has I/V lines and indwelling catheters**, she is prone to infection. Use proper infection prevention techniques and closely monitor for signs of infection.
- If the **woman is receiving I/V fluids**, she is at risk of circulatory overload. Maintain a strict fluid balance chart and monitor the amount of fluids administered and urine output.

SPECIFIC MANAGEMENT

CHRONIC HYPERTENSION

Symptoms

- Pregnancy less than 20 weeks.
- Usually no symptoms.

Signs

- Diastolic BP 90 mm Hg or more.

Investigations (Where possible)

- Hb, Platelets, Serum Uric Acid.
- Urine analysis (specially to check Proteinuria).
- Blood group and Rhesus (Rh) factor.
- Ultrasound to check fetal maturity, viability, presentation & placental site.
- Other tests may be needed in cases with complications.

Management

- If the blood pressure is within acceptable limits it should not be lowered below its pre-pregnancy level. High levels of blood pressure maintain renal and placental perfusion in chronic hypertension; reducing blood pressure will result in diminished perfusion.

There is no evidence that in case of chronic hypertension, aggressive treatment to lower the blood pressure to normal levels improves either fetal or maternal outcome.

- Encourage extra periods of rest during pregnancy.
-

- If the woman was on anti-hypertensive medication before pregnancy and the disease is well-controlled, continue the same medication if it is safe in pregnancy.

- If diastolic blood pressure is 110 mm Hg or more, or systolic blood pressure is 160 mm Hg or more, treat with anti hypertensive drugs e.g. Methyldopa (available as Aldomet), 250 mg, orally, 2-3 times a day (maximum 3 g/day).

- If proteinuria or other signs and symptoms are present, consider superimposed pre-eclampsia and manage as mild pre-eclampsia (page 147).
- Monitor fetal growth and condition.
- If there are no complications, deliver at term.
- If pre-eclampsia develops, manage as mild pre-eclampsia (page 147) or severe pre-eclampsia (page 149).
- If fetal growth restriction is severe and pregnancy dating is accurate, assess the cervix (page 232), and consider delivery.

**SKILLS REQUIRED TO MANAGE ELEVATED BLOOD PRESSURE WITH
HEADACHE/ BLURRED VISION/ CONVULSIONS OR LOSS OF
CONSCIOUSNESS**

- Measuring Blood Pressure (page 162)
 - Checking for Proteinuria (page 162)
 - Urinary Catheterization
 - Intravenous Cannulation
 - Administer Anti Hypertensive (page 155) and Anticonvulsant Drugs (page 154, 155)
 - Cardiopulmonary Resuscitation (page 311)
 - Assessment of the Cervix (Bishop score) (page 232)
 - Induction / Augmentation of Labour (page 232)
 - Artificial Rupture of Membranes (page 235)
 - Assisted delivery with:
 - Vacuum Extraction (page 248)
-
- Forceps (page 251)
-
-
- Caesarean Section (page 254)
 - Managing the Patient in Intensive Care Settings (Refer, page 46)

ANNEXURE

Measuring Blood Pressure

- Diastolic blood pressure is taken at the point at which the arterial sound disappears.
- A falsely high reading is obtained if the cuff does not encircle at least three-fourths of the circumference of the arm.
- A wider cuff should be used when the diameter of the upper arm is more than 30 cm.
- Diastolic blood pressure measures peripheral resistance and does not vary with the woman's emotional state to the degree that systolic pressure does.

Checking for Proteinuria

Dipstick test for checking protein in the urine is a useful screening tool. **If dipsticks are not available**, a sample of urine can be heated to boil in a clean test tube. Add a drop of 2% Acetic Acid to check for persistent precipitates that can be quantified as a percentage of protein to the volume of the total sample.

Effects of Eclampsia on Mother and Fetus

Widespread spasm of arterioles affects most organs in the body, causing organ failure that endangers the lives of mother and fetus.

Effects on the Mother

These include:

- Respiratory (Asphyxia, Aspiration of vomit, Pulmonary Oedema, Broncho-Pneumonia).
- Cardiac (Heart Failure).
- Brain (Haemorrhage, Thrombosis, Oedema).
- Renal (Acute Kidney Failure).
- Hepatic (Liver Necrosis).
- HELLP Syndrome (**H**aemolysis, **E**levated **L**iver enzymes, **L**ow **P**latelet).
- Haemorrhage due to Coagulation Defect (Disseminated Intravascular Coagulation).
- Visual (Temporary Blindness) due to Oedema of the Retina.
- Injuries (Tongue biting during fits, Fractures).

The most common causes of maternal death in eclampsia are Aspiration of Vomit, Kidney Failure, Intracerebral Haemorrhage, and failure of more than one organ (e.g. heart, liver, kidney).

Effects on the Fetus

Placental insufficiency leads to:

- Intra Uterine Growth Restriction (IUGR)
- Hypoxia, which can result in permanent brain damage causing physical or mental handicap.
- The baby may be stillborn.

Patients at High Risk of Developing Pre-eclampsia

Pre-eclampsia and therefore the risk of eclampsia is more common in:

- Primigravidae (especially young teenagers and women over 35 years).
- Obese women.
- Women with essential hypertension.
- Multiple pregnancy.
- Women with Diabetes, Hydatidiform mole, Polyhydramnios.
- Women with history of pre-eclampsia or eclampsia in a previous pregnancy.
- Family history of eclampsia.

Prevention of Pregnancy Induced Hypertension

- Restricting calories, fluids and salt intake does **NOT** prevent pregnancy induced hypertension and may even be harmful to the fetus.
- Aspirin, Calcium and other agents have been used to prevent pregnancy induced hypertension, but their beneficial effects have not yet been proven.
- **Early detection and management** in women with risk factors is critical to the management of pregnancy induced hypertension and the prevention of convulsions. These women should be followed up regularly and given clear instructions regarding **danger signals** and when to return to their health care provider.
- Education of immediate family members is equally important, not only so that they understand the significance of signs of pregnancy induced hypertension, but also to increase social support when hospitalization and changes in work activities are needed.

UNSATISFACTORY PROGRESS OF LABOUR

DEFINITIONS

Labour may be true or false.

True Labour

Regular uterine contractions resulting in effacement and dilatation of the cervix, descent of the presenting part and eventually delivery of the baby.

False Labour

It is a retrospective diagnosis when there are no / infrequent palpable uterine contractions and the status of the cervix (dilatation and effacement) remains **unchanged** over several hours.

Mistaking false labour for prolonged latent phase leads to unnecessary induction and unnecessary caesarean section.

The progress of labour is divided into 3 stages:

First Stage: From the onset of **regular** uterine contractions, until full cervical dilatation.

Second Stage: From full cervical dilatation to delivery of the baby.

Third Stage: From delivery of the fetus to delivery of the placenta.

First Stage is divided into:

Latent Phase: From onset of regular uterine contractions to a cervical dilatation of 4 cm.

Active Phase: From 4 cms to full cervical dilatation (10cm).

Range of Duration of Normal Labour

Parity	1 st Stage		2 nd Stage	3 rd Stage
	Latent Phase	Active Phase		
Primipara	Up to 8 hours	Cervical dilatation of at least 1 cm/hour	60 min	30 min
Multipara	Up to 8 hours	Cervical dilatation of at least 1 cm/hour	30 min	30 min

Elements of Natural Labour:

- Powers
 - Passages
 - Passengers
- **Powers:**
 - **Primary Forces:**
Uterine contractions are the force that dilate the cervix and expel the baby, placenta and membranes, through the birth canal.
 - **Secondary Forces:**
After full cervical dilatation and the descent of fetal presenting part to the pelvic floor, the patient has a desire to push. So in addition to the uterine contractions, secondary forces come into play by utilizing the muscles of abdominal wall and diaphragm.
- **Passages:**

The passages through which the mother expels the baby, placenta and the membranes from the uterus during labour and includes:

 - **Soft Passages:** Soft tissues of the birth canal i.e. upper and the lower uterine segment, cervix and vagina.
 - **Hard Passage:** The bony pelvis.
- **Passengers:**
 - Fetus, placenta and membranes are the passengers.

The force of the powers, and the adequacy of the passages in relation to the size of the passenger (fetus), determines the outcome of labour.

Prolonged Labour

Labour pains lasting 12 hours or more in a primigravida and 8 hours or more in a multigravida, but patient remains undelivered. Prolonged labour may be due to prolongation of different stages of labour e.g.

- **Prolonged Latent Phase**

When the cervical dilatation remains less than 4 cm after 8 hours of regular uterine contractions.

- **Prolonged Active Phase**

A rate of cervical dilatation slower than 1 cm/hour.

Prolonged Expulsive Phase (Second Stage)

Even after active pushing for more than one hour in a primigravida and more than 30 minutes in a multigravida, the baby remains undelivered. (Strict time limits cannot always be enforced, if presenting part is descending well and both mother and fetus are not tired / distressed).

Prolonged Labour may be due to:

- Inefficient Uterine Contractions
- Malposition and Malpresentation of the Fetus
- Cephalopelvic Disproportion

Inefficient Uterine Contractions

Inefficient uterine contractions are infrequent and of short duration i.e. the frequency is less than 3 contractions in 10 minutes and each contraction lasting less than 40 seconds.

Efficient Uterine Contractions

Efficient uterine contractions are characterized by:

- A frequency of 3 contractions in 10 minutes, each lasting 40 seconds or more.

Efficient contractions result in:

- Progressive effacement and dilatation of cervix in the latent phase of labour.
- Progressive dilatation of cervix at the rate of at least 1cm/hour in the active phase of labour.
- Progressive descent of the fetal presenting part.

Malpresentations and Malpositions

- Most frequent and favourable fetal presentation is a well-flexed head in the occipito anterior position.
- All other fetal positions and presentations are called malpositions and malpresentations e.g. occipito posterior, occipito transverse, face, brow (when head is presenting), breech presentation and oblique and transverse lie (shoulder presentation).
- In all these situations bigger diameters of fetal presenting part will need to negotiate the maternal pelvis, resulting in slow progress of labour. Presenting part is poorly applied to the cervix and contractions are usually ineffective.

Cephalo Pelvic Disproportion (CPD)

Disproportion occurs because the baby is too large, or the baby's head is abnormally enlarged (hydrocephalus), or the maternal pelvis is too small. If labour is allowed to persist with disproportion, it may become obstructed.

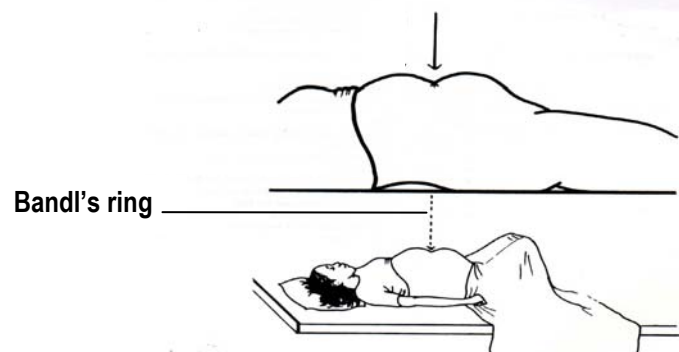
Obstructed Labour

In spite of strong uterine contractions, the presenting part cannot descend because of mechanical factors. The lie may be longitudinal (head or breech), oblique or transverse. Labour may or may not be prolonged. Neglected obstructed labour can lead to:

- Ruptured Uterus
- Vesico-Vaginal, Vesico-Cervical or Recto-Vaginal **Fistulae** resulting in dribbling of urine and faeces from the vagina. When the fetal head is stuck in the pelvis for a long time, portions of bladder, cervix, vagina and rectum are trapped between the fetal head and the pelvic bones, and are subjected to excessive pressure. As a result, the blood supply is impaired resulting in necrosis of tissues, followed by the formation of a fistula in few days.
- Puerperal Sepsis
- Disseminated Intravascular Coagulation (DIC)
- Maternal Death
- Fetal Hypoxia, leading to physical and mental impairment
- Fetal Death

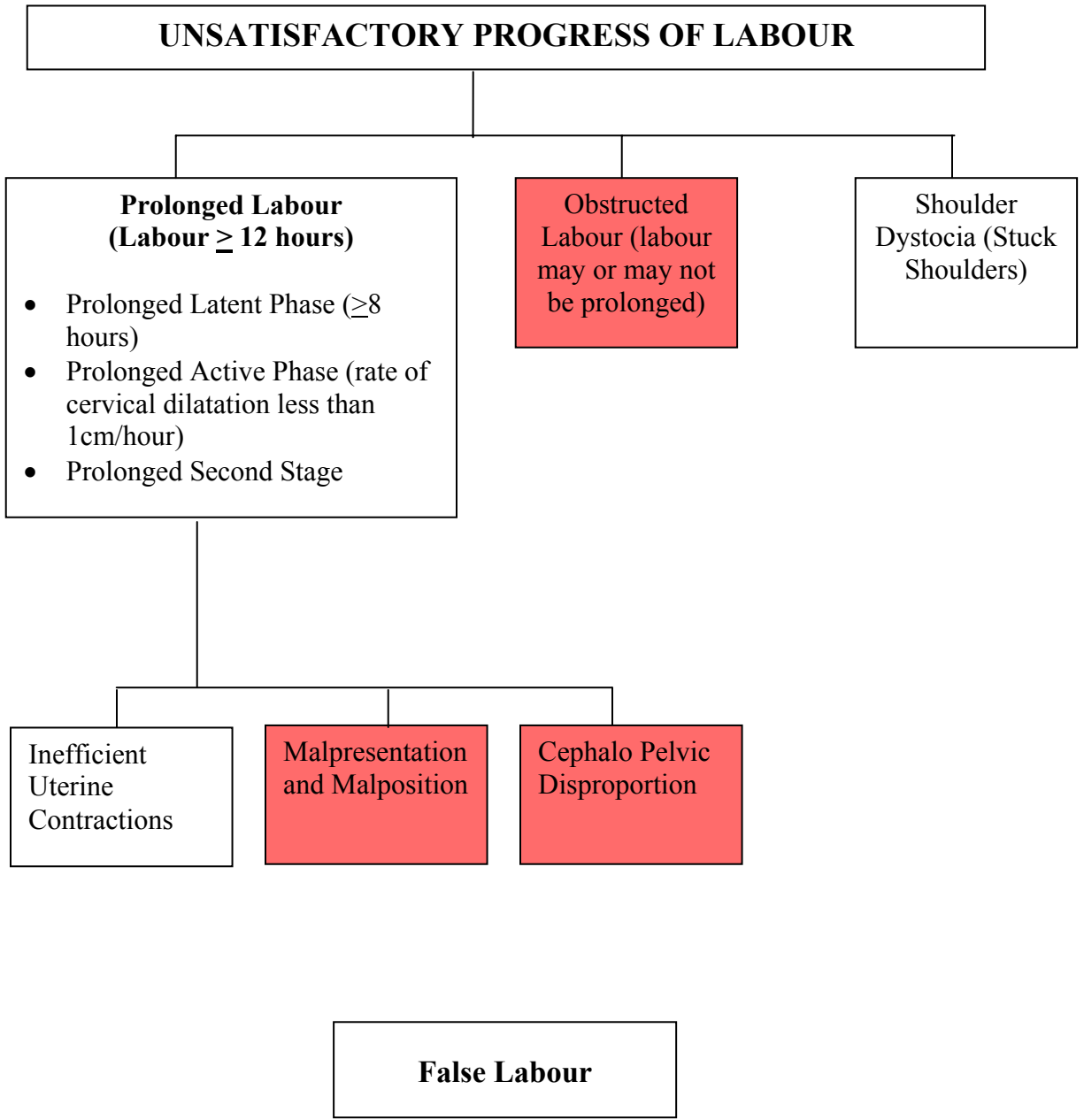
Bandl's Ring

It is a sign of late obstructed labour, and is seen as a depression across the abdomen, at about the level of the umbilicus. Above it, is the retracted thick upper uterine segment & below it, is the distended, thinned out, lower uterine segment. **It is a sign of impending rupture of the uterus.**



Shoulder Dystocia (Stuck Shoulders)

- The fetal head is delivered, but due to broad shoulders the rest of the body cannot be delivered.
- The fetal head remains tightly applied to the vulva.
- The chin retracts and depresses the perineum.
- Traction on the head fails to deliver the shoulder, which is caught behind the symphysis pubis.
- Fetal death follows, if management is not rapid and effective.
- Anticipate this problem if the fetus is big.



Pink Blocks Indicate Life-Threatening Conditions

Guidelines for Clinical Assessment of Patients with Unsatisfactory Progress of Labour

Clinical Assessment	
History	<p>Inquire from the patient and or attendant and record the following information:</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p style="text-align: center;">Simultaneously provide emergency care and record history</p> </div> <ul style="list-style-type: none"> • When was her last menstrual period (LMP)? • If this is her first pregnancy / number of previous deliveries. • Previous caesarean section / difficult instrumental delivery. • Outcome of previous delivery (Normal child / stillbirth / perinatal death / mentally or physically retarded). • Onset of labour, spontaneous / induced. Duration of current labour. • Whether after normal labour pains, the pains have now stopped. • Is there leaking membranes? • Has she received any injection? If so, was it Oxytocin? • Vaginal bleeding (duration and amount).
General Physical Exam	<ul style="list-style-type: none"> • Check and record vital signs (blood pressure, pulse, respiration and temperature). • Note general health of woman (dehydrated, ketotic, malnourished, anaemic). • Examine lungs, heart, abdomen and extremities. • In abdominal examination check: <ul style="list-style-type: none"> - Frequency and intensity of uterine contractions. - Shape of uterus (broad in transverse lie / Bandl's ring). - Lie of the fetus / urinary bladder whether palpable or not. - Presenting part free / high or engaged / entered the pelvis / cephalic / breech / shoulder. - Check for fetal heart (normal / rapid / slow / irregular / absent). - If fetal parts are easily palpable (ruptured uterus).
Pelvic Exam	<ul style="list-style-type: none"> • Per Vaginal (P/V) examination. Look for: <ul style="list-style-type: none"> - Foul-smelling discharge / meconium / blood. - Amount of bleeding. - Oedema of the vulva. - Oedematous, hot and dry vagina. - Oedema of the cervix / cervical dilatation / effacement. - Tears in the vagina or cervix in cases of attempted instrumental delivery. - Membranes present / absent. - Presenting part (head / shoulder / prolapsed arm / face / breech / compound presentation). - Position / station of presenting part. - Caput succadaneum / Severity of moulding. - Adequacy of pelvis.
Investigations (where facilities exist)	<ul style="list-style-type: none"> • Hb, Total Leucocytes Count, Platelets, Random Blood Sugar. • Urine for protein, sugar and ketones. • Blood group and Rhesus (Rh) factor. • Other tests may be needed in cases with complications.

Identifying the Problem

Unsatisfactory Progress Of Labour

Findings	Diagnosis
No palpable contractions / infrequent contractions. No change in cervix (dilatation / effacement).	False Labour
8 hours or more, of regular contractions. Cervix not dilated beyond 4 cm.	Prolonged Latent Phase
<p>Cervical dilatation less than 1 cm /hr or to the right of the alert line on the partograph (page 227).</p> <ul style="list-style-type: none"> • In spite of good uterine contractions there is secondary arrest of cervical dilatation and descent of presenting part. The intensity and severity of contractions decreases as time progresses. • There are usually good uterine contractions. Secondary arrest of cervical dilatation and descent of presenting part. <p>There is:</p> <ul style="list-style-type: none"> - Large caput. - Third degree moulding. - Cervix poorly applied to presenting part. - Oedematous cervix. - Ballooning of lower uterine segment. - Formation of retraction band (Bandl's ring). - Maternal and fetal distress. <ul style="list-style-type: none"> • Less than three contractions in 10 minutes, each lasting less than 40 seconds. • Presentation other than vertex with occiput anterior. 	<p>Prolonged Active Phase</p> <ul style="list-style-type: none"> • Cephalo Pelvic Disproportion • Obstructed Labour • Inadequate Uterine Activity • Malpresentation or Malposition
Cervix is fully dilated. Uterine contractions may or may not be inefficient. Woman may or may not have the urge to push. There is no descent of presenting part.	Prolonged Second Stage

GENERAL MANAGEMENT

- If shock is present or anticipated begin treatment immediately.
 - Rapidly evaluate condition of the woman and fetus and provide supportive care (page 216).
 - Insert 2 large bore I/V cannula (16 gauge or more), at two different sites.
 - From one of the cannula, first collect and send blood for Hb, Total Leucocyte Count, Platelets, Random Blood Sugar, Blood group, Rh status and urgent cross match if caesarean section is anticipated.
 - Do not repeat the tests if they have been done recently.
 - If ketotic, rapidly infuse I/V fluids e.g. Normal Saline or Ringer's Lactate.
 - If the urinary bladder is visibly distended encourage the woman to empty her bladder, if she cannot or operative delivery is anticipated, catheterize and retain the urinary catheter.
 - Test urine for ketones.
 - Review partograph if available (page 227).
 - If operative delivery is anticipated, **Refer** to a health care facility providing comprehensive EmOC.
 - Counsel donors for blood transfusion.
-
- Arrange 2 pints of blood, if operative delivery is anticipated.

SPECIFIC MANAGEMENT

FALSE LABOUR

Symptoms

- No palpable / infrequent uterine contractions.

Signs

- No detectable change in condition of the cervix (effacement and dilatation).
- Intact membranes.

Investigations (Where possible)

- Urine analysis to exclude infection.

DO the following tests, only if **not** done already:

- Hb, Random Blood Sugar.
- Blood group and Rhesus (Rh) factor.

Management

Examine for:

- Urinary tract or other infection (page 204).
- If membranes are ruptured, treat accordingly.
- If none of these are present, discharge the woman and instruct her to return if signs of labour recur.

SPECIFIC MANAGEMENT

PROLONGED LATENT PHASE

Symptoms

- Regular uterine contractions / labour pains for more than 8 hours.

Signs

- Cervix fails to dilate beyond 4 cm.

Investigations (Where possible)

If **not** already done, check:

- Hb, Random Blood Sugar.
- Urine for protein, sugar and ketones.
- Blood group and Rhesus (Rh) factor (If not known).
- Other tests may be needed in cases with complications.

Management

Reassess the situation by assessing the cervix:

- If there has been **no change in cervical effacement or dilatation** and there is no fetal distress, review the diagnosis. The woman may **not** be in labour.
- If there has been a **change in cervical effacement or dilatation**, rupture the membranes with a Kocher clamp or an amniotic hook, if available and induce labour, using Oxytocin or Prostaglandins (page 236).

- Reassess every 4 hours.
- Monitor using the partograph.

-
-
- If the **woman has not entered the active phase after 8 hours of Oxytocin** infusion, deliver by caesarean section (page 254).
 - If there are **signs of infection** (fever, foul-smelling vaginal discharge):
 - Augment labour immediately with Oxytocin (page 236).

- Give a combination of antibiotics until delivery (page 44):

- Ampicillin, 1 g, I/V, every 6 hours

PLUS

- Gentamicin, 80 mg, I/V, every 8 hours
- If the **woman delivers vaginally**, continue antibiotics postpartum till fever free for 48 hours.
- If the **woman has a caesarean section** add:
Metronidazole, 500 mg, I/V, every 8 hours, until the woman is fever-free for 48 hours.

SPECIFIC MANAGEMENT

PROLONGED ACTIVE PHASE

Symptoms

- Regular uterine contractions / labour pains, which may become irregular and of shorter duration.

Signs

- Cervix dilates at a rate less than 1 cm/hour.
- Progress to the right of “Alert line” on the partograph.

Investigations (Where possible)

If **not** already done, check:

- Hb, Random Blood Sugar.
- Urine for protein, sugar and ketones.
- Blood group and Rhesus (Rh) factor.
- Other tests may be needed in cases with complications.

Management

- If there are **no signs of cephalopelvic disproportion or obstruction** and the **membranes are intact**, rupture the membranes with a Kocher clamp or an amniotic hook, if available (page 235).
- Assess uterine contractions:
 - **If contractions are inefficient** (less than three contractions in 10 minutes, each lasting less than 40 seconds), suspect inadequate uterine activity and augment with Oxytocin infusion (page 236).

-
-
- **If contractions are efficient** (three contractions in 10 minutes, each lasting more than 40 seconds) suspect cephalopelvic disproportion, obstruction, malposition or malpresentation and manage accordingly (page 177-179, 181-182).

- General methods of labour support may improve contractions and accelerate progress.

SPECIFIC MANAGEMENT

CEPHALOPELVIC DISPROPORTION

Symptoms

- Prolonged labour.
- Usually regular **efficient** uterine contractions, which may become inefficient later on.

Signs

- Secondary arrest of:
 - Descent of fetal presenting part (head not engaged).
 - Cervical dilatation (at times cervix may be fully dilated).
- Normal sized pelvis with a big baby or a small (contracted) pelvis with an average sized baby.
- Head may be large due to hydrocephalus.

Investigations (Where possible)

If **not** already done, check:

- Hb, Random Blood Sugar.
- Urine for protein, sugar and ketones.
- Blood group and Rhesus (Rh) factor.
- Other tests may be needed in cases with complications.

Management

☞ **If cephalopelvic disproportion is confirmed and fetus is alive and normal** (Table on page 171), deliver by caesarean section (page 254).

☞ **If the baby has hydrocephalus**, perform craniocentesis (page 188).

☞ **If the fetus is dead:**

- Deliver by craniotomy if cervix is fully or nearly fully dilated (page 186).
- If the **operator is not skilled to perform craniotomy**, deliver by caesarean section (page 254).

The best test to determine if a pelvis is adequate is a trial of labour. Clinical pelvimetry is of limited value.

SPECIFIC MANAGEMENT

OBSTRUCTED LABOUR

Symptoms

- Labour may or many not be prolonged.
- Efficient uterine contractions (3 contractions in 10 minutes, each lasting 40 seconds or more).

Signs

- Secondary arrest of:
 - Descent of fetal presenting part.
 - Cervical dilatation.
- Bandl's ring.
- Abnormal lie or presentation e.g. transverse / oblique lie, breech presentation or cephalic presentation with a large baby or a small pelvis.
- Large head / Hydrocephalus
- Oedema of vulva / vagina / cervix.
- Cervix may be fully dilated.
- Cervix poorly applied to presenting part.
- May have genital tears if instrumental delivery is attempted.
- Maternal and fetal distress.

Note: look for signs of rupture of uterus

Investigations (Where possible)

If **not** already done, check:

- Hb, Random Blood Sugar.
- Urine for protein, sugar and ketones.
- Blood group and Rhesus (Rh) factor.
- Other tests may be needed in cases with complications.

Management



If the fetus is alive:

- **The cervix is fully dilated** and the **head is at 0 station or below**, deliver by vacuum extraction / forceps (page 248 / 251). This situation is rare.

Rupture of an unscarred uterus is usually caused by obstructed labour.

- **The cervix is not fully dilated** or if the **fetal head is too high for vacuum extraction**, deliver by caesarean section (page 254).

The lower uterine segment is stretched and thinned out in prolonged / obstructed labour. Beware of extension of uterine incision during caesarean section.

☞ **If the baby has hydrocephalus:**

- Perform Craniocentesis (page 188).
- If the cervix is dilated, drain Cerebro Spinal Fluid (CSF) through the fontanelles or suture lines, by a long wide bore needle.
- In case of breech presentation, drain CSF through the foramen magnum after the body of the baby is delivered (page 189).
- If the patient is not in labour, drain CSF through the anterior abdominal and uterine walls.

☞ **If the fetus is dead:**

- Deliver by craniotomy (page 186).
- If the **operator is not skilled to perform craniotomy**, deliver by caesarean section (page 254).

When performing a caesarean section and the cervix is fully dilated, the incision on the lower uterine segment should be a bit higher than usual, so that if extension occurs it will not involve the urinary bladder.

SPECIFIC MANAGEMENT

INADEQUATE UTERINE ACTIVITY

Symptoms

- Prolonged labour.
- Inefficient uterine contractions / labour pains.

Signs

- Less than 3 contractions in 10 minutes each lasting less than 40 seconds.
- Slow or arrested progress in labour.

Investigations (Where possible)

If **not** already done, check:

- Hb, Random Blood Sugar.
- Urine for protein, sugar and ketones.
- Blood group and Rhesus (Rh) factor.
- Other tests may be needed in cases with complications.

Management

If **contractions are inefficient** and **cephalopelvic disproportion and obstruction have been excluded**, the most probable cause of prolonged labour is inadequate uterine activity.

Inefficient contractions are less common in a multigravida than in a primigravida. Hence, every effort should be made to rule out disproportion in a multigravida before augmenting with Oxytocin.

- Rupture the membranes with, a Kocher clamp or an amniotic hook if available and augment labour using Oxytocin (page 236).
 - Reassess progress by vaginal examination 2 hours after strong contractions have been established:
 - If **progress continues**, continue Oxytocin infusion and re-examine after 2 hours. Continue to follow progress carefully.
-
-
- If there is **no progress** between examinations, deliver by caesarean section (page 254).

SPECIFIC MANAGEMENT

MALPRESENTATION OR MALPOSITION

Symptoms

- Prolonged first or second stage of labour.
- Contractions may be efficient / inefficient.

Signs

- Longitudinal lie with:
 - Cephalic presentation and malposition, occipito posterior and occipito transverse.
 - Face presentation.
 - Brow presentation.
 - Breech presentation.
- Transverse / oblique lie (shoulder presentation) with or without hand / cord prolapse.

Note: Cord may prolapse with any presentation.

Investigations (Where possible)

If **not** already done, check:

- Hb, Random Blood Sugar.
- Urine for protein, sugar and ketones.
- Blood group and Rhesus (Rh) factor.
- Other tests may be needed in cases with complications.

Management

- If **Oblique / Transverse lie:**
 - If in early labour & intact membranes, perform **External Cephalic Version (ECV)**.
 - If ECV fails, or is not advisable, or if there is **hand / cord prolapse**, deliver by caesarean section (page 254).
- If the **head is presenting** and there is malposition (occipito posterior, occipito transverse), or malpresentation (face, brow), assess contractions and fetal condition:
- In Occipito **Posterior** position if:
 - Progress of labour is satisfactory and there is no fetal distress, await spontaneous rotation and delivery.
 - Contractions are inefficient; augment labour with Syntocinon (page 236).
 - Labour is delayed and / or there is fetal distress:
 - Perform caesarean section (page 254) if:
 - Cervix is not fully dilated.
 - Head is not engaged.
 - There are signs of obstructed labour.

Perform Caesarean section, if there are signs of obstruction even if there is no fetal distress.

- Deliver by vacuum / forceps if:
 - Cervix fully dilated.
 - Head is engaged.
- In **Occipito Transverse** position: manage as Occipito Posterior position.
- If the presentation is **Brow**:
 - The fetus is alive, perform caesarean section (page 254).
 - The fetus is dead and:
 - Cervix is not fully dilated, perform caesarean section.
 - Cervix is fully dilated, perform craniotomy (page 186).
 - If operator is not skilled to do craniotomy, perform caesarean section.
- If the presentation is **Face**:
 - **Mento Anterior Position:** Delivery of the baby is possible spontaneously or aided with forceps.
 - **Mento Posterior Position:**
 - If cervix is fully dilated, perform caesarean section (page 254).
 - If cervix is not fully dilated, monitor descent, rotation and progress.
 - If there are signs of obstruction, perform caesarean section.
- If the presentation is **Breech**, consider delivering vaginally, **if**:
 - Fetus is not too big.
 - Pelvis seems adequate on clinical examination.
 - Baby's head is flexed.
 - No h/o previous caesarean section for cephalo pelvic disproportion.

Breech in Labour:

- In labour, monitor progress using a partogram (page 228).
- When membranes rupture, examine immediately to exclude cord prolapse.
- Perform caesarean section (page 254) if:
 - Cord prolapses and delivery is not imminent.
 - There is fetal distress or prolonged labour.
 - In second stage of labour the descent of presenting part is slow, suspect obstruction (avoid augmentation of labour with Oxytocin).

SPECIFIC MANAGEMENT

PROLONGED SECOND STAGE

Symptoms

- Prolonged second stage of labour.

Signs

- Uterine contractions may or may not be inefficient.
- Cervix fully dilated.
- Woman may or may not have the urge to push.
- Slow / no descent of the presenting part.

Investigations (Where possible)

If **not** already done, check:

- Hb, Random Blood Sugar.
- Urine for protein, sugar and ketones.
- Blood group and Rhesus (Rh) factor.
- Other tests may be needed in cases with complications.

Management

Maternal expulsive efforts increase fetal risk by reducing the delivery of oxygen to the placenta. Allow spontaneous maternal "pushing", but do not encourage prolonged effort and holding the breath.

- **If malpresentation and obvious obstruction have been excluded**, augment labour with Oxytocin (page 236).
- If there is **no descent after augmentation**:

- If the **head is not more than 1/5 above** the symphysis pubis or the leading bony edge of the fetal **head is at or below 0 station**, deliver by vacuum extraction (page 248) or forceps (page 251).

- If the **head is more than 2/5 above** the symphysis pubis or the leading bony edge of the fetal **head is above 0 station**, deliver by caesarean section (page 254).

If the descent of the presenting part is progressing well, strict time limits should not be used to diagnose prolonged expulsive phase of second stage of labour.

SPECIFIC MANAGEMENT

SHOULDER DYSTOCIA (STUCK SHOULDERS)

Symptoms

- Baby's head is delivered but the shoulders are stuck. (This is an acute emergency and the baby will die if not delivered quickly).

Signs

- The fetal head is delivered but remains tightly applied to the vulva.
- The chin retracts and depresses the perineum.
- Traction on the head fails to deliver the shoulder, which is caught behind the symphysis pubis.

Investigations (Where possible)

- There is no time to order investigations. Relevant investigations can be done once the baby is delivered e.g. Hb, Random Blood Sugar, blood group and Rhesus (Rh) factor.

Management

- Be prepared for shoulder dystocia at all deliveries, especially if a large baby is anticipated.
- Have several persons available to help.
- Manage as on page 190.

SKILLS REQUIRED TO MANAGE UNSATISFACTORY PROGRESS OF LABOUR

- Obstetric Abdominal Examination
- Vaginal Examination
- Maintaining and Interpretation of Partograph (page 227)
- Medical Induction of Labour (page 232)
- Artificial Rupture of Membranes (ARM) (page 235)
- Repair of Cervical and Vaginal Tears (page 265 & 266)
- Managing Shoulder Dystocia (page 190)
- Instrumental Delivery
 - Vacuum Extraction (page 248)

-
- Forceps (page 251)
-
-

- Caesarean Section (page 254)
- Repair of Ruptured Uterus (page 272)
- Subtotal / Total Hysterectomy (page 276)
- Craniotomy and Craniocentesis (page 186 & 188)

SKILLS REQUIRED TO MANAGE UNSATISFACTORY PROGRESS OF LABOUR

CRANIOTOMY AND CRANIOCENTESIS

In certain cases of obstructed labour with fetal death, reduction in the size of the fetal head by craniotomy makes vaginal delivery possible and avoids the risks associated with caesarean delivery. Craniocentesis can be used to reduce the size of a hydrocephalic head to make vaginal delivery possible. The skull bones are thinner and can be perforated with a needle easily, as a result of which the fetal head collapses.

- Provide emotional support and encouragement. If necessary, give Diazepam, I/V slowly or use a pudendal block (page 245).

CRANIOTOMY (Skull Perforation)

- Review indications.
- Review general care principles (page 6) and apply antiseptic solution to the vagina (page 9).
- Avoid episiotomy, if possible (page 242).

Cephalic Presentation



Fig. 1: Cruciate Incision on Scalp

- Make a cruciate (cross-shaped) incision on the scalp (see above).
- Open the cranial vault at the lowest and most central bony point with a craniotome (or large pointed scissors or a heavy scalpel). In face presentation, perforate the orbits.
- Insert the craniotome or large scissors into the fetal cranium and fragment the intracranial contents.
- Grasp the edges of the skull with several heavy-toothed forceps (e.g. Kocher's or Volsellum) and apply traction in the axis of the birth canal (Fig. 2, page 187).

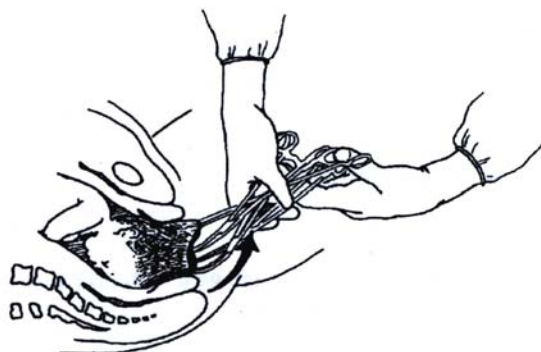


Fig. 2: Extraction by Scalp Traction

- As the head descends, pressure from the bony pelvis will cause the skull to collapse, decreasing the cranial diameter.
- If the **head is not delivered easily**, perform caesarean section (page 254). This is rarely required.
- After delivery, examine the woman carefully and repair any tears to the cervix (page 265) or vagina (page 266).
- Leave a self-retaining catheter in place, until it is confirmed that there is no bladder injury.
- Ensure adequate fluid intake and urinary output.

Breech Presentation with Entrapped Head

- Make an incision through the skin at the base of the neck.
- Insert a craniotome (or large pointed scissors or a heavy scalpel) through the incision and tunnel subcutaneously to reach the occiput.
- Perforate the occiput and open the gap as widely as possible.
- Apply traction on the trunk to collapse the skull as the head descends.

CRANIOCENTESIS (Skull Puncture)

- Review indications.
- Review general care principles (page 6) and apply antiseptic solution to the vagina (page 9).
- Avoid episiotomy, if possible (page 242).

Dilated Cervix



Fig. 1: Craniocentesis with a Dilated Cervix

- Pass a large-bore spinal needle through the dilated cervix and through the sagittal suture line or fontanelles of the fetal skull (see above).
- Aspirate the cerebrospinal fluid until the fetal skull has collapsed and allow normal delivery to proceed.

Closed Cervix

- Palpate for location of fetal head.
- Apply antiseptic solution to the suprapubic skin (page 10).
- Pass a large-bore spinal needle through the abdominal and uterine walls and through the hydrocephalic skull.
- Aspirate the cerebrospinal fluid until the fetal skull has collapsed and allow normal delivery to proceed.

After Coming Head During Breech Delivery

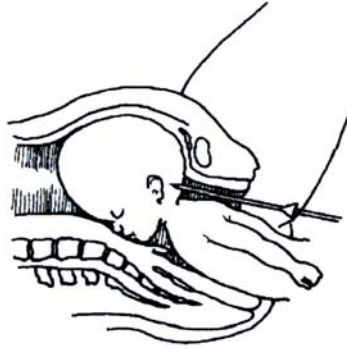


Fig. 2: Craniocentesis of the After coming Head

- After the rest of the body has been delivered, insert a large-bore spinal needle through the dilated cervix and foramen magnum (see above).
- Aspirate the cerebrospinal fluid and deliver the after coming head as in breech delivery.

During Caesarean Section

- After the uterine incision is made, pass a large-bore spinal needle through the hydrocephalic skull.
- Aspirate the cerebrospinal fluid until the fetal skull has collapsed.
- Deliver the baby and placenta as in caesarean section (page 257).

Post-Procedure Care

- After delivery, examine the woman carefully and repair any tears to the cervix (page 265) or vagina (page 266).
- Leave a self-retaining catheter in place, until it is confirmed that there is no bladder injury.
- Ensure adequate fluid intake and urinary output.

MANAGING SHOULDER DYSTOCIA

- Bring the patient to the edge of the table / bed.
- Make an adequate episiotomy (page 242) to reduce soft tissue obstruction and to allow space for manipulation.
- With the woman on her back, ask her to flex both thighs, bringing her knees as far up as possible towards her abdomen (see below). Ask two assistants to push her flexed knees firmly up onto her abdomen.



Fig. 1: Assistant Pushing Flexed Knees Firmly Towards Abdomen

- Apply firm, continuous traction downwards on the fetal head to move the shoulder that is anterior under the symphysis pubis.

Note: Avoid excessive traction on the head as this may result in brachial plexus injury.

- Have an assistant simultaneously apply suprapubic pressure downwards to assist delivery of the shoulder.

Note: Do not apply fundal pressure. This will further impact the shoulder and can result in uterine rupture.

If the shoulder is still not delivered:

- Insert a hand into the vagina.
- Apply pressure to the shoulder that is anterior in the direction of the baby's sternum to rotate the shoulder and decrease the shoulder diameter.
- If needed and possible, apply pressure to the shoulder that is posterior in the direction of the sternum.

If the shoulder is still not delivered despite the above measures:

- Insert a hand into the vagina and grasp the humerus of the arm that is posterior and, keeping the arm flexed at the elbow, sweep the arm across the chest. This will provide room for the shoulder that is anterior to move under the symphysis pubis (see below).

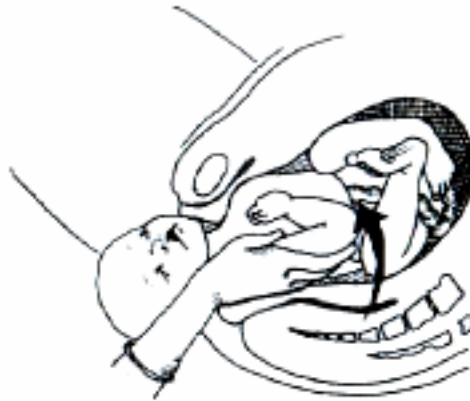


Fig. 2: Grasping the Humerus of the Arm that is Posterior and Sweeping the Arm Across the Chest

If all of the above measures fail to deliver the shoulder, other options include:

- Fracture the clavicle (cleidotomy) to decrease the width of the shoulders and free the shoulder.
- Apply traction with a hook in the axilla to extract the arm that is posterior.

FEVER AFTER CHILD BIRTH (PUERPERAL PYREXIA)

Puerperal Pyrexia

A temperature of 38°C (100.4°F), occurring twice in 24 hours during the puerperium, irrespective of the cause.

Causes:

- **Infection of the Genital Tract (Puerperal Sepsis).**
- Infection of the Urinary Tract.
- Breast Related Conditions.
- Wound Infection.
- Chest Infection.
- Thrombotic Conditions.
- Medical Causes e.g. Malaria, Hepatitis, Typhoid etc.

Puerperal Sepsis

Infection of the genital tract, within 6 weeks after childbirth. It is a major cause of maternal death. Signs include:

- Fever of 38°C (100.4°F) or more, may be associated with rigors.
- Abdominal Pain
- Pelvic Pain
- Foul Smelling Vaginal Discharge (Lochia)
- Tender Uterus
- Delay in the Rate of Involution (reduction of the size of the uterus)

Warning: Delayed, inadequate or lack of treatment may result in one or more of the following:

- Pelvic Abscess (collection of pus in the pouch of Douglas).
- Peritonitis
- Septic Shock.
- Chronic Pelvic Infection with recurrent pelvic pain.
- Dyspareunia (Pain during Sexual Intercourse).
- Blockage of the Fallopian Tubes, resulting in infertility.
- Deep Vein Thrombosis.
- Pulmonary Embolism.
- Death

Other Causes of Puerperal Pyrexia:

- **Infections of the Urinary Tract**

- **Cystitis:** Infection of urinary bladder.
- **Pyelonephritis:** Infection of the upper urinary tract, mainly of pelvis of the kidney. It may also involve parenchyma of the kidneys.

- **Breast Related Conditions**

- **Engorgement of Breast:** Increased venous and lymphatic flow to the breast that occurs prior to lactation. It is not the result of over distension of the breast with milk.
- **Mastitis:** Infection of the breast tissue.
- **Breast Abscess:** Collection of pus in the breast.

- **Wound Infection**

- Infection of the tears (perineal / vaginal / cervical), or of incision on the perineum (episiotomy), or abdominal wall (e.g. in caesarean section).

- **Chest Infection**

This may be due to aspiration of vomitus in an unconscious patient post operatively, or during eclamptic fits.

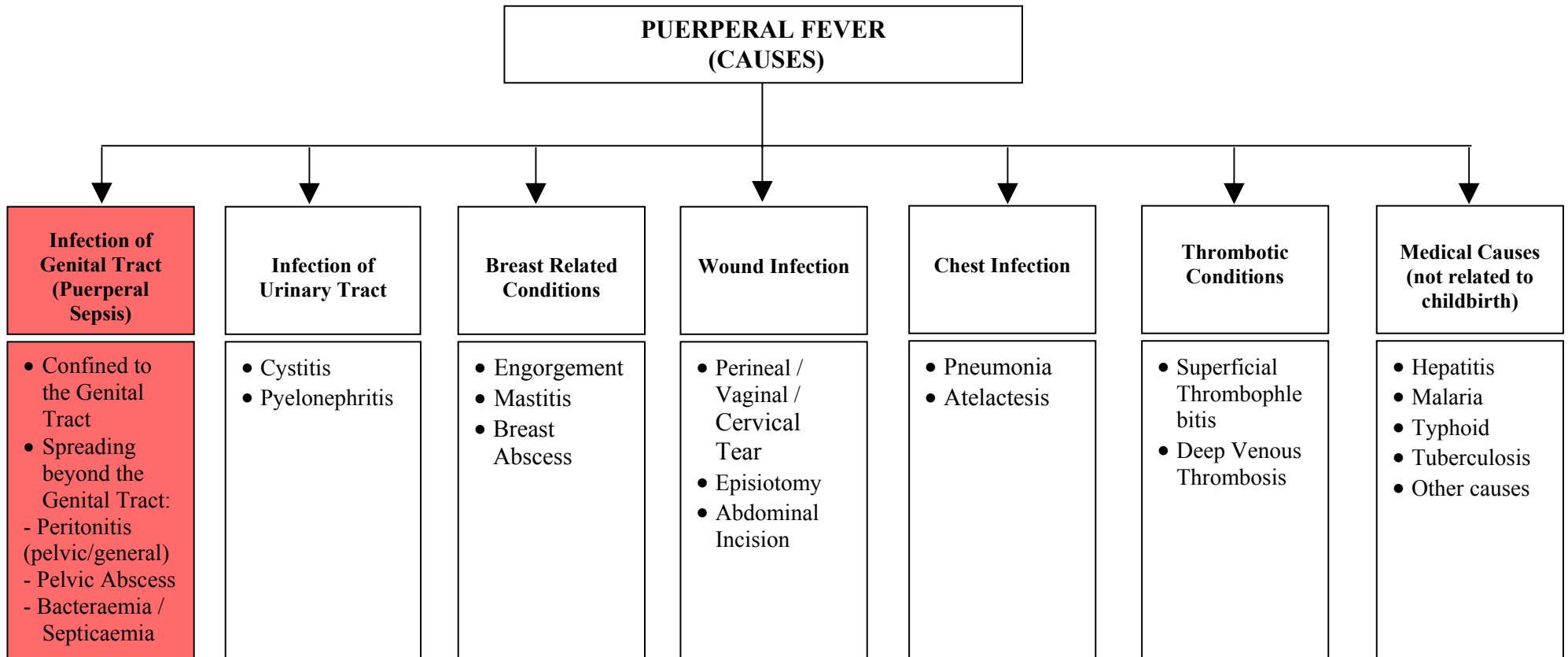
- **Pneumonia:** Infection of the lungs.
- **Atelactesis:** Collapse of the lung.

- **Thrombotic Conditions**

- **Superficial Thrombophlebitis:** Clotting of blood in superficial blood vessels of the legs and is associated with inflammation.
- **Deep Venous Thrombosis:** Clotting of blood in deep veins of the legs and pelvis.

- **Pyrexia due to Incidental Medical Conditions (not related to childbirth)**

- Hepatitis
- Malaria
- Typhoid
- Tuberculosis



Pink Blocks Indicate Life-Threatening Obstetric Conditions

Assessing the Patient

Guidelines for Clinical Assessment of Patients with Fever After Childbirth

Clinical Assessment	
History	<p>Inquire from patient and / or attendants, and record the following information:</p> <ul style="list-style-type: none"> • Date and time of delivery. • Duration and severity of fever / presence of rigors. • Delivery at home or health facility, conducted by trained / untrained person. • Mode of delivery (normal / forceps / vacuum / caesarean section). • Time interval between rupture of membranes and childbirth. • Manual removal of placenta. • Abdominal pain / pain elsewhere. • Vaginal bleeding (duration, amount, foul smell). • Urinary frequency / dysuria. • Breast-feeding / painful breasts. <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-top: 10px;"> <p style="text-align: center;">Simultaneously provide emergency care and record history</p> </div>
General Physical Exam	<ul style="list-style-type: none"> • Check and record vital signs (temperature, pulse, respiration, and blood pressure). • Note general health of woman (toxic, anaemic, dehydrated, malnourished, general poor health). • Examine lungs, heart, abdomen and legs (for tenderness, redness). • In abdominal examination check: <ul style="list-style-type: none"> - If the abdomen is distended or rigid (tense and hard). - If there is rebound / generalized tenderness. - Size and tenderness of the uterus. - For presence, location and severity of tenderness. - Bowel sounds.
Pelvic Exam	<ul style="list-style-type: none"> • Per speculum (P/S) examination. Look for: <ul style="list-style-type: none"> - Placental pieces in the vaginal canal or cervical os. - Foreign body in the vagina. - Tears in the vagina or cervix specially if baby is delivered by forceps or vacuum. - Foul-smelling discharge, pus or blood. • Per vaginal (P/V) and bimanual examination: <ul style="list-style-type: none"> - Note the amount, colour, smell and source of bleeding. - Check whether the cervix is open or closed to determine whether there are retained pieces of placenta and membranes. - Estimate the size of the uterus. - Check pelvic pain (severity, location and what causes the pain e.g. cervical movement). - Check for any pelvic masses (pelvic abscess).
Investigations (where facilities exist)	<ul style="list-style-type: none"> • Hb, Total Leucocyte Count, Platelets and Erythrocyte Sedimentation Rate (ESR), bedside clotting test. • Blood group and Rhesus (Rh) factor. • Send High Vaginal Swab / urine / blood for culture and sensitivity in appropriate cases. • Ultrasound to detect retained pieces of placenta / pelvic abscess. • Other tests may be needed in cases with complications.

Identifying the Problem

Fever After Childbirth

Symptoms	Signs	Probable Diagnosis
Infection of the Genital Tract		
<ul style="list-style-type: none"> • Fever / chills. • Usually light vaginal bleeding. • Lower abdominal pain. • Purulent, foul-smelling lochia. 	<ul style="list-style-type: none"> • Tender uterus. • Size of the uterus bigger than expected. • Shock (In cases with bacteraemia & septicaemia). 	Puerperal Sepsis (Infection limited to Genital Tract)
<ul style="list-style-type: none"> • Loss of appetite. • Nausea / vomiting. • Low-grade fever / chills. • Lower abdominal pain. 	<ul style="list-style-type: none"> • Abdominal distension. • Generalized abdominal tenderness. • Rebound tenderness. • Absent bowel sounds. • Shock (In cases with bacteraemia & septicaemia). 	Peritonitis
<ul style="list-style-type: none"> • Lower abdominal pain and distension. • Persistent spiking fever / chills. • Foul smelling Lochia. • Diarrhoea 	<ul style="list-style-type: none"> • Tender uterus. • Poor response to antibiotics. • Swelling in adnexa or pouch of Douglas. • Pus obtained upon culdocentesis. 	Pelvic Abscess Tubo-Ovarian Masses
Breast Related Conditions		
<ul style="list-style-type: none"> • 3 - 5 days after delivery. • Breast pain and tenderness. 	<ul style="list-style-type: none"> • Hard enlarged breasts. • Both breasts affected. 	Breast Engorgement
<ul style="list-style-type: none"> • 2 - 4 weeks after delivery. • Breast pain. • Fever / chills. 	<ul style="list-style-type: none"> • H/O engorgement of breasts. • Cracked nipples. • Usually only one breast affected. • Reddened, tender wedge shaped area on breast. 	Mastitis
<ul style="list-style-type: none"> • 3 - 4 weeks after delivery. • Breast pain. • Fever / chills. 	<ul style="list-style-type: none"> • Firm, very tender breast. • Usually only one breast affected. • Overlying redness. • Fluctuant swelling in breast. • May burst open to drain pus. 	Breast Abscess

Identifying the Problem

Fever After Childbirth

Symptoms	Signs	Probable Diagnosis
Wound Infection		
<ul style="list-style-type: none"> Painful wound. Blood or serous discharge. 	<ul style="list-style-type: none"> Unusually tender wound. Slight redness extending beyond the edge of incision. 	Wound Abscess, Wound Haematoma
<ul style="list-style-type: none"> Painful wound. Redness and swelling beyond edge of incision. 	<ul style="list-style-type: none"> Tender wound. Hardened wound. Purulent discharge. Reddened area around wound. 	Wound Cellulitis
Infection of the Urinary Tract		
<ul style="list-style-type: none"> Painful and / or burning micturition. Increased frequency and urgency of urination. Abdominal pain. 	<ul style="list-style-type: none"> Lower abdominal tenderness. 	Cystitis
<ul style="list-style-type: none"> Loss of appetite. Nausea / vomiting. Spiking fever / chills. Painful and / or burning micturition. Increased frequency and urgency of urination. Abdominal pain (radiating from loin to groin). 	<ul style="list-style-type: none"> Retropubic / suprapubic tenderness. Loin tenderness. Tenderness in rib cage. 	Acute Pyelonephritis
Thrombotic Conditions		
<ul style="list-style-type: none"> Spiking fever despite antibiotics. 	<ul style="list-style-type: none"> Calf muscle tenderness. 	Deep Vein Thrombosis
Chest Infection		
<ul style="list-style-type: none"> Fever Difficulty in breathing. Cough with expectoration. Chest pain. 	<ul style="list-style-type: none"> Congested throat. Rapid breathing. Rhonchi / crepitations. Consolidation. 	Pneumonia
<ul style="list-style-type: none"> Fever Typically occurs postoperatively. 	<ul style="list-style-type: none"> Decreased breath sound. 	Atelectasis

Identifying the Problem

Fever After Childbirth

Symptoms	Signs	Probable Diagnosis
Medical Conditions		
<ul style="list-style-type: none"> • Fever • Chills / rigors • Headache • Muscle / joint pain 	<ul style="list-style-type: none"> • Enlarged spleen. • Fever touches normal. • Usually has a pattern of recurrence. 	Uncomplicated Malaria
<ul style="list-style-type: none"> • Fever • Chills / rigors • Headache • Muscle / joint pain 	<ul style="list-style-type: none"> • Anaemia • Jaundice • Convulsions • Coma 	Severe / Complicated Malaria
<ul style="list-style-type: none"> • Persistent fever • Headache • Dry cough • Malaise • Anorexia 	<ul style="list-style-type: none"> • Confusion / Stupor. • Enlarged spleen. • Fever settles gradually with treatment. 	Typhoid
<ul style="list-style-type: none"> • Fever • Malaise • Anorexia • Nausea • Muscle / Joint pain 	<ul style="list-style-type: none"> • Jaundice • Urticaria • Dark urine and pale stool. • Enlarged spleen. • Enlarged liver. 	Hepatitis

GENERAL MANAGEMENT

- **If shock is present or anticipated**, immediately begin treatment.
- Insert large bore I/V cannula (16 gauge or more). Insert 2 cannula, at different sites, if in shock.
- From one of the cannula, collect blood for estimation of Hb, Total Leucocyte Count, Platelet Count, Random Blood Sugar, Blood group and Rh status and cross match.
- Ensure adequate hydration by mouth or I/V infusions using Normal Saline or Ringer's Lactate. In severe cases, it is necessary to give intravenous fluids at first. If the woman is conscious and there is no indication for the need of a general anaesthetic in the next few hours, she should be given oral fluids. In mild cases, increase oral fluid intake.
- If patient is conscious and alert, give Paracetamol, 500 mg, by mouth, every 4-6 hours, to minimize pain and / or lower temperature.

Note: These patients might need to be taken to the operation theatre for surgical procedures, therefore give these tablets only with a sip of water.

- Use a fan or tepid sponge to help decrease temperature.
- In seriously ill patients, catheterize the urinary bladder to accurately monitor the urine output.
- Monitor temperature, pulse, blood pressure, urine output and fluids given orally or intravenously.
- Maintain accurate fluid balance chart.
- Keep accurate records of medicines given.
- Prevent the spread of infection and cross infection (page 6).
- Prescribe and give antibiotics according to the clinical situation (page 44).
- If there is a possibility that the woman was exposed to tetanus (cow dung, mud or herbs were inserted in the vagina), and there is uncertainty about her vaccination history, then give her Tetanus toxoid and anti tetanus serum (page 201).
- Encourage bed rest.
- Counsel blood donors, if blood is required.

-
- Arrange 2-3 units of blood, if severely anaemic and transfuse as necessary. Use packed cells, if available (page 14).

SPECIFIC MANAGEMENT

PUERPERAL SEPSIS

Symptoms

- Fever / chills.
- Usually light vaginal bleeding.
- Lower abdominal pain.
- Purulent, foul-smelling lochia.

Signs

- Tender uterus.
- Size of the uterus bigger than expected.
- Shock (In cases with bacteraemia & septicaemia).

Investigations (Where possible)

- Hb, Total Leucocyte Count, Platelets and Erythrocyte Sedimentation Rate (ESR), bedside clotting test.
- Blood group and Rhesus (Rh) factor.
- High Vaginal Swab / Urine / Blood for culture and sensitivity in appropriate cases.
- Ultrasound to detect retained pieces of placenta / pelvic abscess.
- Other tests may be needed in cases with complications.

Management

☞ If the woman is not very sick (mild infection) (e.g. there is no or mild fever, pulse is not very rapid and patient is alert), prescribe oral antibiotics like:

- Co-Amoxiclav (Augmentin), 375mg/625mg, every 8 hours, for 7 days

OR

- Amoxicillin, 1g, stat, followed by 500 mg, every 8 hours, for 7 days

PLUS

- Metronidazole, 400 or 500 mg, every 8 hours, for 7 days

☞ If the woman is very sick (severe infection) (e.g. very high fever, rapid pulse, confused), often more than one kind of bacteria is involved:

- **Refer**

- A combination of antibiotics should be given to provide as broad coverage as possible **until the woman is fever-free for 48 hours:**
 - Ampicillin, 1g, I/V, every 6 hours
 - PLUS**
 - Gentamicin, 80 mg, I/V, every 8 hours
 - PLUS**
 - Metronidazole, 500 mg, I/V, every 8 hours

Continue oral antibiotics (Ampicillin and Metronidazole) for at least 5 days (page 44).

- If fever is still present 48 hours after initiating antibiotics, re-evaluate and revise diagnosis / treatment.
- If there is a possibility that the woman was exposed to tetanus (cow dung, mud or herbs were inserted in the vagina), and there is uncertainty about her vaccination history, then give her Tetanus Toxoid (TT), 0.5 ml, I/M and Anti Tetanus Serum, 1500 units, I/M. Repeat TT after 4 weeks for future protection.

-
-
- **If retained placental fragments** are suspected, (Uterus soft, bigger than expected with heavy lochia or blood clots), perform a digital exploration of the uterus to remove clots and large pieces of product of conception. Use ovum forceps or a large curette, if required (page 81). Give at least one dose of combination antibiotics, I/V, before the procedure and continue for 5 days.
 - If there is **no improvement** with conservative measures and there are **signs of general peritonitis** (fever, rebound tenderness, abdominal pain), perform a laparotomy to drain the pus.
 - If the uterus is **necrotic and septic**, perform subtotal / total hysterectomy (page 276).

SPECIFIC MANAGEMENT

PELVIC ABSCESS

Symptoms

- Lower abdominal pain and distension.
- Persistent spiking fever / chills.
- Foul smelling lochia.
- Diarrhoea

Signs

- Tender uterus
- On vaginal examination, bulge is felt in pouch of Douglas.
- Poor response to antibiotics.

Investigations (Where possible)

- Hb, Total Leucocyte Count, Platelets and Erythrocyte Sedimentation Rate (ESR), bedside clotting test.
- Blood group and Rhesus (Rh) factor.
- Send High Vaginal Swab / Urine / Blood for culture and sensitivity in appropriate cases.
- Ultrasound to detect retained pieces of placenta / pelvic abscess.
- Other tests may be needed in cases with complications.

Management

-
- Give at least one dose of a combination of I/V antibiotics before draining the abscess and continue until the woman is fever-free for 48 hours (page 44):
 - Ampicillin, 1 g, I/V, every 6 hours

PLUS

- Gentamicin, 80 mg, I/V, every 8 hours

PLUS

- Metronidazole, 500 mg, I/V, every 8 hours

Continue oral antibiotics (Ampicillin and Metronidazole) for at least 5 days (page 44).

- If the abscess is **fluctuant in the cul-de-sac**:
 - Drain the pus through the cul-de-sac (colpotomy) (page 282).
 - If the **spiking** fever continues, perform a laparotomy to drain the pus and peritoneal lavage if needed (wash out).

SPECIFIC TREATMENT

PERITONITIS

Symptoms

- Loss of appetite.
- Nausea / vomiting.
- Low-grade fever / chills.
- Lower abdominal pain.

Signs

- Abdominal distension.
- Generalised abdominal tenderness.
- Rebound tenderness.
- Absent bowel sounds.
- Shock (In cases with bacteraemia & septicaemia).

Investigations (Where possible)

- Hb, Total Leucocyte Count, Platelets and Erythrocyte Sedimentation Rate (ESR).
- Urea, Creatinine & Electrolytes.
- Bedside clotting test.
- Blood group and Rhesus (Rh) factor.
- Send High Vaginal Swab / Urine / Blood for culture and sensitivity in appropriate cases.
- Ultrasound to detect retained pieces of placenta / pelvic abscess.
- Other tests may be needed in cases with complications.

Management

- Do not allow oral fluids or diet.
- Pass naso-gastric tube and aspirate contents of the stomach by suction.
- Infuse I/V fluids (page 9).
- Give a combination of antibiotics until the woman is fever-free for 48 hours:

Ampicillin, 1 g, I/V, every 6 hours

PLUS

Gentamicin, 80 mg, I/V, every 8 hours

PLUS

Metronidazole, 500 mg, I/V, every 8 hours

Continue oral antibiotics (Ampicillin and Metronidazole) for at least 5 days.

If not responding in 48-72 hours, perform laparotomy for peritoneal lavage (wash-out).

SPECIFIC MANAGEMENT

URINARY TRACT INFECTIONS

Assume that a urinary tract infection involves all levels of the tract, from renal calyces to urethral meatus.

Assessing the Patient

Dipstick, microscopy and urine culture tests can be used to determine if a urinary tract infection is present, but will not differentiate between cystitis and acute pyelonephritis.

- Microscopic examination of urine specimen may show white cells in clumps, bacteria and sometimes red cells.
- Urine culture and sensitivity tests should be done, if available, to identify the organism and its antibiotic sensitivity.

Note: Urine examination requires a clean-catch mid-stream specimen, to minimize the possibility of contamination.

SPECIFIC MANAGEMENT

CYSTITIS

Treat with antibiotics:

- Amoxicillin, 500 mg, by mouth, three times per day, for 3-5 days

OR

- Co-trimoxazole (Septran), 160 mg / 800 mg (1 tablet), by mouth, twice daily, for 5 days

OR

- Pipedimic Acid (Urixin), 400 mg, twice daily, for 5-7 days
- If treatment **fails**, check urine culture and sensitivity, if available, and treat with an antibiotic appropriate for the organism.
- If infection recurs two or more times, check urine culture and sensitivity, if available, and treat with an antibiotic appropriate for the organism.

SPECIFIC MANAGEMENT

ACUTE PYELONEPHRITIS

- **If shock is present or anticipated**, initiate immediate treatment (page 22).
- Check urine culture and sensitivity, if possible, and treat with an antibiotic appropriate for the organism.
- **If urine culture is unavailable**, treat with antibiotics until the woman is fever-free for 48 hours (page 44):

- Ampicillin, 1 g, I/V, every 6 hours

PLUS

- Gentamicin, 80 mg, I/V, every 8 hours

- **Once the woman is fever-free for 48 hours**, give Amoxicillin, 1 g, by mouth, three times per day, to complete 14 days of treatment.

Note: Clinical response is expected within 48 hours. If there is **no clinical response in 72 hours**, re-evaluate results and antibiotic coverage.

SPECIFIC MANAGEMENT

BREAST RELATED CONDITIONS

BREAST ENGORGEMENT

- **If the woman is breastfeeding and the baby is not able to suckle**, encourage the woman to express milk by hand or with a pump.
- **If the woman is breastfeeding and the baby is able to suckle:**
 - Encourage the woman to breastfeed more frequently, using both breasts at each feeding.
 - Show the woman how to hold the baby and help it attach.

Relief measures **before** feeding, may include:

- Apply warm compresses to the breasts just before breastfeeding, or encourage the woman to take a warm shower / bath.
- Have the woman express some milk manually, prior to breastfeeding.

Relief measures **after** feeding, may include:

- Support breasts with a binder or brassiere.
- Apply cold compress to the breasts between feedings to reduce swelling and pain.
- Give Paracetamol, 500 mg, by mouth, every 4-6 hours as needed.
- Follow up 3 days after initiating management to ensure response.
- **If the woman does not want to breastfeed:**
 - Support breasts with a binder or brassiere.
 - Apply cold compresses to the breasts to reduce swelling and pain.
 - Avoid massaging or applying heat to the breasts.
 - Avoid stimulating the nipples or expression of milk.
 - Give Paracetamol, 500 mg, by mouth, every-6 hours as needed.
 - Follow up 3 days after initiating management to ensure response.

SPECIFIC MANAGEMENT

MASTITIS (BREAST INFECTION)

- Treat with antibiotics:
 - Cloxacillin (available as Orbenin), 500 mg, by mouth, four times per day, for 10 days

OR

- Erythromycin, 250 mg, by mouth, three times per day, for 10 days
- Encourage the woman to continue breastfeeding.
- Support breasts with a binder or brassiere.
- Apply cold compresses to the breasts between feedings to reduce swelling and pain.
- Give Paracetamol, 500 mg, by mouth, 4-6 hourly as needed.
- Follow up 3 days after initiating management to ensure response.

BREAST ABSCESS

- Treat with antibiotics:
 - Cloxacillin (available as Orbenin), 500 mg, by mouth, four times per day, for 10 days

OR

- Erythromycin, 250 mg, by mouth, three times per day, for 10 days.

-
- Drain the abscess (page 211).
 - Encourage the woman to continue breastfeeding even when there is collection of pus.
 - Support breasts with a binder or brassiere.
 - Apply cold compresses to the breasts between feedings to reduce swelling and pain.
 - Give Paracetamol, 500 mg, by mouth, 4-6 hourly as needed.
 - Follow up 3 days after initiating management to ensure response.

SPECIFIC MANAGEMENT

WOUND INFECTION (INFECTION OF PERINEAL AND ABDOMINAL WOUNDS)

WOUND ABSCESS AND WOUND HAEMATOMA

A distinction must be made between wound abscess (collection of pus), and wound haematoma (collection of blood), which require opening and drainage and wound cellulitis, which requires antibiotics but not drainage.

- If there is **pus or fluid**, open and drain the wound.
- Remove infected sutures.
- Debride the wound.
- Do not remove fascial sutures.
- If there is an **abscess without cellulitis**, antibiotics are not required.
- Place a damp dressing in the wound and have the woman return to change the dressing every 24 hours.
- Advise the woman on the need for good hygiene and to wear clean pads or cloths that she changes often.

WOUND CELLULITIS AND NECROTIZING FASCITIS

- If there is **fluid or pus**, open and drain the wound.
 - Remove infected skin or subcutaneous sutures.
 - Debride the wound.
 - Do not remove fascial sutures.
- ☞ **If infection is superficial and does not involve deep tissues**, monitor for development of an abscess and give a combination of antibiotics:
- Ampicillin, 500 mg, by mouth, four times per day, for 5 days
- PLUS**
- Metronidazole, 400 mg, by mouth, three times per day, for 5 days

☞ **If the infection is deep, involves muscles and is causing necrosis (necrotizing fasciitis)**

- Give a combination of antibiotics until necrotic tissue has been removed and the woman is fever-free for 48 hours:

- Penicillin G, 2 million units, I/V, every 6 hours

PLUS

- Gentamicin, 80 mg, I/V, every 8 hours

PLUS

- Metronidazole, 500 mg, I/V, every 8 hours

- Once the **woman is fever-free for 48 hours**, give:

- Ampicillin, 500 mg, by mouth, four times per day, for 5 days

PLUS

- Metronidazole, 400 mg, by mouth, three times per day, for 5 days

Necrotizing Fasciitis

- Admit her to the hospital for management and change wound dressing twice daily.
- Requires wide surgical debridement.
- Perform secondary closure 2-4 weeks later, depending on resolution of infection.

MEDICAL CONDITIONS CAUSING FEVER

- Hepatitis
- Malaria
- Typhoid
- Tuberculosis

These require referral and appropriate treatment.

SKILLS REQUIRED TO MANAGE FEVER AFTER CHILDBIRTH

- Recognize Signs of Infection
 - Manual Expression of Breasts
 - Dressing of Wound
-

- Evacuation of Uterus (page 80)
-
-

- Draining Breast Abscess (page 211)
- Wound Debridement
- Culdocentesis / Colpotomy to Drain Pelvic Abscess (page 281 & 282)
- Laparotomy for:
 - Removal of Tubo-Ovarian Masses
 - Draining Pelvic Abscess
 - Peritoneal Lavage
 - Subtotal / Total Hysterectomy (page 276)

SKILLS REQUIRED TO MANAGE FEVER AFTER CHILDBIRTH

DRAINING BREAST ABSCESS

- General anaesthesia (e.g. ketamine, page 298) is usually required.
- Wearing sterile gloves, make the incision radially extending from near the alveolar margin towards the periphery of the breast to avoid injury to the milk ducts (Fig. 1, below).
- Use a finger or tissue forceps to break up the pockets of pus.
- Loosely pack the cavity with gauze.
- Remove the gauze pack after 24 hours and replace with a smaller gauze pack. If there is **still pus in the cavity**, place a small gauze pack in the cavity and bring the edge out through the wound as a wick to facilitate drainage of any remaining pus.

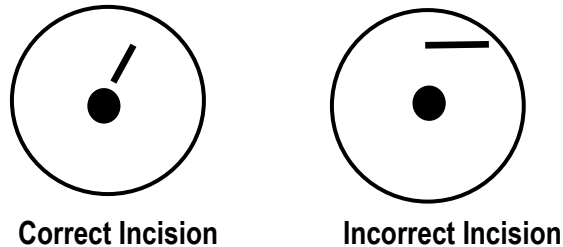


Fig. 1: Incision to Drain Breast Abscess

Annexure

PREDISPOSING CAUSES OF PUERPERAL SEPSIS

- Prolonged Labour
- Prolonged Rupture of Membranes (specially with a dead fetus).
- Multiple vaginal examinations during labour, specially if done without aseptic technique.
- Childbirth in an unclean environment without aseptic techniques.
- Manual Removal of Placenta.
- Retained Products of Conception.

SKILLS REQUIRED TO PROVIDE NORMAL AND EMERGENCY OBSTETRIC CARE

NORMAL LABOUR AND CHILDBIRTH

NORMAL LABOUR

Labour is the process by which uterine contractions lead to progressive dilatation of cervix and descent of presenting part and eventual delivery of the baby and placenta.

Labour is suspected when a woman after 24 weeks of pregnancy has:

- Intermittent abdominal pain with or without blood stained mucoid vaginal discharge.
- A sudden gush of liquor with or without pain.

In Such a Patient:

- Evaluate general condition of the woman including vital signs (pulse, blood pressure, respiration, temperature).
- Perform abdominal examination and check:
 - Frequency & duration of uterine contractions (if present).
 - Height of fundus, lie, presentation.
 - Engagement of presenting part, assess descent in terms of fifths of fetal head palpable above the symphysis pubis (see below).
 - A head that is entirely above the symphysis pubis is five-fifths (5/5) palpable.
 - A head that is entirely below the symphysis pubis is zero-fifths (0/5) palpable.

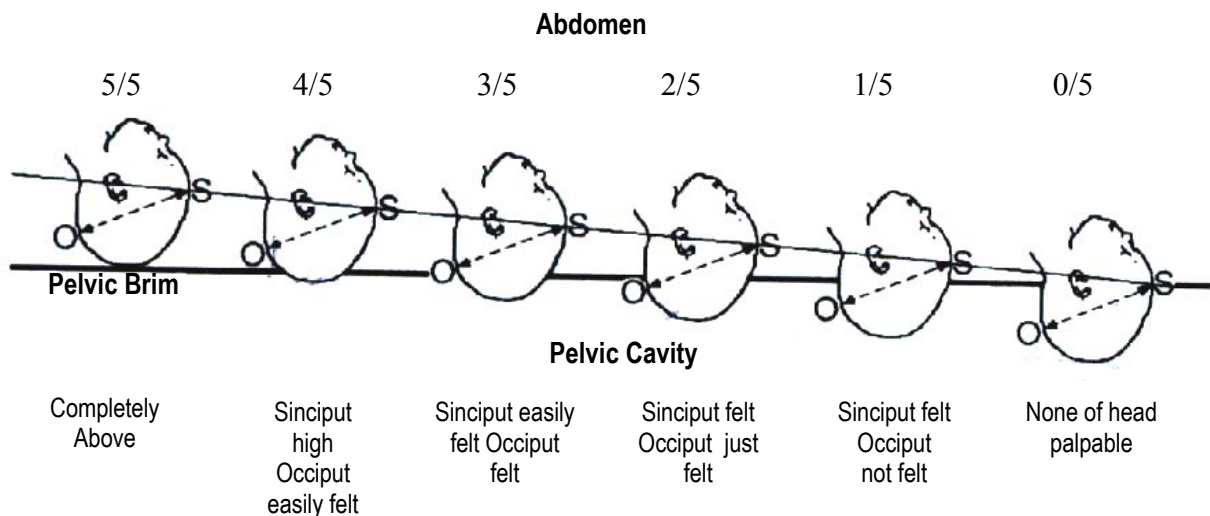


Fig. 1: Assessment of Fifths of Head Palpable Above the Symphysis Pubis

- Assess fetal condition:
 - Listen to the fetal heart rate for one full minute.
 - If the **membranes** have **ruptured**, note the colour of the draining amniotic fluid – whether meconium stained or not.
- Confirm the onset of labour by vaginal examination.

Assess

- Cervical Effacement — the progressive shortening and thinning of the cervix during labour.

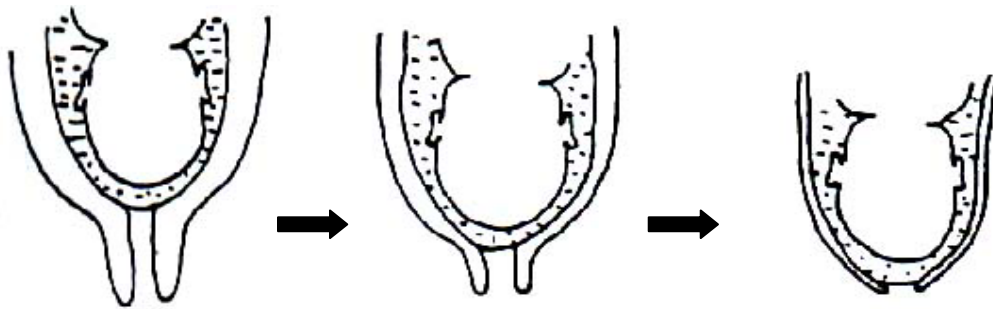


Fig. 2: Cervical Effacement

- Cervical Dilatation — the increase in diameter of the cervical opening measured in centimetres.



Fig. 3: Cervical Dilatation

An incorrect diagnosis of labour can lead to unnecessary anxiety and interventions.

Stage and Phase of Labour^a

Symptoms and Signs	Stage	Phase
<ul style="list-style-type: none"> • Cervix not dilated. 	False labour / Not in labour	
<ul style="list-style-type: none"> • Cervix dilated less than 4 cm. 	First	Latent
<ul style="list-style-type: none"> • Cervix dilated 4-9 cm. • Rate of dilatation typically 1 cm per hour or more. • Fetal descent begins. 	First	Active
<ul style="list-style-type: none"> • Cervix fully dilated (10 cm). • Fetal descent continues. • No urge to push. 	Second	Early (Non-Expulsive)
<ul style="list-style-type: none"> • Cervix fully dilated (10 cm). • Presenting Part of fetus reaches pelvic floor. • Woman has the urge to push. 	Second	Late (Expulsive)
<ul style="list-style-type: none"> • Placenta separates with accompanying bleeding and lengthening of the cord (delivers within 30 minutes) 	Third	-----
<ul style="list-style-type: none"> • Maternal condition stable. • BP and Pulse are normal. • Uterus well contracted. • Vaginal bleeding not excessive. 	Fourth	-----

^a The third stage of labour begins with delivery of the baby and ends with expulsion of placenta.

If Patient is in Labour:

- Assess descent by relating the level of the fetal presenting part to the ischial spines of the maternal pelvis (see below).

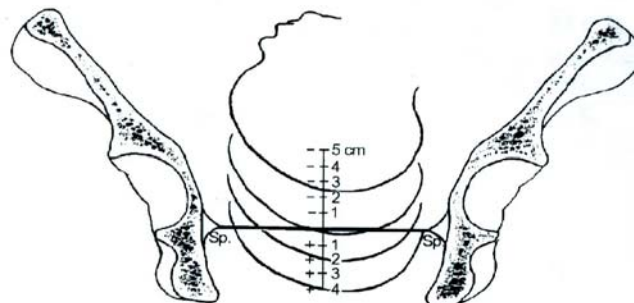


Fig. 4: Assessing Descent of the Fetal Head by Vaginal Examination; 0 Station is at the Level of the Ischial Spine (Sp).

Note: When there is a **significant degree of caput or moulding**, assessment by abdominal palpation using fifths of head palpable is more useful than assessment by vaginal examination.

Determine the Presenting Part

- The most common presenting part is the vertex of the fetal head. If the vertex is not the presenting part, manage as a malpresentation (page 181).
- If the vertex is the presenting part, use landmarks on the fetal skull to determine the position of the fetal head in relation to the maternal pelvis (Fig. 2, page 248).

Determine the Position of the Fetal Head

- The fetal head normally engages in the maternal pelvis in an occiput transverse position, with the fetal occiput transverse in the maternal pelvis.
- With descent, the fetal head rotates so that the fetal occiput is anterior in the maternal pelvis. Failure of an occiput transverse position to rotate to an occiput anterior position should be managed as an occiput posterior position (page 181).
- An additional feature of a normal presentation is a well-flexed vertex with the occiput lower in the vagina than the sinciput.

Supportive Care During Labour and Childbirth

- Encourage the woman to have personal support from a person of her choice, throughout labour and birth:
 - Encourage support from the chosen birth companion.
 - Arrange seating for the companion next to the woman.
 - Encourage the companion to give adequate support to the woman during labour and childbirth (rub her back, wipe her brow with wet cloth, assist her to move about).
- Ensure good communication and support by staff:
 - Explain all procedures, seek permission and discuss findings with the woman.
 - Provide a supportive, encouraging atmosphere for birth, respectful of the woman's wishes.
 - Ensure privacy and confidentiality.

- Maintain cleanliness of the woman and her environment:
 - Encourage the woman to wash herself, or bathe, or shower at the onset of labour.
 - Wash the vulval and perineal areas before each examination.
 - Wash your hands with soap before and after each examination.
 - Ensure cleanliness of labouring and birthing area(s).
 - Clean up all spills immediately.
- Ensure mobility: Encourage the woman to move about freely.
- Encourage the woman to empty her bladder regularly.

Note: Do not routinely give an enema to women in labour.

- Encourage the woman to take light meals and drink as she wishes. If the woman has visible severe wasting or tires during labour, make sure she is fed. Nutritious liquid drinks are important, even in late labour.
- Teach breathing techniques for labour and delivery. Encourage the woman to breathe out more slowly than usual and relax with each expiration.
- Help the woman in labour who is anxious, fearful or in pain:
 - Give her praise, encouragement and reassurance.
 - Give her information on the process and progress of her labour.
 - Listen to the woman and be sensitive to her feelings.
- If the woman is distressed by pain:
 - Suggest changes of position.
 - Encourage mobility.
 - Encourage her companion to massage her back, or hold her hand and sponge her face between contractions.
 - Encourage breathing techniques.
 - Encourage warm bath or shower.

- If necessary, give Pethidine, 1 mg/kg body weight (but not more than 100 mg), I/M.

Assessment of Progress of Labour

In every case use the partograph (page 227).

Once diagnosed, progress of labour is assessed by:

- Measuring changes in cervical effacement and dilatation (Fig. 2 & 3, page 214) during the latent phase.
- Measuring the rate of cervical dilatation and fetal descent (Fig. 3, page 214 and Fig. 4, page 215) during the active phase.
- Assessing further fetal descent during the second stage.
- Progress of the first stage of labour should be plotted on a partograph once the woman enters the active phase of labour. A sample partograph is shown (page 231). Alternatively, plot a simple graph of cervical dilatation (centimetres) on the vertical axis against time (hours) on the horizontal axis.

Vaginal Examinations

Vaginal examinations should be carried out at least once every 4 hours during the first stage of labour and after rupture of the membranes. Plot the findings on a partograph.

- At each vaginal examination, record the following:
 - Colour of amniotic fluid.
 - Cervical dilatation.
 - Descent (can also be assessed abdominally).
- If the cervix is not dilated on first examination it may not be possible to diagnose labour.
 - **If contractions persist**, re-examine the woman after 4 hours for cervical changes. At this stage, if there is **effacement and dilatation**, the woman is in labour; if there is **no change**, the diagnosis is false labour.
- In the second stage of labour, perform vaginal examinations every hour.

Progress of First Stage of Labour

- Findings suggestive of satisfactory progress in first stage of labour are:
 - Regular contractions of progressively increasing frequency and duration.
 - Rate of cervical dilatation at least 1 cm per hour during the active phase of labour (cervical dilatation on or to the left of alert line on partograph).
 - Cervix well applied to the presenting part.
- Findings suggestive of unsatisfactory progress in first stage of labour are:
 - Irregular and infrequent contractions after the latent phase.
OR
 - Rate of cervical dilatation slower than 1 cm per hour during the active phase of labour (cervical dilatation to the right of alert line of partograph).
OR
 - Cervix poorly applied to the presenting part.
- Unsatisfactory progress in labour can lead to prolonged labour (Table on page 171).

Progress of Second Stage of Labour

- Findings suggestive of satisfactory progress in second stage of labour are:
 - Steady descent of fetus through birth canal.
 - Onset of expulsive (pushing) phase.
- Findings suggestive of unsatisfactory progress in second stage of labour are:
 - Lack of descent of fetus through birth canal.
 - Failure of expulsion during the late (expulsive) phase.

Progress of Fetal Condition

Listen to the fetal heart rate immediately after a contraction:

- Count the fetal heart rate for a full minute at least once every 30 minutes during the active phase and every 5 minutes during the second stage.
- If there are fetal heart rate abnormalities (less than 110 or more than 150 beats per minute), suspect fetal distress (page 240).

- Positions or presentations in labour other than occiput anterior with a well-flexed vertex are considered malpositions or malpresentations.
- If unsatisfactory progress of labour or prolonged labour is suspected, manage the cause of slow progress (page 171).

Progress of Maternal Condition

Evaluate the woman for signs of distress:

- If the woman's pulse is increasing, she may be dehydrated, in pain or febrile. Ensure adequate hydration via oral or I/V routes and provide adequate analgesia (page 26).
- If the woman's blood pressure decreases, suspect haemorrhage (page 93).
- If acetone is present in the woman's urine, suspect poor nutrition and give Dextrose, I/V.

NORMAL CHILDBIRTH

General methods of supportive care during labour are most useful in helping the woman tolerate labour pains.

- Once the cervix is fully dilated and the woman is in the expulsive phase of the second stage, encourage her to push.

Note: Episiotomy is no longer recommended as a routine procedure. There is no evidence that routine episiotomy decreases perineal damage, future vaginal prolapse or urinary incontinence. In fact, routine episiotomy is associated with an increase of third and fourth degree tears and subsequent anal sphincter muscle dysfunction.

Episiotomy (page 242) should be considered only in the case of:

- Complicated vaginal delivery (breech, shoulder dystocia, forceps, vacuum).
- Scarring from poorly healed perineal tears.
- Fetal distress.

Delivery of the Head

- Ask the woman to pant or give only small pushes with contractions as the baby's head delivers.
- To control birth of the head, place the fingers of one hand against the baby's head to keep it flexed (bent).
- Continue to gently support the perineum as the baby's head delivers.
- Once the baby's head delivers, ask the woman not to push.
- Suck the secretions from the baby's mouth and nose.
- Feel around the baby's neck for the umbilical cord:
 - If the **cord is around the neck but is loose**, slip it over the baby's head.
 - If the **cord is tight around the neck**, doubly clamp and cut it before unwinding it from around the neck.

Completion of Delivery

- Allow the baby's head to turn spontaneously.
- After the head turns, place a hand on each side of the baby's head. Tell the woman to push gently with the next contraction.
- Reduce tears by delivering one shoulder at a time. Move the baby's head posteriorly to deliver the shoulder that is anterior.

Note: If there is **difficulty in delivering the shoulders**, suspect shoulder dystocia (page 190).

- Lift the baby's head anteriorly to deliver the shoulder that is posterior.
- Support the rest of the baby's body with one hand as it slides out.
- Place the baby on the mother's abdomen. Thoroughly dry the baby, wipe the eyes, nose and mouth and assess the baby's breathing:

Note: Most babies begin crying or breathing spontaneously within 30 seconds of birth.

- If the baby is crying and / or breathing well (chest rising at least 30 times per minute) leave the baby with the mother.
- **If baby does not start breathing within 30 seconds, CALL FOR HELP** and take steps to resuscitate the baby (page 316).

Anticipate the need for resuscitation and have a plan to get assistance for every baby but especially if the mother has a history of eclampsia, bleeding, prolonged or obstructed labour, preterm birth or infection.

- Clamp and cut the umbilical cord with sterile knife or scissors two to three minutes after the birth of the baby..
- Ensure that the baby is kept warm and in skin-to-skin contact on the mother's chest. Wrap the baby in a soft, dry cloth, cover with a blanket and ensure the head is covered to prevent heat loss.
- If the mother is not well, ask an assistant to care for the baby.
- Palpate the abdomen to rule out the presence of an additional baby(s) and proceed with active management of the third stage.

Active Management of the Third Stage

Active management of the third stage (active delivery of the placenta) helps prevent postpartum haemorrhage. Active management of the third stage of labour includes:

- Immediate Oxytocin
- Controlled Cord Traction to aid expulsion of placenta and counter traction of the uterus to prevent uterine inversion
- Uterine Massage

Oxytocin

- Within 1 minute of delivery of the baby, palpate the abdomen to rule out the presence of an additional baby(s) and give Oxytocin, 10 units, I/M.
- Oxytocin is preferred because it is effective 2 to 3 minutes after injection, has minimal side effects and can be used in all women. If Oxytocin is not available, give Ergometrine, 0.2 mg, I/M or Prostaglandins. Make sure there is no additional baby(s) before giving these medications.

Do not give Ergometrine to women with pre-eclampsia, eclampsia or high blood pressure because it increases the risk of convulsions and cerebrovascular accidents.

Controlled Cord Traction

- Clamp the cord close to the perineum using sponge forceps. Hold the clamped cord and the end of forceps with one hand.
- Place the other hand just above the woman's pubic bone and stabilize the uterus by applying counter traction during controlled cord traction. This helps prevent inversion of the uterus (Fig. 1, below).
- Keep slight tension on the cord and await a strong uterine contraction (2-3 minutes).

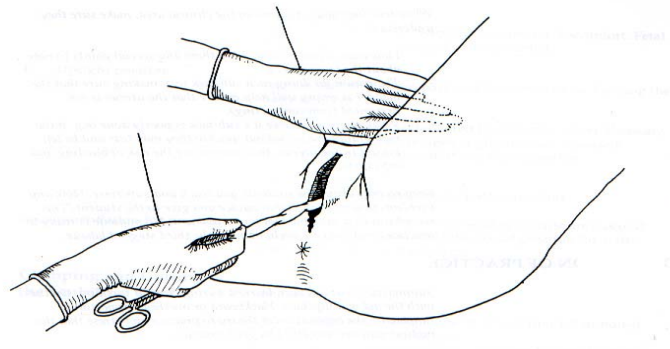


Fig. 1: Controlled Cord Traction

- When the uterus becomes rounded or the cord lengthens, very gently pull downward on the cord to deliver the placenta. Do not wait for a gush of blood before applying traction on the cord. Continue to apply counter traction to the uterus with the other hand.
- If the placenta does not descend during 30-40 seconds of controlled cord traction (i.e. there are no signs of placental separation), do not continue to pull on the cord.
- Gently hold the cord and wait until the uterus is well contracted again. If necessary, use a sponge forceps to clamp the cord closer to the perineum as it lengthens.
- With the next contraction, repeat controlled cord traction with counter traction.

Never apply cord traction (pull) without applying counter traction (push) above the pubic bone with the other hand.

- As the placenta delivers, the thin membranes may tear off. Hold the placenta in two hands and gently turn it until the membranes are twisted.
- Slowly pull to complete the delivery.
- If the membranes tear, gently examine the upper vagina and cervix wearing disinfected gloves and use a sponge forceps to remove any pieces of membranes that are present.
- Look carefully at the placenta to be sure none of it is missing. If a portion of the maternal surface is missing or there are torn membranes with vessels, suspect retained placental fragments (Fig. 2, below).



Fig. 2: Examining the Placenta for Completeness

- If the cord is pulled off, manual removal of the placenta may be necessary (page 130).

Uterine Massage

- Immediately massage the fundus of the uterus through the woman's abdomen until the uterus is contracted.

- Repeat uterine massage every 15 minutes for the first 2 hours.
- Ensure that the uterus does not become relaxed (soft) after you stop uterine massage.

Examination for Tears

- Examine the woman carefully and repair any tears to the cervix (page 265), or vagina (page 266), or repair episiotomy (page 242).

INITIAL CARE OF THE NEWBORN

- Wash hands with soap and water before handling the baby. Newborn infants have very little immunity and can easily catch infections.
- Check the baby's breathing and colour every 5 minutes (Apgar score page 326).
- If the baby becomes cyanotic (bluish), or is having difficulty breathing (less than 30 or more than 60 breaths per minute), give oxygen (Box 3, page 322).
- Check warmth by feeling the baby's feet every 15 minutes:
 - If the baby's feet feel cold, check axillary temperature.
 - If the baby's temperature is below 36.5°C (98°F), rewarm the baby (page 329).
- Check the cord for bleeding every 15 minutes. If the cord is bleeding, tie the cord again more tightly.
- Wipe off any meconium or blood from skin.
- Do not bathe the baby immediately after birth, it may cool the baby and cause harm.
- Oil massage is acceptable, provided the baby does not become cold.
- There is no need to rub off the vernix from the baby's skin, as it protects against infection.

- Examine baby for any congenital abnormality, but do not handle and open the baby's clothes repeatedly and unnecessarily.
- Put the baby on to the mother's breast immediately. There is no need to give "ghutti" or honey, however if traditions make it necessary, give it only once and from clean source.

Avoid separating mother from baby whenever possible. Do not leave mother and baby unattended at any time.

USING THE PARTOGRAPH

The WHO partograph has been modified to make it simpler and easier to use. The latent phase has been removed and plotting on the partograph begins in the active phase when the cervix is 4 cm dilated. A sample partograph is included (page 229). Record the following on the partograph:

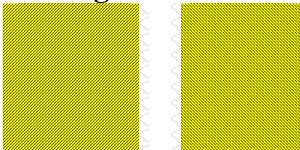
Patient Information: Fill out name, gravida, para, hospital number, date and time of admission and time of ruptured membranes.

Fetal Heart Rate: Record every half hour.

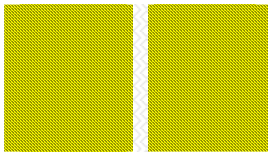
Amniotic Fluid: Note the colour of amniotic fluid at every vaginal examination. Record the following initials according to the situation.

- I: membranes **intact**
- C: membranes ruptured, **clear** fluid
- M: **meconium**-stained fluid
- B: **blood**-stained fluid

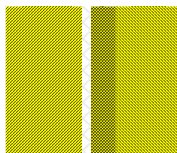
Moulding: record as below:



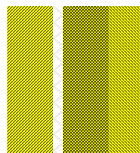
0 = Bones are separated and the sutures can be felt easily



+ = Bones are just touching each other



++ = Bones are overlapping but reducible



+++ = Bones are overlapping severely and not reducible

Moulding may be difficult to assess in the presence of a large caput, but that in itself should alert the attendant to possible cephalo-pelvic disproportion.

Cervical Dilatation: Assessed at every vaginal examination and marked with a cross (X). Begin plotting on the partograph at 4 cm.

Alert Line: A line starts at 4 cm of cervical dilatation to the point of expected full dilatation at the rate of 1 cm per hour.




Action Line: Parallel and 4 hours to the right of the alert line.

Descent assessed by **abdominal** palpation. Refers to the part of the head (divided into 5 parts) palpable above the symphysis pubis, recorded as a circle (0) at every vaginal examination. At 0/5, the sinciput (S) is at the level of the symphysis pubis (Fig. 1, page 213).

Hours: Refers to the time elapsed since onset of active phase of labour (observed or extrapolated).

Time: Record actual time.

Contractions: Chart every half hour; palpate the number of contractions in 10 minutes and their duration in seconds.

- Less than 20 seconds: 
- Between 20 and 40 seconds: 
- More than 40 seconds: 

Oxytocin: Record the amount of Oxytocin per volume I/V fluids, in drops per minute, every 30 minutes when used.

Drugs given: Record any additional drugs given.

Pulse: Record every 30 minutes and mark with a dot (●).

Blood pressure: Record every 4 hours and mark with arrows.

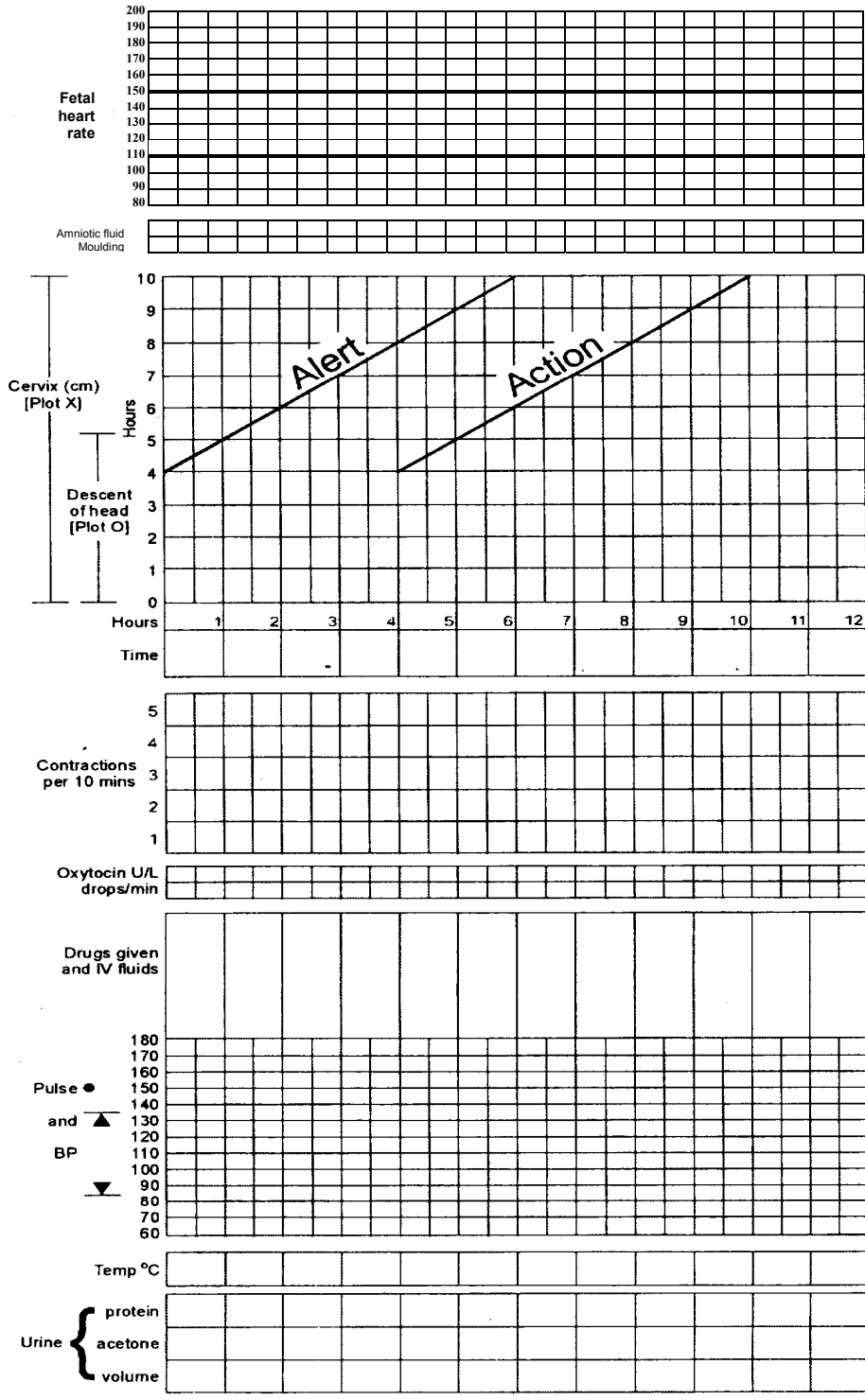
Temperature: Record every 2 hours.

Protein, acetone and volume: Record every time urine is passed.

The modified WHO Partograph

Name _____ Gravida _____ Para _____ Hospital number _____

Date of admission _____ Time of admission _____ Ruptured membranes _____ hours



Normal FHR
Ranges from
110 to 150

On page 231 is a sample partograph for normal labour:

- A third gravida, para 2+0 was admitted in the latent phase of labour at 5 AM:
 - Fetal head 4/5 palpable.
 - Cervix dilated 2 cm.
 - 3 contractions in 10 minutes, each lasting 20 seconds.
 - Normal maternal and fetal condition.

Note: The above information is not plotted on the partograph.

- At 9 AM:
 - Fetal head is 3/5 palpable.
 - Cervix 5 cm dilated.

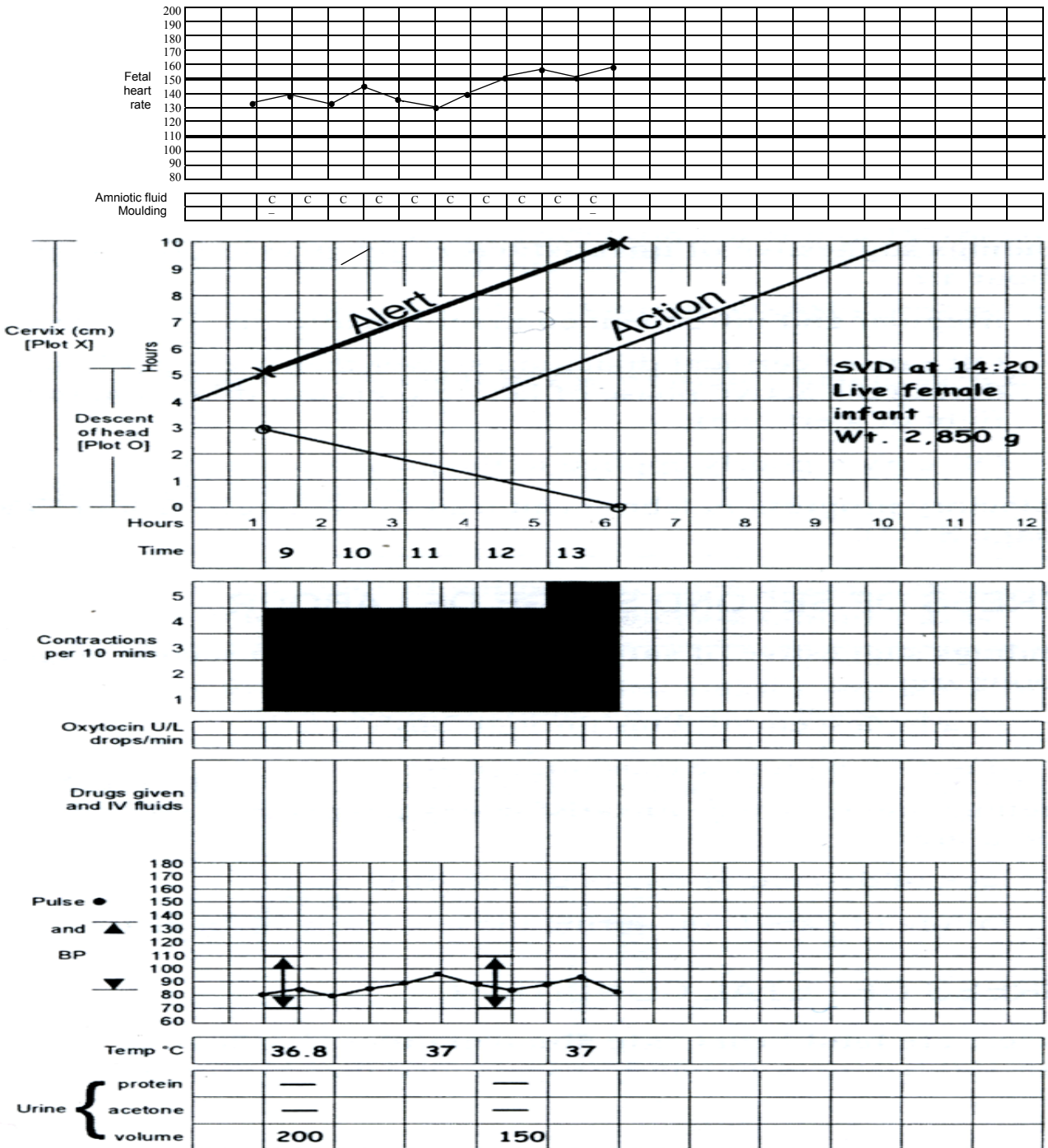
Note: The woman was in the active phase of labour and this information is plotted on the partograph. Cervical dilatation is plotted on the alert line.

- 4 contractions in 10 minutes, each lasting 40 seconds.
- Cervical dilatation progressed at the rate of 1 cm per hour.
- At 2 PM:
 - Fetal head is 0/5 palpable.
 - Cervix is fully dilated.
 - 5 contractions in 10 minutes each lasting 40 seconds.
 - Spontaneous vaginal delivery occurred at 2:20 PM.

Sample partograph for normal labour

Name Mrs. S Gravida 3 Para 2+0 Hospital Number 7886

Date of admission 12.5.2000 Time of admission 5:00 A.M. Ruptured membranes 1 hours



INDUCTION AND AUGMENTATION OF LABOUR

Induction of labour and augmentation of labour are performed for different indications but the methods are the same.

- **Induction of Labour:** Stimulating the uterus to begin labour.
- **Augmentation of Labour:** Stimulating the uterus during labour to increase the frequency, duration and strength of contractions.

A good labour pattern is established when there are three contractions in 10 minutes, each lasting more than 40 seconds.

If the **membranes are intact**, it is recommended practice in both induction and augmentation of labour to first perform artificial rupture of membranes (ARM). In some cases, this is all that is needed to induce labour. Membrane rupture, whether spontaneous or artificial, often sets off the following chain of events:

- Amniotic fluid is expelled.
- Uterine volume is decreased.
- Prostaglandins are produced, stimulating labour.
- Uterine contractions begin (if the woman is not in labour) or become stronger (if she is already in labour).

Induction of Labour

Assessment of the Cervix

The success of induction of labour is related to the **condition of the cervix** at the start of induction. To assess the condition of the cervix, a cervical examination is performed and a score is assigned based on the criteria in **Table** below.

Assessment of Cervix for Induction of Labour

Factor	Rating			
	0	1	2	3
Dilatation (cm)	Closed	1 – 2	3 – 4	More than 5
Length of cervix (cm)	More than 4	3 – 4	1 – 2	Less than 1
Consistency	Firm	Average	Soft	-
Position	Posterior	Mid	Anterior	-
Descent by Station of Head (cm from ischial spines)	-3	-2	-1, 0	+1, +2
Descent by Abdominal Palpation (fifths of head palpable)	4/5	3/5	2/5	1/5

- If the **cervix is unfavourable** (has a score of 5 or less), ripen the cervix using Prostaglandins (see below) or a Foley’s catheter (page 234) before induction with artificial rupture of membranes and / or Syntocinon infusion.
- If the **cervix is favourable** (has a score of 6 or more), labour is usually successfully induced with Oxytocin after artificial rupture of membranes.

Ripening / Priming the Cervix

Prostaglandins

Prostaglandins are highly effective in ripening the cervix during induction of labour.

- Check the woman's pulse, blood pressure and contractions and check the fetal heart rate. Record findings on a partograph (page 227).
- Review indications.
- Prostaglandin E₂ (PGE₂) is available in several forms (3 mg pessary or 2-3 mg gel). The Prostaglandin is placed high in the posterior fornix of the vagina and may be repeated after 6 hours if required.
- Wet the tablet with water for injection or Normal Saline, ensuring that it dissolves well when inserted in the vagina.
- Ensure that the woman empties her bladder before insertion of the vaginal pessary so that she does not have a desire to void for the next 2-3 hours and thereby preventing the tablet from dropping out.

Monitor uterine contractions and fetal heart rate of all women undergoing induction of labour with Prostaglandins.

- If the patient is not in active labour, discontinue use of Prostaglandins and begin Oxytocin infusion if:
 - Membranes rupture.
 - Cervical ripening has been achieved.
 - Good labour has not been established.

Note: If the cervix remains unfavourable after 2 doses of Prostaglandin, reassess the situation and the urgency of induction. Ask yourself if the induction of labour is really necessary?

Misoprostol

Misoprostol is a Prostaglandin E₁ analogue. It is inexpensive, effective and heat stable, and therefore does not require to be kept in the refrigerator.

- Use Misoprostol to ripen the cervix **only in highly selected situations (as experience with it is not very extensive)** such as:
 - Severe pre-eclampsia or eclampsia: when the cervix is unfavourable and safe caesarean section is not immediately available or the baby is too premature to survive.
 - Fetal death in-utero: if the woman has not gone into spontaneous labour after 4 weeks and platelets are decreasing.
- Place Misoprostol, 25 mcg (1/4 of 100 mcg or 1/8 of 200 mcg tablet), in the posterior fornix of the vagina. Repeat after 6 hours, if required.
- If there is **no response after two doses of 25 mcg**, increase to 50 mcg, every 6 hours.
- Do not use more than 50 mcg at a time and do not exceed four doses (200 mcg).

Do not use Oxytocin within 8 hours of using Misoprostol. Monitor uterine contractions and fetal heart rate.

Foley's Catheter

The Foley's catheter is an effective alternative to Prostaglandins for cervical ripening and labour induction. It should, however, be avoided in women with obvious cervicitis or vaginitis.

If there is a history of bleeding or ruptured membranes or obvious vaginal infection, do not use a Foley's catheter.

- Review indications.
- Clean the vagina with an antiseptic solution (page 9).
- Gently insert a sterile speculum into the vagina.
- Hold the catheter with a sterile sponge / ring forceps and gently introduce it through the cervical canal. Ensure that the inflatable bulb of the catheter is beyond the internal os.
- Inflate the bulb with 30 ml of water.

- Coil the rest of the catheter and place in the vagina.
- Leave the catheter inside until contractions begin, or for at least 12 hours.
- Deflate the bulb before removing the catheter and then perform ARM and proceed with Oxytocin infusion.

Artificial Rupture of Membranes

- Review indications.

Note: In areas of high HIV prevalence, it is prudent to leave the membranes intact for as long as possible, to reduce perinatal transmission of HIV.

- Listen to and note the fetal heart rate.
- Ask the woman to lie on her back with a left tilt and her legs bent, feet together and knees apart.
- Wearing sterile gloves, use one hand to examine the cervix and note the consistency, position, effacement and dilatation.
- Use the other hand to insert a Kocher clamp or an amniotic hook into the vagina.
- Guide the clamp or hook towards the membranes along the fingers in the vagina.
- Place two fingers against the membranes and gently rupture the membranes with the instrument in the other hand.
- Allow the amniotic fluid to drain slowly around the fingers. Do not withdraw the fingers immediately as this might encourage a loop of cord to slide down, specially if the head is not engaged.
- Note the colour of the fluid (clear, greenish, bloody). **If thick meconium is present**, suspect fetal distress (page 240).
- After ARM, listen to the fetal heart rate during and after a contraction. If the **fetal heart rate is abnormal** (less than 110 or more than 150 beats per minute), suspect fetal distress (page 240).
- **If delivery is not anticipated within 18 hours**, give prophylactic antibiotics in order to help reduce Group B Streptococcus infection in the neonate:

- Penicillin G, 2 million units, I/V

OR

- Ampicillin, 1 g, I/V, every 6 hours, until delivery
- If there are **no signs of infection after delivery**, discontinue antibiotics.
- **If good labour is not established 1 hour after ARM**, begin Oxytocin infusion (page 238 & 239).
- **If labour is induced because of severe maternal disease** (e.g. sepsis or eclampsia), begin Oxytocin infusion at the same time as ARM.

Oxytocin

Use Oxytocin with great caution as fetal distress can occur from hyperstimulation and, rarely, uterine rupture can occur. Multiparous women are at higher risk for uterine rupture.

Carefully observe women receiving Oxytocin.

The effective dose of Oxytocin varies greatly between women. Cautiously administer Oxytocin in I/V fluids (Dextrose or Normal Saline), gradually increasing the rate of infusion until good labour is established (three contractions in 10 minutes, each lasting more than 40 seconds). Maintain this rate until delivery. The uterus should relax between contractions.

When Oxytocin infusion results in a good labour pattern, maintain the same rate until delivery. In some women the rate might have to be reduced in advanced labour.

- Monitor the woman's pulse, blood pressure and contractions and check the fetal heart rate.
- Review indications.

Be sure induction is indicated, as failed induction is usually followed by caesarean section.

- Ensure that the woman is on her left side to prevent aorto-caval compression.
- Record the following observations on a partograph every 30 minutes (page 227).
 - Rate of infusion of Oxytocin (page 237).

Note: Changes in arm position may alter the flow rate.
 - Duration and frequency of contractions.
 - Fetal heart rate. Listen every 30 minutes, always immediately after a contraction. If the **fetal heart rate is less than 110 beats per minute**, stop the infusion.

Women receiving Oxytocin should never be left alone.

- Infuse Oxytocin, 2.5 units in 500 ml of Dextrose (or Normal Saline), at 10 drops per minute (Tables on page 238 & 239). This is approximately 2.5 mIU, per minute.
- Increase the infusion rate by 10 drops per minute, every 30 minutes, until a good contraction pattern is established (contractions lasting more than 40 seconds and occurring three times in 10 minutes).
- Maintain this rate until delivery is completed.
- **If hyperstimulation occurs** (any contraction lasts longer than 60 seconds), or if there are **more than four contractions in 10 minutes**, stop the infusion and if needed, relax the uterus using tocolytics:
 - Terbutaline (available as Bricanyl), 250 mcg, I/V slowly, over 5 minutes
 - OR**
 - Salbutamol (available as Ventolin), 10 mg in 1 L I/V fluids (Normal Saline or Ringer's Lactate), at 10 drops per minute.
- If there are **not three contractions in 10 minutes**, each lasting **more than 40 seconds** with the infusion rate at **60 drops per minute**:
 - Increase the Oxytocin concentration to 5 units in 500 ml of Dextrose (or Normal Saline), and adjust the infusion rate to 30 drops per minute (15 mIU per minute).
 - Increase the infusion rate by 10 drops per minute, every 30 minutes, until a satisfactory contraction pattern is established, or the maximum rate of 60 drops per minute is reached.
 - **If labour still has not been established** using the higher concentration of Oxytocin:
 - **In multigravida** and in **women with previous caesarean scars**, induction has failed; deliver by caesarean section (page 254).
 - **In primigravida**, infuse Oxytocin at a higher concentration (rapid escalation, Table on page 239):
 - Infuse Oxytocin, 10 units in 500 ml Dextrose (or Normal Saline), at 30 drops per minute.
 - Increase infusion rate by 10 drops per minute, every 30 minutes, until good contractions are established.
 - **If good contractions are not established at 60 drops per minute** (60 mIU per minute), deliver by caesarean section (page 254).

Do not use Oxytocin, 10 units in 500 ml (i.e. 20 mIU / ml), in multigravida and women with previous caesarean section.

Oxytocin Infusion Rates for Induction of Labour
(Note 1 ml = 20 drops)

Time Since induction (hours)	Oxytocin Concentration	Drops per Minute	Approximate Dose (mIU / minute)
0.00	2.5 units in 500 ml Dextrose or Normal Saline (5 mIU / ml)	10	3
0.30	Same	20	5
1.00	Same	30	8
1.30	Same	40	10
2.00	Same	50	13
2.30	Same	60	15
3.00	5 units in 500 ml Dextrose or Normal Saline (10 mIU / ml)	30	15
3.30	Same	40	20
4.00	Same	50	25
4.30	Same	60	30
5.00	10 units in 500 ml Dextrose or Normal Saline (20 mIU / ml)	30	30
5.30	Same	40	40
6.00	Same	50	50
6.30	Same	60	60
7.00	Same	60	60

Increase the rate of Oxytocin infusion only to the point where good labour is established and then maintain infusion at that rate or reduce if needed.

Rapid Escalation for Primigravida: Oxytocin Infusion Rates for Induction of Labour (Note 1ml= 20 drops)

Time Since Induction (hours)	Oxytocin Concentration	Drops per Minute	Approximate Dose (mIU / minute)
0.00	2.5 units in 500 ml Dextrose or Normal Saline (5 mIU / ml)	15	4
0.30	Same	30	8
1.00	Same	45	11
1.30	Same	60	15
2.00	5 units in 500 ml Dextrose or Normal Saline (10 mIU / ml)	30	15
2.30	Same	45	23
3.00	Same	60	30
3.30	10 units in 500 ml Dextrose or Normal Saline (20 mIU / ml)	30	30
4.00	Same	45	45
4.30	Same	60	60
5.00	Same	60	60

Augmentation of Labour With Oxytocin

- Review indications.
- Infuse Oxytocin as described for induction of labour (page 236).

Note: Do not use rapid escalation for augmentation of labour.

FETAL DISTRESS IN LABOUR

Signs of Fetal Distress

- Abnormal fetal heart rate (less than 110 or more than 150 beats per minute).
- Thick meconium-stained amniotic fluid.

General Management

- Prop up the woman or place her on her left side.
- Stop Oxytocin if it is being administered.

Abnormal Fetal Heart Rate

A normal fetal heart rate may slow during a contraction but usually recovers to normal as soon as the uterus relaxes.

A very slow fetal heart rate in the absence of contractions or persisting after contractions is suggestive of fetal distress.

A rapid fetal heart rate may be a response to maternal fever, drugs causing rapid maternal heart rate (e.g. tocolytic drugs), hypertension or amnionitis. In the absence of a rapid maternal heart rate, a rapid fetal heart rate should be considered a sign of fetal distress.

- If a maternal cause is identified (e.g. maternal fever, drugs), initiate appropriate management.
- If a maternal cause is not identified and the fetal heart rate remains abnormal throughout at least three contractions, perform a vaginal examination to check for cause of distress:
 - If there is bleeding with intermittent or constant pain, suspect Abruption Placentae (page 94).
 - If there are signs of infection (fever, foul-smelling vaginal discharge), give antibiotics as for amnionitis (page 44).
 - If the cord is below the presenting part or in the vagina, and the cervix is not fully dilated, immediately deliver by caesarean section. If the cervix is fully dilated and the presenting part is engaged deliver by vacuum extraction or forceps.

- If fetal heart rate abnormalities persist or there are additional signs of distress (thick meconium-stained fluid), plan delivery:
 - If the cervix is fully dilated and the fetal head is not more than 1/5 above the symphysis pubis or the leading bony edge of the head is at 0 station, deliver by vacuum extraction (page 248), or forceps (page 251).
 - If the cervix is not fully dilated or the fetal head is more than 1/5 above the symphysis pubis or the leading bony edge of the head is above 0 station, deliver by caesarean section (page 254).

Meconium

- Meconium staining of amniotic fluid is seen frequently as the fetus matures and by itself is not an indicator of fetal distress. A slight degree of meconium without fetal heart rate abnormalities is a warning of the need for vigilance.
- Thick meconium suggests passage of meconium in reduced amniotic fluid and may indicate the need for expedited delivery and meconium management of the neonatal upper airway at birth to prevent meconium aspiration.
- In breech presentation, meconium is passed in labour because of compression of the fetal abdomen during delivery. This is not a sign of distress unless it occurs in early labour.

EPISIOTOMY

Episiotomy should not be performed routinely.

Review indications.

Episiotomy should be considered only in the case of:

- Complicated vaginal delivery (breech, shoulder dystocia, forceps, vacuum).
 - Very tight perineum.
 - Scarring from poorly healed previous perineal tears.
 - Fetal distress.
- Review general care principles (page 6), and apply antiseptic solution to the perineal area (page 9).
 - Provide emotional support and encouragement. Use local infiltration with Lignocaine (page 27), or a pudendal block (page 245).
 - Make sure there are no known allergies to Lignocaine or related drugs.
 - Infiltrate beneath the vaginal mucosa, beneath the skin of the perineum and deeply into the perineal muscle (see below), using about 10 ml of Lignocaine 0.5% solution.

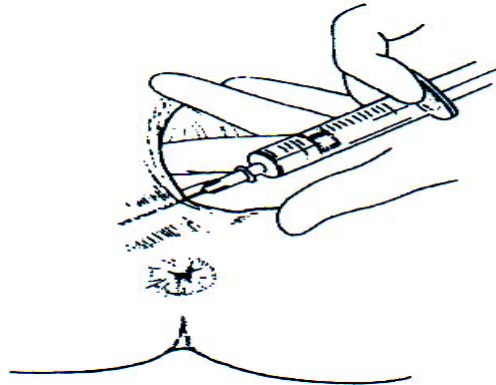


Fig. 1: Infiltrating the Perineal Tissues with Local Anaesthetic

Note: Aspirate (pull back on the plunger), to be sure that no vessel has been penetrated.

If blood is returned in the syringe with aspiration, remove the needle. Recheck the position carefully and try again. Never inject if blood is aspirated. The woman can suffer seizures and death if I/V injection of Lignocaine occurs.

- At the conclusion of the set of injections, wait 2 minutes and then pinch the incision site with forceps. If the **woman feels the pinch**, wait 2 more minutes and then retest.

Anaesthetize early to provide sufficient time for effect.

- Wait to perform episiotomy until:
 - The perineum is thinned out.
 - 3-4 cm of the baby's head is visible during a contraction.

Performing an episiotomy will cause bleeding. It should not, therefore, be done too early.

- Wearing sterile gloves, place two fingers between the baby's head and the perineum.

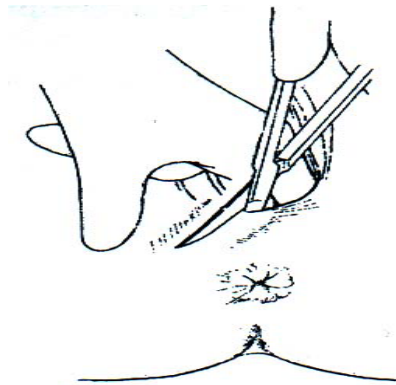


Fig. 2: Inserting Two Fingers in the Vagina Before Making the Incision to Protect the Baby's Head

- Use scissors to cut the perineum about 3-4 cm in the mediolateral direction (see above).
- Use scissors to cut 2-3 cm up the middle of the posterior vagina.
- Control the baby's head and shoulders as they deliver, ensuring that the shoulders have rotated to the midline to prevent an extension of the episiotomy.
- Carefully examine for extensions and other tears and repair (see below).

Repair of Episiotomy

Note: It is important that absorbable sutures be used for closure. Polyglycolic sutures (Vicryl / Dexon) are preferred over chromic catgut for their tensile strength, non-allergenic properties and lower probability of infectious complications and episiotomy breakdown. Chromic catgut is an acceptable alternative, but is not ideal.

- Apply antiseptic solution to the area around the episiotomy (page 9).
- If the **episiotomy is extended** through the anal sphincter or rectal mucosa, manage as third or fourth degree tears, respectively (page 267).

- Close the vaginal mucosa using continuous 2-0 suture:
 - Start the repair about 1 cm above the apex (top) of the episiotomy. Continue the suture to the level of the vaginal opening.
 - At the opening of the vagina, bring together the cut edges of the vaginal opening.
 - Bring the needle under the vaginal opening and out through the incision and tie.
- Close the perineal muscle using interrupted 2-0 sutures.
- Close the skin using interrupted (or subcuticular) 2-0 sutures.

Complications

- **If a haematoma develops**, open and drain it. If there are **no signs of infection and bleeding has stopped**, reclose the episiotomy.
- If there are **signs of infection**, open and drain the wound. Remove infected sutures and debride the wound:
 - If the **infection is mild**, antibiotics are not required.
 - If the **infection is severe but does not involve deep tissues**, give a combination of antibiotics (page 44):
 - Ampicillin, 500 mg, by mouth, four times per day, for 5 days
 - PLUS**
 - Metronidazole, 400 mg, by mouth, three times per day, for 5 days
 - If the **infection is deep, involves muscles and is causing necrosis** (necrotizing fasciitis), give a combination of antibiotics until necrotic tissue has been removed and the woman is fever-free for 48 hours (page 44):
 - Penicillin G, 2 million units, I/V, every 6 hours
 - PLUS**
 - Gentamicin, 80 mg, I/V, every 8 hours
 - PLUS**
 - Metronidazole, 500 mg, I/V, every 8 hours
 - Once the **woman is fever-free for 48 hours**, give:
 - Ampicillin, 500 mg, by mouth, four times per day, for 5 days
 - PLUS**
 - Metronidazole, 400 mg, by mouth, three times per day, for 5 days

Note: Necrotizing fasciitis requires wide surgical debridement. Perform secondary closure in 2-4 weeks (depending on resolution of the infection).

PUDENDAL BLOCK

Indications and Precautions for Pudendal Block

Indications	Precautions
<ul style="list-style-type: none">• Instrumental or breech delivery.• Episiotomy and repair of perineal tears.• Craniotomy or craniocentesis.• Manual removal of placenta.	<ul style="list-style-type: none">• Make sure there are no known allergies to lignocaine or related drugs.• Do not inject into a vessel.

- Review general care principles (page 6).
- Prepare 40 ml of Lignocaine 0.5% solution without Adrenaline (Box 1, page 28).

Note: It is best to limit the pudendal block to 30 ml of solution, so that a maximum of 10 ml of additional solution may be injected into the perineum during repair of tears, if needed.

- Use a 15 cm, 22-gauge needle to inject the Lignocaine.

The target is the pudendal nerve as it passes through the lesser sciatic notch. There are two approaches:

- Through the perineum.
- Through the vagina.

The perineal approach requires no special instrument. For the vaginal approach, a special needle guide ("trumpet"), if available, provides protection for the provider's fingers.

Perineal Approach

- Infiltrate the perineal skin on both sides of the vagina using 10 ml of Lignocaine solution.

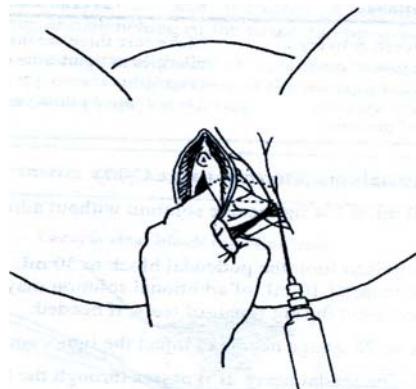


Fig. 1: Perineal Approach

Note: Aspirate (pull back on the plunger) to be sure that no vessel has been penetrated. If **blood is returned in the syringe with aspiration**, remove the needle. Recheck the position carefully and try again. Never inject if blood is aspirated. **The woman can suffer convulsions and death if I/V injection of Lignocaine occurs.**

- Wearing sterile gloves, place two fingers in the vagina and guide the needle through the perineal tissue to the tip of the woman's left ischial spine (Fig. 1, page 242).
- Inject 10 ml of Lignocaine solution in the angle between the ischial spine and the ischial tuberosity.
- Pass the needle through the sacrospinous ligament and inject another 10 ml of Lignocaine solution.
- Repeat the procedure on the opposite side.
- If an **episiotomy is to be performed**, infiltrate the episiotomy site in the usual manner at this time (page 242).
- At the conclusion of the set of injections, wait 2 minutes and then pinch the area with forceps. If the **woman can feel the pinch**, wait 2 more minutes and then retest.

Anaesthetize early to provide sufficient time for effect.

Vaginal Approach

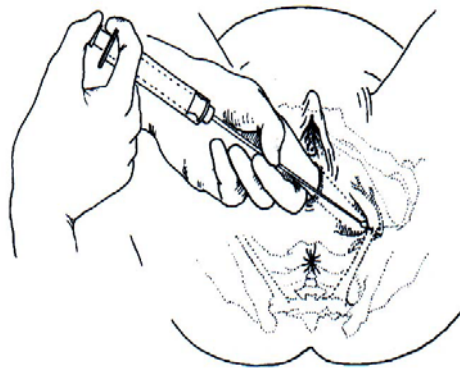


Fig. 2: Vaginal Approach Without a Guide Needle

- Wearing sterile gloves, use the left index finger to palpate the woman's left ischial spine through the vaginal wall (see above).
- Use the right hand to advance the needle guide ("trumpet") towards the left spine, keeping the left fingertip at the end of the needle guide.
- Place the needle guide just below the tip of the ischial spine.

Remember to keep the fingertip near the end of the needle guide. Do not place the fingertip beyond the end of the needle guide as needle-stick injury can easily occur.

- Advance a 15 cm, 22-gauge needle with attached syringe through the guide.
- Penetrate the vaginal mucosa until the needle pierces the sacrospinous ligament.

Note: Aspirate (pull back on the plunger) to be sure that no vessel has been penetrated. **If blood is returned in the syringe with aspiration**, remove the needle. Recheck the position carefully and try again. Never inject if blood is aspirated. **The woman can suffer convulsions and death if I/V injection of Lignocaine occurs.**

- Inject 10 ml of Lignocaine solution.
- Withdraw the needle into the guide and reposition the guide to just above the ischial spine.
- Penetrate the vaginal mucosa and aspirate again to be sure that no vessel has been penetrated.
- Inject another 5 ml of Lignocaine solution.
- Repeat the procedure on the other side, using the right index finger to palpate the woman's right ischial spine. Use the left hand to advance the needle and needle guide and inject the Lignocaine solution.
- If an **episiotomy is to be performed**, infiltrate the episiotomy site in the usual manner at this time (page 242).
- At the conclusion of the set of injections, wait 2 minutes and then pinch the area with forceps. If the **woman can feel the pinch**, wait 2 more minutes and then retest.

Anaesthetize early to provide sufficient time for effect.

VACUUM EXTRACTION

- Review conditions:
 - Vertex presentation
 - Term fetus
 - Cervix fully dilated
 - Head at least at 0 station or no more than 2/5 above symphysis pubis.
- Check all connections and test the vacuum on a gloved hand.

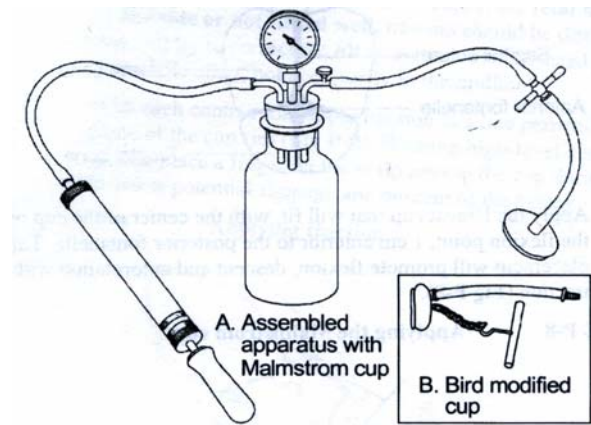


Fig. 1: Vacuum Extractor

- Provide emotional support and encouragement. If necessary, use a pudendal block (page 245).
- Assess the position of the fetal head by feeling the sagittal suture line and the fontanelles.
- Identify the posterior fontanelle (see below).

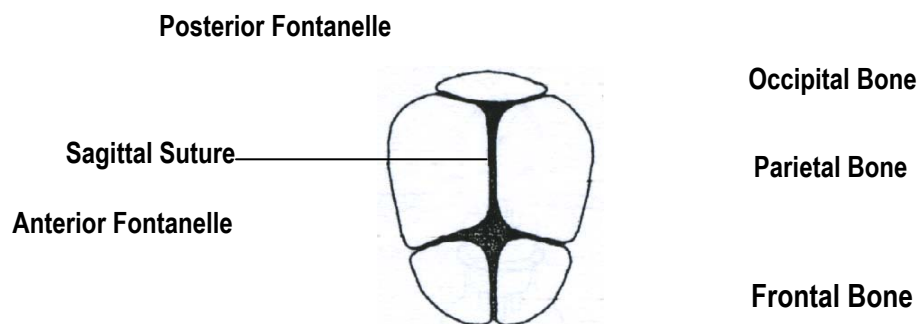


Fig. 2: Landmarks of Fetal Skull

- Apply the largest cup that will fit, with the center of the cup over the flexion point, 1 cm anterior to the posterior fontanelle. This placement will promote flexion, descent and autorotation with traction (Fig. 3, below).

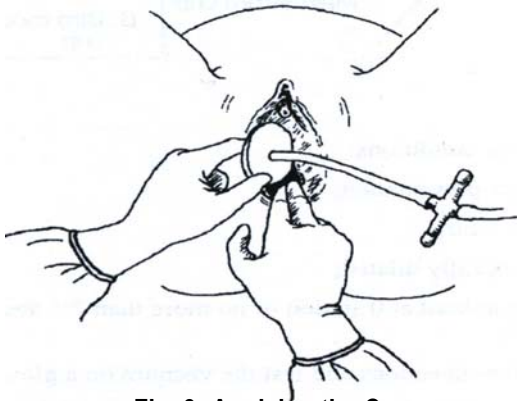


Fig. 3: Applying the Cup



Fig. 4: Applying Traction

- An episiotomy may be needed for proper placement at this time (page 242). If an **episiotomy is not necessary for placement**, delay the episiotomy until the head stretches the perineum or the perineum interferes with the axis of traction. This will avoid unnecessary blood loss.
- Check the application. Ensure there is no maternal soft tissue (cervix or vagina) within the rim.
- With the pump, create a vacuum of 0.2 kg/cm^2 negative pressure and check the application.
- Increase the vacuum to 0.8 kg/cm^2 and check the application.
- After maximum negative pressure, start traction in the line of the pelvic axis and perpendicular to the cup. If the **fetal head is tilted to one side or not flexed well**, traction should be directed in a line that will try to correct the tilt or deflexion of the head (i.e. to one side or the other, not necessarily in the midline).
- With each contraction, apply traction in a line perpendicular to the plane of the cup rim (Fig. 4, above). Wearing disinfected gloves, place a finger on the scalp next to the cup during traction to assess potential slippage and descent of the vertex.
- Between contractions check:
 - Fetal heart rate
 - Application of the cup

Tips

- Never use the cup to actively rotate the baby's head. Rotation of the baby's head will occur spontaneously with traction.
- The first few pulls help to find the proper direction for pulling.
- Do not continue to pull between contractions and without expulsive efforts.
- With progress, and in the absence of fetal distress, continue the "guiding" pulls for a maximum of 15 – 20 minutes.

Failure

- Vacuum extraction failed if:
 - The head does not advance with each pull.
 - The fetus is undelivered after three pulls with no descent, or after 15 - 20 minutes.
 - The cup slips off the head twice at the proper direction of pull with a maximum negative pressure.
- Every application should be considered a trial of vacuum extraction. Do not persist if there is no descent with every pull.
- **If vacuum extraction fails**, perform caesarean section (page 254).

Complications

Complications usually result from not observing the conditions of application or from continuing efforts beyond the time limits stated above.

Fetal Complications

- Localized scalp oedema (artificial caput or chignon) under the vacuum cup is harmless and disappears in a few hours.
- Cephalhaematoma (collection of blood under the periosteum) requires observation and usually will clear in 3-4 weeks.
- Scalp abrasions (common and harmless) and lacerations may occur. Clean and examine lacerations to determine if sutures are necessary. Necrosis is extremely rare.
- Intracranial bleeding is extremely rare and requires immediate intensive neonatal care.

Maternal Complications

- Tears of the genital tract may occur. Examine the woman carefully and repair any tears to the cervix (page 265), or vagina (page 266), or repair episiotomy (page 242).

FORCEPS DELIVERY

- Review indications:
 - Vertex presentation or face presentation with chin-anterior or entrapped after-coming head in breech delivery.
 - Cervix fully dilated.
 - Head at +2 or +3 station or 0/5 palpable.

At a minimum, the sagittal suture should be in the midline and straight, guaranteeing an occiput anterior or occiput posterior position.

- Provide emotional support and encouragement. If necessary, use a pudendal block (page 245).
- Assemble the forceps before application. Ensure that the parts fit together and lock well.
- Lubricate the blades of the forceps.
- Wearing sterile gloves, insert two fingers of the right hand into the vagina on the side of the fetal head. Slide the left blade gently between the head and fingers to rest on the side of the head (see below).

A biparietal, bimalar application is the only safe application.

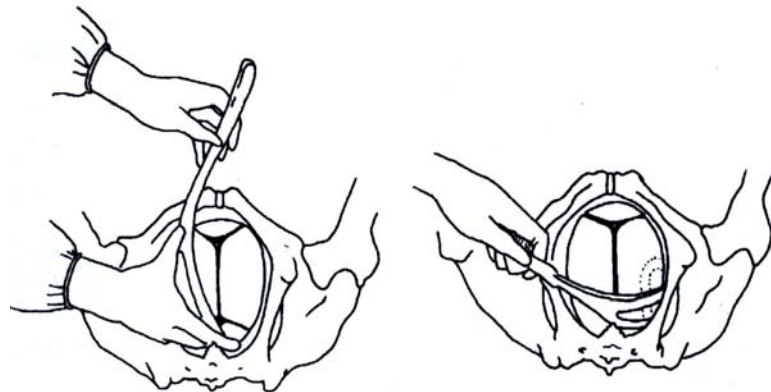


Fig. 1: Applying the Left Blade of the Forceps

- Repeat the same manoeuvre on the other side, using the left hand and the right blade of the forceps.
- Depress the handles and lock the forceps.

- Difficulty in locking usually indicates that the application is incorrect. In this case, remove the blades and recheck the position of the head. Reapply only if Occipito Anterior / Direct Occipito Posterior position is confirmed.

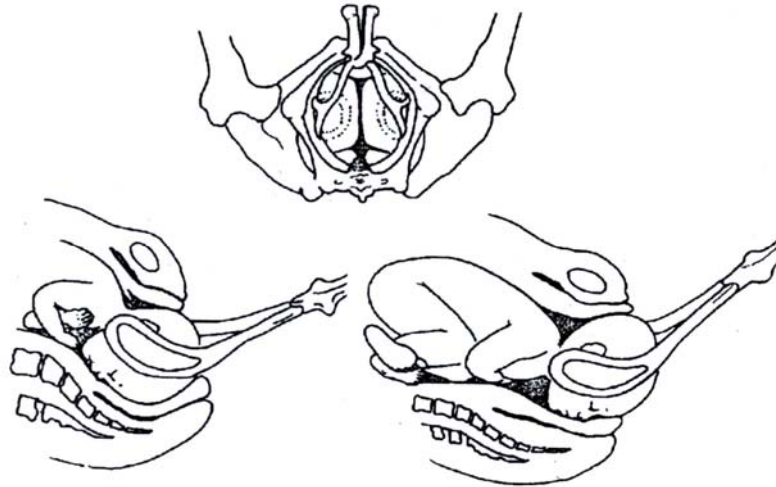


Fig. 2: Locking and Applying Traction

- After locking, apply steady traction inferiorly and posteriorly with each contraction (see above).
- Do not pull between contractions. Unlock the forceps between contractions to ease the pressure of forceps on the fetal head.
- Between contractions check:
 - Fetal heart rate
 - Application of forceps
- **When the head crowns**, make an adequate episiotomy (page 242).
- Lift the head slowly out of the vagina.

The head should descend with each pull. Only two or three pulls should be necessary.

Failure

- Forceps failed if:
 - Fetal head does not advance with each pull.
 - Fetus is undelivered after three pulls with no descent or after 15 - 20 minutes.

- Every application should be considered a trial of forceps. Do not persist if there is no descent with every pull.
- **If forceps delivery fails**, perform caesarean section (page 254).

Complications

Fetal

- Injury to facial nerves requires observation. This injury is usually self-limiting.
- Lacerations of the face and scalp may occur. Clean and examine lacerations to determine if sutures are necessary.
- Fractures of the face and skull require observation.

Maternal

- Tears of the genital tract may occur. Examine the woman carefully and repair any tears to the cervix (page 265), or vagina (page 266), or repair episiotomy (page 242).
- Uterine rupture may occur and requires immediate treatment (page 272).

CAESAREAN SECTION

- Review indications. Ensure that vaginal delivery is not possible.
- Check for fetal life by listening to the fetal heart rate and examine for fetal presentation.
- Review surgical care principles (page 35).
- Use local infiltration with Lignocaine (page 27), Ketamine (page 298), Spinal Anaesthesia (page 302), or General Anaesthesia (page 293):
 - Local Anaesthesia is a safe alternative to General, Ketamine or Spinal Anaesthesia when these anaesthetics or persons trained in their use are not available.
 - The use of local anaesthesia for caesarean section requires that the provider counsel the woman and reassure her throughout the procedure. The provider should use instruments and handle tissue as gently as possible, keeping in mind that the woman is awake and alert.

Note: In the case of heart failure, use local infiltration anaesthesia with conscious sedation. Avoid spinal anaesthesia.

- Start an I/V infusion (page 9).
- If the **baby's head is deep down into the pelvis** as in obstructed labour, prepare the vagina for assisted caesarean delivery (page 9).
- Have the operating table tilted to the left or place a pillow or folded linen under the woman's right lower back to decrease supine hypotension syndrome.

Opening the Abdomen

Abdomen may be opened by:

- Pfannensteil / transverse incision
OR
- Midline vertical incision below the umbilicus

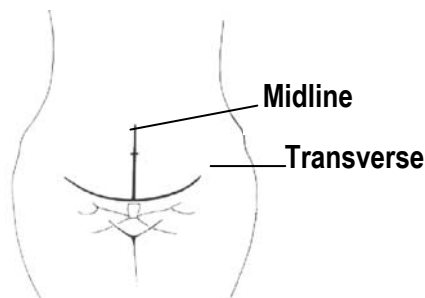


Fig. 1: Sites of Abdominal Incision

Pfannensteil / Transverse Incision

The value of this incision is cosmetic and a lower incidence of incisional hernia.

- The umbilicus, symphysis pubis and right & left anterior superior iliac spines are the land marks which must be visualized before making the skin incision, in order to achieve a symmetrical scar.
- The incision is given in the natural fold a short distance (about 2 cms) above the hair-bearing area of the mons pubis. The incision is also more vascular than the midline incision and hence increased incidence of rectus sheath haematoma.
- The length of the incision depends on the nature of the operation, shorter for more minor operations and can be extended to nearly the anterior superior iliac spines for major procedures.
- The initial cut is made cleanly through the skin, slightly convex towards the pubis (Fig. 1, page 254).
- The fat is incised in the midline down to the rectus sheath and the aponeurosis of the external oblique muscle.
- Short transverse cuts are made in the rectus sheath on either side of the midline / linea alba.
- Linea Alba is next divided, and the two transverse cuts on either side are now united to form one transverse incision. This incision can then be extended laterally by stretching or cutting.
- Small vessels in the fat are more numerous than in the midline incision and must be clipped and tied or diathermised.
- The two recti muscles can be retracted laterally; the peritoneum is exposed and opened.
- Use fingers to make an opening in the peritoneum as near the umbilicus as possible. Use scissors to lengthen the incision up and down in order to see the entire uterus. To prevent bladder injury, carefully use scissors to separate layers and open the lower part of the peritoneum.
- Place a bladder retractor over the pubic bone.

Midline Vertical Incision

- Make a midline vertical incision below the umbilicus to the pubic hair, through the skin and to the level of the fascia (Fig. 1, page 254).

Note: If the **caesarean section is performed under local anaesthesia**, make the midline incision that is about 4 cm longer than when general anaesthesia is used. A **Pfannenstiel incision should not be used** as it takes longer, retraction is poorer and it requires more local anaesthetic.

- Make a 2-3 cm vertical incision in the fascia.
- Hold the fascial edge with forceps and lengthen the incision up and down using scissors.
- Use fingers or scissors to separate the rectus muscles (abdominal wall muscles).
- The peritoneum is exposed and opened. This is performed in the same manner as for the transverse incision, keeping a watchful eye on the bladder.

Opening the Uterus

- Use forceps to pick up the loose peritoneum covering the anterior surface of the lower uterine segment and incise with scissors.
- Extend the incision by placing the scissors between the uterus and the loose serosa and cutting about 3 cm on each side in a transverse fashion.
- Use two fingers to push the bladder downwards off of the lower uterine segment. Replace the bladder retractor over the pubic bone and bladder.
- Use a scalpel to make a 3 cm transverse incision in the lower segment of the uterus. It should be about 1 cm below the level where the vesico-uterine serosa was incised to bring the bladder down.
- Cut very carefully, aiming not to cut the fetal membranes and thereby preventing injury to the fetus. Tear off the fetal membranes with the tooth forceps.
- Widen the incision by placing a finger at each edge and gently pulling upwards and laterally at the same time (see below).

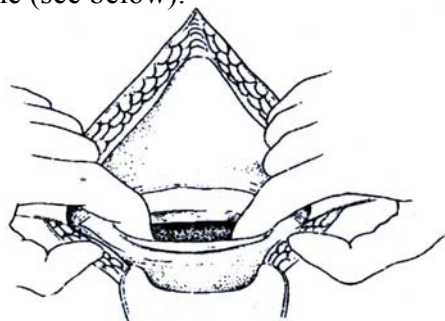


Fig. 2: Enlarging the Uterine Incision

- If the **lower uterine segment is thick and narrow**, extend the incision in a crescent shape, using scissors instead of fingers to avoid extension to the uterine vessels.
- If the caesarean section is done in second stage of labour, when the cervix is fully dilated and effaced, the uterine incision should be at a higher level than usual.

It is important to make the uterine incision big enough to deliver the head and body of the baby without tearing the incision.

- A **high vertical incision** (page 261) may be indicated if:
 - An inaccessible lower segment due to dense adhesions from previous caesarean sections.
 - Transverse lie with prolonged rupture of membrane (with baby's back down) for which a lower uterine segment incision cannot be safely performed.
 - Fetal malformations (e.g. conjoined twins).
 - Large fibroids over the lower segment.
 - Carcinoma of the cervix (rare).

Delivery of the Baby and Placenta

- To deliver the baby, place one hand inside the uterine cavity between the uterus and the baby's head.
- With the fingers, grasp and flex the head.
- Gently lift the baby's head through the incision, taking care not to extend the incision down towards the cervix.
- With the other hand / assistants help, gently press on the abdomen over the top of the uterus to help deliver the head.
- If the **baby's head is deep down in the pelvis or vagina**, ask an assistant (wearing sterile gloves) to reach into the vagina and push the baby's head up through the vagina. Then lift and deliver the head.
- Suck the baby's mouth and nose as soon as the baby's head is delivered, specially if the liquor is meconium stained to prevent meconium aspiration by the baby.
- Deliver the shoulders and body.

- Give 5 units Oxytocin slowly I/V.
- Ask anesthetist / assistant to give Oxytocin, 20 units in 1 L I/V fluids (Normal Saline or Ringer's Lactate), at 60 drops per minute, for 2 hours/ at the end of the procedure insert 3 tablets (600ug) of Misoprostol per-rectum.
- Clamp and cut the umbilical cord. Hand the baby to the assistant for initial care (page 225).
- Give a single dose of prophylactic antibiotics after the cord is clamped and cut (page 44):
 - Ampicillin, 1 g, I/V

OR

 - Cefazolin, 1 g, I/V
- Keep gentle traction on the cord and massage (rub) the uterus through the abdomen.
- Deliver the placenta and membranes.

Closing the Uterine Incision

Note: If a Couvelaire uterus (swollen and discolored by blood) is seen at caesarean section, close it in the normal manner and observe.

- Grasp the corners of the uterine incision with clamps.
- Grasp the bottom edge of the incision with clamps. Make sure it is separate from the bladder.
- Look carefully for any extensions of the uterine incision.
- Repair the incision and any extensions with a continuous stitch of 0/1 chromic catgut (or polyglycolic) suture in 2 layers. Lock the first layer of sutures.
- If there is any **further bleeding from the incision site**, close with figure-of-eight sutures.

Closing the Abdomen (Midline Incision)

- Look carefully at the uterine incision before closing the abdomen. Make sure there is no bleeding and the uterus is firm. Use a sponge to remove any clots inside the abdomen.
- Examine carefully for injuries to the bladder and repair if any found (page 274).
- Inspect both the ovaries and fallopian tubes to exclude any pathology.
- Close the fascia with continuous 0 chromic catgut (or polyglycolic) suture.

There is no need to close the bladder peritoneum or the abdominal peritoneum.

- **If there are signs of infection**, pack the subcutaneous tissue with gauze and apply a sterile dressing. Close the skin with a delayed closure after the infection has cleared.
- If there are **no signs of infection**, close the skin with vertical mattress sutures of 3-0 nylon (or silk) or continuous subcuticular stitches with 2-0 Nylon / Polyglycolic sutures (available as Vicryl / Dexon), and apply a sterile dressing.
- Gently push on the abdomen over the uterus to remove clots from the uterus and vagina.

Closure of the Abdomen With Transverse Incision

- Closing the abdomen. This is carried out as in the midline incision, using a continuous absorbable suture material. It is not required to suture the rectus muscles together as the design of the wound gives adequate strength.
- **Wound drains.** The transverse incision requires drainage more frequently than the midline. As soon as drainage has ceased, the drain can be removed without great discomfort to the patient.

Problems During Surgery

Bleeding is Not Controlled

- Massage the uterus.
- Apply warm swabs to the uterus, this might promote a uterine contraction.
- If the **uterus is atonic**, continue to infuse Oxytocin and give Ergometrine, 0.2 mg, I/M or in the myometrium, and Prostaglandin if available. These drugs can be given together or sequentially (Table on page 113).
- Transfuse as necessary (page 14).
- Have an assistant press fingers over the aorta to reduce the bleeding until the source of bleeding can be found and stopped.
- **If bleeding is not controlled**, perform uterine and utero-ovarian artery ligation (page 136) or hysterectomy (page 276).

Baby is Breech

- If the **baby is breech**, grasp a foot and deliver it through the incision.
- Complete the delivery as in a vaginal breech delivery:

- Deliver the legs and the body up to the shoulders, then deliver the arms.
- Flex (bend) the head using the Mauriceau Smellie Veit manoeuvre (putting the finger in the baby's mouth and flexing the head).

Baby is Transverse

The Baby's Back is Up

- If **the back is up** (near the top of the uterus), reach into the uterus and find the baby's ankles.
- Grasp the ankles and pull gently through the incision to deliver the legs and complete the delivery as for a breech baby.

The Baby's back is Down

- If the **back is down**, a high vertical uterine incision is the preferred incision (page 261).
- After the incision is made, reach into the uterus and find the feet. Pull them through the incision and complete the delivery as for a breech baby.
- To repair the vertical incision, you will need several layers of suture (page 261).

Placenta Praevia

- **If a low anterior placenta** is encountered, incise through it and deliver the fetus.
- After delivery of the baby, if the **placenta cannot be detached manually**, the diagnosis is placenta accreta, a common finding at the site of a previous caesarean scar. Perform a hysterectomy (page 276).
- Women with placenta praevia are at high risk of postpartum haemorrhage. If there is **bleeding at the placental site**, under-run the bleeding sites with Chromic Catgut (or Polyglycolic) sutures.
- Packing the uterine cavity before closing the uterine incision helps to control bleeding at times. Ensure that the pack is not included in the stitches and one end hangs in the vagina for easy removal when bleeding is controlled (24-48 hours later).
- Watch for bleeding in the immediate postpartum period and take appropriate action (page 98).

Post-Procedure Care

- Review post surgical care principles (page 40).

If bleeding occurs:

- Massage the uterus to expel blood and blood clots. Presence of blood clots will inhibit effective uterine contractions.
- Give Oxytocin, 20 units in 1 L I/V fluids (Normal Saline or Ringer's Lactate), at 60 drops per minute and Ergometrine, 0.2 mg, I/M and Prostaglandins (Table on page 113). These drugs can be given together or sequentially.
- Give prophylactic broad-spectrum antibiotic e.g. Co-Amoxiclav (Augmentin), 1.2 g, I/V, every 8 hours, for 24 hours and follow up with Co-Amoxiclav, 375 mg / 625 mg, by mouth, every 8 hours, for the next 4 days.
- **If there are signs of infection** or the woman **currently has fever**, give a combination of antibiotics until she is fever-free for 48 hours (page 44):
 - Ampicillin, 1g, I/V, every 6 hours
 - PLUS**
 - Gentamicin, 80 mg, I/V, every 8 hours
 - PLUS**
 - Metronidazole, 500 mg, I/V, every 8 hours
- Give appropriate analgesic drugs (page 34).

High Vertical ("Classical") Incision

- Open the abdomen through a midline incision skirting the umbilicus. Approximately one-third of the incision should be above the umbilicus and two-thirds below.
- Use a scalpel to make the incision:
 - Check the position of the round ligaments and ensure that the incision is in the midline (the uterus may have twisted to one side).
 - Make the uterine incision in the midline below the fundus of the uterus.
 - The incision should be approximately 12-15 cm in length and the lower limit should not extend to the utero-vesical fold of the peritoneum.
- If necessary ask an assistant (wearing sterile gloves) to apply pressure on the cut edges to control the bleeding.
- Cut down to the level of the membranes and then extend the incision using scissors.
- After rupturing the membranes, grasp the baby's foot and deliver the baby.
- Deliver the placenta and membranes.
- Grasp the edges of the incision with Allis or Green Armytage forceps.

- Close the incision using at least three layers of suture:
 - Close the first layer closest to the cavity but avoiding the decidua with a continuous 0 Chromic Catgut (or Polyglycolic) suture.
 - Close the second layer of uterine muscle using interrupted 1 Chromic Catgut (or Polyglycolic) sutures.
 - Close the superficial fibres and the serosa using a continuous 0 Chromic Catgut (or Polyglycolic) suture with an atraumatic needle.
- Close the abdomen as for lower segment caesarean section (page 258).

After 'classical' caesarean section the woman should not be allowed to go in labour with future pregnancies, as there is a high risk of rupture of the uterus.

Tubal Ligation at Caesarean section

Tubal ligation can be done immediately following caesarean section if the woman requested the procedure **before** labour began (during prenatal visits). Adequate counselling and informed decision-making and consent must precede voluntary sterilization procedures; this is often not possible during labour and delivery.

- Review for consent of patient.
- Grasp the least vascular, middle portion of the fallopian tube with a Babcock or Allis forceps.
- Hold up a loop of tube 2.5 cm in length (Fig. A, below).

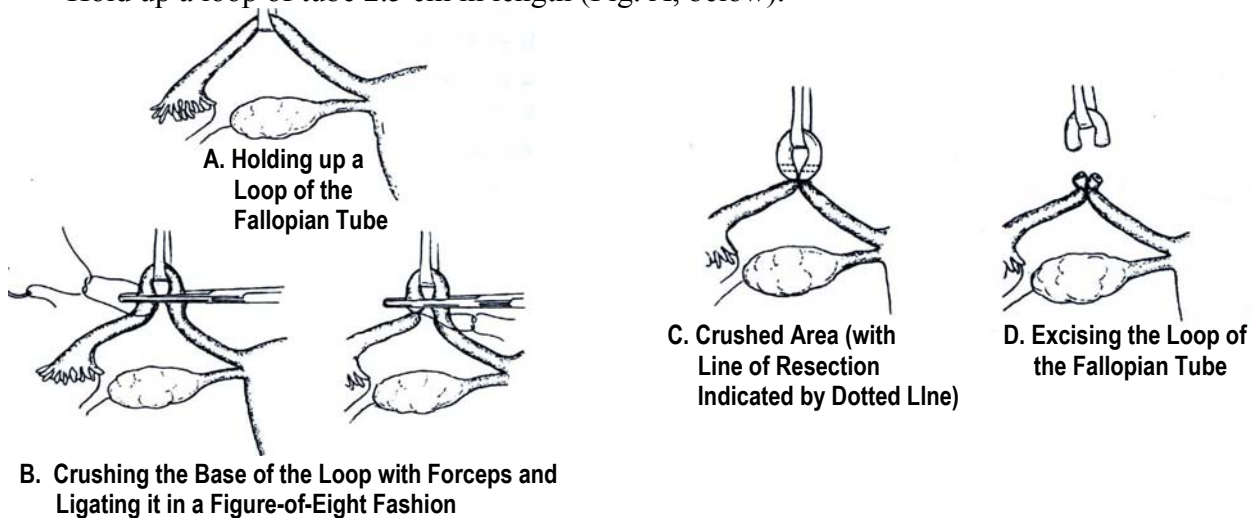


Fig. 3: Tubal Ligation

- Crush the base of the loop with artery forceps and ligate it with 0 plain catgut suture (Fig. B, above).
- Excise the loop (a segment 1 cm in length) through the crushed area (Fig. C and D, above).
- Repeat the procedure on the other side.

LOCAL ANAESTHESIA FOR CAESAREAN SECTION

Local anaesthesia is a safe alternative to general, Ketamine or spinal anaesthesia when these anaesthetics (or persons trained in their use), are not available.

The use of local anaesthesia for caesarean section requires that the provider counsel the woman and reassure her throughout the procedure. The provider must keep in mind that the woman is awake and alert and should use instruments and handle tissue as gently as possible.

Indications and precautions for local anaesthesia for **caesarean section**

Indications	Precautions
<ul style="list-style-type: none"> • Caesarean section (especially in woman with heart failure). 	<ul style="list-style-type: none"> • Avoid use in women with eclampsia, or severe pre-eclampsia. • Previous laparotomy. • Avoid use in women who are obese, apprehensive or allergic to Lignocaine or related drugs. • Avoid use if the surgeon is inexperienced at caesarean section. • Do not inject into a vessel.

- Review general care principles (page 6) and start an I/V infusion (page 9).
- Prepare Lignocaine 0.5%, 200 ml with 1:200 000 Adrenaline (page 28). Usually less than half this volume (approximately 80 ml) is needed in the first hour.
- If the **fetus is alive**, give Pethidine, 1 mg/kg body weight (but not more than 100 mg) I/V slowly (or give Morphine, 0.1 mg/kg body weight, I/M), and Promethazine, 25 mg, I/V, **after** delivery. Alternatively, Pethidine and Promethazine may be given before delivery, but the baby may need to be given Naloxone, 0.1 mg/kg body weight, I/V, at birth.
- If the **fetus is dead**, give Pethidine, 1 mg/kg body weight (but not more than 100 mg) I/V slowly and Promethazine, 25 mg, I/V.

Talk to the woman and reassure her throughout the procedure.

- Using a 10 cm needle, infiltrate one band of skin and subcutaneous tissue on either side of the proposed incision, two fingerbreadths apart (Fig. 1, page 264).

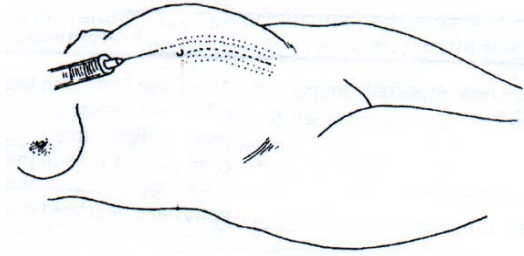


Fig. 1: Infiltration of Skin and Subcutaneous Tissue with Local Anaesthetic for Caesarean Section

Note: Aspirate (pull back on the plunger) to be sure that no vessel has been penetrated. **If blood is returned in the syringe with aspiration, remove the needle.** Recheck the position carefully and try again. Never inject if blood is aspirated. **The woman can suffer convulsions and death if I/V injection of Lignocaine occurs.**

- Raise a long wheal of Lignocaine solution 3-4 cm on either side of the midline from the symphysis pubis to a point 5 cm above the umbilicus.
- Infiltrate the Lignocaine solution down through the layers of the abdominal wall. The needle should remain almost parallel to the skin. Take care not to pierce the peritoneum and insert the needle into the uterus, as the abdominal wall is very thin at term.
- At the conclusion of the set of injections, wait 2 minutes and then pinch the incision site with forceps. If the **woman feels the pinch**, wait 2 more minutes and then retest.

Anaesthetize early to provide sufficient time for effect.

Note: When local anaesthesia is used, perform a midline incision that is about 4 cm longer than when general anaesthesia is used. A **Pfannenstiell incision should not be used**, as it takes longer, requires more Lignocaine and retraction is poorer.

The anaesthetic effect can be expected to last about 60 minutes.

Proceed with caesarean section (page 254) keeping the following in mind:

- Do not use abdominal packs. Use retractors as little as possible and with a minimum of force.
- Inject 30 ml of Lignocaine solution beneath the uterovesical peritoneum as far laterally as the round ligaments. No additional anaesthetic is required. The peritoneum is sensitive to pain; the myometrium is not.
- Inform the woman that she will feel some discomfort from traction when the baby is delivered. This is usually no more than occurs during vaginal delivery.
- Remove the placenta by controlled cord traction (page 223).
- Repair the uterus without removing it from the abdomen.
- Additional local anaesthesia may be necessary to repair the abdominal wall.

REPAIR OF CERVICAL TEARS

- Review general care principles
- Provide emotional support and encouragement. Anaesthesia is not required for most cervical tears. For tears that are high and extensive, give Pethidine and Diazepam, I/V slowly (page 27), do not mix in the same syringe **or** use Ketamine (page 298)
- Ask an assistant to massage the uterus and **provide fundal pressure**.
- Apply antiseptic solution to the vagina and cervix.
- Gently grasp the cervix with ring or sponge forceps. Apply the forceps on both sides of the tear and gently pull in various directions to see the entire cervix. There may be several tears.
- Repair the cervical tears with continuous 0 Chromic Catgut (or Polyglycolic) suture starting at the apex (upper edge of tear), which is often the source of bleeding.

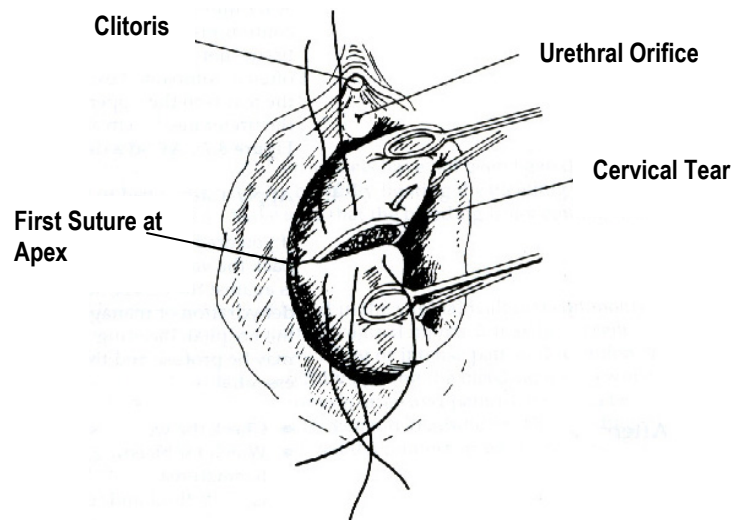


Fig. 1: Holding the Cervix Steady with Forceps for Repair

- **If a long section of the rim of the cervix is tattered**, under-run it with continuous 0 Chromic Catgut (or Polyglycolic) suture.
- Occasionally the **apex may be difficult to reach and ligate**, but it may be possible to grasp it with artery or ring forceps. In such cases leave the forceps in place for 4 hours. Do not persist in attempts to ligate the bleeding points as such attempts may increase the bleeding. Then:
 - After 4 hours, open the forceps partially but do not remove.
 - After another 4 hours, remove the forceps completely.

A laparotomy may be required to repair a cervical tear that has extended deep beyond the vaginal vault.

REPAIR OF VAGINAL AND PERINEAL TEARS

There are four degrees of tears that can occur during delivery:

- First-degree tears involve the vaginal mucosa and connective tissue.
- Second-degree tears involve the vaginal mucosa, connective tissue and underlying muscles.
- Third degree tears involve complete transection of the anal sphincter.
- Fourth degree tears involve the rectal mucosa.

It is important that absorbable sutures be used for closure. Polyglycolic sutures are preferred over Chromic Catgut for their tensile strength, non-allergenic properties and lower probability of infectious complications. Chromic catgut is an acceptable alternative, but is not ideal.

Repair of First and Second Degree Tears

Most first-degree tears close spontaneously without sutures.

- Review general care principles (page 6).
- Provide emotional support and encouragement. Use local infiltration with Lignocaine. If necessary, use a pudendal block (page 245).
- Ask an assistant to massage the uterus and provide fundal pressure.
- Carefully examine the vagina, perineum and cervix.
- If the **tear is long and deep through the perineum**, inspect to be sure there is no third or fourth degree tear:
 - Place a gloved finger in the anus.
 - Gently lift the finger and identify the sphincter.
 - Feel for the tone or tightness of the sphincter.
- Change to clean, disinfected gloves.
- If the **sphincter is injured**, see the section on repair of third and fourth degree tears (page 267).

- If the **sphincter is not injured**, proceed with repair.
- Apply antiseptic solution to the area around the tear.
- Make sure there are no known allergies to Lignocaine or related drugs.

Note: If more than 40 ml of Lignocaine solution will be needed for the repair, add Adrenaline to the solution.

- Infiltrate beneath the vaginal mucosa, beneath the skin of the perineum and deeply into the perineal muscle using about 10 ml 0.5% Lignocaine solution.

Note: Aspirate (pull back on the plunger) to be sure that no vessel has been penetrated. **If blood is returned in the syringe with aspiration**, remove the needle. Recheck the position carefully and try again. Never inject if blood is aspirated. **The woman can suffer convulsions and death if I/V injection of Lignocaine occurs.**

- At the conclusion of the set of injections, wait 2 minutes and then pinch the area with forceps. If the **woman feels the pinch**, wait 2 more minutes and then retest.

Anaesthetize early to provide sufficient time for effect.
--

- Repair the vaginal mucosa using a continuous 2-0 suture.
 - Start the repair about 1 cm above the apex (top) of the vaginal tear. Continue the suture to the level of the vaginal opening.
 - At the opening of the vagina, bring together the cut edges of the vaginal opening.
 - Bring the needle under the vaginal opening and out through the perineal tear and tie.
- Repair the perineal muscles using interrupted 2-0 suture. If the tear is deep, place a second layer of the same stitch to close the space.
- Repair the skin using interrupted (or subcuticular) 2-0 sutures starting at the vaginal opening.
- If the tear was deep, perform a rectal examination. Make sure no stitches are in the rectum.

Repair of Third and Fourth Degree Perineal Tears

Note: The woman may suffer loss of control over bowel movements and gas if a torn anal sphincter is not recognized and repaired correctly. If a **tear in the rectum is**

not repaired, the woman can suffer from infection and rectovaginal fistula (passage of stool through the vagina).

- Repair the tear in the operating room.
- Review general care principles (page 6).
- Provide emotional support and encouragement. Use a pudendal block (page 245) or Ketamine (page 298). Rarely, if all edges of the tear can be seen, the repair can be done using local infiltration with Lignocaine (see above), and Pethidine and Diazepam I/V slowly (do not mix in the same syringe).
- Ask an assistant to massage the uterus and provide fundal pressure.
- Examine the vagina, cervix, perineum and rectum.
- To see if the anal sphincter is torn:
 - Place a gloved finger in the anus and lift slightly.
 - Identify the sphincter, or lack of it.
 - Feel the surface of the rectum and look carefully for a tear.
- Change to clean disinfected gloves.
- Apply antiseptic solution to the tear and remove any faecal material, if present.
- Make sure there are no known allergies to Lignocaine or related drugs.
- Infiltrate beneath the vaginal mucosa, beneath the skin of the perineum, and deeply into the perineal muscle using about 10 ml 0.5% Lignocaine solution.

Note: Aspirate (pull back on the plunger) to be sure that no vessel has been penetrated. **If blood is returned in the syringe with aspiration**, remove the needle. Recheck the position carefully and try again. Never inject if blood is aspirated. **The woman can suffer convulsions and death if I/V injection of Lignocaine occurs.**

- At the conclusion of the set of injections, wait 2 minutes and then pinch the area with forceps. If the **woman feels the pinch**, wait 2 more minutes and then retest.

Anaesthetize early to provide sufficient time for effect.

- Repair the rectum using interrupted 3-0 or 4-0 sutures 0.5 cm apart to bring together the mucosa.

Remember: Place the suture through the muscularis (not all the way through the mucosa).

- Cover the muscularis layer by bringing together the fascial layer with interrupted sutures.
- Apply antiseptic solution to the area frequently.
- If the sphincter is torn:
 - Grasp each end of the sphincter with an Allis clamp (the sphincter retracts when torn). The sphincter is strong and will not tear when pulling with the clamp.
 - Repair the sphincter with two or three interrupted stitches of 0 or 1 sutures.

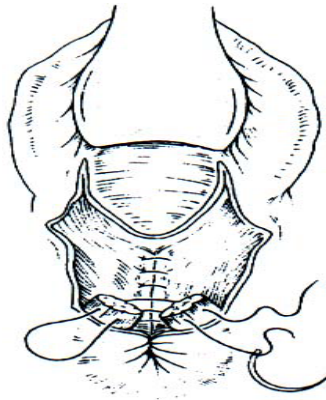


Fig. 1: Suturing the Anal Sphincter

- Apply antiseptic solution to the area again.
- Examine the anus with a gloved finger to ensure the correct repair of the rectum and sphincter. Then change to clean disinfected gloves.
- Repair the vaginal mucosa, perineal muscles and skin as described for first and second degree tears (page 266).

Post-Procedure Care

- If there is a **fourth degree tear**, give prophylactic antibiotics **for at least 5-7 days**:
 - Ampicillin, 500 mg, by mouth, every 8 hours

PLUS

 - Metronidazole, 400 mg, by mouth, every 8 hours
- Follow up closely for signs of wound infection.
- Avoid giving enemas or rectal examinations for 2 weeks.

- Give stool softener like Isphagul husk, 2 tablespoons in a glass of water / milk, morning and evening, by mouth, for 1 week.

Management of Neglected Cases

A perineal tear is always contaminated with faecal material. **If closure is delayed more than 12 hours**, infection is inevitable. Delayed primary closure is indicated in such cases.

- For **first and second degree tears**, leave the wound open.
- For **third and fourth degree tears**, close the rectal mucosa with some supporting tissue and approximate the fascia of the anal sphincter with 2 or 3 sutures. Close the muscle and vaginal mucosa and the perineal skin 6 days later.

Complications

- **If a haematoma develops**, open and drain it. If there are **no signs of infection and the bleeding has stopped**, the wound can be reclosed.
- If there are **signs of infection**, open and drain the wound. Remove infected sutures and debride the wound:
 - If the **infection is mild**, antibiotics are not required.
 - If the **infection is severe but does not involve deep tissues**, give a combination of antibiotics.
 - Ampicillin, 500 mg, by mouth, four times per day, for 5-7 days
 - PLUS**
 - Metronidazole, 400 mg, by mouth, three times per day, for 5-7 days
 - If the **infection is deep, involves muscles and is causing necrosis** (necrotizing fasciitis), give a combination of antibiotics until necrotic tissue has been removed and the woman is fever-free for 48 hours:
 - Penicillin G, 2 million units, I/V, every 6 hours
 - PLUS**
 - Gentamicin, 80 mg, I/V, every 8 hours
 - PLUS**
 - Metronidazole, 500 mg, I/V, every 8 hours
 - Once the **woman is fever-free for 48 hours**, give:
 - Ampicillin, 500 mg, by mouth, four times per day, for 5 days
 - PLUS**
 - Metronidazole, 400 mg, by mouth, three times per day, for 5 days

Necrotizing fasciitis requires wide surgical debridement. Perform secondary closure in 2-4 weeks (depending on resolution of the infection).

- Faecal incontinence may result from complete sphincter transection. Many women are able to maintain control of defaecation by the use of other perineal muscles. When incontinence persists, reconstructive surgery must be undertaken 3 months or more after delivery.
- Rectovaginal fistula requires reconstructive surgery 3 months or more postpartum.

REPAIR OF RUPTURED UTERUS

- Review indications.
- Review surgical care principles and start an I/V infusion.
- Give a single dose of prophylactic antibiotics:
 - Ampicillin, 1 g, I/V

OR

- Cefazolin, 1 g, I/V
- **Open the abdomen** (page 254).
- Deliver the baby and placenta.
- Examine the abdomen and the uterus for site of rupture and remove clots.
- Infuse Oxytocin, 20 units in 1 litre I/V fluids (Normal Saline or Ringer's Lactate), at 60 drops per minute, until the uterus contracts and then reduce to 20 drops per minute.
- Lift the uterus out of the pelvis in order to note the extent of the injury.
- Examine **both** the front and the **back** of the uterus.
- Hold the bleeding edges of the uterus with Green Armytage clamps (or Ring forceps).
- Separate the bladder from the lower uterine segment by sharp or blunt dissection. If the **bladder is adherent to the uterus**, use fine scissors.

Rupture Through Cervix and Vagina

- If the **uterus is torn through the cervix and vagina**, mobilize the bladder at least 2 cm below the tear.
- If possible, place a suture 1 cm below the upper end of the cervical tear and keep traction on the suture to bring the lower end of the tear into view as the repair continues.

Rupture Laterally Through Uterine Artery

- If the **rupture extends laterally to damage one or both uterine arteries**, ligate the injured artery.
- **Identify the arteries and ureter prior to ligating the uterine vessels.**

Rupture with Broad Ligament Haematoma

- If the **rupture has created a broad ligament haematoma**, clamp, cut and tie off the round ligament.
- Open the anterior leaf of the broad ligament.
- Drain off the haematoma manually, if necessary.
- Inspect the area carefully for injury to the uterine artery or its branches. Ligate any bleeding vessels.

Repairing the Uterine Tear

- Repair the tear with a continuous locking stitch of 0 chromic catgut (or polyglycolic) suture. **If bleeding is not controlled** or if the **rupture is through a previous classical or vertical incision**, place a second layer of suture.

Ensure that the ureter is identified and exposed to avoid including it in a stitch.

- If the **woman has requested tubal ligation**, perform the procedure at this time.
- If the **rupture is too extensive for repair**, proceed with subtotal hysterectomy **or if the tear has extended into the vagina perform total hysterectomy**.
- Control bleeding by clamping with long artery forceps and ligating. If the **bleeding points are deep**, use figure-of-eight sutures.
- Place an abdominal drain.
- Ensure that there is no bleeding. Remove clots using a sponge.
- In all cases, check for injury to the bladder. If a **bladder injury is identified**, repair the injury (page 274).
- **Close the abdomen** (page 258).

Note: There is no need to close the bladder peritoneum or the abdominal peritoneum.

Repair of Bladder Injury

- Identify the extent of the injury by grasping each edge of the tear with a non-crushing clamp and gently stretching. Determine if the injury is close to the bladder trigone (ureters and urethra).
- Dissect the bladder off the lower uterine segment with fine scissors or with a sponge on a clamp.
- Free a 2 cm circle of bladder tissue around the tear.
- Repair the tear in two layers with continuous 3-0 Chromic Catgut (or Polyglycolic) suture:
 - Suture the bladder mucosa (thin inner layer) and bladder muscle (outer layer).
 - Invert (fold) the outer layer over the first layer of suture and place another layer of suture.
 - Ensure that sutures do not enter the trigone area.
- Test the repair for leaks:
 - Fill the bladder with sterile saline or water through the catheter.
 - If leaks **are present**, remove the suture, repair again carefully and test again.
- **If it is not certain that the repair is well away from the ureters and urethra**, complete the repair and refer the woman to a higher-level facility for an intravenous pyelogram.
- Keep the bladder catheter in place for at least 10-14 days and until urine is clear. Continue I/V fluids to ensure flushing of the bladder.

Post-Procedure Care

- Review and follow postsurgical care principles (page 40).
- Give prophylactic broad-spectrum antibiotic e.g. Co-Amoxiclav (Augmentin), 1.2 g, I/V, every 8 hours, for 24 hours and follow up with Co-Amoxiclav, 375 mg / 625 mg, by mouth, every 8 hours, for the next 4 days.
- If there **are signs of infection** or the woman **currently has** fever, give a combination of antibiotics until she is fever-free for 48 hours.

- Ampicillin, 1 g, I/V, every 6 hours

PLUS

- Gentamicin, 80 mg, I/V, every 8 hours

PLUS

- Metronidazole, 500 mg, I/V, every 8 hours

- Give appropriate analgesic drugs (page 34).
- If there are **no signs of infection**, remove the abdominal drain after 48 hours.
- **If tubal ligation was not performed**, offer family planning advice. If the **woman wishes to have more children**, advise her that in future pregnancies she will be delivered by elective caesarean section.

If the uterus is repaired following rupture, there is an increased risk of rupture of uterine scar during subsequent pregnancies; the option of tubal ligation should be discussed with the woman after the emergency is over.

POSTPARTUM HYSTERECTOMY

Postpartum hysterectomy can be **subtotal** unless the cervix and lower uterine segment are involved. **Total** hysterectomy is necessary in the case of a tear of the lower segment that extends into the cervix or bleeding after placenta praevia.

- Review indications.
- Review surgical care principles (page 35) and start an I/V infusion.
- If there is **uncontrollable haemorrhage following vaginal delivery**, keep in mind that speed is essential.
- **Open the abdomen** (page 254).
- If the **delivery was by caesarean section**, clamp the sites of bleeding along the uterine incision:
 - In case of **massive bleeding**, have an assistant press fingers over the aorta in the lower abdomen. This will reduce intraperitoneal bleeding.
 - Extend the skin incision, if needed.

Subtotal (Supracervical) Hysterectomy

- Lift the uterus out of the abdomen and gently pull to maintain traction.
- Doubly clamp and cut the round ligaments with scissors. Clamp and cut the pedicles, **but ligate after the uterine arteries are secured to save time and minimize bleeding.**

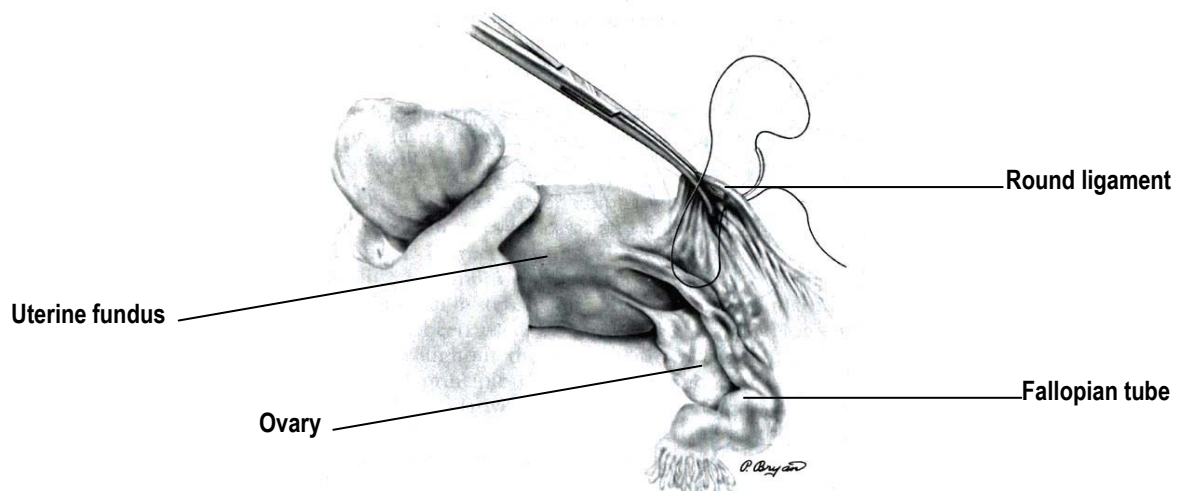


Fig. 1: Dividing the Round Ligament

- From the edge of the cut round ligament, open the anterior leaf of the broad ligament. Incise to:
 - The point where the bladder peritoneum is reflected onto the lower uterine surface in the midline.
 - OR
 - The incised peritoneum at a caesarean section.

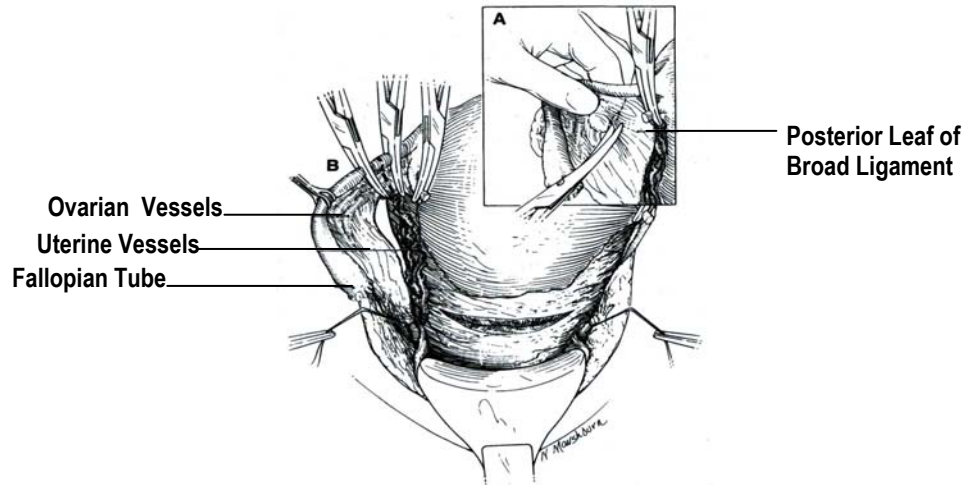


Fig. 2: Dividing the Tube and Ovarian Ligaments

- Use two fingers to push the posterior leaf of the broad ligament forward, just under the tube and ovary, near the uterine edge. Make a hole the size of a finger in the broad ligament, using scissors. Doubly clamp and cut the tube, the ovarian ligament and the broad ligament through the hole in the broad ligament.

The ureters are close to the uterine vessels. The ureter must be identified and exposed to avoid injuring it during surgery or including it in a stitch.

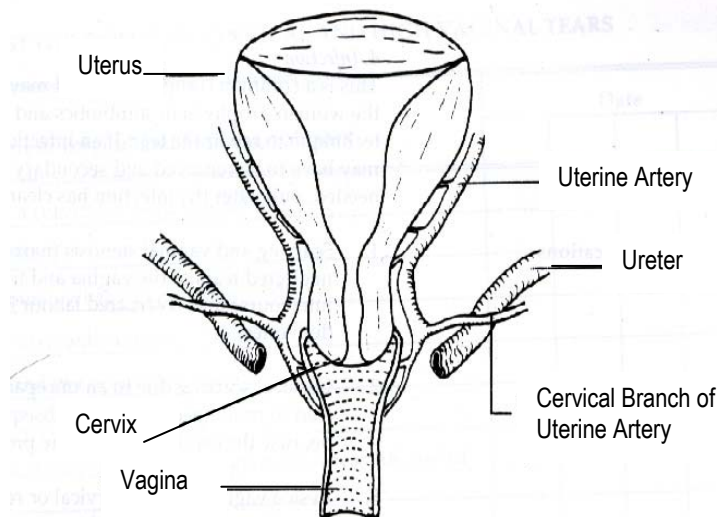


Fig. 3: Relation of Blood Vessels and Ureter to the Cervix and Vagina

- Divide the posterior leaf of the broad ligament downwards towards the uterosacral ligaments, using scissors.
- Grasp the edge of the bladder flap with forceps or a small clamp. Using fingers or scissors, dissect the bladder downwards off of the lower uterine segment. Direct the pressure downwards but inwards toward the cervix and the lower uterine segment.
- Locate the uterine artery and vein on each side of the uterus. Feel for the junction of the uterus and cervix.
- Doubly clamp across the uterine vessels at a 90° angle on each side of the cervix. Cut and doubly ligate with 0 or 1 Chromic Catgut (or Polyglycolic) suture.

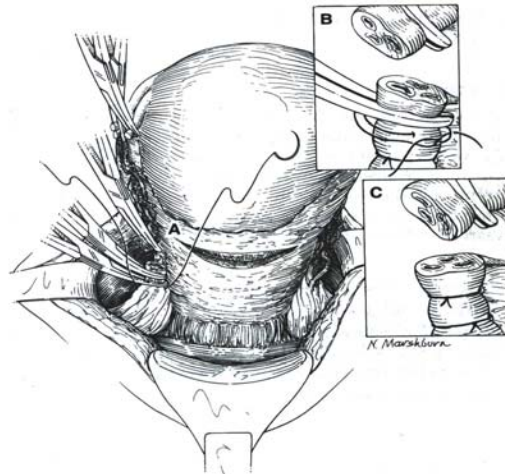


Fig. 4: The Uterine Artery and Veins on Either Side are Doubly Clamped Adjacent to the Uterus, Divided and Doubly Ligated

- Observe carefully for any further bleeding. If the **uterine arteries are ligated correctly**, bleeding should stop and the uterus should look pale.
- **Return to the clamped pedicles of the round ligaments and tubo-ovarian ligaments** and ligate them with 0 or 1 Chromic Catgut (or Polyglycolic) suture.
- Amputate the uterus above the level where the uterine arteries are ligated.

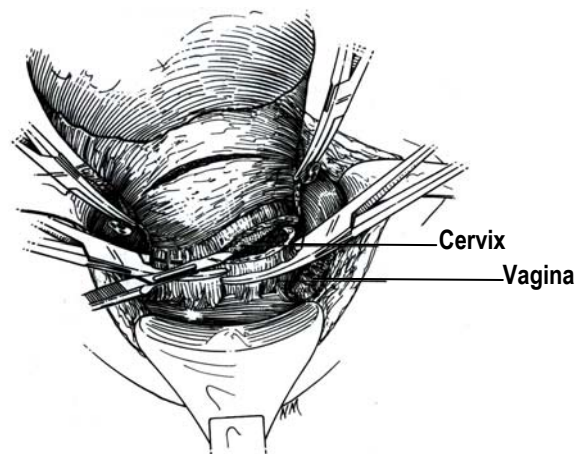


Fig. 5: Amputating the Uterus

- Close the cervical stump with interrupted 0 or 1 Chromic Catgut (or Polyglycolic) sutures.
- Carefully inspect the cervical stump, leaves of the broad ligament and other pelvic floor structures for any bleeding.
- **If slight bleeding persists or a clotting disorder is suspected**, place a drain through the abdominal wall. Do not place a drain through the cervical stump as this can cause postoperative infection.
- Ensure that there is no bleeding. Remove clots using a sponge.
- In all cases, check for injury to the bladder. If a **bladder injury is identified**, repair the injury (page 274).
- **Close the abdomen** (page 258).

Total Hysterectomy

The following additional steps are required for total hysterectomy:

- Push the bladder down to free the top 2 cm of the vagina.
- Open the posterior leaf of the broad ligament.
- Clamp, ligate and cut the uterosacral ligaments.
- Clamp, ligate and cut the cardinal ligaments, which contain the descending branches of the uterine vessels. This is the critical step in the operation:
 - Grasp the ligament vertically with a large-toothed clamp (e.g. Kocher).
 - Place the clamp 5 mm lateral to the cervix and cut the ligament close to the cervix, leaving a stump medial to the clamp for safety.
 - If the **cervix is long**, repeat the step two or three times as needed.
 - The upper 2 cm of the vagina should now be free of attachments.
 - Circumcise the vagina as near to the cervix as possible, clamping bleeding points as they appear.
 - Place haemostatic angle sutures, which include round, cardinal and uterosacral ligaments.

- Place continuous sutures on the vaginal cuff to stop haemorrhage.
- Close the abdomen (page 258) after placing a drain in the extraperitoneal space near the stump of the cervix.

Postoperative Care

- Review postsurgical care principles.
- Give prophylactic broad-spectrum antibiotic e.g. Co-Amoxiclav (Augmentin), 1.2 g, I/V, every 8 hours, for 24 hours and follow up with Co-Amoxiclav, 375 mg / 625 mg, by mouth, every 8 hours, for the next 4 days.
- If there **are signs of infection** or the woman **currently has fever**, give a combination of antibiotics until she is fever-free for 48 hours or for at least 5 days:
 - Ampicillin, 1 g, I/V, every 6 hours
 - PLUS**
 - Gentamicin, 80 mg, I/V, every 8 hours
 - PLUS**
 - Metronidazole, 500 mg, I/V, every 8 hours
- Give appropriate analgesic drugs (page 34).
- If there are **no signs of infection**, remove the abdominal drain after 48 hours.

CULDOCENTESIS AND COLPOTOMY

CULDOCENTESIS

- Review indications and general care principles.
- Provide emotional support.
- Apply antiseptic solution to the vagina, especially the posterior fornix (page 9).
- If necessary, use local infiltration with Lignocaine (page 27).
- Gently grasp the posterior lip of the cervix with a tenaculum and gently pull to elevate the cervix and expose the posterior vagina.
- Place a long needle (e.g. spinal needle) on a syringe and insert it through the posterior vagina, just below the posterior lip of the cervix (see below).

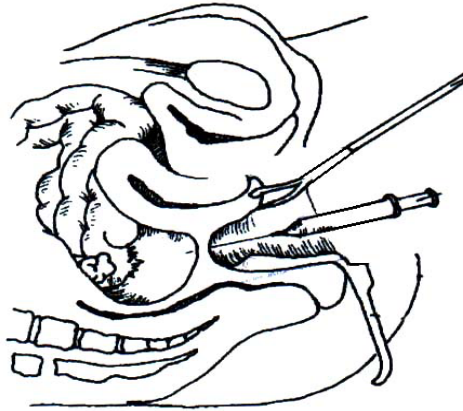


Fig. 1: Diagnostic Puncture of the Cul-de-Sac (Culdocentesis)

- Pull back on the syringe to aspirate the cul-de-sac (the space behind the uterus).
- **If non-clotting blood** is obtained, suspect ectopic pregnancy (page 70).
- **If clotting blood** is obtained, a vein or artery may have been aspirated. Remove the needle, re-insert it and aspirate again. Tiny clots aspirated may indicate old pelvic haematoma due to “old” ruptured ectopic pregnancy.
- **If clear or yellow fluid** is obtained, there is no blood in the peritoneum. The woman may, however, still have an unruptured ectopic pregnancy and further observations and tests may be needed (page 70).
- **If no fluid** is obtained, remove the needle, re-insert it and aspirate again. If no fluid is obtained, the woman may have an unruptured ectopic pregnancy (page 70).
- **If pus is obtained**, keep the needle in place and proceed to colpotomy (page 282).

COLPOTOMY

- If **pus is obtained** on culdocentesis, keep the needle in place and make a stab incision at the site of the puncture:
- Remove the needle and insert blunt forceps or a finger through the incision to break loculi in the abscess cavity (see below).

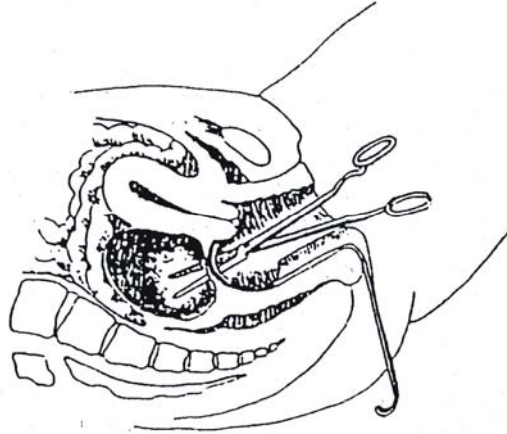


Fig. 2: Colpotomy to Drain Pelvic Abscess

- Allow the pus to drain
- Insert soft rubber corrugated drain through the incision.

Note: A drain can be prepared by cutting off the fingertips of a rubber glove OR a thick polythene urinary catheter with the tip cut off.

- If required, use a stitch through the drain to anchor it in the vagina; Remove the drain when there is no more drainage of pus.

If no pus is obtained, the abscess may be higher than the pouch of Douglas. A laparotomy will be required for peritoneal lavage (wash-out).

EMERGENCY NEWBORN CARE

Introduction and Definitions

Globally there are over seven million perinatal deaths annually, mostly in developing countries. Almost 4 million newborns suffer moderate to severe birth asphyxia, with at least 800,000 dying and probably higher number developing sequelae such as epilepsy, mental retardation, cerebral palsy and learning disabilities.

In Pakistan, independent surveys indicate that neonatal mortality accounts for nearly 61% of all deaths in infancy, a proportion that has remained almost unchanged for over 30 years. There are no reliable estimates of perinatal mortality rate (PMR) for Pakistan and most of the data is hospital based. A multicentre survey from hospital-based facilities indicated an overall PMR of 92 per thousand births with the majority (72%) being stillbirths. A major cause of death and disability is perinatal asphyxia, and requires prompt recognition and correct action. Among community births, almost half of all early neonatal deaths are a consequence of birth asphyxia.

Birth Asphyxia

Failure to initiate or maintain regular breathing at birth, requiring resuscitation. There may be a variable degree of associated cerebral ischaemia (reduced blood supply to the brain) or multi organ dysfunction.

“Blue Asphyxia” *Asphyxia Livida*

The asphyxiated infant is **active** and **cyanosed**.

“Pale Asphyxia” *Asphyxia Pallida*

The asphyxiated newborn infant is **pale** due to severe or prolonged hypoxia, resulting in circulatory failure. The baby has to be resuscitated immediately, aggressively and also requires circulatory support.

Stillbirth

A baby born after 28 weeks (WHO recommends 22 weeks), of pregnancy and showing no signs of life.

Perinatal Death

Includes all stillbirths and death of babies born alive after 28 weeks of gestation (WHO recommends 22 weeks), but who die within first 7 days of birth.

Perinatal Mortality Rate

Number of perinatal deaths /1000 total births.

Neonatal Death

Death of a baby within first 28 days of birth.

Early Neonatal Death

Death of a baby within 7 days of birth.

IMMEDIATE NEWBORN PROBLEMS

Serious condition / problem in the newborn which requires immediate attention:

- Birth Asphyxia:
 - Not breathing or gasping for breath.
 - Breathing with difficulty (less than 30 or more than 60 breaths per minute, indrawing of the chest or grunting).
 - Cyanosis (blueness) / Pallor.

Other conditions / problems that require attention in the delivery room:

- Preterm or very low birth weight (less than 32 weeks gestation or birth weight less than 1500 grams).
- Lethargy
- Hypothermia
- Convulsions
- Low birth weight (less than 2500 grams).
- Possible bacterial infection in an apparently normal newborn whose mother had prelabour rupture of membranes, or prolonged rupture of membranes during labour.

Asphyxia can be anticipated in a large number of cases, but in others may be entirely unexpected.

The Asphyxiated Baby

Assessment

Check

- **Airway:**
 - Clear or not?

- **Breathing:**

- Is the baby breathing?
- What is the respiratory rate?
- Is the breathing regular?
- Is there indrawing of the chest?
- Is the baby grunting?

- **Circulation:**

- What is the heart rate?
- What is the colour of the baby?

Blue / Pale: Is it central or peripheral? Most of the babies have some peripheral cyanosis of their fingers or toes, but central cyanosis, for example tongue, tip of the nose, requires immediate intervention.

Immediate Management

The following situations require immediate management: no breathing / gasping / breathing with difficulty and cyanosis (blueness) / pallor.

No Breathing / Gasping / Breathing with Difficulty and / or Cyanosis / Pallor

General Management

- Dry the baby, remove the wet cloth and wrap the baby in a dry, warm cloth.
- Clamp and cut the cord immediately if not already done.
- Move the baby to a firm, warm surface under a radiant heater, if available, for resuscitation.
- Observe standard infection prevention practices when caring for and resuscitating a newborn (page 6).

Resuscitation

Box 1: Resuscitation Equipment

To avoid delays during an emergency situation, it is vital to **ensure that the equipment is in good working condition:**

- Heat source and light source (Infant Warmer – if available)
- Suction source – Wall / mobile / Mucous extractors – Bulb suction
- Oxygen source – Wall / Oxygen cylinder
- Appropriate size masks according to the expected size of the baby (size 1 for a normal weight newborn and size 0 for a small newborn) and an appropriate self-inflating bag with a pressure release valve.
- Airway sizes 000, 00, 0.

In order to check that the mask is working, block the mask by making a tight seal with the palm of your hand and squeeze the bag:

- If you feel pressure against your hand, the bag is generating adequate pressure.
- If the bag reinflates when you release the grip, the bag is functioning properly.

Clear The Airway

- Positioning the newborn (Fig. 1, below):
 - Place the baby on its back.
 - Position the head in a slightly extended position to straighten the airway.
 - Keep the baby wrapped or covered, except for the face and upper chest.

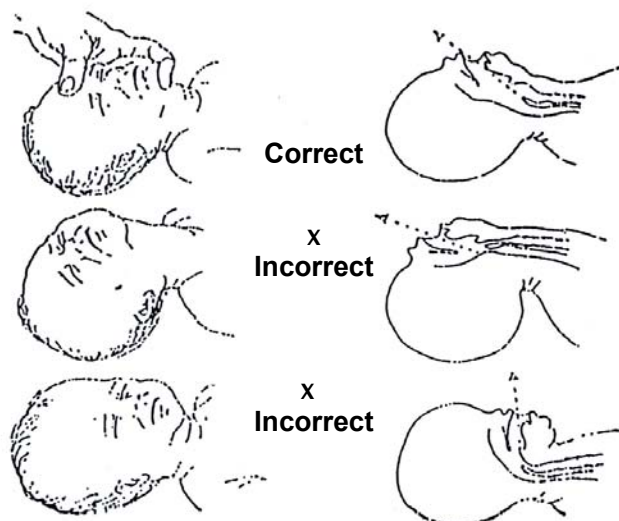


Fig. 1: Positioning the Head for Resuscitation

- Clear the airway by suctioning first the mouth and then the nostrils.

If blood or meconium is in the baby's mouth or nose, suck it out immediately to prevent aspiration.

Note: Do not apply suction deep in the throat as this may cause the baby's heart to slow or the baby may stop breathing. If using a suction machine, do not exceed suction pressure of more than 100 cm of water.

Stimulate Breathing

- Provide stimulation by drying the baby.
- Provide additional stimulation by flicking the baby's sole or rubbing the skin (see below).



Fig. 2: Flicking and Rubbing the Sole

- Provide oxygen 1 – 2L/min.



Fig. 3: Giving Oxygen by Tube and Face Mask

Every obstetric care provider must be trained to provide basic neonatal resuscitation.

Reassess the baby:

- If the **newborn starts crying or breathing**, no further immediate action is needed. Proceed with initial care of the newborn (page 225).

- If the **baby is still not breathing** (apnoeic), or gasping, and remains cyanosed, or has heart rate below 100/min, start Positive Pressure Ventilation (PPV) with bag and mask.

Ventilate the Newborn with Bag and Mask

- It is possible to resuscitate the baby with a bag and mask (even without oxygen), for as long as 30 minutes.
- Recheck the newborn's position. The neck should be slightly extended (Fig. 1, page 317).
- Connect the bag to an oxygen source.
- Place an adequate size airway (Fig. 4, below).

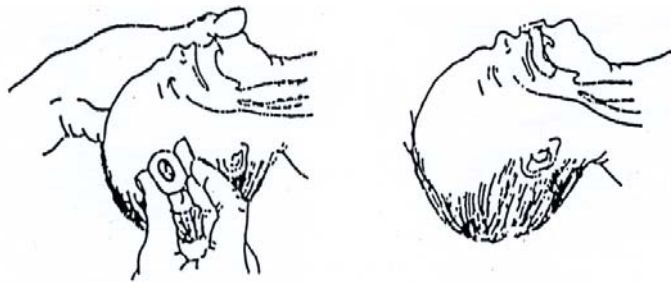


Fig. 4: Insertion of Airway

- Place the mask on the newborn's face. It should cover the chin, mouth and nose (Fig. 5, below).

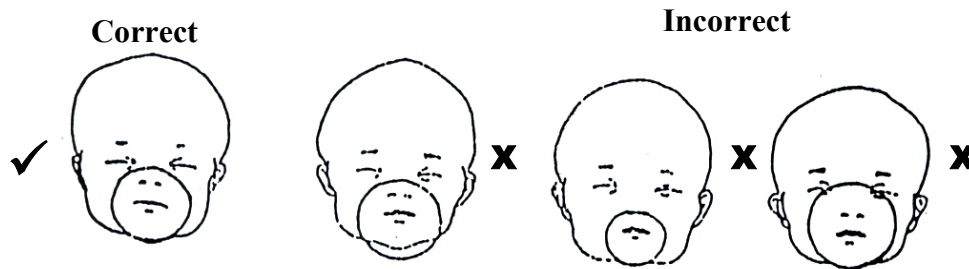


Fig. 5: Choice and Positioning of Face Mask

- Form a seal between the mask and the baby's face, to prevent leakage of air or oxygen (Fig. 6, page 320)

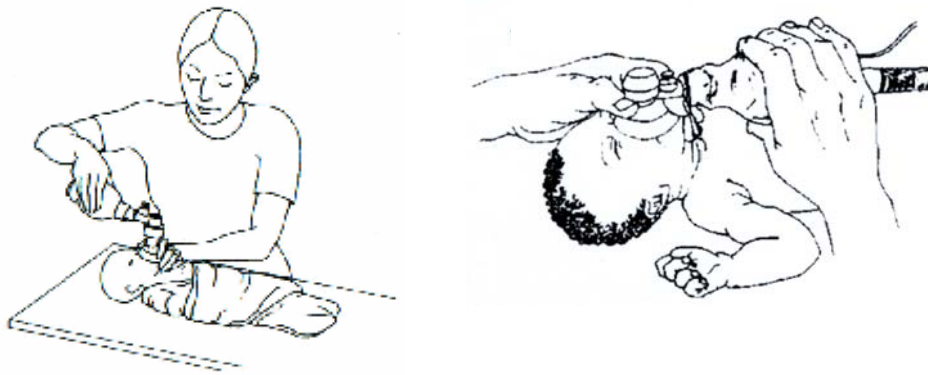


Fig. 6: Ventilation with Bag and Mask

- Check the seal by ventilating twice and observing the rise of the chest.
- Squeeze the bag with a thumb and two fingers only (Fig 7, below)

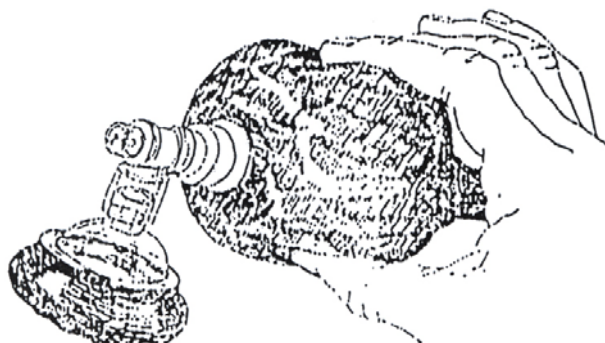


Fig. 7: Finger Tip Pressure for Insufflation

- Once the seal is ensured and chest movement is present, ventilate the newborn. Maintain the correct rate (approximately 40 breaths per minute) and the correct pressure (observe the chest for an easy rise and fall):
 - If the **baby's chest is rising**, ventilation pressure is probably adequate.
 - If the baby's chest is not rising:
 - Recheck and correct, if necessary, the position of the newborn (Fig. 1, page 317).
 - Reposition the mask on the baby's face to improve the seal between mask and face.
 - Repeat suction of mouth and nose to remove mucus, blood or meconium from the airway.
 - Ensure there is an adequate sized airway in place.

If the **mother of the newborn has received Pethidine or Morphine** prior to delivery, and the baby has respiratory depression, administer Naloxone (Box 2, page 322).

- **Provide Positive Pressure Ventilation (PPV) for 1 minute** and then stop and quickly **assess** if the newborn is breathing spontaneously:
 - **No further PPV is needed if:**
 - Breathing is spontaneous (30-60 breaths per minute) and regular.
 - No indrawing of the chest and no grunting.
 - No cyanosis.
 - Heart rate is above 100/minute.
- If the **newborn remains pink**, continue observing breathing for 1 - 2 minutes:
 - **No further resuscitation is needed if:**
 - Breathing is normal (30-60 breaths per minute).
 - No indrawing of the chest.
 - No grunting for 1 minute.
 - Heart rate more than 100 per minute.
- If there is **no spontaneous / regular breathing and the baby is cyanosed**, continue ventilating.
- **Provide chest compressions.**
- **Check the heart rate:**
 - If heart rate is below 60 or between 60-80 and not increasing, **start external cardiac compressions** (Fig. 8, below).
 - Exert pressure over mid sternum with both the thumbs (Fig. 8, below) at a ratio of 3:1 (3 cardiac compressions to 1 breath). Continue resuscitating (PPV) by mouth to mouth or bag and mask ventilation.



Fig. 8: Oxygenation by Bag & Mask and External Cardiac Massage

- **If the newborn is not breathing regularly and heart rate is not improving after 20 minutes of ventilation and cardiac compressions:**
 - Transfer the baby to the most appropriate facility for the care of sick newborns.
 - During the transfer, keep the newborn warm and ventilated.
- If there is **no gasping or breathing at all after 20 minutes of ventilation**, stop ventilating, as the baby is dead. Provide emotional support to the family.

Box 2:

Counteracting Respiratory Depression in the Newborn Caused by Narcotic Drugs

If the **mother has received Pethidine or Morphine**, the newborn may have **respiratory depression**. **Naloxone is the antidote** for this.

Note: If the mother is a known narcotic drug addict, do not administer Naloxone to the newborn.

- If there are **signs of respiratory depression**, begin resuscitation immediately:
 - After vital signs have been established, give Naloxone, 0.1 mg/kg body weight, I/V to the newborn i.e. 0.25 to 0.3 mg to an average sized baby.
 - **If the infant has adequate peripheral circulation**, Naloxone may be given I/M after successful resuscitation. Repeated doses may be required to prevent recurrent respiratory depression.
- If there are **no signs of respiratory depression**, but **Pethidine or Morphine was given within 4 hours of delivery**, observe the baby for signs of respiratory depression and treat as above if they occur.

Box 3: Oxygen for Neonates

When using oxygen, remember:

- Supplemental oxygen should only be used for difficulty in breathing or cyanosis.
- If the baby is having **severe indrawing of the chest, is gasping for breath or is persistently cyanotic**, give oxygen by a tube close to the baby's face (Fig. 3, page 318) (do not insert into the mouth or nose) or by a face mask or oxygen hood.

Note: Indiscriminate use of supplemental oxygen for premature infants has been associated with the risk of blindness.

In community settings with no facilities, neonatal resuscitation is possible by:

- **Cleaning the mouth and the nose** (Fig. 9).
- **Employing postural drainage of secretions** (Fig. 10).
- **Mouth to mouth resuscitation** (Fig. 11).



Fig. 9: Cleaning the Mouth and Nose

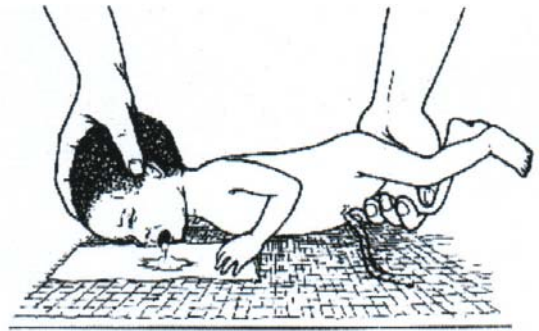


Fig. 10: Postural Drainage of Secretions



Fig. 11: Mouth to Mouth Resuscitation

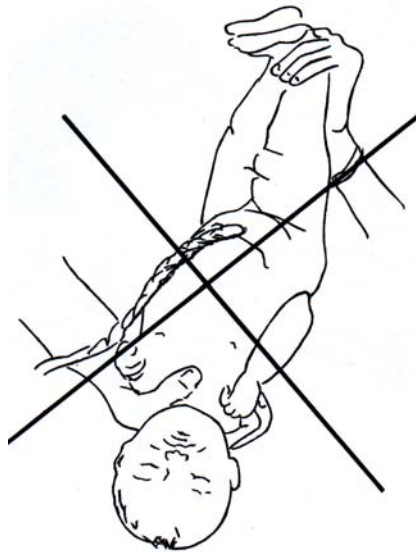


Fig. 12: Do Not Turn the Baby Up Side Down

DO NOTs of Resuscitation:

- Do not persist in unnecessary and aggressive pharyngeal suctioning as it may induce reflex bradycardia (slowing of the heart rate).
- Do not slap the baby; gentle flicking of the soles and rubbing of the skin is enough.
- Do not turn the baby upside down (Fig. 12, page 323)
- Do not blow too hard when performing mouth-to-mouth resuscitation (Fig. 11, page 323). Just the air in the mouth is sufficient.
- Do not give intravenous bicarbonate until after respiration is well established.
- Do not let the baby get cold during resuscitation.
- Do not hesitate to call for help.

Care After Successful Resuscitation

Ensure that all newborn infants with birth asphyxia requiring resuscitation are observed for at least 24 hours.

- Prevent heat loss:
 - Place the baby skin-to-skin on the mother's chest and cover the baby's body and head.
 - If available, place the baby under a radiant heater.
- Examine the newborn and count the number of breaths per minute:
 - If the **baby is cyanotic** (bluish) or is **having difficulty breathing** (less than 30 or more than 60 breaths per minute, indrawing of the chest or grunting), give oxygen (Fig. 3, page 318).
- Measure the baby's axillary temperature:
 - If the **temperature is 36°C (97°F) or more**, keep the baby skin-to-skin on the mother's chest and encourage breastfeeding.
 - If the **temperature is less than 36°C (97°F)**, provide extra warmth to the baby (page 329).
- Encourage the mother to begin breastfeeding. A newborn that required resuscitation is at higher risk of developing hypoglycaemia:
 - **If suckling is good**, the newborn is recovering well.
 - **If suckling is not good**, transfer the baby to the appropriate facility for the care of sick newborns.

- Ensure frequent monitoring of the newborn during the next 24 hours. If **signs of breathing difficulties recur**, arrange to transfer the baby to the most appropriate service for the care of sick newborns to:

-
-
- Watch the urinary output to exclude oligouria / anuria (less or no urine output).
 - Avoid fluid overload. Maintain fluid restriction (usually at 2/3 of normal requirements in the first 24 hours i.e. about 40-50 ml/kg/day).
 - Prevent hypoglycemia and hypothermia.
 - Monitor vital signs such as heart rate and respiratory rate.
 - Promptly recognize and treat seizures (Phenobarbitone, 20 mg/kg/day, oral or I/V). Avoid I/V Diazepam.
 - If any of the above problems exist, refer to a higher-level facility.

Annexures

Neonates at High Risk of Developing Birth Asphyxia

It may be possible to identify high-risk pregnancies where the likelihood of asphyxia is high. Such pregnancies may be ideally referred for institutional birth or a person skilled in neonatal resuscitation must attend the delivery.

Health workers must be aware of the risk of asphyxia in:

- Premature births.
- Maternal illness such as Diabetes, Hypertension.
- Maternal infection with fever.
- Antepartum haemorrhage.
- Multiple pregnancies e.g. twins or triplets.
- Small sized baby / severe intrauterine growth restriction.
- Abnormal presentation e.g. breech, especially in a primigravida.
- Prolonged pre-labour rupture of the membranes.
- Prolonged labour (> 12 hours) / Obstructed labour.
- Instrumental birth e.g. forceps or vacuum extraction.
- Caesarean section.
- Passage of meconium in the liquor.
- Previous perinatal death.

To determine neonatal status at birth and the need for resuscitation, Apgar scoring system is useful.

Apgar Scoring System

Check Apgar score at 1 and 5 minutes (Additional Apgar scores should be recorded at intermediate and later times, if active resuscitation is required).

Low Apgar scores at 1 minute: initiate resuscitation.

Low Apgar score at 5 minutes: poor prognoses, indicative of cerebral damage.

	0	1	2
Heart Rate	absent	<100	>100
Respiratory Effort	absent	weak cry	strong cry
Muscle Tone	Flaccid	some movement	extremities, well flexed
Colour	Blue/pale	peripheral cyanosis	pink
Reflex Irritability	No response	some movement	active movement

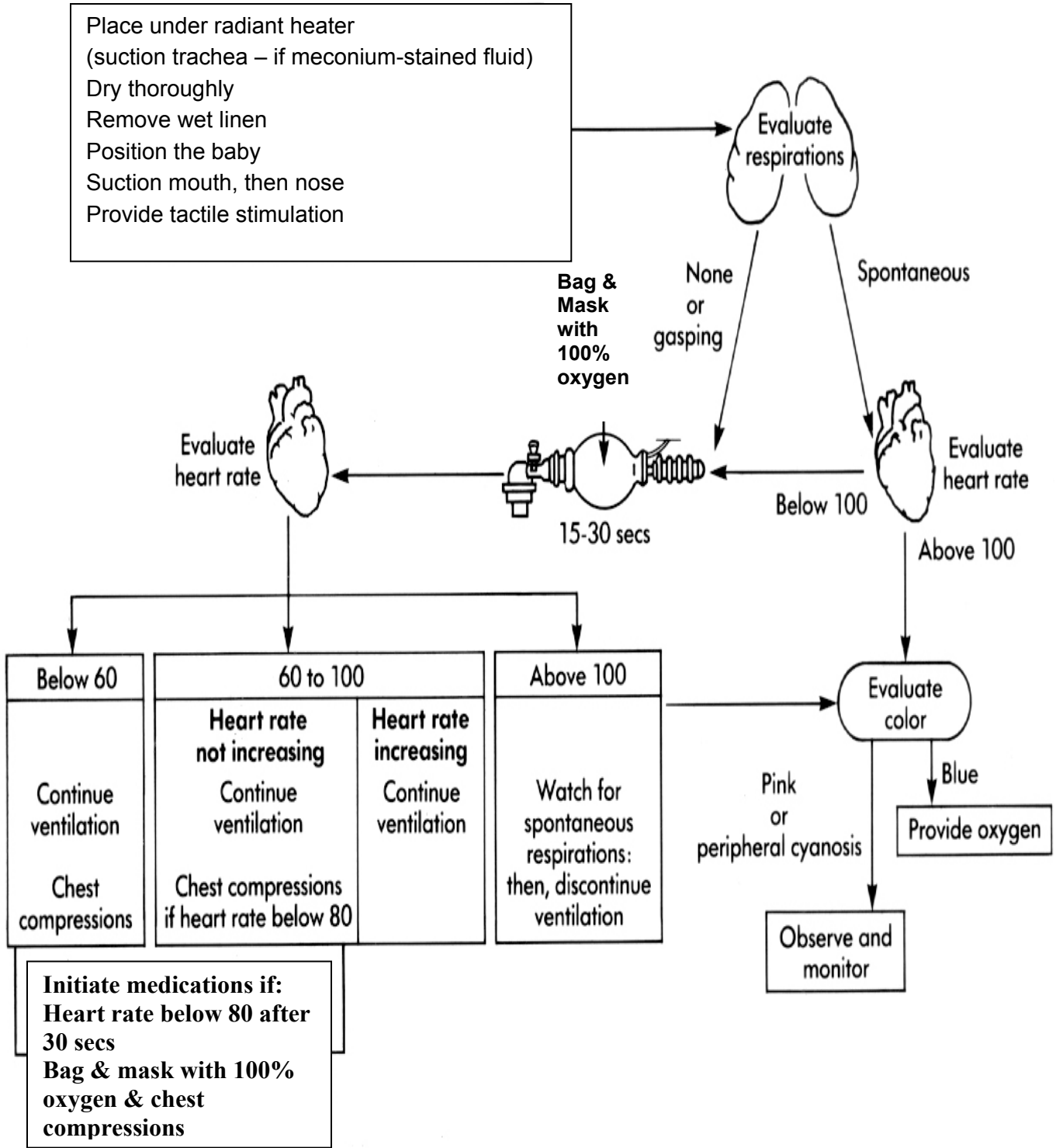


Fig. 13: Sequence of Action for Resuscitation

Other Common Problems Encountered in the Immediate Neonatal Period

Small Newborn Infant

Such babies may be either:

- Premature
- Small-for-dates because of intrauterine problems and maternal malnutrition.

These babies are at increased risk of:

- Intrauterine Death
- Birth Asphyxia
- Postnatal complications such as:
 - Hypoglycemia (low blood sugar)
 - Hypothermia
 - Respiratory problems
 - Infections

Some of these immediate problems can be avoided by:

- Recognizing the risk of asphyxia at birth and taking appropriate preventive measures e.g. referral to a facility for birth in more controlled circumstances, or being prepared for adequate resuscitation.
- Immediate care of the newborn (page 225).
- Early and exclusive breastfeeding is essential. If baby is too small to suckle, express the milk in a cup and feed by a spoon. These babies should be fed at least hourly or earlier if the baby demands feeds.
- If the baby has breathing difficulty or turns blue, refer to a physician at the earliest (preferably in a suitable facility).

Breathing Difficulty

☞ A premature newborn baby may encounter breathing difficulty, because of immaturity of lungs. Such newborn infants must be referred to a hospital, after stabilization.

☞ Normal weight mature babies may develop breathing difficulty due to delay in getting rid of the intrapulmonary fluid that normally fills the foetal lungs (Transient Tachypnoea of newborn). The respiratory difficulty in such cases is usually mild and subsides itself in a day or so. Some useful ways of helping such babies are:

- Nurse them on their side.

- If breathing rate is 60 or more per minute and associated with a grunting sound, refer to hospital. Such babies may need oxygen and intravenous feeding.
- If respiratory rate is less than 60 per minute, feed the baby small amounts of expressed breast milk frequently.

Some important points to be remembered in infants with breathing difficulty include:

- The possibility of meconium aspiration (such babies may pass and inhale meconium at the time of birth due to foetal distress, which can be seen in the oropharynx at the time of birth or suspected on the basis of skin staining).
- Intrauterine bacterial infection, which may contribute to the development of early-onset pneumonia. Chest X-ray and referral to a higher care facility is required.

Hypothermia

This is a common but serious problem in newborn infants, especially where delivery rooms are cold and attention is not paid to drying and keeping the baby warm. A cold newborn can develop complications such as respiratory distress, poor feeding and metabolic disturbances. Similarly hypothermia can be a marker of other co-existing problems, such as sepsis or birth asphyxia.

To prevent hypothermia:

- Dry the baby immediately after birth and wrap in warm clothes.
- Do not place on cold surface or near a draft (door / window / fan / air conditioner).
- Delay bathing the newborn infant for the first 12-24 hours.
- Do not rub and remove vernix from the skin.
- Breastfeed the baby frequently and keep the baby with the mother (co-bedding).
- Cover the exposed areas where heat loss is maximum (such as the head and extremities).
- Monitor axillary temperature every 30 minutes until normal.
- Alternatively, if facilities exist, the baby can be put in an incubator or under a radiant heater.

Poor Feeding / Vomiting

Slight difficulty in feeding may be temporary in small or sick infants, especially if premature. However, persistent difficulty in feeding or vomiting in larger babies should always be taken seriously as it may be an early indication of serious infection or other problems. Some newborn infants bring up a little milk after each feed. This is entirely normal. If the baby is gaining weight, it does not require any special treatment. Burping the baby (bringing up the wind) after feeds and keeping the baby head-up after feeds helps.

Important points to look for in a baby with poor feeding and vomiting are:

- Is the baby cold or febrile?
- Is the baby jaundiced?
- Is the vomitus yellow tinged?
- Is the fontanelle bulging?
- Is the abdomen distended?

These last two features may also be suggestive of intestinal obstruction or a surgical problem.

- Is there stiffness of the jaw / face muscles? (may be suggestive of early neonatal tetanus).
- Is there a problem with the mouth? (check the palate and for the presence of oral thrush).
- Are there other associated problems e.g. respiratory difficulty, fits, colour change?

Diarrhoea

- The colour of normal stool is brown / yellow (after initial meconium).
- Breastfed baby may pass ten to twelve soft stools per day, which is normal.
- In infective diarrhoea, the stools may be mucoid or watery and profuse.
- It is not the number but the type of stools that matter. If the stools are watery and foul smelling, the infant may have infective diarrhea.
- Give Oral Rehydration Salt (ORS) to the baby, alternate with plain water.
- Do not stop breastfeeding.
- If diarrhoea is severe or associated with other signs of infection, refer to hospital for assessment, rehydration and further treatment, if required.

Fever

- Over wrapping of newborn infants can lead to a rise in temperature.
- Unwrap the baby and take temperature after half an hour.
- If temperature is still high, give paracetamol drops and refer for assessment, investigations and treatment.

Serious Infections or Sepsis

Most serious infections in the newborn may not present with obvious features but can lead to a very rapid deterioration. It is therefore important to suspect, recognise and treat such infections promptly. Such babies should always be referred to a doctor for further management.

Important indicators suggestive of infection in a newborn infant include:

- Umbilical discharge
- Skin pustulosis
- Low body temperature or fever
- Respiratory distress
- Abdominal distension and / or vomiting
- Diarrhoea (distinguish from normal soft breastfed stools)
- Poor feeding
- Reduced activity / lethargy
- Jaundice within the first few days or rapidly increasing jaundice

If maternal history indicates possible bacterial infection, give first dose of antibiotics:

- Gentamicin, 4 mg/kg body weight, I/M (or give Kanamycin)

PLUS

- Ampicillin, 100 mg/kg body weight, I/M (or give Benzyl Penicillin)

If the baby is cyanotic (bluish) or is **having difficulty breathing** (less than 30 or more than 60 breaths per minute, indrawing of the chest or grunting), give Oxygen (Fig. 3, page 318).

Seizures / Convulsions (Fits)

Though rare, these are important to recognize and treat in a newborn infant. Early signs of seizures in the newborn infant may differ from older children and adults. They might be very subtle (such as a staring look, repeated lip-smacking, limb cycling movements). However, these can rapidly progress to seizures involving one or all limbs.

Important causes of neonatal seizures include:

- Birth asphyxia (check the birth history for this possibility).
- Hypoglycemia (especially in small babies or in case of delayed feeds / poor feeding).
- Hypocalcemia (usually seen in larger infants after a few days).
- Infection especially meningitis (check for features of infection and the anterior fontanelle for bulging).
- Hypoxia (in severe cases with respiratory disease).

Stabilize. Keep the baby warm and refer these infants to an appropriate facility, as soon as possible.

Jaundice (Yellow Discoloration of the Skin)

Physiological Jaundice

Is mild and usually develops on third to fifth day and is entirely normal.

- Continue exclusive breast feeding.
- No extra water or glucose is required.
- No dietary restrictions for the mother.
- Refer to doctor if there is no improvement in jaundice by 10th day after birth or appears to be getting worse (baby's legs and feet are yellow).
- Jaundice associated with other problems such as feeding difficulty, fever etc may be abnormal and lead to complications.

Pathological Jaundice

- Jaundice is noticed within the first two days of birth or appears to be increasing rapidly.
- There may be history of jaundice in a previous newborn infant.
- Be aware of the possibility of problems such as bilirubin encephalopathy (manifested by irritability or seizures).
- Such infants will usually require **prompt referral**, and advice of a specialist doctor may be required.

Lethargy

If the **baby is lethargic** (low muscular tone, does not move), it is very likely that the baby has a severe illness and should be transferred to an appropriate facility for the care of sick newborns.

Vaginal Bleeding in the Female and Swelling of Breast in a Male / Female Newborn Child

This is due to sudden withdrawal of maternal female sex hormones.

- Reassure the mother. This needs no intervention and will settle in a few days.

ANAESTHESIA AND ANALGESIA FOR EMERGENCY OBSTETRICS

Contents

- Introduction
- Problems of Emergency Obstetric Anaesthesia (EmOA)
- Preoperative Management
- Spinal Anaesthesia
- Epidural Anaesthesia
- General Anaesthesia
- Anaesthesia in Complicated Cases
 - Bleeding during Pregnancy
 - Pregnancy Induced Hypertension, Pre-eclampsia, Eclampsia, HELLP syndrome
 - Amniotic Fluid Embolism
 - Disseminated Intravascular Coagulopathy
 - Acute Inversion of the Uterus
- Analgesia in Emergency Obstetrics
- Skills required for Emergency Obstetric Anaesthesia
- Annexures:
 - Mendelsons Syndrome
 - Failed Intubation Protocol
 - Cardiac Arrest

All patients in labour are potential candidates for Emergency Anaesthesia as the need for emergency surgery can occur even during an apparently expected normal labour and childbirth.

Indications for Emergency Obstetric Surgery

- To prevent maternal mortality & morbidity.
- To prevent foetal mortality & morbidity.

Anaesthesia Given for Emergency Obstetrics Could Be

- General Anaesthesia
- Regional Anaesthesia techniques, Spinal / Epidural using local Anaesthetics
- Local Anaesthesia
 - Pudendal block (page 245).
 - Subcutaneous infiltration of local anaesthetics (page 27 and 263).

CHOICE OF ANAESTHESIA

Spinal Anaesthesia:

Advantages are:

- It is a technically easy procedure and cost effective.
- There is less bleeding during surgery and less foetal depression.
- Avoids risk of aspiration (note: aspiration has been reported but rare).
- Avoids risk of failed intubation and subsequent hypoxia.

Disadvantages include:

- Time consuming compared to general anaesthesia.
- Risk of failure (therefore preparation for general anaesthesia must be ready in all cases in which spinal anaesthesia is planned).
- More severe haemodynamic derangement compared to general anaesthesia.
- Risk of postoperative complications like post dural puncture headache, backache, meningitis / meningism, neurological complications (most complications can be avoided by careful sterile technique, use of small gauge spinal needles of pencil point variety).

Epidural Anaesthesia has the same effect as spinal anaesthesia.

Advantage:

Placement of epidural catheter enables repeated injections to be given for prolonged periods. It is therefore used for pain relief in labour.

Disadvantages:

- It is technically more difficult to give.
- Requires an experienced anaesthetist who is usually only available in a tertiary hospital.
- Onset of anaesthesia is not as quick as with spinal anaesthesia making it unsuitable for use in emergency caesarean section.
- However if an epidural cannula is already in place (for pain relief during labour) it would be convenient to use this route for anaesthesia.

General Anaesthesia (G.A):

Maternal mortality is higher with general anaesthesia as compared to spinal anaesthesia.

Advantages are:

- Can be given to all cases (unless patient is unfit for G.A, which is seldom).
- Induction is quicker compared to spinal anaesthesia.

Disadvantages include:

- Vomiting or regurgitation during induction and subsequent acid aspiration syndrome.
- Hypoxia due to failed intubation.

In emergency obstetrics, spinal anaesthesia should be given unless contraindicated.

Local Anaesthesia:

Pudendal block is usually given by surgeon for minor procedures (page 245).

Subcutaneous infiltration of local anaesthesia can be used for caesarean section where trained anaesthetist is not available, or when patient is not fit for general / spinal anaesthesia (page 263).

Problems in Emergency Obstetric Anaesthesia

Full Stomach - All obstetric patients should be considered as to be having a full stomach, and precautions must be taken to prevent vomiting or regurgitation, which may be followed by acid aspiration syndrome (Mendelson's syndrome).

Management: see annexure: acid aspiration syndrome (page 307).

Severe Haemorrhage - could occur at any stage of pregnancy.

Management: see Anaesthesia in complicated cases: Massive obstetric haemorrhage (page 296).

Foetal Distress - may occur due to obstetric causes and / or due to administration of drugs given for pain relief during labour.

Management: see management of neonatal asphyxia (page 316).

Aortocaval Compression (compression of the aorta and inferior vena cava by the full term gravid uterus), decreases venous return and hence cardiac output causing uteroplacental insufficiency. Foetal oxygenation is decreased. In some patients, due to defective collateral circulation, this condition may be exaggerated causing hypotensive supine syndrome of pregnancy. The patient becomes hypotensive (systolic BP <100 mm Hg), and develops bradycardia in the supine position.

Management: Keep the patient lying in the lateral position, during labour and during transit to the operation theatre. On the operation table, a pillow / wedge should be placed below the right buttock. This is to produce left uterine displacement so that Aortocaval compression is reduced.

Failed Intubation: may cause hypoxia / aspiration that may result in cardiac arrest. Preoperative assessment of the airway is essential.

Management: see annexure: difficult intubation (page 309).

PRE-OPERATIVE MANAGEMENT FOR EMERGENCY OBSTETRIC ANAESTHESIA

Assessment of the patient must be done from the anaesthetist's point of view in the time available.

HISTORY

A few questions will give required information:

- Have you ever been hospitalised and for what?
- Have you ever had an operation and for what and when?
- Whether there were any complications related to surgery?
- Are you suffering from any disease?
- Have you ever suffered from any chronic illness?
- Are you taking any medicines or drugs regularly?
- What is the condition of health of your close relatives?

PHYSICAL EXAMINATION

General examination including:

- Condition of veins.
- Assessment for intubation difficulty: see annexure, difficult intubation (page 309).
- Examination of back and spine for purposes of spinal / epidural puncture.

Systemic Examination

Cardiovascular System

Respiratory system

Medical conditions often co-exist and require perioperative treatment.

INVESTIGATIONS

- Complete blood picture.
- Blood for grouping and cross matching (page 296).
- Any other tests, if indicated.

Note: The patient may be shifted directly to the operation theatre and the preoperative assessment and management may have to be done by the anaesthetist in the operation theatre. Urine and blood samples for necessary investigations could be collected in the operation theatre, in urgent situations. However, if immediate surgery is required, it should not be delayed to wait for the results.

- Obtain informed consent.
- Obtain I/V access. Insert an I/V cannula **14/16 gauge** (if necessary, insert 2 cannula at different sites), and start an I/V drip of Ringer's Lactate / Normal Saline. Start preoperative treatment required as soon as the anaesthetist sees the patient and continue intra- and post operatively.
- Send 10 ml clotted blood to the blood bank for Blood grouping and cross matching. **At least two pints of blood should be arranged and more may be required** (page 296).
- **If spinal anaesthesia is to be given, preloading** may be done by rapid intravenous infusion of crystalloids (Normal Saline or Ringer's Lactate) to prevent hypotension following spinal anaesthesia. Colloids are no longer recommended (page 9).

Do not give any sedatives preoperatively. Preoperative attempts to empty stomach are also not recommended, as they are time consuming and do not empty the stomach fully.

- Give Metoclopramide, 10 mg, I/V, stat (it improves the lower oesophageal sphincter tone and helps in preventing vomiting and regurgitation.).
- Give 0.3 Molar Sodium citrate, 30 ml, orally, not more than 30 minutes before induction of general anaesthesia. It is a clear, non-particulate antacid and increases gastric pH. If it is not available as a proprietary preparation, make it in the pharmacy page 307).

Do not use particulate (non-clear) antacids.

- Give Ranitidine (available as Zantac), 50 mg, slow I/V (2 ml dissolved in 20 ml of Normal Saline / Dextrose Water and given over at least 2 minutes), 45-60 minutes before induction of general anaesthesia. If oral Ranitidine prophylaxis is being given then it is not necessary to give injection.

Ranitidine, 150 mg, by mouth, should be given in labour and repeated every 6 hours, as it reduces gastric pH and prevents Mendelson's syndrome.

- Start oxygen inhalation.
- Keep the patient on the side even during transport to the operation theatre to prevent supine hypotension. In the operation theatre when the patient is kept supine, place a pillow / wedge below the right buttock to prevent Aortocaval compression.
- Check anaesthesia trolley, suction machine and drugs, which may be required.

- Call neonatologist (if available), and check that the neonatal resuscitation trolley, necessary drugs and equipment are present in working condition (Box 1, page 317).
- Have a trained assistant available.

Monitoring During Emergency Obstetric Anaesthesia

- Clinical monitoring by anaesthetist is always necessary and is often the only monitoring available. Pulse, respiration and BP should be monitored in all cases. Urinary output should be measured.
- Attach monitors if available. The following monitors are recommended for patients undergoing EmOA, whether spinal / epidural or general anaesthesia.
 - E.C.G
 - Non-Invasive BP monitor
 - Pulse oximetre

An anaesthetic ventilator (Manley type) is a valuable equipment, when GA is being given, as it helps the anaesthetist, (who is often working without trained assistants), to simultaneously perform other functions like giving drugs, helping in neonatal resuscitation etc.

MANAGEMENT DURING SPINAL ANAESTHESIA

Technique of Giving Spinal Injection: (page 302).

- Reassure the patient during the procedure, theatre staff should talk softly and patient should be uncovered only as much as is necessary. Use a screen.
- Continue oxygen inhalation till the baby is delivered and even afterwards if required.
- After delivery of the baby, give Syntocinon, 10 IU, slowly I/V, and put 10-40 IU in 1000 ml of crystalloid infusion. Give at a rate sufficient to control uterine atony (0.02-0.04 units/min) e.g. if 30 units is added to 1000 ml of crystalloid infusion, approximately 10- 20 drops per minute will be required. (Do not add any medication in the blood transfusion set). Sometimes surgeon may ask to give Ergometrine, 0.25 mg, I/M, if uterine contraction is inadequate.

Postoperative Care

- The patient will not require any analgesic till the effect of the spinal anaesthesia wears off.
- Note the time when motor movement of the lower limbs returns.
- The patient should keep lying down in bed and should not be allowed to get up or sit for a period of 12 hours. This is to prevent headache.

Complications of Spinal Anaesthesia and its Management

Intraoperative Complications

- **Hypotension**
 - Give oxygen inhalation, 8-10 litres/minute.
 - Give I/V fluids rapidly (Normal Saline or Ringer's Lactate).
 - Give Atropine, I/V, if there is bradycardia (dose depends on severity of bradycardia and response of the patient, usually 0.4-1.0 mg is sufficient).
 - If available give Ephedrine, 5 mg, I/V, which may be repeated.
 - If required give Adrenaline infusion (Dilute 5 mg in 500 ml Dextrose 5 %, 1 ml will contain 10 µg/ml. Starting dose is 0.02-0.05 µg/kg/min. Most cases respond to less than 0.2 µg/kg/min).
 - Dopamine, I/V, may also be given for hypotension (Dilute 200 mg in 500ml of 5 %Dextrose, 1 ml will contain 400 µg. Dose is 0.5-5 µg/kg/minute, could be increased to 15 µg/kg/minute).
 - Replace blood loss (page 14).

- **Nausea and Vomiting**

Nausea and vomiting is often due to inadequate analgesia, hypotension or parasympathetic over activity.

- Give oxygen inhalation 8-10 litres/minute.
- Treat hypotension (page 290).
- Give Atropine, I/V, if there is bradycardia (page 290).
- Give anti emetics e.g. Metoclopramide, 10 mg, I/M or I/V.

- **Inadequate Analgesia**

- Consider general anaesthesia. Be careful to avoid aspiration.
- If the baby has been delivered, give Pethidine, 20-30 mg, I/V (maximum 100 mg) **or** Nalbuphine, 4-6 mg, I/V (maximum 20 mg). Depending on availability, other opioids like Pentazocine, may also be given.

- **Restlessness, Shivering**

- Check if analgesia is satisfactory and the patient is well oxygenated.
- Give a Benzodiazepine injection (e.g. Midazolam, 1-2 mg, I/V) after delivery.

- **High Spinal**

The patient will become severely hypotensive and will hypoventilate.

- Reassure
- Start oxygen, (if not already on oxygen).
- Treat hypotension (see management of hypotension given above).
- If necessary ventilate the patient; Pass an Endotracheal tube if necessary.
- If cardiac arrest occurs, start cardiopulmonary resuscitation (page 311).

Postoperative Complications

- **Headache (Post Dural Puncture Headache: PDPH)**

- Give analgesics e.g. Paracetamol, 500 mg with caffeine 65 mg, orally, every 6 hours.
- Advise to rest in bed.
- Give oral and I/V fluids to prevent dehydration.
- If headache persists for more than 3-4 days, place an **epidural blood patch**.
Using aseptic measures, an epidural puncture is made at the same site as that of the previous spinal puncture. 15 ml of the patient's blood is removed aseptically and is injected in the epidural space. It provides a seal to the dural puncture and stops leakage of CSF thus removing the cause of headache. An experienced anaesthetist is required for the procedure.

- **Backache**

Backache is common after normal childbirth It is rare after spinal anaesthesia because of the fine needles used. It may occur after epidural anaesthesia (page 305).

Management:

- Give analgesics e.g. Paracetamol, 500 mg with caffeine 65 mg, orally, every 6 hours.
- Arrange physiotherapy.

- **Meningitis / Meningism**

- For prophylaxis maintain strict sterile technique.
- Treat with antibiotics in consultation with a physician.

Contraindications of Spinal Anaesthesia

- Patient refusal or non co-operation; Patients with dementia or psychosis.
- Technical difficulty.
- Spinal deformities.
- Inexperienced anaesthetist.
- Foetal distress.
- Hypovolaemia
- Eclampsia
- Skin sepsis.
- Systemic sepsis.
- Bleeding disorders, patient on anticoagulants, low platelet count $<100 \times 10^9/l$.
- Increased intracranial pressure.
- Peripheral neuropathy.
- Severe stenotic valvular heart disease (These patients are unable to compensate for vasodilatation due to fixed cardiac output).

MANAGEMENT OF GENERAL ANAESTHESIA

Preoperative Preparation (page 287)

- When the patient arrives in operation theatre, place her supine on the operation table with a pillow below the head and a pillow / wedge is placed below the right buttock to prevent Aortocaval compression.
- Apply monitors and take baseline reading of pulse and blood pressure.
- Preoxygenate. Give 100 % oxygen (O₂) inhalation to the mother for 3-5 minutes or ask her to take 5 deep breaths with 100% O₂.

If the patient has been brought directly to the operation theatre, then quickly assess the patient, (while making preparation for induction of general anaesthesia).

- Ask when the patient has had her last meal.
- Find out if any medications have been given, preoperatively, e.g. analgesics during labour, antacids etc.
- Assess whether intubation will be difficult (page 309).

- Pass an I/V cannula, 14-16 gauge and start a drip of crystalloid, e.g. Normal Saline or Ringer's Lactate. If the patient is bleeding heavily, pass another cannula. (page 296). Start blood transfusion as soon as available.

- Check:

- Oxygen and Nitrous Oxide cylinders. They should be full and additional full cylinders should be available.

Note: If there is a system of central supply of oxygen and Nitrous Oxide, then there should be protocols of regularly checking the system. Audible and visual alarm system for low pressure of gases in the line should be fixed in appropriate places. Additional cylinders with reducing valves, connections etc. should also be available in the operation theatre in case of central system malfunction.

- Anaesthesia trolley, drugs, suction machines, laryngoscopes, stillete and endotracheal tubes. (Inflate cuff and check for any leaks.)
- Check neonatal resuscitation trolley:
 - Bag and mask (paediatric).
 - Suction machine and paediatric catheters.
 - Oxygen cylinder with reducing valve, flow meter and paediatric circuit.
 - Drugs for resuscitation (usually not required).
 - Endotracheal tubes (size 2.0, 2.5, 3.0).
 - Laryngoscope with paediatric blade.

In multiple pregnancies a trolley and health care provider will be needed for each baby.

- Prepare and **label** drugs.
- Have an assistant and suction machine ready.

Do not uncover the patient for passing Foley's catheter and do not start skin preparation before the patient is unconscious, as it is distressing for the patient.

To avoid problem of aspiration during induction of anaesthesia use rapid sequence induction.

- Preoxygenate i.e. give 100% oxygen for 5, minutes or in emergency ask the patient to take 5 deep breaths of 100% oxygen.
- Assistant should be ready to apply cricoid pressure.
- Rapidly give Thiopentone, 4-5 mg/kg, I/V and Succinylcholine, 1.5 mg/kg, I/V.
- **Do not ventilate.** Assistant should apply cricoid pressure as soon as patient becomes unconscious.
- Pass a cuffed Endotracheal tube, size 7.0 (smaller sizes 6.0 and 6.5 should be available) and inflate the cuff of the endotracheal tube with the minimum amount of air required to provide a complete seal.
- Release cricoid pressure after cuff is inflated.
- Maintain anaesthesia with oxygen and Nitrous Oxide. Add a small dose of volatile anaesthetic agent (0.6 MAC) like Halothane 0.5% (to avoid awareness during anaesthesia).
- Give a long acting relaxant (e.g. Pancuronium, 4-6 mg, I/V **or** Atracurium, 25-50 mg, I/V), to maintain relaxation after the effect of Succinylcholine starts wearing off. Ventilate the patient manually or with a ventilator.
- Give an Opioid (e.g. Pethidine, 40-50 mg (Maximum 100 mg), I/V. If required give further doses in increments) **or** Nalbuphine, 4-6 mg (maximum 20 mg), I/V. If required, give further doses in increments to the mother after delivery of the baby. Other opioids like Pentazocine may be used.

- After delivery of the baby, give Syntocinon, 10 IU, slowly I/V, and put 10-40 IU in 1000 ml of crystalloid infusion. Give at a rate sufficient to control uterine atony (0.02-0.04 units/min) e.g. if 30 units is added to 1000 ml of crystalloid infusion, approximately 10- 20 drops per minute will be required. (Do not add any medication in the blood transfusion set). Sometimes surgeon may ask to give Ergometrine, 0.25 mg, I/M, if uterine contraction is inadequate.
- Replace blood loss with crystalloid infusion. One litre of Ringer's Lactate will increase plasma volume by 200-300 ml, therefore fluid administered should be 3-4 times the estimated blood loss. If blood loss is excessive (more than 20% blood volume) or Hb is less than 10 gm, then blood transfusion should be given.

Unless strongly indicated, blood transfusion should be avoided as far as possible, due to risk of Hepatitis etc.

- Suck the secretions in the oro pharynx and place the patient on the side at the end of surgery.
- Reverse the effect of relaxant with Atropine, 1.2 mg, I/V and Neostigmine, 2.5 mg, I/V.
- Extubate when the patient is awake, as vomiting and aspiration can occur when the patient is recovering from the anaesthetic.
- Keep the patient lying on the lateral side during recovery, and continue monitoring and oxygenation till the patient is in full control of her reflexes.

ANAESTHESIA IN COMPLICATED OBSTETRIC CASES

(Supervision by Senior and Competent Obstetrician, Anaesthetist and Neonatologist is Essential).

Massive Obstetric haemorrhage (APH, PPH, Ectopic Pregnancy, Bleeding During Abortion)

Bleeding during pregnancy and childbirth may be massive and life threatening.

Treatment:

- Start resuscitation.
- Perform **immediate surgery to stop bleeding.**
- Other measures may also be required e.g. use of Oxytocin and Prostaglandins in Post-Partum Haemorrhage (Table on page 113). Use of local infiltration of Vasopressin (1 ml containing 5 IU diluted with 19 ml 0.9% Saline and injected endometrially at the bleeding site), in placenta accreta has also been reported.

Resuscitation

Providers should be familiar with blood bank and laboratory facilities in their hospital and management protocols. Experienced staff is required. Consultant supervision is necessary. Blood bank and operation theatre staff and all concerned consultants must be alerted as both mother and foetus are at grave risk.

- If not already done, **obtain I/V access. Pass two, 14 or 16 gauge** cannulas, at two different sites and **send blood (10 ml clotted blood) for cross matching (Arrange at least 6 units of blood in cases of massive haemorrhage).** Also send blood to laboratory for following investigations:
 - Haemoglobin, Packed Cell Volume, Platelets (2 ml EDTA blood).
 - PT (Prothrombin time), APTT (Activated Partial Thromboplastin Time) (5 ml citrated blood).
 - If PT, APTT is abnormal, Fibrinogen level should also be checked.
 - Urea and Electrolytes (5 ml clotted blood).
- **Initially start rapid infusion of I/V Crystalloids.** (Colloids and 5% Dextrose in water is no longer recommended.) One litre of Ringer's Lactate will increase plasma volume by 200-300 ml, therefore fluid administered should be 3-4 times the estimated blood loss. **If blood loss is very excessive, uncross-matched O-ve blood should be given till cross-matched blood is available.**

O-ve blood should be available in blood bank for emergency use, in life threatening situations.

The Royal College of Obstetricians and Gynaecologists, U.K. has recommended that uncross-matched blood should be available within 10 minutes and cross matched-blood within 30 minutes. However, wide variations are found in various hospitals and maternity units.

On an average, type specific blood is available within 10-15 minutes and cross matched-blood within 45 – 60 minutes. In massive obstetric haemorrhage, type specific blood may be given initially without full cross match till fully cross-matched blood is available. Risk of incompatibility is small enough to be acceptable because otherwise there is a risk of losing life.

- Regularly record vital signs, urinary output, and fluids and drugs administered. If facilities exist CVP should be monitored.
- In a previously healthy woman, clotting factor deficiency is unlikely to occur until nearly 80% of the blood volume has been replaced. However PT, APTT and Platelet count should be regularly monitored.
- If PT and APTT tests are prolonged and the patient is bleeding, give fresh frozen plasma, at a starting dose of 12 to 15 ml/kg i.e. an infusion of 4-5 units of FFP should be given rapidly. Thereafter 4 units of FFP should be given for each 6 units of stored blood transfused.
- If platelet count falls below $50 \times 10^9/l$, 8-12 units of platelets should be rapidly infused. If coagulation test still remain abnormal, acute DIC should be suspected. If available, perform FDP / D-dimer levels.

Blood should be given through standard filter sets (170 μ m) and should be warmed to body temperature before administration through appropriate blood warming device. **Do NOT put in hot water or oven.** Blood set should be regularly changed. **Do NOT add any drug to blood giving set.**

In cases of massive obstetric haemorrhage, anaesthesia may be required for evacuation of the uterus, Caesarean Section, Laparotomy for utero-ovarian artery / internal iliac artery ligation or hysterectomy.

Anaesthetic Management

- Resuscitate first. **Do not delay anaesthesia.**
- Continue resuscitation till patient is stable.
- General anaesthesia is the anaesthesia of choice.
- Resuscitation may have to be continued during the recovery period.

Technique is the same as described previously.

Thiopentone may be used, after resuscitation, in appropriately reduced dose. Ketamine (see Box below) is an alternative induction agent and may be used in hypotensive patients, as it does not lower BP. Lower doses of muscle relaxants will be required.

Anaesthesia for Evacuation of the Uterus

- Patient with incomplete abortion may have severe bleeding.
- If blood loss is excessive, hypovolaemia should be corrected by crystalloids and blood transfusion.
- If the patient is haemodynamically stable, anaesthesia can be induced by Thiopentone, 4 mg/kg and maintained with oxygen and Nitrous Oxide, with a small dose of opioid or small incremental doses of Thiopentone, 25-50 mg.
- If the patient is hypotensive, patient should first be resuscitated. After adequate resuscitation, when patient is haemodynamically stable, a similar technique as described above, may be used with careful titration of dose of Thiopentone **or** alternatively Ketamine, 2 mg/kg may be used and a dose of Midazolam, 1-2 mg may be added to avoid hallucinations, which occur with Ketamine.
- The same anaesthesia can be used for **manual removal of placenta** but sometimes full general or spinal anaesthesia is required if procedure is likely to be difficult and prolonged. However spinal anaesthesia should not be given to hypovolaemic patients.

Ketamine, 2 mg/kg (100 mg for a 50 kg female), I/V, is used for induction of anaesthesia in high-risk patients particularly in centres where facilities are limited. It can also be used for maintenance of anaesthesia in cases expected to be of short duration. It produces anaesthesia for 5 to 10 minutes when given intravenously. Intermittent bolus doses may be repeated depending on the response of the patient.

- It can also be given intramuscularly and a dose of 10 mg/kg produces anaesthesia for 10 to 20 minutes.
- It should not be used in patients with Hypertension / Ischaemic Heart Disease / Pulmonary Hypertension.
- It causes post anaesthetic hallucinations for which Midazolam, 1-2 mg, I/V **or** Diazepam, 2.5-5 mg, I/V, may be given.
- Atropine, 0.5 mg, I/V, should be given to prevent excessive secretions, which may occur when Ketamine is used.

Pregnancy Induced Hypertension (PIH), Pre-Eclampsia, Eclampsia

Anaesthetic Management

Preoperative management of PIH, Pre-eclampsia and eclampsia is usually done by the obstetrician (page 139), but the anaesthetists should be informed early.

- Monitor BP, weight, oedema, urine for proteinuria.
- Perform the following investigations, and repeat as necessary.
 - Hb, Platelets, Serum Uric Acid, Urea and Creatinine.
 - PT, APTT
 - Liver Function Tests
- Control BP by:
 - Hydralazine, (initially 5-10 mg, slow I/V, over 20 min, may be repeated in 20-30 minutes. If needed continue in Saline infusion 50-150 mcg /min).
 - Labetalol may be used in I/V infusion of 5 % Glucose in a dilution of 1 mg/ml (20 mg/hr doubled every 30 minutes to a maximum of 160 mg/hr).
 - Sublingual Nifedipine may be used and is safe for baby and mother.
- Keep the patient well oxygenated.
- CVP monitoring, if available, should be done in severe cases.

One must remember that these patients are hypovolaemic.

- Monitor foetal heart sounds regularly.
- **Deliver the baby as soon as possible.**
- **Spinal or Epidural anaesthesia is preferred.**
- **For patients with Eclampsia, general anaesthesia must be given.**

(These patients may require postoperative ventilation. If convulsions occur they should be resuscitated and ventilated).

- **Magnesium Sulphate** should be used for prophylaxis and control of convulsions under senior supervision. If Magnesium Sulphate is not available Diazepam, I/V, may be used.

HELLP Syndrome

(**H**aemolysis, **E**levated **L**iver enzymes, **L**ow **P**latelets)

- Indicates severe PIH with complications. Hepatic rupture may occur.
- Management is as for severe pre eclampsia.
- Immediate delivery of foetus is the definitive treatment.
- Spinal block is contraindicated because of thrombocytopenia, (Platelet count less than 90,000 ul) and coagulopathies due to hepatic dysfunction.

Amniotic Fluid Embolism

It carries a high mortality.

- Sudden infusion of amniotic fluid into the maternal circulation, after rupture of the membranes, gives rise to an acute shock-like state, which may be attributed to anaesthesia.
- Diagnosis (usually post mortem) can be established when elements of amniotic fluid are found in maternal tissues, especially blood, urine, lungs and sputum.

Treatment

- Intensive Resuscitation and immediate delivery of the foetus is required.
- Patient should be intubated and ventilated using high FiO₂.
- Blood transfusion, fresh frozen plasma or fibrinogen, vasopressors, IPPV with oxygen, Bronchodilators, Steroids, Digoxin may be required.

Disseminated Intravascular Coagulopathy (DIC)

May be due to a variety of conditions like shock, abortion, hydatidiform mole, intra-uterine foetal death, amniotic fluid embolism, HELLP syndrome, and abruptio placenta. There may be continuous bleeding and coagulation tests are abnormal:

- Platelet count less than 10,000/ml.
- PT and APTT will be raised.
- Fibrinogen level would be less than 150 mg/dl.
- FDP and D-dimer levels will be raised.

Treatment

- Treat the cause.
- Give Platelets concentrates and Fresh Frozen Plasma (FFP).
- Use Cryoprecipitate.
- If surgery is necessary, Platelet count must be raised to $80 \times 10^9/l$.

Acute Inversion of the Uterus

- Patient is in severe shock and requires resuscitation.
- Correction of uterine inversion should be done as soon as possible.
- General anaesthesia is required for surgical correction.

Analgesia in Emergency Obstetrics

In emergency obstetrics, I/V analgesics are not given before delivery of the baby. If an injection of narcotic has been given less than 4 hours before surgery there is a risk of respiratory depression in the baby. The baby may have to be given Naloxone, I/V, as antidote (Box 2, page 322).

After delivery of baby, pain relief can be provided by injection of opioids as for any routine surgery. Non-steroidal anti-inflammatory drugs e.g. Diclofenac or Ketorolac can be given by injection or suppository if not contraindicated (Asthma, Renal dysfunction, Bleeding tendencies, Peptic ulcer).

Anaesthesia and Analgesia for Patients with an Epidural Catheter in Place for Pain Relief During Labour

If surgery is required, then in such circumstance, this becomes a safe and convenient route for anaesthesia and also for postoperative analgesia.

Skills Required for Emergency Obstetric Anaesthesia

Technique of Giving Spinal Anaesthesia

- A general physical examination should be done, including the pulse and blood pressure, in both supine and lateral positions.
- Lumbar spine and the skin of the back should be examined.
- The most easily palpable and widest vertebral interspace below L1-L2 is chosen for lumbar puncture.

To avoid damaging the spinal cord, which terminates in adults at the lower border of L1 vertebrae, the first lumbar interspace and those above this level are avoided. A useful point in identifying the lumbar space is that the line joining the highest points of the iliac crests crosses either the spine of the fourth lumbar vertebra, or the interspace between L4 and L5.

- After choosing the interspace it should be marked.
- The patient is placed for lumbar puncture in the sitting position on the operating table with feet resting comfortably on a stool.
- Spine should be flexed with chin pressed on to the sternum. A pillow on the knees gives helpful support to the arms.

A trained assistant is needed.

Lumbar puncture is done in the lateral position. May be used by those using this technique regularly. However sitting position is recommended as it has a higher success rate.

- Anaesthetist scrubs and wears sterile gown and gloves.
- Drugs are prepared.
- Skin is prepared and draped (page 10).
- In the chosen interspace an intradermal needle is inserted after careful palpation midway between the two spines, and a small wheal is raised using a local anaesthetic solution (Lignocaine 1%).
- Selecting the spinal needle: The smallest gauge should be used with which the anaesthetist can perform the puncture. Size 25 is used commonly although smaller sizes are also used. Pencil point tip is preferred.

- The spinal needle is slowly advanced at right angles to the back with its bevel in the plane to separate and not to divide the longitudinal fibres of the dura.
- If bone is met or nerve pain is felt it is necessary to withdraw the needle and slightly alter direction.
- Identification of Subarachnoid space is made by free flow of CSF when the stylette is removed. The syringe containing local anaesthetic solution is attached and before giving the injection it should be checked whether CSF can be easily aspirated. If there is difficulty in easy aspiration, needle should be repositioned.
- If there is a “bloody tap”(i.e. on removing the stylette of the spinal needle, blood or blood mixed with CSF starts coming out of the spinal needle), attempt should be made in another intervertebral space.
- After correct placement of the spinal needle in the Subarachnoid space, injection of local anaesthetic is made.
- 0.5% Bupivacaine Isobaric, 1.6-2.2 ml, I/V **or** 0.75% Bupivacaine Hyperbaric, 1.4-1.6 ml, I/V, is used depending on height and built of the patient.
- Immediately after the injection has been made the spinal needle is removed and the puncture point is sealed with sterile dressing.
- **Patient is placed quickly in the supine position with a pillow / wedge below the right buttock.**
- Note the pulse and blood pressure.
- After 5-10 minutes check height of block (which should be up to costal margin), by a spirit swab or pinching the skin with toothed forceps or needle pricks.
- Ask the surgeon to proceed if analgesia is effective.

Technique of Giving Epidural Anaesthesia

The preoperative preparation is the same as for spinal Anaesthesia.

Special needle (Tuohys needle size 16 or 18 gauge) is required, with epidural catheter, bacterial filter and a special syringe for “loss of resistance” test to identify epidural space.

Note: Pre packed sets are available but are costly.

- Any intervertebral space can be chosen for epidural anaesthesia but for obstetric analgesia and anaesthesia the widest and most easily palpable lumbar intervertebral space is selected, L2-3 or L3-4.
- All preoperative preparation and positioning is as for spinal (Subarachnoid) anaesthesia.

Technique

- A wheal is raised with local anaesthetic (Lignocaine 1%), in the chosen lumbar intervertebral space.
- The Tuohys needle is now introduced and slowly advanced at right angles to the back until the tip engages in the ligamentum flavum. The feel of entering the ligamentum flavum is characteristic and it is impossible to push even a drop of saline while the needle is in the ligamentum flavum.
- The stylette of the epidural needle is now removed and the syringe to check loss of resistance, filled with saline, is attached to the hub of the needle.
- The needle is now introduced very slowly keeping pressure on the plunger of the syringe with the right finger while the left hand is used to keep the needle steady.
- As soon as the epidural space is entered, there is a sudden **loss of resistance** to injection.
- The syringe is now removed and the epidural catheter is introduced through the Tuohy’s needle.
- After the epidural catheter has been placed, the epidural needle is removed.
- The catheter is attached to a bacterial filter and the whole catheter is strapped to the back of the patient with the bacterial filter over the shoulder to facilitate injection.
- A test dose of analgesic solution (Bupivacaine 0.5%, 2 ml, **or** Lignocaine 2%, 2ml) is given to test for accidental intrathecal injection and if this does not produce a spinal block, Bupivacaine 0.5% or Lignocaine 2%, (15 ml), is given.

- Height of block is checked and if necessary an incremental dose can be given. Height of block should reach costal margin.

Epidural Anaesthesia takes longer to become effective but allows repeated injections to be given, therefore it is an excellent method of pain relief during labour.

Complications of Epidural Anaesthesia

They are almost the same as for spinal anaesthesia and treatment is similar.

- **Unintentional Intrathecal Injection** can occur, causing total spinal anaesthesia because volume required for epidural anaesthesia (15-20 ml) is much more than that required for spinal anaesthesia.
 - Caution: Give small test dose (Bupivacaine 0.5%, 2ml, **or** Lignocaine 2%, 2 ml), before giving the full dose.
 - If total spinal occurs, treat as for high spinal (see complications of spinal anaesthesia on page 290).
- **Unintentional Intra vascular Injection**
Always aspirate before injecting and give test dose first.
- **Backache** is more common with epidural anaesthesia due to the use of thicker needle (16-18 gauge). Give analgesics and treat the cause.
- **Headache** may occur due to accidental dural puncture. Treatment is the same as described for post-dural puncture headache (page 291).
- **Epidural Haematoma** is an emergency, urgently consult neurosurgeon if there are spinal cord compression symptoms.

Subcutaneous Infiltration of Local Anaesthetic for Caesarean Section (page 263).

- If patient's condition does not permit general or regional anaesthesia, or if skilled help is not available, it is possible to perform a Caesarean section by subcutaneous infiltration of local anaesthesia although it is not very comfortable for the patient.
- The surgeon gives the injection.
- Do not give an overdose of local anaesthesia. Lignocaine 0.5% with Adrenaline 1: 200,000, may be given up to a maximum of 100cc (500 mg), in an adult.
- The line of incision is infiltrated and injections are made as the surgeon proceeds layer by layer. After the delivery of the baby a strong analgesic can be given I/V.

Convulsions Following Local Anaesthesia

Inadvertent injection of local anaesthesia can cause convulsions. These are preceded by prodromal symptoms like circumoral numbness, apprehension, muscle twitching, and visual disturbances.

Immediate treatment is required:

- Start 100% oxygen.
- Give Diazepam, 0.1 mg/kg, I/V **or** Midazolam, 0.5 mg/kg, I/V.
- If convulsions persist, give Thiopentone, 4 mg/kg, I/V and Succinylcholine, 1 mg/kg, I/V, intubate and ventilate with 100% oxygen till the effect of local anaesthetic wears off.
- Take precautions to prevent aspiration.

Skill Levels for Anaesthetists Giving Emergency Obstetric Anaesthesia

Level A (Registrar Anaesthesia)

Ability to:

- Give general anaesthesia to uncomplicated patients.
- Give spinal anaesthesia to uncomplicated patients.
- Perform Cardio Pulmonary Resuscitation (CPR).
- Perform neonatal resuscitation.
- Use ventilator.

Can give anaesthesia to uncomplicated cases.

Level B (Senior Registrar / Consultant)

Apart from above, has ability to:

- Give general anaesthesia to complicated cases.
- Give spinal anaesthesia to complicated cases.
- Give epidural anaesthesia.
- Pass Central Venous Pressure (CVP) line.
- Draw arterial blood for Blood gases estimation.
- Can manage patients requiring intensive care.

Can give anaesthesia to all cases needing emergency obstetric care and can also supervise and train junior personnel.

Annexure 1

Acid Aspiration (Mendelson's) Syndrome

Acid aspiration (Mendelson's) syndrome is an acute chemical aspiration pneumonitis clinically seen as a triad of tachypnoea, (signs of bronchospasm will be observed), tachycardia and cyanosis, following aspiration of acid gastric contents during induction of general anaesthesia (acid may be seen to be aspirated during induction), or following extubation at the end of surgery. It is due to the irritative action of gastric acid (pH less than 2.5) on the lungs. It is more common in obstetric patients.

The respiratory distress usually occurs immediately following aspiration, but may sometimes be delayed.

Incidence of aspiration in caesarean section was 15/10000 operations in one study.

As the severity of symptoms and ultimate prognosis depends on the acidity of aspirated material, the objective of prophylaxis protocol is to **maintain a gastric pH of more than 2.5** and reduce the volume of gastric contents. This may not be possible in the emergency situation, so the obstetric patient is always at risk.

Prophylaxis Protocol

Diet Protocol: As all patients in labour may require surgery it is necessary to have a diet protocol during labour to reduce volume and acidity of gastric contents, to prevent acid aspiration syndrome.

- Diet should be mainly fluid and easily digestible for cases considered as expected to have normal labour and childbirth. For high-risk cases keep the patient nil by mouth and give fluids by I/V drip.
- Give Ranitidine (available as Zantac), 150 mg, orally, at onset of labour, then every 6 hours.

If surgery is decided

- Give clear non-particulate antacids (e.g. 0.3 molar Sodium Citrate, 30 ml, before induction). **It can be prepared in the pharmacy by dissolving 2.6 grams of Sodium Citrate powder in 30 ml of Distilled Water.**

Do not give particulate non-clear antacids as they aggravate the situation, if aspirated.

- If oral H₂ antagonists could not be given before, give Ranitidine, 50 mg, I/V slowly (**Dilute in 20 ml of Normal Saline and give over a minimum of 2 minutes**), it may take 45-60 minutes to act. Acid aspiration is known to occur following postoperative vomiting.
- Give Metoclopramide, 10 mg, I/V, before surgery.

- **Give spinal anaesthesia unless contraindicated.**
- If general anaesthesia is to be given, use **rapid sequence induction** (page 294).

Management of Aspiration

- Rapidly tilt the table to a 30% head down position to allow drainage of gastric contents.
- Suction mouth and pharynx as rapidly as possible.
- Pass Endotracheal tube (ETT) and inflate cuff to prevent further aspiration.
- Suction through ETT quickly and briefly to prevent hypoxia.
- Give 100% oxygen.
- Give Hydrocortisone, 100 mg, I/V, 6 hourly.
- Ask the surgeon to quickly deliver foetus (meanwhile call the consultant for help).
- Pass a nasogastric tube and, if possible, determine pH of gastric contents.
- Collect tracheobronchial aspirate for culture and sensitivity.
- For bronchospasm give Aminophylline, 250 mg, slowly I/V, in 5-10 minutes.
- Start broad spectrum antibiotics (page 44).
- Continue artificial ventilation with Positive End Expiratory Pressure (PEEP).
- Keep the patient in Intensive Care Unit if available, or shift the patient to an Intensive Care Unit if possible.

Annexure 2

Difficult Intubation

The following features suggest a difficult intubation:

- Obesity
- Large breasts
- Short muscular neck
- Full dentition
- Limited neck flexion or head extension
- Receding jaw
- Prominent upper incisors
- Limited mouth opening
- High arched palate

Mallampati Classification

A simple and popular method to predict difficult intubation has been described by Mallampati. The patient is seated and asked to open the mouth as wide as possible and to protrude the tongue fully.

With a torch the hard palate, soft palate, uvula and tonsillar pillars are visualised. Depending on the structures seen the patients are classified and graded.

Structures Seen

Class I	Class II	Class III	Class IV
Hard palate	Hard palate	Hard palate	Hard palate
Soft Palate	Soft Palate	Soft Palate	
Uvula	Uvula		
Tonsillar pillars			
Grade 1	Grade 2	Grade 3	Grade 4

Grade 3 and 4 maybe difficult to intubate.

Failed Intubation Protocol

- **Cannot Intubate but can ventilate with bag and mask:**
 - **Do not make more than 3 attempts** and avoid hypoxia. **Maintain cricoid pressure and ventilate with 100% oxygen** between attempts.
 - Try Laryngeal mask airway if experienced in its use.

Immediate Delivery Required:

- Maintain cricoid pressure, ventilate with 100% oxygen till breathing comes back, and then proceed with anaesthesia using inhalation agent with the patient breathing spontaneously.
- Notify obstetrician to proceed and deliver baby quickly. After delivery give strong analgesic and continue with inhalation agent or Ketamine.

Immediate Delivery Not Required:

- Maintain cricoid pressure, ventilate with 100% oxygen till breathing comes back.
- Awaken the patient. Call for senior help and consider other options e.g. spinal / epidural or local infiltration anaesthesia.

• Cannot Intubate and Ventilate:

Try Laryngeal mask airway if experienced in its use.

- Perform **cricothyroidotomy** to save mother from hypoxia. The largest bore cannula available may be inserted in the cricothyroid membrane and connected to an oxygen source.
- Awaken the patient and call for senior help.

Immediate Delivery Required:

- After the patient starts breathing proceed with anaesthesia using an inhalation agent with the patient breathing spontaneously.
- Notify obstetrician to proceed and deliver baby quickly. After delivery give strong analgesic and continue with inhalation agent or Ketamine.

Immediate Delivery Not Required:

- Consider other options like spinal, epidural or local infiltration anaesthesia / endoscopic intubation.

Annexure 3

Management of Cardiac Arrest

Two types of protocols are used for Cardio Pulmonary Resuscitation (CPR).

- **Basic Life Support (BLS)** is the protocol for the management of cardiac arrest in a situation where special equipment is not available.
 - Airway is cleared by whatever means available (handkerchief etc.).
 - Maintain airway with head chin lift and ventilate with mouth-to-mouth techniques initially.
 - Give cardiac massage. With single rescuer compression / ventilation ratio is 15:2, and with two rescuers a pause is given after 5 compressions (5:1) for one artificial breath. Rate of compressions should be 80-100 with a downward thrust of 1.5-2 inches sufficient to generate a palpable carotid pulse.
 - As soon as possible help and equipment should be summoned for Advanced Cardiac Life Support (ACLS).

A chart showing Cardiac arrest algorithm should be placed at all prominent places like operation theatre, labour room, wards, casualty and surgical ICU.

- **Advanced Cardiac Life Support (ACLS)** is the protocol for the management of cardiac arrest with the use of special equipment and drugs as adjuvant.
 - Give strong Precordial thump and start ventilation and cardiac massage.
 - As soon as possible pass Endotracheal tube and ventilate with 100% oxygen.
 - Continue cardiac massage.
 - Defibrillate as soon as possible to resume normal heartbeat.
 - Drugs like Adrenaline are used as adjuvant.

Cardiopulmonary resuscitation (CPR) protocols are best learnt on simulators under the guidance of an experienced observer and all doctors must attend refresher workshops at regular intervals.

Cardiopulmonary Resuscitation (CPR) in Obstetrics

(Caval compression due to pregnant uterus makes CPR less effective)

- Less than 25 weeks : Resuscitation as above.
- 25 –32 weeks : Use wedge to relieve caval compression and continue CPR.
- Over 32 weeks : Degree of caval compression precludes effective CPR. Therefore perform immediate caesarean section, while continuing CPR.

SUPPLIES AND EQUIPMENT FOR EMERGENCY OBSTETRIC CARE

ENTRANCE

Wheel chair foldable, adult size
Stretcher, wheel / carrying combination

EMERGENCY ROOM

Renewable Medical Supplies:

Soap

Surgical Gloves, sterile, disposable, size: 6.5, 7, 7.5, and 8
Latex, Disposable Examination Gloves (small and medium size) BOX-100
Mucus Extractor, (20 ml, sterile, disposable)
Suction Tube (CH 08, 10,14), 50 cm length, sterile, disposable
Urethral Catheter, (CH 12, 14) sterile, disposable
Foley Catheter, (CH 14), sterile, disposable
Urine Collecting bag, 2000 ml
I/V Cannula, 14, 16,18,20 22,24 Gauge (sterile, disposable)
Scalp Vein Needle, 21G, 25G (sterile, disposable)
Sterile Syringe, disposable, luer 2ml, 5 ml &10 ml, / BOX-100

OR

Reusable Sterile, Plastic Syringe 2 ml, 5 ml and 10 ml
Sterile Disposable Needle, 19x1.5", 21x1.5" and 23x1"/ BOX-100
Safety Box for used syringes / needles
Zinc Oxide Adhesive Tape, 2.5 cm x 5m
Sterile Compress, Gauze, 10x10 cm
Non Sterile Compress Gauze, 10 x 10 cm
And / or
Non Sterile Gauze Roll, 90 cm x 100 m
Non Sterile Cotton Wool Roll, 500g

Medical and Other Equipment:

Plastic Hand Scrubbing Brush
Protective Plastic Apron
Plastic Draw Sheet, 90 x 180 cm
Blanket, 220 x 140 cm
Sphygmomanometer with cuff, aneroid
Stethoscope binaural complete
Fetal Pinard Stethoscope
Measuring Tape, vinyl-coated, 1.5m/6 feet
Thermometer, clinical, 35-42°C
Stainless steel Kidney Basin, 825 ml
Dressing Trays, 300 x 200 x 30 mm

Stainless steel Bowl, 600 ml
Round, Stainless steel Bowl, 4L
Round, Polypropylene Bowl, 6L
Forceps Jar, 180 mm, without cover
Cheron **Dressing Forceps**, 250 mm
Latex / rubber **Tourniquet**, 75 cm
Cylindrical Drum, diameter, 150 mm, 240 mm, 290 mm
Blue, ballpoint **Pen**
Exercise Book, A5, ruled-8mm, 48 pages

Resuscitation Equipment:

Oxygen Cylinder with flow meter
High-performance foot-operated **Suction Pump**
Hand operated, **Infant / Child Resuscitator (Ambu bag)**

Delivered with:

Translucent **Masks**, in 3 different sizes
Translucent **Airways**, in 3 different sizes

Hand operated **Adult Resuscitator (Ambu bag)**

Delivered with:

Translucent **Masks**, 3 different sizes
Translucent **Airways**, 3 different sizes

Laryngoscope set
Magill Forceps, adult and child
Sterile **Endotracheal Tube**, size 2, 2.5 and 3 **without balloon**
Sterile **Endotracheal Tube**, size 7, 7.5 and 8 **with balloon**

Surgical Instruments:

➤ **Dressing set:**

- 1 **Kocher Artery Forceps**, 140 mm
- 1 **Standard Dressing Forceps**, 155 mm
- 1 **Deaver Scissors**, 140 mm

For Gynecological Examination:

Cheron, **Dressing Forceps**, 250 mm
Stainless steel **Bowl**, 180 ml
Double-ended, Sims Vaginal Speculum, 60 mm, 70 mm and 80 mm
Cusco's Vaginal Speculum, different sizes
Kocher Artery Forceps, 180 mm, 200 mm
Anterior Vaginal Wall Retractor
Antiseptic Examination Cream

Hospital Equipment-Furniture:

Adult size, foldable **Wheel Chair**
Stretcher, wheel / carrying combination
Dismantable, **Medical Examination Table**
Standard, double hook, **Infusion Stand** on wheels
2 trays **Dressing Trolley**
Mayo **Instrument Table** (adjustable, with tray)
Mobile hospital, **Bed Screen**, with 3 panels
Cabinet, for drugs / instruments
Emergency Trolley, 2 trays, with drawer
Suction Pump, 220V

Other:

Table, chairs, bench
Waste bucket
Light, torch

DELIVERY ROOM

Renewable Medical Supplies:

As for Emergency Room

Absorbable Suture, DEC2, need 3/8 26mm, tri / BOX-36

Absorbable Suture, DEC3, need 3/8 50mm, round / BOX-36

Absorbable Suture, DEC4, need 3/8 36mm, tri / BOX-36

Medical Equipment:

As for Emergency Room

Infant Scale, (metric 16 kg x 10g)

Stainless steel Bowl, 180 ml

Resuscitation Equipment:

As for Emergency Room

Surgical Instruments:

➤ Dressing Set

- 1 **Kocher, Artery Forceps**, 140 mm
- 1 **Standard Dressing Forceps**, 155 mm
- 1 **Deaver Scissors**, 140 mm

Delivery Set:

- 1 **Mayo Curved Scissors**, 140 mm
- 1 **Curved Gynaecology Scissors**, 200 mm
- 2 **Kocher, straight Artery Forceps**, 140 mm

Suture Set:

- 1 **Deaver Scissors**, 140 mm
- 1 **Mayo-Hegar Straight Needle Holder**, 180 mm
- 1 **Kocher Straight Artery Forceps**, 140 mm
- 1 **Scalpel Handle**, no.4
- 1 **Standard Straight Tissue Forceps**, 145 mm
- 1 **Double-ended Probe**, 145 mm
- 1 **Angular Episiotomy Scissors**, 145 mm

Instrumental Delivery Set:

- 2 pair **Wrigley Obstetrical Forceps**
- 1 set Hand-operated Bird, **Vacuum Extractor**
- 1 **Mayo Curved Scissors**, 140 mm
- 1 **Curved Gynaecology Scissors**, 200 mm
- 2 **Kocher, straight Artery Forceps**, 140 mm

Hospital Equipment-Furniture:

Adult size, foldable, **Wheel Chair Stretcher**, wheel / carrying combination
Labour / Delivery Bed
Adjustable Stool, on castors
Mobile Examining Light, 220-12V
Double hook **Infusion Stand**, on wheels
Dressing Trolley, with 2 trays
Adjustable Mayo **Instrument Table**, with tray
Mobile Instrument Table, with 2 trays
Electric **Baby Warmer**
Mobile hospital **Bed Screen**, 3 panels
Drugs / instruments cabinet
Emergency Trolley, with 2 trays and drawer
Newborn **Resuscitation Table**
Surgical Suction Pump, 1, 220 V

Sterilisation Equipment:

Sterilisation Kit:

- 1 Single-burner **Kerosene / Gas Stove**, pressure
- 1 **Steriliser** 39L with basket, steam, fuel
- 1 **Timer**, 60 mins. x 1 min
- 1 TST control spot **Indicator**, /pkt-300
- 2 of each **Cylindrical Drum**, diameter, 150 mm, 240 mm, 290 mm
- 1 Straight Kocher **Artery Forceps**, 140 mm

Linen-Clothing:

Trousers, Tunic / Blouse
Shoes
Caps
Masks
Gowns
Towels

Other:

- Table, Chairs, Benches
- Waste Bucket Plastic
- Light, Torch
- Wall Clock
- Water Drum / supply with tap

OPERATING THEATRE

Renewable Medical Supplies:

Same as Emergency Room

Spinal Needle, 24, 25, 26, 27 G, sterile, disposable (preferably pencil point).

Epidural Needles (Tuohy,s needle, size 16 or 18) with epidural catheter, bacterial filter and a special syringe for “loss of resistance” test to identify epidural space.

Perforated ZincOxide Adhesive Tape, 10 cm x 5m

Absorbable Suture, DEC2, need 3/8 26mm, tri / BOX-36

Absorbable Suture, DEC1, need 1/2 18mm, round / BOX-36

Absorbable Suture, DEC3, need 1/2 30mm, round / BOX-36

Absorbable Suture, DEC3, need 3/8 50mm, round / BOX-36

Absorbable Suture, DEC4, need 3/8 36mm, tri / BOX-36

Absorbable Suture, DEC3, spool / BOX-36

Absorbable Suture, DEC3, need 3/8 30mm, tri / BOX-36

Sterile, **Disposable Scalpel Blade**, no. 22

Medical Equipment:

As for Emergency Room

Resuscitation Equipment:

As for Emergency Room

Stilettes and Bougies

Surgical Instruments:

➤ Dressing Set:

- 1 **Kocher, Artery Forceps**, 140 mm
- 1 **Standard Dressing Forceps**, 155 mm
- 2 **Deaver Scissors**, 140 mm

Delivery Set:

- 2 **Mayo Curved Scissors**, 140 mm
- 2 **Curved Gynaecology Scissors**, 200 mm
- 2 **Kocher, straight Artery Forceps**, 140 mm

Suture Set:

- 2 Deaver **Scissors**, 140 mm
- 2 Mayo-Hegar straight **Needle Holder**, 180 mm
- 2 Kocher **Straight Artery Forceps**, 140 mm
- 2 **Scalpel Handle**, no.4
- 2 Standard **Straight Tissue Forceps**, 145 mm
- 2 Double-ended **Probe**, 145 mm
- 1 Angular **Episiotomy Scissors**, 145 mm
- 1 pair **Wrigley Obstetrical Forceps**

Abdominal Surgery Set:

- 4 Backhaus, **Towel Clamp**, 130 mm
- 1 Kelly **Curved Artery Forceps**, 140 mm
- 2 Kocher **Straight Artery Forceps**, 140 mm
- 2 Pean / Roch **Curved Artery Forceps**, 200 mm
- 2 Pean / Roch **Curved Artery Forceps**, 240 mm
- 4 Halst-Mosq **Curved Artery Forceps**, 125 mm
- 1 Mixer **Artery Forceps**, 230 mm
- 1 Standard **Straight Dressing Forceps**, 155 mm
- 1 Standard **Straight Dressing Forceps**, 250 mm
- 1 Cheron **Dressing Forceps**, 250 mm
- 2 Doyen **Curved Intestinal Clamp Forceps**, 230 mm
- 2 Phaneuf **Curved Uterine Forceps**, 215 mm
- 1 Duplay **Curved Uterine Forceps**, 280 mm
- 2 Allis **Tissue Forceps**, 150 mm
- 1 Babcock **Tissue Forceps**, 200 mm
- 2 Duval **Tissue Forceps**, 230 mm
- 1 Standard **Straight Tissue Forceps**, 145 mm
- 1 Standard **Straight Tissue Forceps**, 250 mm
- 1 Mayo-Hegar **Needle Holder**, 180 mm
- 1 Collin **Abdominal Retractor**, 3 blades
- 1 Balfour **Abdominal Retractor**, 3 blades
- 1 Farabeuf **Retractor**, 180 mm, pair
- 1 **Scalpel Handle**, no.4
- 1 **Curved Metzlem / Nelson Scissors**, 180 mm
- 1 **Curved Metzlem / Nelson Scissors**, 230 mm
- 1 **Curved Mayo Scissors**, 170 mm
- 1 **Curved Mayo Scissors**, 230 mm
- 2 Malleable **Abdominal Spatula**, 270 mm
- 1 Yankauer **Suction Tube**, 270 mm
- 1 Stainless steel **Bowl**, 600 ml
- 6 **Green Armytage Forceps**

➤ **Vaginal / Cervical Examination and Suture Set:**

- 1 **Curved Mayo Scissors**, 170 mm
- 1 **Mayo-Hegar Needle Holder**, 180 mm
- 2 **Doyen Vaginal Retractor**, 45 x 85 mm
- 1 **Graves Vaginal Speculum**, 75 x 20 mm
- 1 **Graves Vaginal Speculum**, 95 x 35 mm
- 1 **Graves Vaginal Speculum**, 115 x 35 mm
- 2 **Cheron Dressing Forceps**, 250 mm

➤ **Curettage Set:**

- 1 **Hegarde Dilators**, 3-4 to 17-18 mm
- 1 **Cheron Dressing Forceps**, 250 mm
- 1 **Museux Curved Uterine Forceps**, 240 mm
- 1 **Doyen Vaginal Retractor**, 45 x 85 mm
- 1 **Auvarde Vaginal Retractor**, 38 x 80 mm
- 1 **Simon Sharp Uterine Scoop**, 6 mm
- 1 **Sims Blunt Uterine Curette**, 8 mm
- 1 **Sims Sharp Uterine Curette**, 7 mm
- 1 **Sims Sharp Uterine Curette**, 9 mm
- 1 **Sims Sharp Uterine Curette**, 12 mm
- 1 **Martin Uterine Sound**, 320 mm
- 1 **Graves Vaginal Speculum**, 95 x 35 mm
- 1 **Stainless steel Bowl**, 180 ml

Embryotomy Set:

- 1 **Braun Cranioclast**, 420 mm
- 1 **Smellie Perforator**, 250 mm
- 1 **Gynecology Curved Scissors**, 200 mm
- 1 **Braun Decapitation Hook**, 310 mm
- 1 **Scalp Forceps** (Willet / Moris)
- 1 **Pair of Wrigley Obstetrical Forceps**
- 1 **Hand-operated Bird Vaccum Extractor set**

Hospital Equipment-Furniture:

- Adult size, foldable, **Wheel Chair**
- **Stretcher**, wheel / carrying combination / EA
- **Adjustable Stool**, on castors
- Double hook **Infusion Stand**, on wheel
- **Dressing Trolley**, with 2 trays
- Adjustable Mayo **Instrument Table**, with tray
- **Mobile Instrument Table**, with 2 trays
- **Infant Scale**, metric 16 kg x 10 g
- Electric **Baby Warmer**
- Mobile hospital **Bed Screen**, 3 panels
- Drugs / instruments cabinet
- **Emergency Trolley**, with 2 trays and drawer
- Newborn **Resuscitation Table**
- Surgical **Suction Pump**, 220 V, (2 bottles)
- Nitrous Oxide Cylinder, reducing valves
- Mobile Operation **Theater Light**, 220 V
- Operation **Theater Table**, with access
- **Anesthesia Machine**
- **Electro Surgical Unit**
- If possible resuscitation & monitoring equipment like **Defibrillator, Pulse Oximeter, Noninvasive Automated Blood Pressure Monitor, Ventilator**

Linen-Clothing:

- Trousers, Tunic / Blouse
- Shoes
- Caps
- Masks
- Gowns
- Towels

Other:

- Table, Chairs, Benches
- Waste Bucket, Plastic
- Light, Torch
- Wall Clock
- Water Drum / supply with tap

DAILY TASKS FOR EMERGENCY OBSTETRIC CARE TEAM

Obstetrician / Doctor should check every day that there is readiness of facility to provide EmOC, which includes checking on the followings:

- House keeping and cleaning of facility
- Instrument / linen processing
- Autoclaving
- Anesthesia preparation
- Waste disposal from OT and Delivery room
- Facility maintenance
- Supplies and drugs
- Blood supply
- 24 hour coverage by Emergency Response Team (ERT)

Anesthetist

Should check every day that:

- Anesthesia machine is working.
- Extra gas cylinders are available.
- Anesthetics are available and replaced if used.
- Laryngoscope with battery cells and spare bulbs are available.

Scrub Nurse / Nurse

- House keeping and cleaning of facility.
- Instrument and linen processing.
- Autoclaving

Autoclaving Operator

- Autoclaving

Cleaner

- Cleaning the facility.

Pharmacist

- Responsible for supplies and drugs.

Laboratory Incharge

- Blood supply

Receptionist

- Responsible for receiving and carrying emergencies to ER, Ward, OT etc.

Maintenance Incharge

- Responsible for maintenance of the facility.

Antiseptics for Skin Preparation

- Tincture Iodine (1-3%), followed by Spirit (60%-90% Ethyl or Isopropyl).
OR
- Iodophore (e.g., Betadine) and Chlorhexidine Gluconate (e.g., Hibitane, Hibidens, Hibiscrub).
- Chlorhexidine Gluconate with Cetrimide (e.g. Savalon).

SUGGESTED DRUGS FOR EMERGENCY OBSTETRIC CARE

Antibiotics

Amoxicillin
Ampicillin
Benzathine Penicillin
Benzyl Penicillin
Ceftriaxone
Cloxacillin
Erythromycin
Gentamicin
Kanamycin
Metronidazole
Nitrofurantoin
Procaine Penicillin G
Penicillin G
Cefazolin
Trimethoprim / Sulfamethoxazole

Steroids

Betamethasone
Dexamethasone
Hydrocortisone

Drugs Used in Emergencies

Adrenaline (Epinephrine)
Aminophylline
Atropine Sulphate
Calcium Gluconate
Digoxin
Diphenhydramine
Dopamine
Ephedrine
Frusemide
Insulin
Metoclopramide
Naloxone
Nitroglycerine
Potassium Chloride
Prednisone
Prednisolone
Promethazine

I/V Fluids

Dextrose 10%
Glucose (5%, 10%, 50%)
Normal Saline
Ringer's Lactate

Anticonvulsants

Diazepam
Magnesium Sulphate
Phenytoin

Antihypertensives

Hydralazine
Labetolol
Nifedipine
Methyldopa

Oxytocics

Ergometrine
Methylethergometrine
Misoprostol
Oxytocin
15-Methyl Prostaglandin F2
Prostaglandin E2

Analgesics

Pethidine
Morphine
Diclofenac
Paracetamol
Indomethacin

Sedatives

Diazepam
Phenobarbitone
Midazolam

Antimalarial

Artesunate
Artemether
Clindamycin
Mefloquine
Quinine Dihydrochloride
Quinidine
Chloroquine
Sulfadoxine / Pyrimethamine

Tocolytics

Salbutamol
Terbutaline
Indomethacin
Nifedipine
Ritrodine

Other

Folic Acid
Heparin
Sodium Citrate
Tetanus Toxoid
Tetanus Antitoxin

Contraceptives

Subdermal Implants
Ethinylestradiol + Levonorgestrel
(tablets)
Ethinylestradiol + Norethisterone
(tablets)
Depot Medroxy-Progesterone Acetate
(injection)

Barrier Methods

Condoms with or without Spermicide
(Nonoxinol)
Diaphragms with Spermicide
(Nonoxinol)

Intrauterine Devices

Copper-containing Devices

Anaesthetic Drugs

Thiopentone
Succinyl Choline Pancuronium /
Atracurium / Vecuronium /
Rocuronium
Neostigmine
Halothane or other Volatile Anaesthetic
agents
Lignocaine with and without Adrenaline
Bupivacaine
Propofol
Ketamine

Laboratory (WHO 1994)

Cross Matching

Sodium Chloride Solution

Bovine Albumin

Centrifuge

Incubator

Pipettes

Test tubes

Collection of Blood

Sphygmomanometer

Airway needle for collecting blood

Artery Forceps

Scissors

Pilot Bottles (containing 1 ml ACD solution)

Slides

Compound Microscope

Microscope Illuminator

CHECKLIST FOR Emergency Obstetric Care (EmOC) READINESS

Objectives of the Guidelines

The guidelines will assist service providers and managers to:

- Overcome delays in establishing EmOC services by focusing on each necessary step.
- Organize and build the Emergency Response Team (ERT), for effective management and performance of quality EmOC services.
- Organize and build the Facility Team to set up the facility, room by room, with equipment, instruments, linen, drugs and supplies.
- Create “READINESS” in each room to respond to obstetric emergencies around the clock.
- Strengthen recording and reporting of process indicators.
- Manage day to day team work.

The guidelines presented here should be adapted to local situation. Their aim is to help program managers:

- Avoid delays in decision-making, procurement and distribution of essential goods.
- Organize teams in the facility to respond to emergencies.
- Set up and create “READINESS” in the facility.
- Ensure day-to-day management of EmOC services.

Unless hospital team members (including cleaners, gatekeepers, and other support staff) know their responsibilities, they cannot respond to an emergency promptly and effectively. The team needs to be organized and responsibilities distributed and adjusted in order to perform the work necessary to achieve results.

Room by Room Set Up and Creating READINESS

Each room should be set up according to the list below:

Note: The following tables may be used for checklists.

Emergency Room (Casualty)

The Emergency Room (ER) should be equipped with the following items and be ready around the clock to receive emergency cases.

	✓
Wheel Chair / Trolley / Stretcher available at the hospital gate / reception, and somebody to transport the patient to the ER.	
Seats in waiting room for relatives.	
Emergency Drugs and I/V solutions.	
Examination Table with privacy.	
BP Apparatus, Stethoscope, Thermometer, Kidney Basin, Sterile Gloves etc. available.	
Core (ERT) staff available 24 hours.	

Labour / Delivery Room

Delivery and linen sets should be prepared (pages 336 - 342) and placed in the labour / delivery room. The room should be kept ready with the following items:

	✓
3 Sterilized Delivery Sets ready to use (page 336).	
Sterilized Gloves, Gowns, Gauze, Cotton Balls.	
Clean linen.	
Sterilized Forceps Set.	
Functioning Vacuum Extractor.	
Working Suction Machine with Suction Tube.	
Mucus Suckers for Neonates.	
Filled Oxygen cylinder with cylinder carrier and key to open cylinder valve.	
Emergency Drugs as per list (page 344), replace if expired.	
Antiseptics (page 343).	
<ul style="list-style-type: none"> • Working BP Apparatus, Stethoscope, Thermometer, I/V Stands, I/V Needles and Cannulas. 	
Delivery Table with Lithotomy Poles.	
Staff available and prepared to handle emergency cases.	

Change / Scrub Room

The change and scrub rooms, whether separate or combined, should have the following items:

OT Dresses for changing from street clothes.	
OT Shoes / Shoe Covers.	
Caps and Masks.	
24-hour running water and a wash basin with elbow tap.	
Scrub Brushes and Soap.	

Operation Theatre

The operation theatre should be equipped and made functional with the following items:

3 sets of Sterilized Cesarean Section Instruments ready to use.	
Sterilized linen packs.	
Sterilized Gloves, Gowns, Gauze, Cotton Balls.	
Sterilized Suction Tubing and Nozzle.	
Working OT Light with spare bulbs.	
OT Table	
Working Suction Machine.	
Emergency drug list with quantity and expiry dates.	
Resuscitator / Ambu bag.	
Laryngoscope with Battery Cells and spare bulbs.	
Endotracheal Tubes	
Working Anesthesia Machine, spare Oxygen and Nitrous Oxide Cylinders (filled).	
List of Anesthetic agents with quantity (page 344).	
Spinal Needles / Epidural Kits.	
Antiseptics (page 343)	
List of suture material with quantity.	
Working BP Apparatus, Stethoscope, Thermometer, I/V Stands, I/V Needles and Cannulas	
Stretcher / Trolley	
Cleaned OT after surgery (cleaning in between and after surgery according to infection prevention principles).	
On-call staff (ready to perform emergency procedures within 30 minutes).	

Ward

The obstetric ward should have the following items and ward staff ready to receive emergencies.

Beds ready to receive patient (mattress covered with clean rubber sheet and bed sheets and pillows).	
Bedside locker.	
Bench / Chair for attendant.	
Emergency drugs and I/V solutions in the Medicine Cabinet (page 344).	
Working BP Apparatus, Stethoscope, Thermometer, I/V Stands, I/V Needles and Cannulas.	

Filled oxygen Cylinder with Cylinder Carrier (with key to open the cylinder valve) and Facemask.	
Staff prepared to handle emergency cases.	

Pharmacy

A mechanism should be established in the pharmacy so that drugs for obstetric emergencies are available 24 hours.

Drugs are placed for EmOC in pharmacy (page 344).	
Mechanism for replenishing drugs when supply reaches a certain minimum level.	
Mechanism of timely supply of emergency drugs to Emergency Room, OT, Labour / Delivery Room and Wards.	
Accurately maintain inventory register.	
Qualified person on call to dispense necessary drugs 24 hours.	

Laboratory / Blood Supply

Laboratory should be open 24 hours (on call) to provide blood bank services for obstetric emergencies. Laboratory must have the following items:

Blood type, Cross Matching Reagents and Blood collection items (page 346).	
Blood collection bags	
Microscope	
Register for recording the events.	
Functioning Refrigerator	
Lab Technician on call to process blood supply request.	

Autoclave Room

Each EmOC facility should have a designated area or separate autoclave room with the following items:

Working Autoclave Machine with Temperature and Pressure Gauge.	
Supply of Indicator Paper.	
Reliable and safe electric connection or supply of kerosene oil / gas.	
Table with marked areas-indicating space for unsterile and sterile areas.	
Person trained in autoclaving.	

Recording and Reporting

Set up recording and reporting mechanism in the facility room by room (The number of registers will vary according to the level of facility. For example, female, maternity and gynecology wards are often combined.) Recording must be done completely, accurately,

neatly and regularly just after the event has happened. The objective of keeping records is to get information on complications during pregnancy treated in the facility both medical and / or surgical obstetrics. Therefore, review your record keeping system and make sure you get information on women with obstetric complications including abortions, prenatal, intranatal and postpartum complications.

Individual Role of Team Members for Day-to-Day Management of the Facility

Process of Management

Each team member is responsible for playing her / his role efficiently and effectively, which may include preparing instrument and linen sets, facility cleaning, ensuring regular supply of reagents for blood tests, making blood available for transfusion, and ensuring 24-hour availability of drugs. All these tasks contribute to keeping the facility ready for emergencies.

Each team member and supervisor should take steps each day for “READINESS” of the facility. The supervisor should use supportive supervision methods so that **processes** are completed regularly to keep facility ready to respond to emergencies.

Instruments and Linen Sets: Preparations for Next Procedure

After use of instruments - decontaminate (soak in 0.5% Chlorine Solution for 10 minutes), rinse, wash, dry, pack it in cloth wrapper or drum, and autoclave (autoclave at 121 degree Celsius, under 15-20 lbs. pressure for 30 minutes for instruments, linen and 15 minutes for rubber and glass goods). Always keep 3 instrument sets ready for emergencies in OT and labour / delivery room.

After use of other items (Linens, Gloves, Rubber Suction Tubing), decontaminate, wash, dry, wrap separately and autoclave them. Keep 3 sets always ready for emergencies in OT and labour / delivery room.

Anesthesia

Follow instructions for regular maintenance of the machine supplied by the manufacturer. Establish mechanism of periodic visit of engineer / technician for preventive maintenance of anesthesia machine.

Check every day that there are extra filled cylinders of oxygen and Nitrous Oxide.

Check each morning and after use that anesthetic agents and emergency drugs are present as per list. Replace drugs and anesthetics agents each day after use.

Make sure Endotracheal tubes and connectors are available.

Make sure Laryngoscope is working and has spare Bulbs and Battery cells.

Spinal Needles are available.

Ambu bag is working.

Housekeeping and Facility Cleaning

Housekeeping refers to the general cleaning of the ward, emergency room, OT and other clinic environment, which include floors, walls, tables and other surfaces. According to his / her job description, the responsible person should prepare the OT, labour / delivery and ward every day.

Clean facility before starting daily work.

Keep the floors of OT and labour / delivery room, clean and dry all the time.

Check supplies and drugs in the cabinet / store / tray every day and replace if used.

Review the expiry date of drugs, replace them if expired.

Weekly Cleaning of OT

Clean OT table, trolleys and other equipment with soap and water.

Thoroughly scrub the OT, including walls and floor.

Wash walls from top to bottom, so that the debris that falls on the floor will be cleaned up last.

Use utility gloves to clean heavily contaminated areas such as spills of blood and body fluids.

Change disinfectant solution (0.5% Chlorine Solution) when it is obviously dirty (the heavier the load of soil and organic material, the lesser the killing power of disinfectant).

Between the Cases in OT

Wear gloves and decontaminate the OT table and floor after surgical procedure. Use 0.5% Chlorine Solution for decontamination.

Remove the used instruments, linen and place them in the proper containers for decontamination.

Remove the decontamination solution that contained the instruments used during surgery. Resupply decontamination solution as needed.

Building, Electricity, Water and Sewage Maintenance

Check every morning that all electrical and mechanical appliances in the OT and labour / delivery room are in working order such as suction machine, OT light etc.

Observe if there is any water leakage from taps, toilets or any other problems in the building, notify to the maintenance department, remind them if action is delayed.

Waste Disposal

Use a separate container for papers, bottles, plastic etc, which poses no risk of injury or infection. Dispose off in appropriate place, such as incinerator or dump.

Use a separate container for medical waste such as blood, tissue, body fluids, bandages and sponges and do not throw on the floor. Dispose in incinerator or other designated place.

Use a separate container for sharp items such as needles, scalpel blades etc. Bury the container.

Laboratory / Blood Supply

Check every day that the following are available:

Trained Personnel

24 hour coverage by laboratory personnel.

At least two units of O+ blood.

All the reagents are present, replace if expired (page 346).

All items for blood collection are present and in working condition.

Pharmacy

Conduct regular inventory and make sure that essential drugs for emergency obstetrics are available 24 hours (page 344).

There is 24 hour coverage for pharmacy.

Procure drug if stock reaches a minimum level.

Review the expiry dates of drugs and replace them as needed.

Maintain inventory register.

Supportive Supervision

The supervisor of each department (obstetrician / doctor, pathologist, pharmacist), should make sure that both facility management (step-by-step as given above) and technical supervision (case management according to protocols and procedures), are provided each day. External supervisors both for facility and clinical management should visit the hospital / center at intervals to help solve problems, provide spot training, and inspire the teams to improve the quality of care continuously. Supervisors should make sure that:

ERT is available around the clock and 24 hour roster duty is posted in a prominent place.

There is READINESS in emergency room, labour / delivery room, ward, OT, laboratory and pharmacy.

The supervisor should help all team members perform their functions well, provide extra assistance, on the job training and solve problems / difficulties.

VAGINAL BLEEDING IN EARLY PREGNANCY (ABORTION/MISCARRIAGE)

QUICK ASSESSMENT

- **Heavy Bleeding**
 - **+ SHOCK**
-
- Incomplete Abortion
 - Inevitable Abortion

• Light Bleeding

- **Light or Heavy Bleeding**
-
- Septic Abortion

With Shock

- Ruptured Ectopic Pregnancy

Without Shock

- Threatened Abortion
- Complete Abortion
- Missed Abortion
- Unruptured Ectopic Pregnancy

Hydatidiform Mole can present as Threatened / Incomplete / Inevitable / Complete / Missed / Septic Abortion.

HEAVY BLEEDING + SHOCK

PRINCIPLES OF GENERAL MANAGEMENT

All actions should be taken simultaneously.

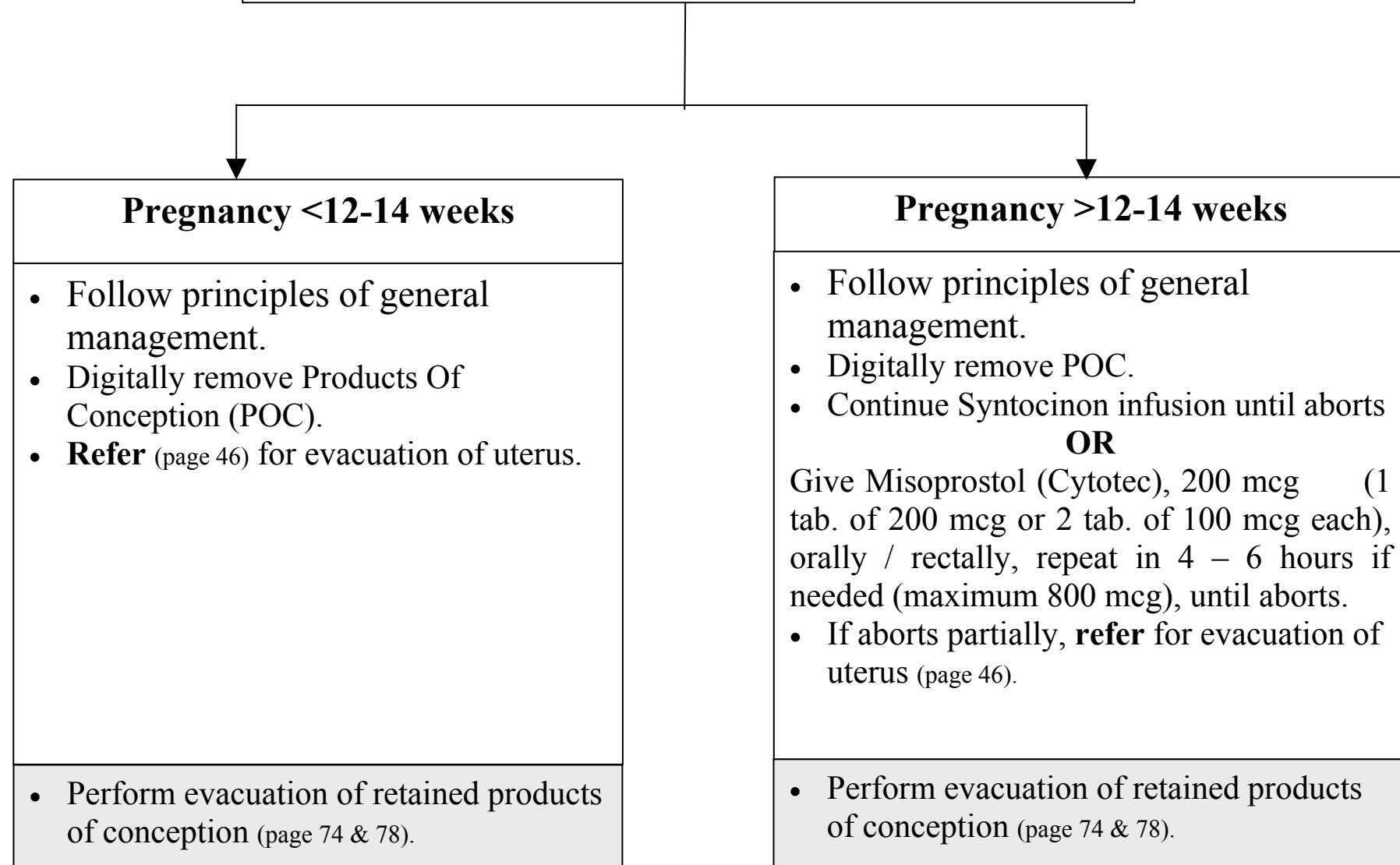
- Mobilize all personnel.
- Treat shock if present or anticipated (page 21).
- Insert 2 large bore I/V canulas (16G), one in each arm.
- From one of the cannula, first collect blood for Hb, Random Blood Sugar, Blood Group and cross matching (15-20 ml).
- Start rapid I/V infusion with Normal Saline or Ringer's Lactate. This is preferable to plasma substitutes like Haemaccel, Gelafundin (page 9).
- Give Ergometrine, 0.2 mg, I/M + Syntocinon, 10 units, I/M or I/V slowly.
- Start infusion of Syntocinon, 40 Units in a litre of Normal Saline or Ringer's Lactate, at 40 drops/min.
- Catheterize urinary bladder.
- If in pain give Inj. Diclofenac, 75 mg, I/M, stat **or** Inj. Nalbuphine, 10 mg, I/M, stat.
- Monitor blood loss, BP, pulse, respiration and urine output.
- Maintain fluid balance chart.
- Perform bedside clotting test if coagulopathy is suspected (page 23).
- Counsel blood donors.

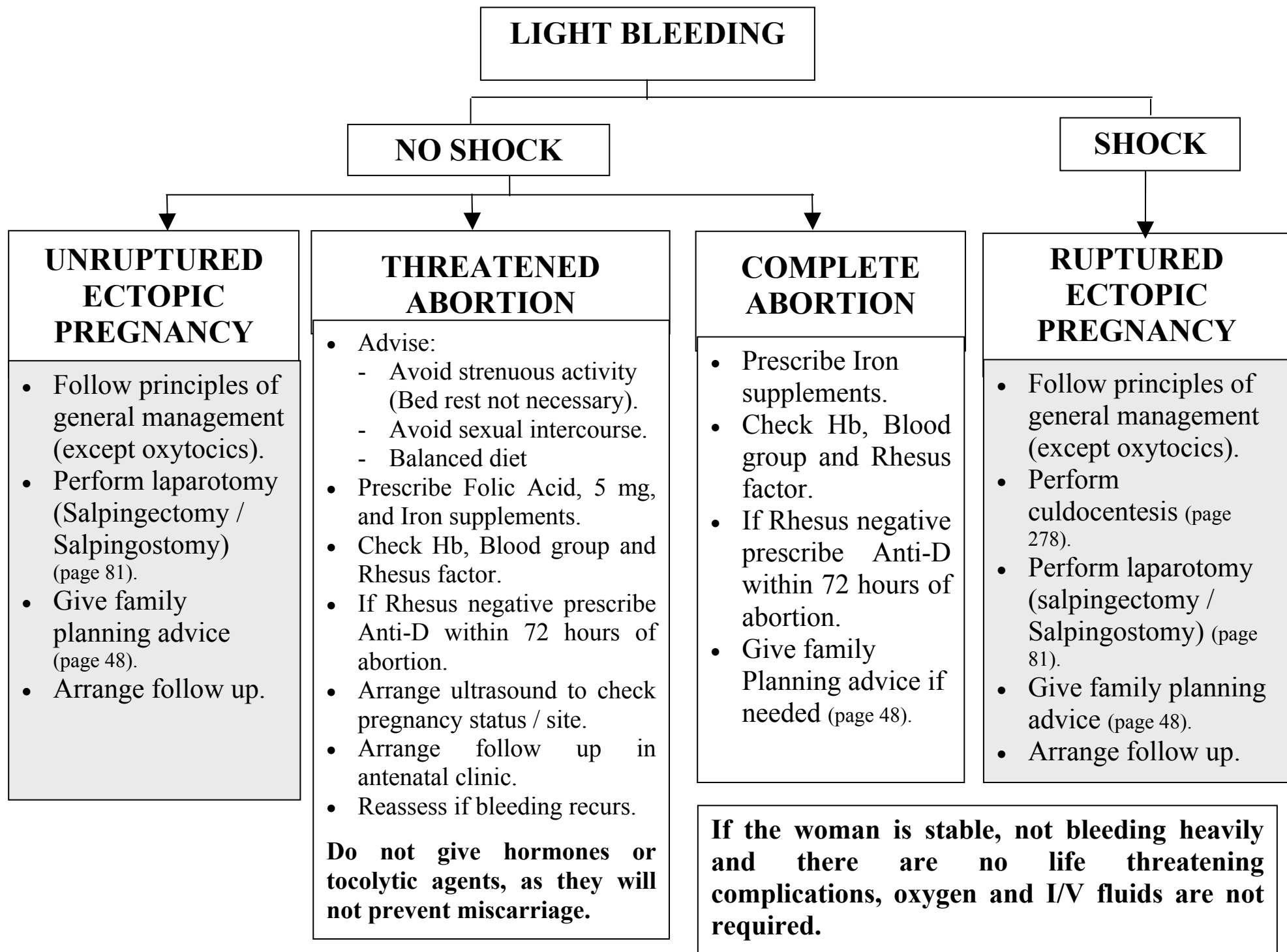
Arrange 2-4 units of blood (page 14).

Transfuse blood if needed.

Prescribe Anti-D (250 IU, I/M) within 72 hours of abortion, if Rhesus negative and pregnancy less than 20 weeks. Give 500 IU if pregnancy more than 20 weeks (page 61).

INCOMPLETE / INEVITABLE ABORTION





**INFECTION
HEAVY / LIGHT BLEEDING
+ SHOCK**

SEPTIC ABORTION

SEVERE INFECTION

MILD INFECTION

- Follow principles of general management.
- Remove foreign body from vagina / cervix, if present.
- Send High Vaginal and Cervical Swab / Blood for Culture and Sensitivity.
- Start I/V antibiotics:
 - Ampicillin, 1 g, I/V, every 6 hours
PLUS
 - Gentamycin, 80 mg, I/V, every 8 hours
PLUS
 - Metronidazole, 500 mg, I/V, every 8 hours
- If already immunized against tetanus, give Tetanus Toxoid (TT), 0.5 ml, I/M. If not already immunized additionally give anti Tetanus serum, 1500 units, I/M. Evaluate for retained products of conception and visceral injury.
- If Retained Products of Conception / Visceral injury/ Gas gangrene is present or suspected, **refer** (page 46).

- Perform evacuation of retained products of conception (page 74 & 78).
- Perform laparotomy (Repair of injured organ / subtotal / total hysterectomy)(pg S 64).

- Repeat TT after 4 weeks for future protection.
- At discharge from facility give family planning advice (page 48).
- Arrange follow up.

- Send High Vaginal and Cervical Swab for culture and sensitivity.
- Start oral antibiotics:
 - Co-Amoxiclav (Augmentin), 375 mg / 625 mg, every 8 hours
PLUS
 - Metronidazole, 500 mg, every 8 hours
- Give family planning advice (page 48).
- **Refer** (page 46) if evidence of retained products of conception (Clinical / Ultrasound).

- Perform evacuation of retained products of conception (page 74 & 78).

HEAVY / LIGHT BLEEDING

± PASSAGE OF GRAPE LIKE STRUCTURES
± INFECTION
± SHOCK

HYDATIDIFORM MOLE

- Follow principles of general management.
- Arrange ultrasound if in doubt of diagnosis.

Refer (page 46)

- Perform suction evacuation (page 74).
- Arrange follow up.
- Give family planning advice at discharge from hospital (page 48).

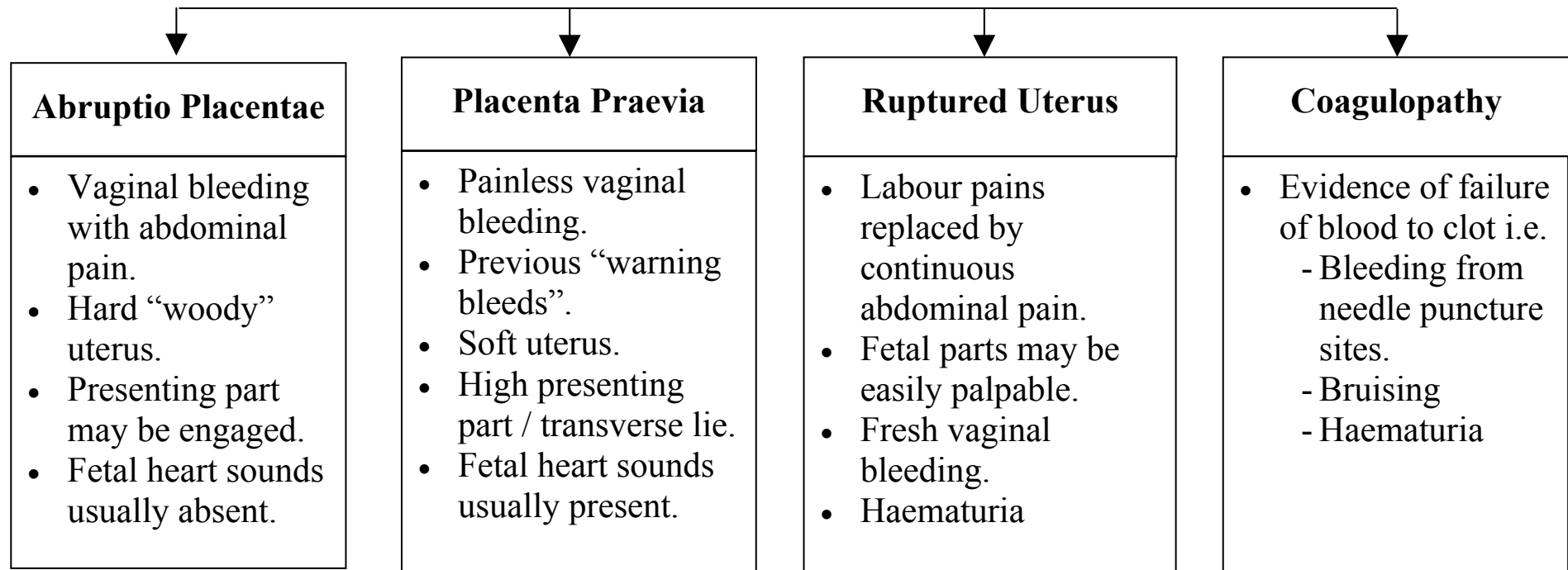
MISSED ABORTION

- Counsel:
 - Wait 2-3 weeks for pregnancy to abort spontaneously.
 - **Refer** (page 46) if fails to abort spontaneously / evidence of DIC.
-
- Soften the cervix with Misoprostol, 200 mcg or Prostaglandin E₂, 3 mg, Vaginal tablet, placed in posterior vaginal fornix.
 - If aborts partially perform evacuation of retained products of conception (page 74 & 78).
 - Give family planning advice.
 - Arrange follow up.

VAGINAL BLEEDING IN LATER PREGNANCY AND LABOUR ANTEPARTUM /INTRAPARTUM HAEMORRHAGE (APH)

QUICK ASSESSMENT

DO NOT DO VAGINAL EXAMINATION

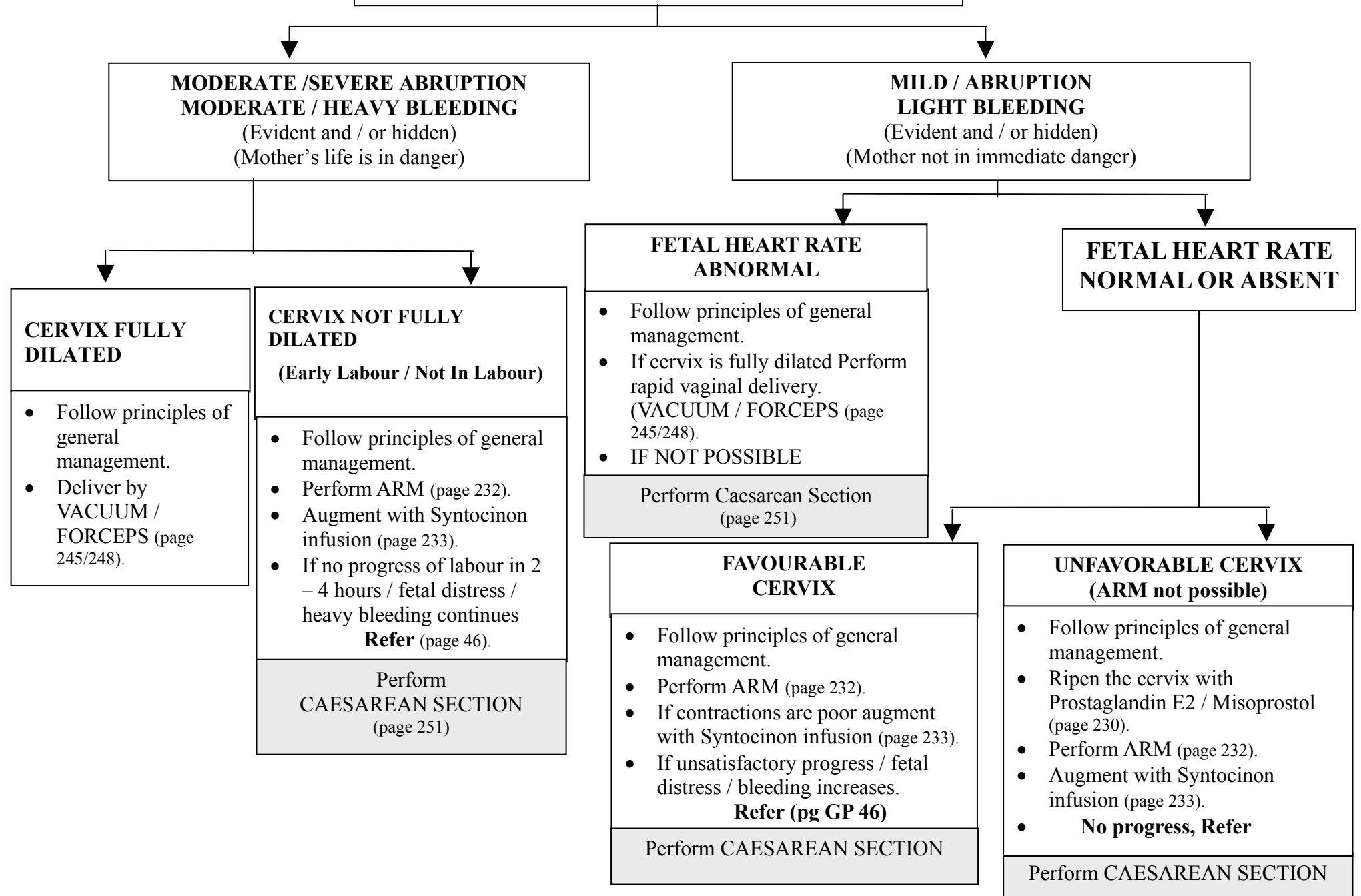


Perform vaginal examination only after stabilizing the patient and in double setup (page 95).

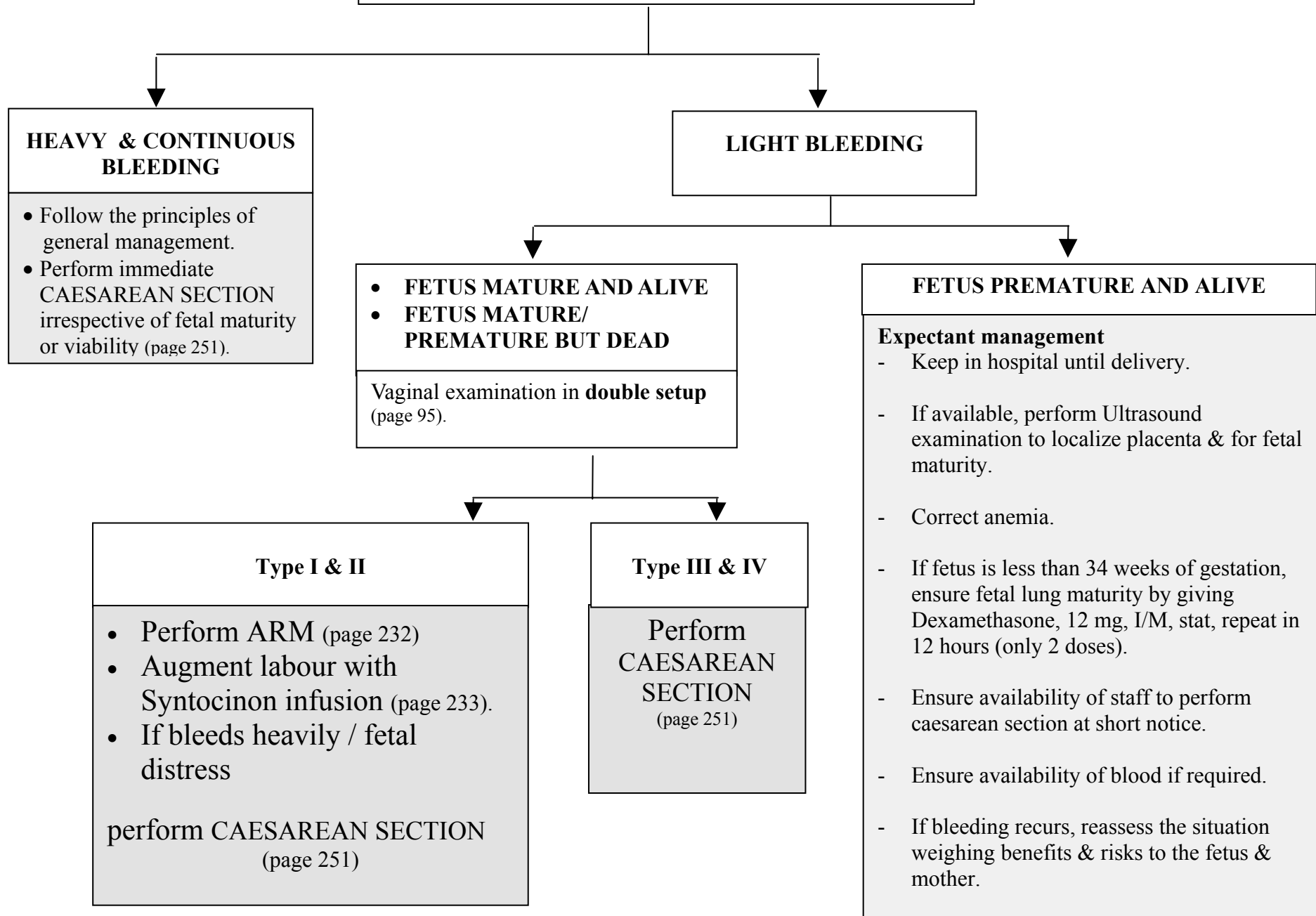
Principles of General Management

- Mobilize all personnel.
 - All actions should be taken simultaneously.
 - Treat shock if present or anticipated (page 21).
 - Insert 2 large bore I/V canula (16G or more), at different sites.
 - From one of the cannula collect blood for Hb, Random Blood Sugar, Blood Group and cross matching (15-20 ml).
 - Start rapid I/V infusion i.e. Normal Saline or Ringer's Lactate. This is preferable to plasma substitutes like Haemaccel, Gelafundin etc.
 - Catheterize the urinary bladder.
 - Monitor blood loss, BP, Pulse, Respiration Rate, Urine Output and Fetal Heart Rate.
 - Maintain fluid balance chart.
 - Perform bed side clotting test if coagulopathy is suspected (page 23).
 - Counsel blood donors.
- Arrange 2-4 units of blood.
 - Transfuse blood if needed (page 14).
- If Rhesus negative, give Anti-D (500 IU, I/M) within 72 hours of bleeding episode or childbirth (page 61).

ABRUPTIO PLACENTAE



PLACENTA PRAEVI



RUPTURED UTERUS

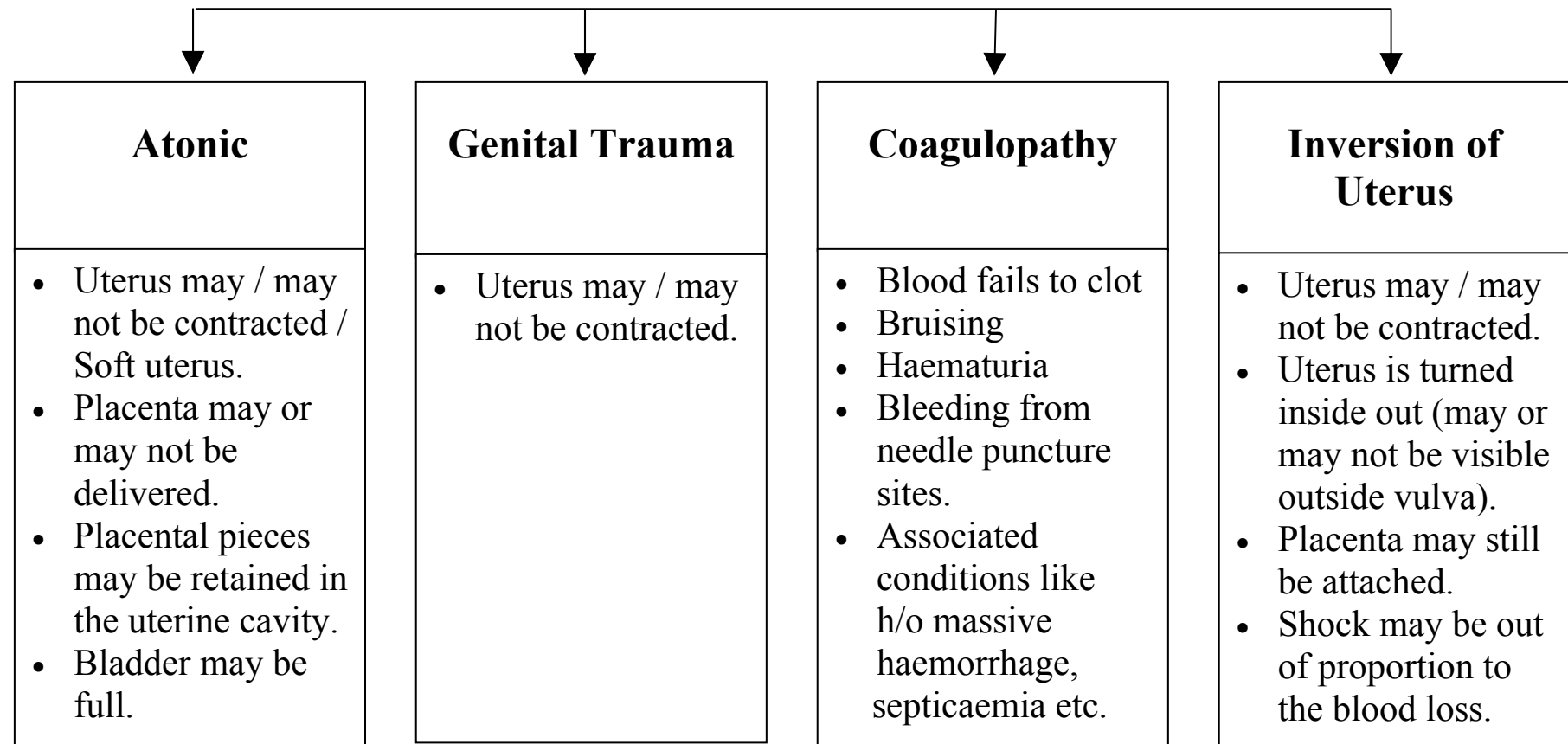
- Follow the general principles of management.
- Perform immediate laparotomy.
- If edges of the tear are not necrotic, repair the ruptured uterus if possible (page 269) and ± tubal ligation (page 259).
- If repair of uterus is not possible, perform hysterectomy (page 273).
- If the tear extends to the cervix or the uterus is necrotic, perform Total Hysterectomy (page 276).
- Give family planning advice if tubal ligation or hysterectomy was not performed.

APH weakens and PPH kills the patient.

VAGINAL BLEEDING AFTER CHILDBIRTH POSTPARTUM HAEMORRHAGE (PPH)

Quick Assessment

Treatment and assessment should be done simultaneously



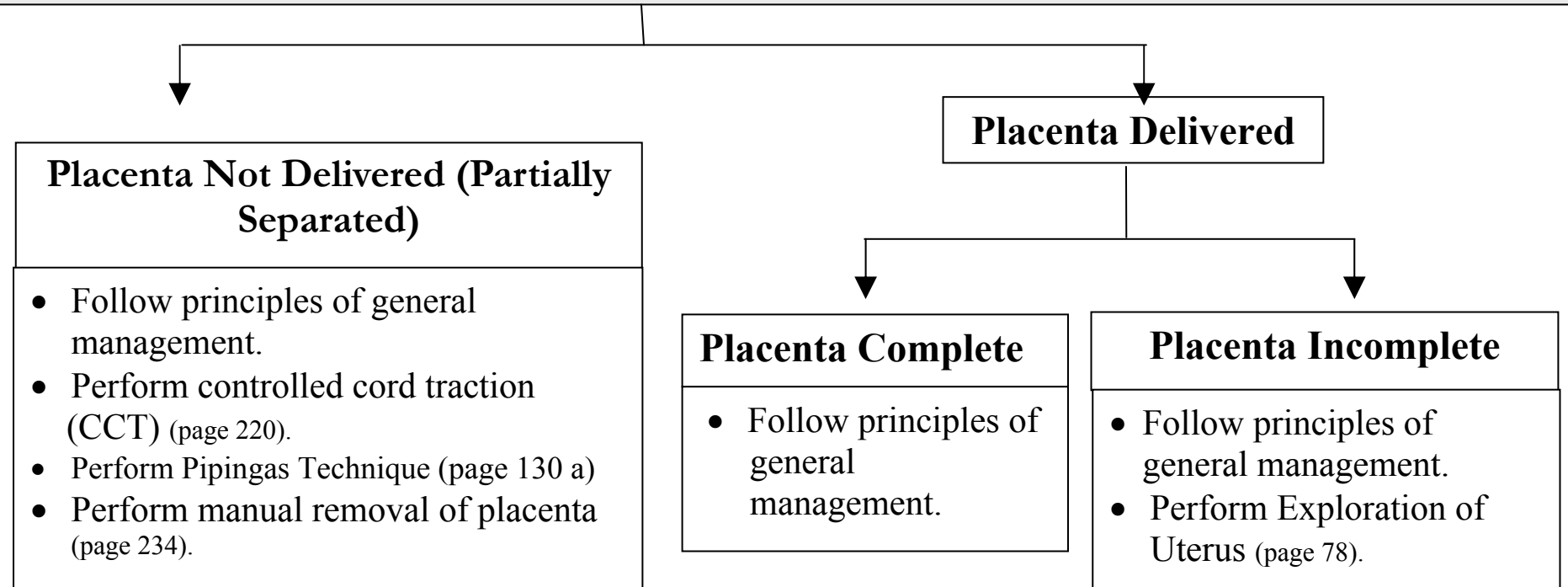
Principles of General Management

- Insert 2 large bore I/V canulas (16G or more), at different sites.
 - From one of the cannula, first send blood for Hb, Grouping and cross matching (20 ml).
 - Give I/V fluids rapidly i.e. Normal Saline / Ringers Lactate.
 - Perform uterine Massage.
 - Empty bladder (catheterize).
 - *Give Ergometrine, 0.2 mg, I/M + Syntocinon, 10 units, I/V, slowly.
 - *Start Syntocinon infusion, 20-30 units in a litre of Normal Saline or Ringers Lactate, at 60 drops/min.
 - *Give Prostaglandin F_{2a}, 0.25 mg, I/M.
 - *Insert Misoprostol (Cytotec), 1000 mcg (5 tab. of 200mcg each), rectally (use *together or one after the other).
 - Monitor level of Consciousness, Blood loss, Blood pressure, Pulse, Urinary output and Fluid intake.
 - Keep accurate records of vital signs, medications and fluids given and urine output.
 - Counsel blood donors.
- Arrange 4 – 6 units of blood.
 - Transfuse blood as required (page 14).

Uterus Not Well Contracted (Atonic)

- Follow principles of general management.
- Perform bimanual compression of uterus (external / internal) (page 123).
- Perform manual compression of Aorta (page 124).
NOT working – Bleeding continues
Refer (page 46).

- Perform uterine packing (Do not pack vagina only) (page 125).
If not working, perform:
 - B-Lynch Suture (page 136 a & b), if not working , perform
 - Uterine / Utero – Ovarian artery ligation / Internal Iliac artery ligation (page 133).
- If not working, perform:
 - Abdominal Hysterectomy (Subtotal / Total) (page 273).



Genital Trauma (Uterus Usually Well Contracted)

- Follow principles of general management.
- Explore and locate source of bleeding.

- Tears of:**
- **Perineum**
 - **Vulva**
 - **Lower Vagina**

Bleeding point visible

- Repair the tear (page 263).

- Tears of:**
- **Upper Vagina**
 - **Cervix**

- Tightly pack the vagina.
- **Refer** (page 46).

- Bleeding point not visible
 - Get help from seniors.
 - Repair the tear (page 262).

Ruptured Uterus

- Refer

- Repair the tear in the uterus (page 269).
- Perform Abdominal Hysterectomy (Subtotal / Total) (page 273 & 276).

Inversion of Uterus

- Follow principles of general management.
 - Replace uterus manually (page 130).
 - Perform hydrostatic reduction of uterus (page 130)
 - Not possible – **Refer** (page 46).
-
- Replace uterus under general anaesthesia
 - Manual correction
 - Combined Abdominal – Vaginal Correction

Coagulopathy (Clotting Defect)

- Follow principles of general management.
 - **Refer** (page 46).
-
- Check Prothrombin Time (PT), Activated Partial Thromboplastin Time (APTT), Platelets, Fibrinogen, Fibrin Degradation Products (FDPs).
 - Transfuse Fresh Frozen Plasma (FFP), Platelets, blood as required (page 116).

ECLAMPSIA

QUICK ASSESSMENT

The strategies in managing a case of Eclampsia include:

- **To stop convulsions and prevent repeat convulsions.**
 - **Control hypertension.**
 - **Stabilise the patient.**
 - **Deliver as soon as possible, either vaginally or by caesarean section.**
-
- Admit the woman to the hospital for observation and further management.
 - If a woman is unconscious or convulsing, CALL FOR HELP. Urgently mobilize all available personnel.
 - Rapidly evaluate the general condition of the woman, including vital signs (blood pressure, pulse, respiration) while simultaneously inquiring about the history of her present and past illnesses either from her or from persons accompanying the patient.
 - Gather equipment (airway, suction, mask and bag, oxygen).
 - If she is **not breathing or her breathing is shallow:**
 - Check airway.
 - Assist ventilation using Ambu bag and facemask.
 - Give oxygen by facemask at 4-6 L per minute.
 - Intubate if required and give oxygen at 4-6 L per minute, via endotracheal tube.
 - If she **is breathing:**
 - Give oxygen at 4-6 L per minute by mask or nasal cannulae.
 - If she is **unconscious:**
 - Insert airway (or use handle of the spoon covered with cloth) in the mouth to prevent the tongue falling back.
 - Check airway.
 - Position her on her side.
 - Check temperature.
 - Check for neck rigidity.

- If she is **convulsing**:
 - Position her on her side to reduce the risk of aspiration of secretions, vomit and blood.
- Insert an I/V cannula and infuse I/V fluids (page 9).
- If severe pre eclampsia or eclampsia is diagnosed (Table on page 137), give Magnesium Sulfate (Box 1, page 369)
- Catheterize the bladder and leave indwelling catheter to monitor urine output and to check proteinuria. **If urine output is less than 30 ml per hour**, withhold Magnesium Sulfate and infuse I/V fluids (Dextrose Saline or Ringer's Lactate) at the rate of 1 L in 8 hours.

If the **cause of convulsions has not been determined**, manage as eclampsia and continue to investigate other causes.

- Monitor the amount of fluids administered and urine output to ensure that there is no fluid overload.
- Maintain a strict fluid balance chart.
- Monitor for the development of pulmonary oedema. Auscultate the lung bases hourly for crepitations indicating pulmonary oedema. **If crepitations are heard**, withhold fluids and give Frusemide, 40 mg, I/V. Repeat if required.
- **Never leave the woman alone.** A convulsion followed by aspiration of vomit may cause death of the woman and fetus.
- Nurse the woman in a quiet well lit area and **NOT** in a dark room, so that she can be monitored constantly
- Protect her from injuries (fall), but do not tie her hands and feet to the bed.
- Observe vital signs, reflexes and fetal heart rate, every 30 minutes or more frequently, if required.
- Assess clotting status with a bedside clotting test (page 23).
- After the convulsion, aspirate the mouth and throat as necessary.

CONTROLLING FITS

Anticonvulsive Drugs

- **Magnesium Sulfate is the drug of choice for preventing and treating convulsions in severe pre-eclampsia and eclampsia.** Administration is outlined in Box 1
- If Magnesium Sulfate is **not** available, Diazepam may be used, although there is a greater risk for neonatal respiratory depression because Diazepam passes the placenta freely.

Box 1

Protocol for Magnesium Sulphate should be followed strictly.

Loading Dose:

- Magnesium Sulfate 20% solution, 4 g, I/V, over 5 minutes (8 ml of 50 % Magnesium Sulfate solution + 12 ml of Distilled Water).
- Follow promptly with Magnesium Sulfate solution 50%, 10 g, 5 g (10 ml), in each buttock as deep I/M injection with Lignocaine 2%, 1 ml, in the same syringe. Ensure that aseptic technique is practiced when giving Magnesium Sulfate deep I/M injection. Warn the woman that a feeling of warmth will be felt when Magnesium Sulfate is given.
- If **convulsions recur after 15 minutes**, give Magnesium Sulfate, 2 g (4 ml of 50% solution), I/V, over 5 minutes.

Maintenance Dose:

- Magnesium Sulfate 50% solution 5 g (10 ml) + Lignocaine 2%, 1 ml, I/M, every 4 hours, into alternate buttocks.
- Continue maintenance dose of Magnesium Sulfate for 24 hours after delivery or the last convulsion, whichever occurs last.

Before repeat administration, ensure that:

- Respiratory rate is at least 16 per minute.
- Patellar reflexes are present.
- Urinary output is at least 30 ml per hour over preceding 4 hours.

WITHHOLD OR DELAY DRUG IF:

- Respiratory rate falls below 16 per minute.
- Patellar reflexes are absent.
- Urinary output falls below 30 ml per hour over preceding 4 hours.

Keep antidote ready

- In case of respiratory arrest:
 - Assist ventilation (mask and bag, intubation, anesthesia apparatus).
 - To antagonize the effects of Magnesium Sulfate give Calcium Gluconate, 1g (10 ml of 10% solution), I/V slowly, until respiration begins.

Box 2:

DIAZEPAM SCHEDULES FOR SEVERE PRE-ECLAMPSIA AND ECLAMPSIA

Note: Use Diazepam ONLY if Magnesium Sulfate is NOT available.

Intravenous Administration

Loading Dose:

- Diazepam, 10 mg, I/V slowly, over 2 minutes.
- **If convulsions recur**, repeat loading dose.

Maintenance Dose:

- Diazepam, 40 mg in 500 ml I/V fluids (Normal Saline or Ringer's Lactate), titrated to keep the woman sedated but arousable.
- Maternal respiratory depression may occur when dose exceeds 30 mg in 1 hour:
 - Assist ventilation (mask and bag, anaesthesia apparatus, intubation), if necessary.
 - **Do not give more than 100 mg in 24 hours.**

Rectal Administration

Give Diazepam rectally when I/V access is not possible. The loading dose is 20 mg in a 10 ml syringe. Remove the needle, lubricate the barrel and insert the syringe into the rectum to half its length. Discharge the contents and leave the syringe in place, holding the buttocks together for 10 minutes to prevent expulsion of the drug. Alternatively, the drug may be instilled in the rectum through a catheter.

If convulsions are not controlled within 10 minutes, administer an additional 10 mg per hour or more, depending on the size of the woman and her clinical response.

CONTROLLING HYPERTENSION

Antihypertensive Drugs

If the **diastolic pressure is 110 mm Hg or more**, give antihypertensive drugs. The goal is to keep the diastolic pressure between 90 mm Hg and 100 mm Hg to prevent cerebral haemorrhage. **Hydralazine (Available as Apresoline)**, is the drug of choice.

- Give Hydralazine, 5 mg, I/V slowly, every 5 minutes, until blood pressure is lowered. Repeat hourly as needed or give Hydralazine, 12.5 mg, I/M, every 2 hours, as needed.
 - **If hydralazine is NOT available**, give:
 - **Labetolol (Available as Trandate)**, 10mg, I/V:
 - If response **is inadequate** (diastolic blood pressure remains above 110 mm Hg) after 10 minutes, give Labetolol, 20 mg, I/V.
 - Increase the dose to 40 mg and then 80 mg if satisfactory response is not obtained after 10 minutes of each dose.
- OR**
- **Nifedipine (Available as Adalat)**, 5 mg, under the tongue:
 - **If response is inadequate** (diastolic pressure remains above 110 mm Hg) after 10 minutes, give an additional 5 mg, under the tongue.

Note: There is concern regarding a possibility for an interaction with Magnesium Sulfate that can lead to hypotension.

- **Methyldopa (available as Aldomet)**. In case the above drugs to control hypertension are **not** available, Methyldopa may be used though it is not as effective and slow to act (4 hours).
- 250 -500 mg in 100 ml of Dextrose Water, given as slow I/V infusion, over 30-60 minutes. Repeat after 6 hours, if necessary.

STABILIZE THE PATIENT

Once the fits are controlled and the diastolic blood pressure is between 90-100 mm of Hg make appropriate plans to deliver the patient or refer to a facility providing comprehensive EmOC.

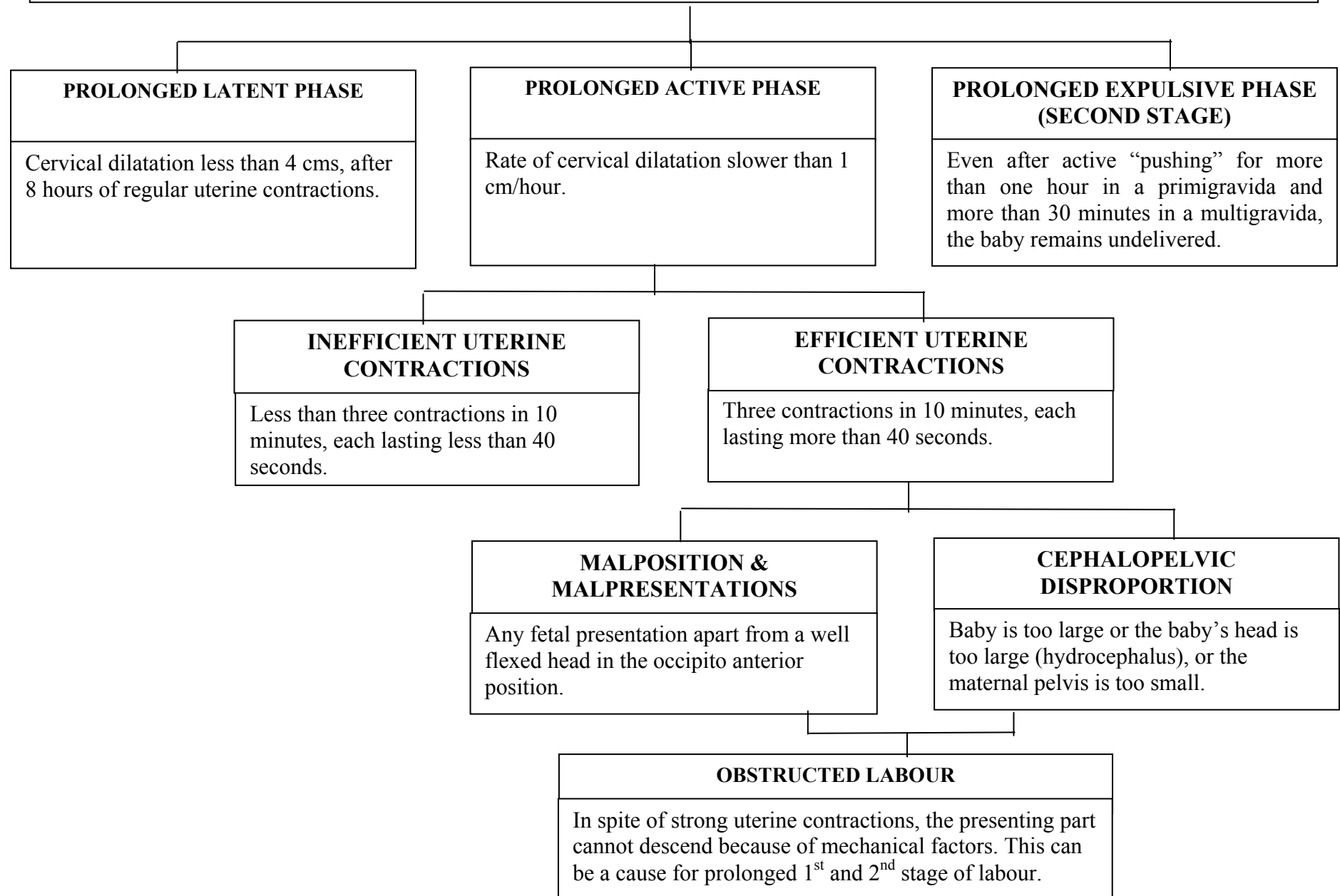
DELIVERY

Delivery should take place as soon as the woman's condition has stabilized. **Delaying delivery to increase fetal maturity will risk the lives of both the woman and the fetus.** Delivery should occur regardless of the gestational age.

In severe pre-eclampsia, delivery should occur within 24 hours of the onset of symptoms. In eclampsia, delivery should occur within 12 hours of the onset of convulsions.

- Assess the cervix (page 229).
- If the **cervix is favourable** perform ARM (page 232) and induce labour by Oxytocin infusion or Prostaglandins (page 230/233).
- **Deliver by Caesarean section** (page 251) **IF:**
 - There is a slow progress of labour and **if vaginal delivery is not anticipated** within 12 hours (for eclampsia) or 24 hours (for severe pre-eclampsia).
 - There are **fetal heart rate abnormalities** (less than 110 or more than 150 beats per minute).
 - The **cervix is unfavourable** and the **fetus is alive.**
- **Aim for vaginal delivery:**
 - If safe anaesthesia is not available for caesarean section.
 - If the fetus is dead or too premature for survival.
- If the **cervix is unfavourable**, and the aim is to deliver vaginally, ripen the cervix using Misoprostol / Prostaglandins / Foley's catheter (page 230/233).

UNSATISFACTORY PROGRESS OF LABOUR



UNSATISFACTORY PROGRESS OF LABOUR

QUICK ASSESSMENT

GENERAL MANAGEMENT

- Rapidly evaluate the condition of the woman and fetus and provide supportive care (page 213).
 - If shock is present or anticipated begin treatment immediately.
 - Insert 2 large bore I/V cannula (16 gauge or more), at two different sites.
 - From one of the cannula, first collect and send blood for Hb, Random Blood Sugar, Blood Group, Rh status and urgent cross match, if caesarean section is anticipated.
 - Infuse I/V fluids e.g. Normal Saline or Ringer's Lactate.
 - If the urinary bladder is visibly distended encourage the woman to empty her bladder, if she cannot do so or operative delivery is anticipated, catheterize and retain the urinary catheter.
 - Test urine for ketones.
 - If ketotic, rapidly infuse I/V fluids.
 - Review, partograph if available (page 224).
 - **Refer** (page 46), if operative delivery is anticipated, to a health care facility providing comprehensive EmOC.
 - Counsel blood donor.
- Arrange 1- 2 pints of blood, if operative delivery is anticipated.

PROLONGED LATENT PHASE

(ASSESS THE CERVIX) (page 229)

- **No change in cervical effacement or dilatation**
- **No fetal distress**

May **not** be in labour / false labour

- Exclude urinary tract infection.
- Send her home and instruct to return if signs of labour recur.

Inefficient contractions are less common in a multigravida than in a primigravida. Hence, every effort should be made to rule out disproportion in a multigravida before augmenting with Oxytocin.

Change in cervical effacement or dilatation

- Rupture the membranes (ARM) (page 232).
- Induce labour using Oxytocin or Prostaglandins (page 230/233).
- Reassess every 4 hours.
- Monitor using the partograph (page 224).
- If the **woman has not entered the active phase after 8 hours of Oxytocin** infusion.
Refer (page 46).

Caesarean Section (page 251)

- If there are **signs of infection** (fever, foul-smelling vaginal discharge):
 - Augment labour immediately with Oxytocin (page 233).
 - Give a combination of injectable antibiotics until delivery:
 - Ampicillin, 1 g, I/V, every 6 hours
 - PLUS**
 - Gentamicin, 80 mg, I/V, every 8 hours
 - If the **woman delivers vaginally**, continue oral antibiotics postpartum.
 - If the **woman has a caesarean section**, continue injectable antibiotics.
- And ADD
- Metronidazole, 500 mg, I/V, every 8 hours, until the woman is fever-free for 48 hours (page 44).

PROLONGED ACTIVE PHASE
(ASSESS UTERINE CONTRACTIONS (page 163))

INEFFICIENT CONTRACTIONS

- Exclude cephalopelvic disproportion and obstruction.
- Rupture the membranes (page 232).
- Augment labour using Oxytocin (page 233).
- Reassess progress by vaginal examination 2 hours after strong contractions have been established.

No Progress Between Examinations

Refer (page 46)

Perform Caesarean Section (page 251)

Progress Continues

- Continue Oxytocin infusion
- Re-examine after 2 hours
- Continue to follow progress of labour carefully.

EFFICIENT CONTRACTIONS

Malposition or Malpresentation

- **Refer** (page 46)
- Deliver by Vacuum/Forceps (page 245/248).
Not possible
- Perform Caesarean section

Cephalopelvic Disproportion

Alive Fetus

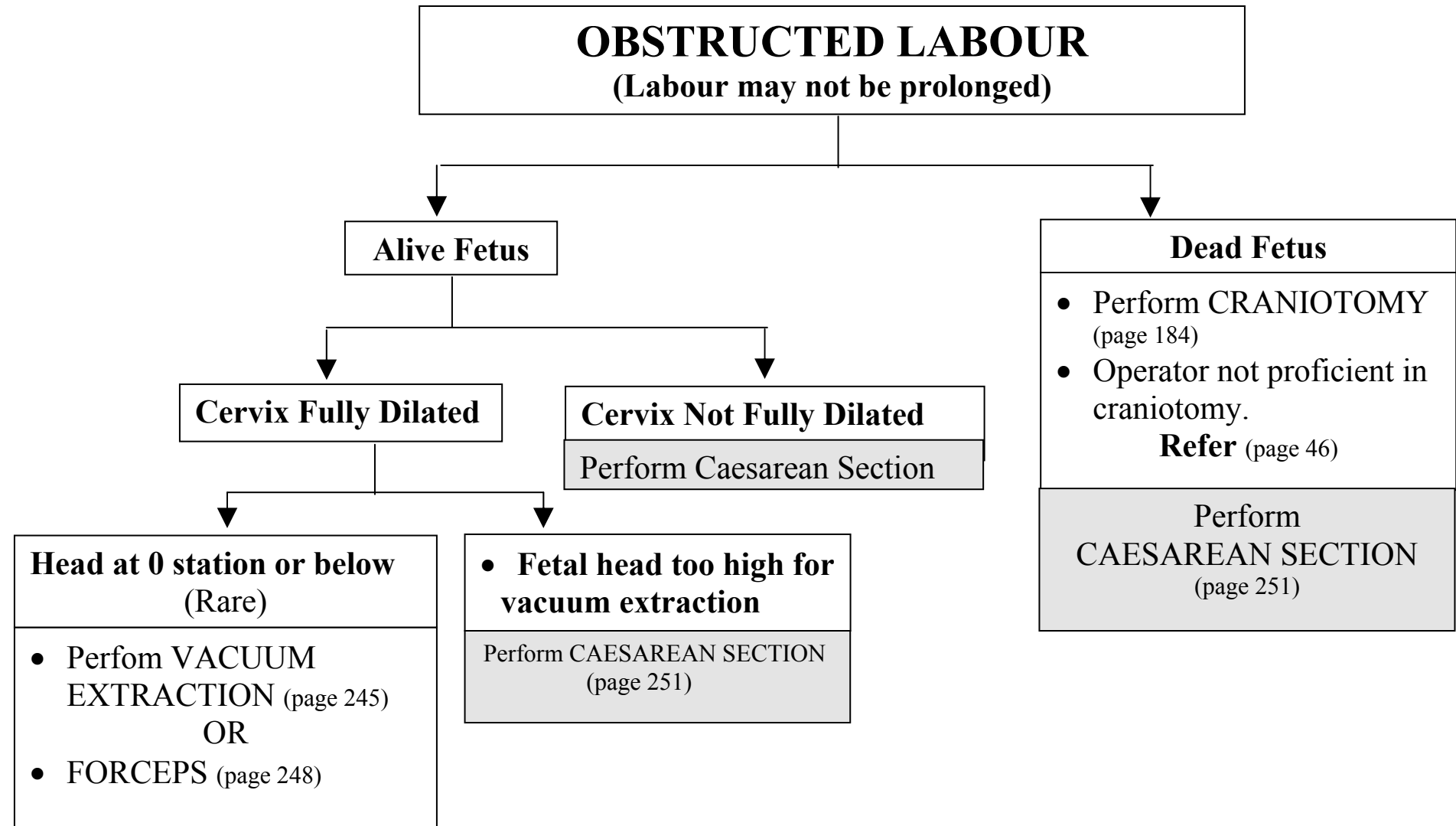
Perform Caesarean section

Dead Fetus

- Do Craniotomy (page 184)
- Operator not proficient in craniotomy
Refer (page 46)

Perform Caesarean section

The best test to determine if a pelvis is adequate is a trial of labour. Clinical pelvimetry is of limited value.



Rupture of an unscarred uterus is usually caused by obstructed labour.

PROLONGED SECOND STAGE

- Allow spontaneous maternal “pushing”.
- Do not encourage prolonged breath holding.
- **Exclude malpresentation and obvious obstruction.**
- Augment labour with Oxytocin (page 233).
- **If no descent after augmentation.**

- **Head not more than 1/5 above** symphysis pubis.
- OR**
- The leading **bony** edge of the fetal **head is at 0 station.**

Perform VACUUM EXTRACTION (page 245)
OR
FORCEPS (page 248)

- **Head is more than 2/5 above** the symphysis pubis.
- OR**
- The leading bony edge of the fetal **head is above 0 station.**

Perform CAESAREAN SECTION (page 251).

If the descent of the presenting part is progressing well, and fetal heart rate is normal, strict time limits should not be used to diagnose prolonged second stage.

SHOULDER DYSTOCIA

- Have several persons available to help.
- Make an adequate episiotomy (page 239).
- Bring the patients buttocks to the edge of the bed / table.
- Ask the woman to flex both her thighs, bringing her knees up as far as possible towards her abdomen (Fig. 1, below)

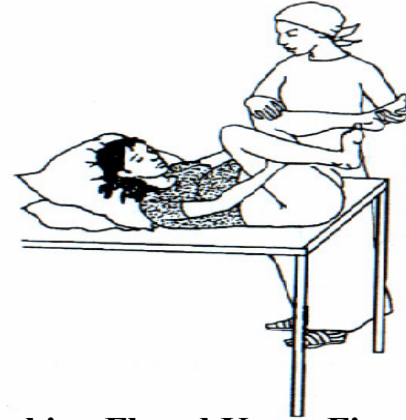


Fig. 1: Assistant Pushing Flexed Knees Firmly Towards Abdomen

- Ask two assistants to push her flexed knees firmly up onto her abdomen.
- Apply firm, continuous traction downwards on the fetal head to move the shoulder that is anterior under the symphysis pubis.

Note: Avoid excessive traction on the head as this may result in brachial plexus injury.

- Have an assistant simultaneously apply suprapubic pressure downwards to assist delivery of the shoulder.
- Note:** Do not apply fundal pressure. This will further impact the shoulder and can result in uterine rupture.

If the shoulder is still not delivered:

- Insert a hand into the vagina.
- Apply pressure to the shoulder that is anterior in the direction of the baby's sternum to rotate the shoulder and decrease the shoulder diameter.

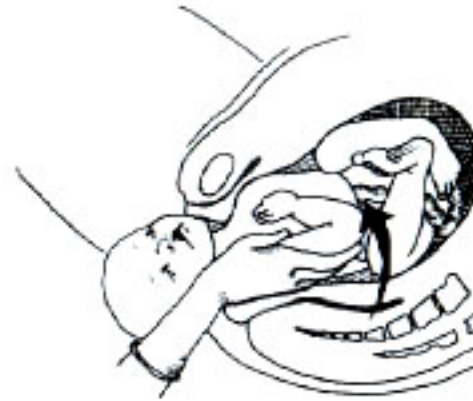


Fig. 2: Grasping the Humerus of the Arm that is Posterior and Sweeping the Arm Across the Chest

- If needed, apply pressure to the shoulder that is posterior in the direction of the sternum.

If the **shoulder is still not delivered despite the** above measures:

- Insert a hand into the vagina and grasp the humerus of the arm that is posterior and, keeping the arm flexed at the elbow, sweep the arm across the chest. This will provide room for the shoulder that is anterior to move under the symphysis pubis (Fig. 2, above)

If all of the above measures fail to deliver the shoulder, other options include:

- Fracture the clavicle (cleidotomy), to decrease the width of the shoulders and free the shoulder.
- Apply traction with a hook in the axilla, to extract the arm that is posterior.

FEVER AFTER CHILD BIRTH

Quick Assessment

GENERAL TREATMENT

- Insert large bore I/V cannula (16 gauge or more), insert 2 cannulae at different sites, if in shock.
- From one of the cannula, collect blood for estimation of Hb, Total Leucocyte Count, Platelet Count, Random Blood Sugar, Blood Group and Rh status and Cross Match.
- Ensure adequate hydration by mouth or I/V infusions using Normal Saline or Ringer's Lactate. In severe cases, it is necessary to give intravenous fluids at first. If the woman is conscious and there is no indication for the need of a general anaesthetic in the next few hours, she should be given oral fluids. In mild cases, increase oral fluid intake.
- If patient is conscious or alert give Paracetamol, 500 mg, every 4-6 hours, to minimize pain or lower temperature.
- **If shock is present or anticipated**, immediately begin treatment (page 21).

Note: These patients might need to be taken to the operation theatre for surgical procedures, therefore give these tablets only with a sip of water.

- Use a fan or tepid sponge to help decrease temperature.
- In seriously ill patients catheterize the urinary bladder to accurately monitor the urine output.
- Monitor temperature, pulse, blood pressure, urine output and fluids given orally or intravenously.
- Maintain accurate fluid balance chart.
- Keep accurate records of medicines given.
- Prevent the spread of infection and cross infection (page 6).
- Prescribe and give antibiotics according to the clinical situation (page 44).
- If there is a possibility that the woman was exposed to tetanus, and there is uncertainty about her vaccination history, give Tetanus Toxoid and anti tetanus serum (page 65).
- Encourage bed rest.
- Counsel blood donors if blood is required.

Arrange 2-3 units of blood if severely anaemic and transfuse as necessary. Use packed cells if available (page 14).

INFECTION OF THE GENITAL TRACT

PUERPERAL SEPSIS

- **Mild Infection**

Prescribe oral antibiotics like:

- Co-amoxiclav (Augmentin), 375mg / 625mg, every 8 hours, for 7 days

OR

- Amoxicillin, 1g, stat, followed by 500 mg, every 8 hours, for 7 days

PLUS

- Metronidazole, 400 or 500mg, every 8 hours, for 7 days

- **Severe Infection**

Prescribe a combination of antibiotics to provide as broad coverage as possible, **until the woman is fever-free for 48 hours**:

- Ampicillin, 1g, I/V, every 6 hours

PLUS

- Gentamicin, 80 mg, I/V, every 8 hours

PLUS

- Metronidazole, 500 mg, I/V, every 8 hours

- If fever is still present 48 hours after initiating antibiotics, re-evaluate and revise diagnosis / treatment.

- **If retained placental fragments** are suspected, perform a digital exploration of the uterus to remove clots and large pieces. Give at least one dose of combination antibiotics before the procedure.

- If there is **no improvement** with conservative measures and there are **signs of general peritonitis**, perform a laparotomy to drain the pus.

- If the uterus is necrotic **and septic**, perform subtotal / total hysterectomy (page 273).

- Repeat TT after 4 weeks for future protection.

INFECTION OF THE GENITAL TRACT

PERITONITIS	PELVIC ABSCESS
<ul style="list-style-type: none">• Do not allow oral fluids or diet.• Pass naso gastric tube and aspirate contents of the stomach by suction.• Infuse I/V fluids e.g. Normal Saline, Ringer's Lactate or Dextrose Saline• Give a combination of antibiotics until the woman is fever-free for 48 hours:<ul style="list-style-type: none">- Ampicillin, 1 g, I/V, every 6 hours<p style="text-align: center;">PLUS</p><ul style="list-style-type: none">- Gentamicin, 80 mg, I/V, every 8 hours<p style="text-align: center;">PLUS</p><ul style="list-style-type: none">- Metronidazole, 500 mg, I/V, every 8 hours• If not responding in 24-48 hours, Refer	<p>Give a combination of I/V antibiotics before draining the abscess and continue until the woman is fever-free for 48 hours (page 44):</p> <ul style="list-style-type: none">- Ampicillin, 1 g, I/V, every 6 hours <p style="text-align: center;">PLUS</p> <ul style="list-style-type: none">- Gentamicin, 80 mg, I/V, every 8 hours <p style="text-align: center;">PLUS</p> <ul style="list-style-type: none">- Metronidazole, 500 mg, I/V, every 8 hours
<ul style="list-style-type: none">• Perform laparotomy for peritoneal lavage (wash-out).	<ul style="list-style-type: none">• If the abscess is fluctuating in the cul-de-sac:<ul style="list-style-type: none">- Drain the pus through the cul-de-sac (colpotomy) (page 279).- If the spiking fever continues, perform a laparotomy to drain the pus and peritoneal lavage if needed (wash out).

BREAST RELATED CONDITIONS CAUSING PUERPERAL PYREXIA

BREAST ENGORGEMENT

- If the **woman is breastfeeding** and the **baby is not able to** suckle, encourage the woman to express milk by hand or with a pump.
 - **If the woman is breastfeeding and the baby is able to suckle:**
 - Encourage the woman to breastfeed more frequently, using both breasts at each feeding.
 - Show the woman how to hold the baby and help it attach to the breast.
- Relief measures **before** feeding may include:
- Apply warm compresses to the breasts just before breastfeeding, or encourage the woman to take a warm shower / bath.
 - Have the woman express some milk manually prior to breastfeeding.
- Relief measures **after** feeding may include:
- Support breasts with a binder or brassiere.
 - Apply cold compress to the breasts between feedings to reduce swelling and pain.
 - Give Paracetamol, 500 mg, by mouth, every 4-6 hours as needed.
 - Follow up 3 days after initiating management to ensure response.
- **If the woman does not want to breastfeed:**
 - Support breasts with a binder or brassiere.
 - Apply cold compresses to the breasts to reduce swelling and pain.
 - Avoid massaging or applying heat to the breasts.
 - Avoid stimulating the nipples or expression of milk.
 - Give Paracetamol, 500 mg, by mouth, every-6 hours, as needed.
 - Follow up 3 days after initiating management to ensure response.

BREAST RELATED CONDITIONS CAUSING PUERPERAL PYREXIA

BREAST ABSCESS

- Treat with antibiotics:
 - Cloxacillin (available as Orbenin), 500 mg, by mouth, four times per day, for 10 days.

OR

 - Erythromycin, 250 mg, by mouth, three times per day, for 10 days.
- Drain the abscess (page 208).
- Encourage the woman to continue breastfeeding even when there is collection of pus.
- Support breasts with a binder or brassiere.
- Apply cold compresses to the breasts between feedings to reduce swelling and pain.
- Give Paracetamol, 500 mg, by mouth, 4-6 hourly as needed.
- Follow up 3 days after initiating management to ensure response.

MASTITIS

- Treat with antibiotics:
 - Cloxacillin (available as Orbenin), 500 mg, by mouth, four times per day, for 10 days.

OR

 - Erythromycin, 250 mg, by mouth, three times per day, for 10 days.
- Encourage the woman to continue breastfeeding.
- Support breasts with a binder or brassiere.
- Apply cold compresses to the breasts between feedings to reduce swelling and pain.
- Give Paracetamol, 500 mg, by mouth, 4-6 hourly as needed.
- Follow up 3 days after initiating management to ensure response.

INFECTION OF URINARY TRACT CAUSING PUERPERAL PYREXIA

CYSTITIS
<p>Treat with antibiotics:</p> <ul style="list-style-type: none"> - Amoxicillin, 500 mg, by mouth, three times per day, for 3 days <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> - Co-trimaxazole (available as Septran), (160 / 800 mg) 1 tablet, by mouth, two times per day, for 3 days. <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> - Pipedimic acid (Urixin), 400 mg, by mouth, three times a day, for 5-7 days. <ul style="list-style-type: none"> - If treatment fails, check urine culture and sensitivity, if available, and treat with an antibiotic appropriate for the organism. - If infection recurs two or more times check urine culture and sensitivity, if available, and treat with an antibiotic appropriate for the organism.

ACUTE PYELONEPHRITIS:
<ul style="list-style-type: none"> • If shock is present or anticipated, initiate immediate treatment (page 21). • Check urine culture and sensitivity, if possible, and treat with an antibiotic appropriate for the organism. • If urine culture is unavailable, treat with antibiotics until the woman is fever-free for 48 hours: <ul style="list-style-type: none"> -Ampicillin, 1 g, I/V, every 6 hours <p style="text-align: center;">PLUS</p> <ul style="list-style-type: none"> -Gentamicin, 80 mg, I/V, every 8 hours • Once the woman is fever-free for 48 hours, give Amoxicillin, 1 g, by mouth, three times per day, to complete 14 days of treatment. Note: Clinical response is expected within 48 hours. If there is no clinical response in 72 hours, re-evaluate results and antibiotic coverage.

	Basic + comprehensive EmOC
	Comprehensive EmOC (Needs Referral)