MANAGEMENT PROTOCOL ON SELECTED OBSTETRICS TOPICS FOR HOSPITALS

ጤና ሚኒስቴር - ኢትዮጵያ
MINISTRY OF HEALTH·ETHIOPIA
የዜጎች ጤና ለሃገር ብልፅግና!
HEALTHIER CITIZENS FOR PROSPEROUS NATION!

December 2020



TABLE OF CONTENTS

TABLE OF CONTENTS ii
FOREWORD iv
ACRONYMS v
ACKNOWLEDGMENT vii
LIST OF CONTRIBUTORS viii

1 ..... **RESPECTFUL MATERNITY CARE** **1**
2 ..... **RAPID INITIAL ASSESSMENT AND EMERGENCY MANAGEMENT** **6**
3 ..... **TRIAGE** **10**

LIAISON **12**

4 ..... **ANTENATAL CARE** **16**
5 ..... **ECTOPIC PREGNANCY** **23**
6 ..... **MOLAR PREGNANCY** **29**
7 ..... **HYPEREMESIS GRAVIDARUM** **33**
8 ..... **ANTEPARTUM HEMORRHAGE** **39**

PLACENTAL ABRUPTION **39**
PLACENTA PREVIA **41**
ADHERENT PLACENTA **42**

9 ..... **MULTIPLE PREGNANCY** **44**
10 ..... **PREMATURE RUPTURE OF MEMBRANE** **50**

APPROACH TO MANAGEMENT OF PROM **51**

11 ..... **MANAGEMENT OF LABOR AND DELIVERY** **56**
12 ..... **THIRD STAGE OF LABOR** **65**
13 ..... **NEWBORN CARE AT THE TIME OF BIRTH** **68**

14 POSTPARTUM CARE 78
ROUTINE POSTPARTUM/ POSTNATAL CARE 78
PUERPERAL FEBRILE MORBIDITIES 82
15 ABNORMAL LABOR 91
16 PRETERM LABOR 96
17 UMBLICAL CORD PROLAPSE 100
18 MALPOSITIONS AND MALPRESENTATION 103
OCCIPUT POSTERIOR POSITION 104
PERSISTENT OCCIPUT TRANSVERSE POSITION 105
BROW PRESENTATION 105
FACE PRESENTATION 106
COMPOUND PRESENTATION 107
TRANSVERSE LIE (SHOULDER PRESENTATION) 108
19 BREECH PRESENTATION 109
VAGINAL BREECH DELIVERY 111
CESAREAN DELIVERY 115
20 CEPHALOPELVIC DISPROPORTION 116
21 OBSTRUCTED LABOR AND UTERINE RUPTURE 120
OBSTRUCTED LABOR 120
UTERINE RUPTURE 126
22 POST PARTUM HEMORRHAGE 129
PRIMARY PPH 129
23 POST TERM PREGNANCY 139
24 INDUCTION AND AUGMENTATION OF LABOR 141
INDUCTION OF LABOR 141
AUGMENTATION OF LABOR 147
25 OPERATIVE VAGINAL DELIVERY 148
VACUUM DELIVERY 148
FORCEPS DELIVERY 150

CRANIOTOMY **153**
CRANIOCENTESIS **156**

26 **CESAREAN SECTION AND TRIAL OF LABOR AFTER CESAREAN SECTION (TOLAC)** **158**

CESAREAN SECTION (CS) **158**
TRIAL OF LABOR AFTER CESAREAN SECTION (TOLAC) **161**

27 **FAMILY PLANNING** **165**

28 **COMPREHENSIVE ABORTION CARE** **169**

29 **HIV IN PREGNANCY** **176**

30 **HYPERTENSIVE DISORDERS** **183**

GESTATIONAL HYPERTENSION **183**
PRE-ECLAMPSIA **184**
ECLAMPSIA: **188**
CHRONIC HYPERTENSION **191**

31 **DIABETES MELLITUS IN PREGNANCY** **192**

MANAGEMENT OF PREGESTATIONAL DIABETES MELLITUS **192**
MANAGEMENT OF GESTATIONAL DM **196**

32 **MALARIA IN PREGNANCY** **199**

REFERENCES **204**

FOREWORD

Ethiopia made a significant achievement in the last two decades to reduce maternal and neonatal mortality. However, reduction in preventable mortality is still a challenge. A number of factors contributed to high maternal and neonatal mortality. In addition to a diverse range of individual and household problems, health system challenges like poor infrastructure and supply, shortage of skilled manpower, weak referral system and poor quality of care, lack of standard guideline and protocols along the continuum of care are the most important factors.

High impact interventions like preconception care, family planning service, access and quality emergency obstetric and newborn care services, skilled care during child birth and delivery, skilled postnatal care and comprehensive abortion care service will significantly reduce maternal and newborn mortality and morbidity which will help achieve the sustainable development goal.

Even among those who received skilled care at continuum of care, adverse obstetric outcomes remain higher than expected in most low-income countries. This might be due to poor access to timely and appropriate obstetric care within health facilities. Sometimes there is potential for important steps of management to be missed in emergency obstetric and newborn situations, even in the presence of many health care team members.

Cognizant with this, Ministry of Health-Ethiopia, revised the 2010 hospital protocol by organizing three series of workshops involving experts in the field from universities, partners and Ministry of Health staff. Relevant evidence based up to date global and national guidelines and recommendations were used in the protocol revision considering the national policy and plan, strategy, standards, potential implementation capacity and challenges on maternal and newborn health care.

Having evidence based revised version of this obstetric protocol at each level of hospitals will help to ensure standardized care and practice , continuity of care and promotes positive health outcomes. In addition, this obstetric protocol will allow systematic approach for a specific obstetric and newborn condition, helps to avoid serious mistakes and variation in treatment. It also help to order correct investigations and to institute optimal treatment. The protocol is designed for use by health professionals involved in maternal and newborn health care at all levels of the hospitals (primary, general and teaching), for pre-service health education, private and non-government organization hospitals and centers.

166

This protocol touches on the management of common obstetric problems encountered during clinical practice and professionals can use their experience and judgment if there is a need and new or recommendations which were not included in this protocol as evidences subject to change with time.

This protocol will contribute significantly in improving quality of care and patient safety for every woman and every newborn and is critical to implement it as soon as possible in order to accelerate reductions in maternal and new born mortality and morbidity .Hence, this is to underscore that the ministry of health will put all its effort for the realization of all recommendations included in this protocol to ensure a positive pregnancy and child birth outcome.

ACRONYMS

Act D	Actinomycin D
AIDS	Acquired Immuno deficiency Syndrome
ALAT	Alanine Amino Transferase
AMTSL	Active Management of Third Stage of Labor
ANC	Antenatal care
APH	Antepartum Hemorrhage
ARM	Artificial Rupture of Membranes
ARV	Anti Retrovirals medications
ASAT	Aspartate Amino Transferase
AZT	Azathioprine
BCG	Bacille Calmette Guerin
BMI	Body Mass Index
BP	Blood Pressure
BPD	Biparietal Diameter
BPM	Beats Per Minute
BPP	Biophysical Profile
CBC	Complete Blood Count
CCT	Controlled Cord Traction
CIN	Cervical Intraepithelial Neoplasia
CNS	Central Nervous System
COC	Combined Oral Contraceptive
CPD	Cephalo Pelvic Disproportion
CS	Cesarean Section
CST	Contraction Stress Test
CTG	Cardio Tocography
CVA	Cerebro-Vascular Accident
CVP	Central Venous Pressure
D & C	Dilatation and Curettage
DM	Diabetes Melitus
DPT	Diphtheria, Pertusis, Tetanus
DT	Diphtheria, Tetanus
DS	Dextrose in Saline
DTR	Deep Tendon Reflex
DVT	Deep Venous Thrombosis

166

DW	Dextrose in Water
ECV	External Cephalic Version
EDD	Expected date of Delivery
ERCS	Elective Repeat Caesarean Section
FA	Folic Acid
FBS	Fasting Blood Sugar
FDP	Fibrin Degradation Product
FFP	Fresh Frozen Plasma
FGC	Female Genital Cutting
FHR	Fetal Heart Rate
FP	Family planning
FPD	Feto Pelvic Disproportion
GA	Gestational Age
GDM	Gestational Diabetes Mellitus
GS	Gestational Sac
GTD	Gestational trophoblastic disease
HAART	Highly Active Anti Retroviral Treatment
HBsAG	Hepatitis B Surface Antigen
hCG	Human Chorionic Gonadothrophin
Hct	Hematocrit
HEENT	Head, Eye, Ear, Nose and Throat
HEP	Hepatitis Vaccine
HG	Hyperemesis Gravidarum
HIV	Human Immunodeficiency Virus
HPV	Human Papiloma Virus
HTPs	Harmful Traditional Practices
ICU	Intensive care Unit
IFG	Impaired Fasting Glucose
IGT	Impaired Glucose Tolerance
IM	Intramuscular
ITN	Insecticide Treated Net
IU	International Unit
IUD/IUCD	Intrauterine contraceptive device
IUFD	Intrauterine Fetal Death
IUGR	Intrauterine Growth Restriction
IUP	Intrauterine pregnancy
IV	Intravenous
JVP	Jugular Venous Pressure
LAM	Lactational Amenorrhea Method
LBW	Low Birth Weight
LDH	Lactate Dehydrogenase
LFT	Liver Function Test
LGA	Large for Gestational Age
LMP/LNMP	Last normal menstrual period
LOA	Left Occipito Anterior
MA	Mento Anterior
MEC	Medical Eligibility Criteria
MRN	Medical Record Number
MTCT	Mother To Child Transmission
MTX	Methotrxate
MVA	Manual Vacuum Aspiration
mU	milli Units
NaCL	Sodium Chloride

166

NGT	Naso Gastric Tube
NPO	Nothing Per Os
NRFHR	Non reassuring Fetal Heart Rate
NST	Non Stress Test
NVP	Niverapine
OA	Occipito Anterior
OGTT	Oral Glucose Tolerance Test
OIs	Opportunistic Infections
OL	Obstructed Labor
OP	Occipito Posterior
OPD	Out Patient Department
OPV	Oral Polio Vaccine
PCP	Pneumocystis Carinii
PCWP	Pulmonary Capillary Wedge Pressure
PID	Pelvic Inflammatory Disease
PIH	Pregnancy Induced Hypertension
PMTCT	Prevention of mother to child transmission
PO	Per Oral
PPFP	Postpartum family planning
PPH	Post Partum Hemorrhage
PROM	Premature Rupture of Membranes
PSTT	Placental Site Trophoblastic Tumors
PT	Prothrombine Time
PTT	Partial Thromboplastine Time
RFT	Renal Function Test
Rh	Rehsus
RMC	Respectful Maternity Care
ROA	Right Occipito Anterior
ROM	Rupture of Membranes
RPR	Rapid Plasma reagin
RR	Respiratory Rate
RUQ	Right Upper Quadrant
SGA	Small for Gestational Age
SIL	Squamous Intraepithelial Lesion
SoB	Shortness of Breath
SST	Saline Suspension Test
STDs	Sexually Transmitted Diseases
STI	Sexually Transmitted Infection
TAT	Tetanus Anti Toxin
TB	Tuberculosis
TT	Tetanus Toxoid
TTTS	Twin to Twin Transfusion Syndrome
US	Ultrasound
UTI	Urinary Tract Infection
VDRL	Venereal Disease Research Laboratory
WBC	White Blood Cell
WHO	World Health Organization
ZDV	Zudovudine

ACKNOWLEDGMENT

The Ministry of Health would like to convey a special gratitude for Engender Health of Ethiopia, World Health Organization and World Vision

166

Ethiopia for their technical and financial contributions in the revision and finalization process of the protocol.
Special thanks go to those health professionals who devoted their time and energy throughout the revision process. We would like to thank Dr Mulat Adefris, Mr Zenebe Akale, Mr Sheleme Humnessa and Sr Zemzem Mohammod who managed to coordinate all the revision process. We also grateful for Dr and Dr who did a final touch to the content of the document and did the editorial process.
We appreciate members of universities, partners and professional associations for giving their feedback during the revision.

166

LIST OF CONTRIBUTORS

This protocol is a collaborative effort of medical professionals and program managers from various disciplines with huge experience in the field. MOH would like to acknowledge all who participated in the revision process.

Name	Organization
Dr Eyasu Mesfin	AAU
Dr Berhanu Kebede	Yekatit 12 Hospital
Dr Dereje Nigussie	Abt Associate
Sheleme Humnessa	MOH
Etenesh Gebreyohaness	MOH
Dr Mulat Adefris	MOH/EH
Dr Balkachew Nigatu	SPMMC
Dr Meseret Zelalem	MOH
Zenebe Akale	MOH
Dr Mengistu Tefera	Engender health
Dr Fikru zeleke	Adama Teaching Hospital
Sr. Zemzem mohammod	MOH
Dr Fikremelekote Temesgen	AAU
Dr Gelane Lelisa	Yekatit 12 Hospital
Dr Hailemariam Segni	Transform Primary
Dr Wassie Lingerh	MOH/EH
Takele Yeshwas	MOH/MSI
Dr Nega Tesfaw	MSI
Dr Kiros Terefe	University of Gondar
Dr Goitom Gebreyesus	AAU
Likelesh Lemma	MOH
Dr Wondimu Gudu	SPMMC
Hinsermu Bayu	Arsi University

166

Name	Organization
Zewge Moges	EMWA
Melaku Tamir	IESO association
Dr Mekdes Daba	ESOG
Sr Aster Berhe	UNFPA
Dr Ahadu Workneh	St Peter Hospital
Dr Haimanot Ambelu	WHO
Dr Zeray Kahsay	Hawassa University
Sr Aster Teshome	MOH
Sr Meseret	
Sr Roza Teshome	AAU
Dr Dilayehu Bekele	SPMMC
Dr Fithanegest Mamo	Mekele University
Aklilu Kefyalew	Woreda 11 Health center , AA
Abeba Mekonnen	AMREF
Dr Adem Jambo	Arsi University
Dr. Solomon Kumbi	AAU
Sr Haweni Adugna	AAU
Sr Eyerusalem Meseret	Kotebe Metropolitan University
Dr Tamiru Minwyelet	University of Gondar
Dr Yirgu Gebrehiwot	AAU
Dr Girma Derbie	St Petros hospital
Dr Fenta Assefa	Jimma University
Elizabeth Kassaye	GHSC-PSM/MOH
Sr Senait Birhanu	Kotebe Health Center
Sr. Mintiwab Gelagay	Jepaigo

166

166

166



RESPECTFUL MATERNITY CARE

INTRODUCTION

Respectful Maternity Care (RMC) refers to care organized for and provided to all women in a manner that maintains their dignity, privacy and confidentiality, ensures freedom from harm and mistreatment, and enables informed choice and continuous support during pregnancy, labour and childbirth and postnatal period.

RMC is an attitude that permeates each word, action, thought, and non-verbal communication involved in the care of women during pregnancy, childbirth, and the postnatal period. Provision of RMC is in accordance with a human rights-based approach to reduce maternal and neonatal morbidity and mortality. See table 1 below for categories of disrespect and abuse with Corresponding Rights.

Table 1. *Categories of disrespect and abuse with corresponding rights*

Category of disrespectful and abusive care	Example	Corresponding rights
Physical abuse	• Slapping, pinching, pushing, beating	• Freedom from harm and ill treatment
Non-consented care	• Doing procedure, • Providing medication without verbal or oral consent.	• Right to information, • Informed consent and refusal, and • Respect for choices and preferences, including companionship during maternity care
Non-confidential care	• Lack of privacy (laboring in public or disclosure of patient	• Confidentiality, privacy

Category of disrespectful and abusive care	Example	Corresponding rights
	information	
Non-dignified care (including verbal abuse)	• Intentional humiliation, rough treatment, shouting, blaming, laughing at patient, • Not introducing self, • Not calling patient by name.	• Dignity, respect
Discrimination based on specific attributes	• Discrimination based on age ethnic, religion and finance	• Equality, freedom from discrimination, • Equitable care
Abandonment or denial of care	• Women left alone during labor and birth, • Failure to provide monitoring and intervene when needed	• Right to timely healthcare and • Right to the highest attainable level of health
Detention in facilities	• Detention of patient/family in health facility after delivery usually due to failure to pay.	• Liberty, • Autonomy, • Self-determination, and • Freedom from coercion

POTENTIAL CONTRIBUTORS TO DISRESPECT AND ABUSE

- Service delivery related
  - Lack of standards, leadership and supervision
  - lack of accountability mechanisms at health facility
  - Lack of appropriate drugs, supply and equipment
- Providers related
  - Discriminatory behaviour against certain sub-groups of women based on, ethnicity, age, infectious disease status (e.g HIV), financial and educational status of woman.

- Provider demotivation related to weak health systems (shortages of human resources & professional development opportunities).
- Provider status (e.g behavioral, physical and emotional status).

PRINCIPLES OF RESPECTFUL CARE:

Respectful care has the following seven core principles:-

1. Identify factors affecting individual's dignity
2. Recognize diversity and the uniqueness of individual
3. Communicating with individuals in ways that are meaningful to them
4. Identify and challenge care that may reduce the respect of the individual
5. Uphold the responsibility to shape care and support services around each individual (understand the implications of the individual's mental capacity, knowledge and experience, client's involvement and level of participation in care planning and treatment.)
6. Recognize that an individual's surroundings and environments are important to their sense of respect (welcoming atmosphere, respect for personal space and privacy)
7. Value workplace cultures that actively promote the respect for everybody (a positive enabling environment for health care professionals to provide respectful maternity care)

PROVIDING RESPECTFUL MATERNITY CARE

It should be emphasized that provision of respectful maternity care involves holistic approach (policy makers, hospital leaders/ managers, health care providers and community).

PROVIDER CONSIDERATIONS:

Maintain privacy

During provision of all maternal health care services, use curtains, doors, screens and separate rooms to maintain environmental privacy and confidentiality. Ensure bodily privacy by covering body and minimizing time exposed during undressing and clothing.

Maintain confidentiality

All identifiable information about a patient's health status, medical condition, diagnosis, prognosis and treatment and all other information of a client must be kept confidential.

Have an informed consent

Provide complete information for the woman (or her family) about the purpose, benefits, risks and other alternatives before she receives the care intended. A woman (or her family) has a right to decline any treatment or procedure offered.

Have effective communication

- Speak in a calm quiet manner and assure the woman that the conversation is confidential.
- Be sensitive to any cultural or religious considerations and respect her views.
- Ask the woman whom she would like to be present. Facilitate the presence of only those she chooses to be present.
- Encourage the woman and her family to speak honestly and completely about her condition.
- Listen to what the woman and her family have to say and encourage them to express their concerns; try not to interrupt.
- Let the woman know that she is being listened to and understood.
- Use supportive nonverbal communication such as nodding and smiling.
- Answer the woman's questions directly in a calm and reassuring manner.
- If a woman must undergo a surgical procedure, explain to her the nature of the procedure and its risks and help to reduce her anxiety.
- Ask the woman to repeat back to you the key points to ensure her understanding.

Provide supportive care:

- A woman should be made to feel as comfortable as possible when receiving care.
- Respect the woman's choices and preferences including birthing position options, companion ship during maternity care, procedures and treatment.
- Emotional and psychological support for patients (or family members) with poor obstetric outcome (e.g still birth, hysterectomy, etc)
- Facilitate on site clinical mentorship.

- Provide adequate pain management.

ORGANIZATIONAL CONSIDERATIONS:

Staffing

There should be adequate numbers of competent and trained staff with appropriate skills mix (health work force), working in multidisciplinary teams that are able to provide respectful and continuous care to all women. There should be regular practice-based training on RMC provision to enable effective delivery of RMC services that meet the social, cultural and linguistic needs of women and orientation of new staff.

Supply:

- Provisions for staff in labor ward e.g. refreshments (snacks, drinks).
- Health education materials in written or pictorial format, accessible and available in the languages of the communities served by the health care facility.
- A standard informed consent form.
- Information (written or pictorial, e.g. as leaflets) for the woman and her companion.
- Essential medicines for maternal and new-born health care that is available in sufficient quantities at all times.

Equipment:

Basic and adequate equipment for maternal and new-born health care that is available in sufficient quantities at all times in the health facility.

Infrastructure:

The facility should ensure the presence of enhanced physical environment including:-

- Rooming-in to allow women and their babies to remain together.
- Clean, appropriately illuminated, well ventilated maternity service area that allow for privacy and are adequately equipped and maintained.
- Continuous energy supply in the labour, childbirth and neonatal areas.
- Clean and accessible bathrooms for use by pregnant women, laboring and postnatal mothers.

- Safe drinking water and a hand hygiene station with soap or alcohol-based hand rubs.
- Curtains, screens, partitions and sufficient bed capacity.
- Facilities for labor companions, including physical private space for the woman and her companion.
- On-site pharmacy (labor ward) and a medicine and supplies stock management system that is managed by a trained pharmacist or dispenser.

Supervision and monitoring:

- Regular supportive supervision by labour ward/facility leaders.
- Staff meetings to review RMC practices.
- Easily accessible mechanism (e.g. a box) for service users and providers to submit complaints to management.
- Establishment of accountability mechanisms to prevent mistreatment or violations.
- Establishment of informed consent procedures.

Strengthening referral linkage:

Good-quality supervision, communication and transport links between facilities needs to be established to ensure that referral pathways are efficient.

1 RAPID INITIAL ASSESSMENT AND EMERGENCY MANAGEMENT

DEFINITION:

It means immediate identification and recognition of specific problems for taking quick action to save the life of the patient during arrival to the facility.

All staff at the health facility should perform a Quick Check of a woman who presented with an emergency condition.

QUICK CHECK

- Observe the woman:
  - Did someone carry her into the health institution, and how was she transported?
  - Is there blood on her clothing or on the floor beneath her?
  - Is she grunting, moaning, or bearing down?
  - Is she conscious and alert?
- Ask the woman or her companion whether she has or has recently had:
  - Vaginal bleeding, severe headache/blurred vision, convulsions or loss of consciousness, difficulty breathing, fever, severe abdominal pain, pushing down pain.
- If the woman has or recently had ANY of the above danger signs, immediately:
  - Call for help.
  - Don't panic, focus on the needs of the woman.
  - Do not leave the woman unattended.
  - Ask and check relevant information from referral.
  - Avoid confusion by having one person in charge

RAPID INITIAL ASSESSMENT AND MANAGEMENT PRINCIPLES

See table 2 below for principles to be followed for selected danger signs during rapid initial assessment and management.

Table 2. *Rapid initial assessment and management principles for selected danger signs.*

Danger sign	Ask and check	Perform	Consider
Breathing difficulty	• Cyanosis (blueness) • Skin: pallor • V/S • Oxygen saturation • Signs of respiratory distress • Lungs: wheezing or rales	• Prop up the woman on her left side • Maintain airway • Give oxygen at 4–6 L/min. by mask or nasal cannulae • Investigations to determine the cause and initiate specific management	• Severe anemia • Heart failure • Pneumonia • Pulmonary edema • Asthma
Convulsion or loss of consciousness	• Airway patency • V/S- focus on BP, temp • If pregnant, length of gestation • Neck stiffness	*If the woman is unconscious:* • Position her on her left side; *If the woman is convulsing:* • Position her on her left side • Never leave the woman unattended • Protect her from injuries (eg. fall from bed) • If the cause of convulsion has not been determined, manage as eclampsia and continue to investigate other	• Eclampsia • Hypoglycemia malaria • Epilepsy • Tetanus

Danger sign	Ask and check	Perform	Consider
		causes.	
High grade fever	• Weakness, lethargy • Frequent, painful urination • V/S • Consciousness • Neck stiffness • Lungs: shallow breathing, consolidation • Abdomen: tenderness • Vulva: purulent discharge • Breasts: tender	• Increased fluid intake by mouth/IV • Use a fan or tepid sponge, and if necessary, open a window to help decrease temperature • Antipyretics - paracetamol 500–1000 mg every six to eight hours, diclofenac 75mg IM if unconscious • Determine the exact cause and start specific management	• UTI • Malaria • Endometritis • Pelvic abscess • Peritonitis • Breast infection • Complications of abortion • Pneumonia
Abdominal pain	• If pregnant, gestational age • V/S • Abdominal wall movement with respiration • Abdominal tenderness, • Peritoneal fluid collection, • Uterine size and tenderness, • Cervical motion tenderness	• Determine the specific cause • Initiate targeted management	• Ovarian cyst torsion/rupture • Appendicitis • Ectopic pregnancy • Possible term or preterm labor • Amnionitis • Abruptio placentae • Ruptured uterus

Danger sign		Ask and check	Perform	Consider
Vaginal bleeding	Early pregnancy	• Gestational age, pain, passage of vesicles • V/S, uterine size, abdominal tenderness,	• Call for help, • Monitor vital signs. • Turn the woman onto her side to minimize the risk of aspiration	• Abortion, • Ectopic or • Molar pregnancy
	Late pregnancy	• Gestational age • Color and amount of bleeding, abdominal pain, fetal kick	• Keep the woman warm but do not overheat her Elevate the legs if in shock • Start IV infusion (2 lines)	• Placenta praevia, • Abruptio placentae, • Ruptured uterus
	Post-delivery	• Duration of delivery, • Color and amount of bleeding • Uterine size and consistency • Vulvar evaluation	• Blood typing and cross match • Determine specific cause and start targeted management	• Ruptured uterus, • Uterine atony, • Tears of genital tract, • Retained placenta or placental fragments

Note:

- *The woman also needs prompt attention if she has any of the following signs: gush of fluid per vaginum, pallor, weakness, fainting, severe headache, blurred vision, vomiting.*
- *The woman should be sent to the front of the queue and promptly treated.*

REFERRAL

- After emergency management, discuss the decision to refer the woman with her and the family.
- Quickly organize transport and possible financial aid.

- Inform the referral center by radio or phone.
- Give the woman a referral slip containing all the necessary identification and clinical information.
- Send with the woman:
    - A health worker trained in child birth care
    - Essential emergency drugs and supplies
    - A family member who can support and attend her
    - If there is a newborn, send a family member who can go with the mother to care for the neonate.
- During journey:
    - Maintain IV infusion
    - Keep the woman (and newborn, if born) warm but do not overheat
    - Give appropriate treatment on the way
    - Keep record of all IV fluids, medications given, time of administration, and woman's condition

Note: Most emergencies happening in the hospital can be prevented by:

- Careful planning
- Following clinical guidelines
- Close monitoring of the woman

Remark: *For specific management of each emergency condition refer to appropriate sections in this document and other relevant national protocols.*

TRIAGE

DEFINITION:

Sorting of obstetric patients at the triage unit into priority groups according to their need or level of acuity.

OBSTETRIC TRIAGE UNIT

It is an assessment area adjacent to L&D ward staffed with competent health care provider/s and functional 24 hrs/7days for any condition that requires further assessment and care. The triage area is the 1st contact point for patients with the ED/EU staff and should be situated at the entrance of the ED/EU with easily recognizable signage for patients and the general public.

The emergency-waiting area should be located near to the triage area with easy access and suitable for observation and follow up of patients by the triage nurse. Patients with stable conditions should remain in the waiting area until the physician is ready to evaluate their conditions.

NOTE: In hospitals where there is a central triage pregnant and labouring mothers are not supposed to visit the central triage. They rather are directly seen at the obstetric triage unit.

OBJECTIVES:

1. To identify emergency or life-threatening problems of the pregnant woman and/or fetus.
2. To provide timely emergency or life saving treatment and prevent further complications
3. To determine further assessment and plan further management
4. To utilize resources efficiently and prevent unnecessary admissions.
5. To improve client/patient flow and decrease waiting time.

NB: *The specific health institution should have clear admission criteria at the triage unit.*

ACTIVITIES IN THE TRIAGE UNIT:

Women should be cared for according to triage acuity rather than by time of arrival. Emergency patients should access to the triage area without hindrance of their financial capacity and/or other issues. All emergency cases should be seen at the triage unit; and rapid initial assessment and immediate initial management (see chapter 1 above) should be provided by competent health care providers. All women presenting for care to the triage unit should be assessed using the triage assessment sheet (Annex 1) and be registered on the triage log book.

Main activities:

- Initiate appropriate triage assessment and emergency care.
- Classify acuity level based on the five level color coded emergency triage system using the triage assessment and acuity scale classification tool shown below (Annex 2).
- Request very important investigations
- Initiate appropriate interventions based on their level of acuity (Annex 3).
- Reassess and re-triage as necessary
- Transfer patients according to their level of acuity to labour & delivery or maternity ward, medical side, procedure room, or waiting area.

NB: If admission is not possible refer to other health institutions following the standard referral procedures.

EMERGENCY TRIAGE EQUIPMENT AND SUPPLY REQUIREMENTS

The obstetrics triage should be equipped with the following items as a minimum. Each hospital should conduct its own assessment to determine the quantity of each item and any other necessary items in addition to the following:

- Examination coach/stretcher
- Thermometer
- Stethoscope
- Adult sphygmomanometer/BP Cuff
- Pulse oximeter
- Oxygen and O2 administration face mask
- Glucometer
- 40% glucose
- Tourniquet
- Ambu-bags (adult & neonatal)
- Suction machines and tubes

- Air-way
- IV fluids and canula
- Syringes and needles
- Catheter
- NG-tube
- Delivery set
- MVA set
- Light source
- Weight scale- adult/paediatric- hanging, tape measures
- Emergency management flow chart
- Screens or partitions
- Wheelchairs, stretchers
- Personal protective equipment
- Emergency drugs (oxytocin, ergometrin, hydralazine, adrenalin, hydrocortisone, MgSO4,calcium gluconate,e.t.c.)
- Triage assessment sheet
- Triage Acuity Scale

LIAISON

DEFINITION:

Liaison is a means of good communication on specific case management readiness from sending and receiving referrals with facilitation beyond checking availability of beds.

There is no need for separate liaison office or officer for Obstetrics and Neonatology departments.

PROCEDURE:

- Referring facility health care provider should call/contact the receiving hospital□s specific obstetrics department or Neonatology department.
- Receiving facility will take highlight about specific referral and reason for referral from the referring health professional.
- Receiving facility□s responding health care provider should inform the senior in charge and the team about the specific case and has to get ready specified to referred cases
- Pre informed receiving facilities will rapidly initiate assessment and decide management after triaging specific obstetrics or neonatal cases.

Note: Liaison referring physician communication with accepting physician

- Creates strong referral linkage,

- Minimizes wasted time and investigation repeatedly done
- Minimizes repeated medication provision
- Saves lives of mothers and neonates

Annex 1. **Triage Assessment Sheet**

Arrival Date: _____

1. Name _____ Age ___ Sex ___ Card No. _____ Address _____
2. Time of Illness/accident _____ Time at arrival to ED _____ Triage time _____
3. Mode of arrival to the Hospital/ED: € Ambulance € Private car € Taxi € Carried € Walking
4. Origin of Referral € Government Hosp € Private Hosp € Health cent € Self € Police
5. Pre-Hospital care/First aid given: € Yes € NO
6. Gravidity _____ Parity_____ Abortion _____ LNMP_____ _____ GA by Date _____
7. Presenting complaints

Pushing down pain	Convulsion	Epigastric pain	Fever
Leakage of Fluid	Sudden collapse	Shortness of breath	Chest pain
Decreased fetal kick	Headache	Constant abd. pain	Flank pain
Vaginal Bleeding	Blurred Vision	Diarrhea /Vomiting	Trauma

Other (Specify) _____

8. Physical Examination
   - General Appearance: _____
   - Vital Signs: BP_____ PR_____ RR_____ T_____ O2 Saturation_____
   - HEENT_____
   - Chest Finding _____
   - CVS _____
   - Abdominal Examination Findings:
     - Fundal height _____ Lie _____ Presentation _____
     - Uterine contraction ___/___/_____
     - FHB _____/ min
   - Pelvic Examination (if done):
     - Active vaginal bleeding: € Yes € No
     - Cervical Status (Dilatation, effacement, Position, Station) _____ _____
     - Other findings: Caput: _____ Moulding: _____
     - Membrane status: € Intact € Ruptured (status of the liquor _____)
   - CNS _____
9. Investigation results

- o BG & RH_____ HGB/HCT _____ HBsAg _____ Urine hCG _____ HIV testing_____
- o Others _____

10. Assessment _____
11. **Color code:** € **RED** € **ORANGE** € **YELLOW** € **GREEN** € **BLUE**
12. Action taken: _____
13. Transfer to: € Resuscitation room € Labor ward € OR € Regular OPD € Home
    € Procedure room € Regular ward € Waiting room € Refered out € Other
14. Revaluation time (If applicable) _____
15. Remarks: _____

16. **Name & Signature:**
    _____

Annex 2. **Triage assessment and acuity scale classification tool**

Triage Acuity Scale	Level 1 (Resuscitative)	Level 2 (Emergent)	Level 3 (Urgent)	Level 4 (Less Urgent)	Level 5 (Non-Urgent)
Time for initial contact with care providers	Immidiate	≤15 minutes	≤30 minutes	≤60 minutes	Within 120 minutes or less
Re-assessment time	Continiuos care	Every 15 minutes	Every 15 minutes	Every 30 minutes	Every 60 minutes
Labour/ Fluid leakage	• Imminent birth	• Suspected Preterm labour or Preterm PROM	• Signs of active labour in GA ≥ 37weeks	• Signs of early labour • Term PROM	
Vaginal bleeding	• Active vaginal bleeding with or without abdominal cramp • Hemodynamically unstable	• Bleeding associated with cramping and moderate in amount and GA<37 weeks but no vital signs derangement	• Bleeding associated with cramping (mild to moderate in amount and GA ≥37weeks)	• Spotting type of bleeding	
Hypertension	• Seizures • Coma	• Hypertension:SBP≥160 OR/& DBP ≥ 110mmHg • HTN with cerebral or visual symptoms • Epigastric or right upper quadrant pain	• Mild HTN: BP <160/110 mmHg with or without associated signs and symptoms		
Fetal Assessment	• Abnormal FHB tracing/ NRFHRP/ • Absent fetal movement	• Non-Reassuring BPP • Abnormal Doppler study • Decreased fetal movement			

Other	• Cord prolapse • Acute severe abdominal pain • Severe cardio-respiratory distress • Suspected sepsis • Altered level of consciousness	• Major trauma • Shortness of breath • Unattended delivery	• Abdominal or back pain which is more severe than expected in normal pregnancy • Flank pain, • Hematuria • Nausea & vomiting &/or diarrhea with suspected dehydration	• Minor trauma(Motor vehicle accident, or fall down injury) • Nausea/Vomiting &/or diarrhea with no dehydration • Signs of infection (i.e. fever, chills)	• Anything that does not seem to pose threat to mother or fetus

Complaint / clinical condition	Level of acuity	Intervention
• **Imminent birth** • **Active vaginal bleeding** • **Hemodynamically unstable** • **Seizures** • **Coma** • **Altered level of consciousness** • **Abnormal FHB tracing /NRFHRP/** • **Absent fetal movement** • **Cord prolapse** • **Acute severe abdominal pain** • **Severe cardio-respiratory distress** • **Suspected sepsis**	**Level 1 (Resuscitative)**	• Immediate intervention • Continiuos care • Initiate emergency care • Transfer immediately to labour & delivery ward, HDU or OR. • Inform and mobilize the labour ward &/or OR teams, call the most senior persons preferably Obstetrician and Anesthesiologist (if available). Or • Refer to next level of Health Institution with all pre-referral care and accompanying medical personnel.
• **Suspected Preterm labour or Preterm PROM** • **Bleeding associated with cramping and moderate in amount and GA<37 weeks but no vital signs derangement** • **Hypertension: SBP≥160 OR/& DBP ≥ 110mmHg** • **HTN with cerebral or visual symptoms** • **Epigastric or right upper quadrant pain** • **Non-Reassuring BPP** • **Abnormal Doppler study** • **Decreased fetal movement** • **Major trauma** • **Shortness of breath** • **Unattended delivery**	**Level 2 (Emergent)**	• Intervention in ≤15 minutes • Keep in the triage room until medical assessment or room on L&D ward available. • Open IV line access & obtain blood for basic lab tests(BG& Rh, CBC/Hgb, X-match, RBS & other important tests) • Keep NPO, • Inform Senior health provider (Obstetrician or IESO/GP/HO) • Obtain urine sample for PT, U/A • Monitor Fetal Condition • Bed side Ultrasound for BPP • Re-assessment every 15 minutes
• Signs of active labour in GA ≥ 37weeks • Bleeding associated with cramping (mild to moderate in amount and GA ≥37weeks) • Mild HTN: BP <160/110 mmHg with or without associated signs and symptoms • Abdominal or back pain which is more severe than expected in normal pregnancy • Flank pain, • Hematuria • Nausea & vomiting &/or diarrhea with suspected dehydration	**Level 3 (Urgent)**	• Intervention in ≤30 minutes • Keep in the triage room until medical assessment or room on L&D ward available. • Open IV line access & obtain blood for basic lab tests as required • Keep NPO, Inform Senior staffs (Obstetrician or IESO/GP/HO) • Obtain urine sample for PT, U/A • Monitor Fetal Condition • Bed side Ultrasound for BPP • Re-assessment every 15 mins
• Signs of early labour • Term PROM • Spotting type of bleeding • Minor trauma(Motor vehicle accident, or fall down injury) • Nausea/Vomiting &/or diarrhea with no dehydration • Signs of infection (i.e. fever, chills)	**Level 4 (Less Urgent)**	• Intervention in ≤60 minutes • Keep in the triage room until medical assessment or room on L&D ward available. • Monitor Fetal Condition • Bed side Ultrasound • Re-assessment every 30 mins

- Anything that does not seem to pose threat to the woman or fetus

Level 5 (Non-Urgent)

- Intervention in ≤120 minutes
- Link to ANC, regular OPD or other RH services as required

Annex 3. **Acuity level assessment and intervention guide**

Antenatal Care

DEFINITION

ANC is defined as the complex of interventions that a pregnant woman and adolescent girl receives from skilled health care professionals in order to ensure the best health conditions for both mother and baby during pregnancy

THE 2016 WHO ANC MODEL

WHO reviewed how ANC should be delivered in terms of both the timing and content of each of the ANC contacts, and arrived at a new model the 2016 WHO ANC model which replaces the previous four-visit focused ANC (FANC) model. Antenatal care models with a minimum of eight contacts are recommended to reduce perinatal mortality and improve women s experience of care.

OVERARCHING AIM

To provide pregnant women with respectful, individualized, person-centred care at every contact, with implementation of effective clinical practices (interventions and tests), and provision of relevant and timely information, and psychosocial and emotional support, by practitioners with good clinical and interpersonal skills within a well-functioning health system.

COMPONENTS

Risk identification; prevention and management of pregnancy-related or concurrent diseases; and health education and health promotion.

STEPS

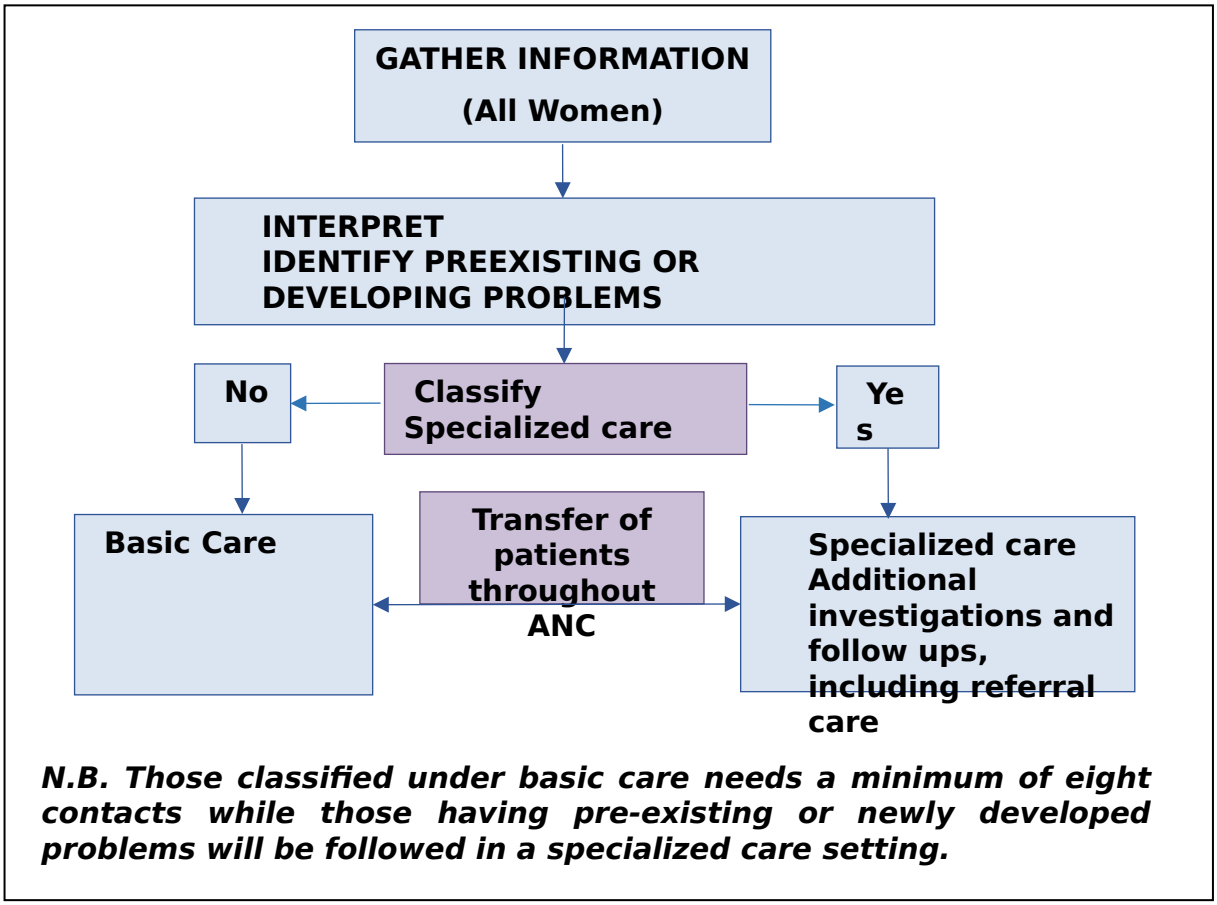
- Gather and Interpret information (History, P/E, Investigations,)
- Classify type of care
- Develop a care plan
- Implement care plan

- Evaluate care plan.

Use the ANC classifying format (diagram) in the MoH integrated pregnancy, labor, delivery, newborn and postnatal care card to gather detailed information during first visit (Annex: See Integrated client card.)

ANC SCHEDULE

The 2016 WHO ANC model recommends a minimum of eight ANC contacts, with the first contact scheduled to take place in the first trimester (up to 12 weeks of gestation), two contacts scheduled in the second trimester (at 20 and 26 weeks of gestation) and five contacts scheduled in the third trimester (at 30, 34, 36, 38 and 40 weeks). Within this model, the word □contact□ has been used instead of □visit□, as it implies an active connection between a pregnant woman and a health-care provider that is not implicit with the word □visit□. The contact



N.B. Those classified under basic care needs a minimum of eight contacts while those having pre-existing or newly developed problems will be followed in a specialized care setting.

schedule, lists of interventions to be delivered at each contact and details about where they are delivered and by whom is found in the table below (see Table 1).

Figure 1. Classifying the type of care

Table 3. **Contact schedule, risk identification, list of interventions at each contact**

Contents of Care	**Eight schedule of ANC contacts (weeks of gestation)**							
	1st	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**
	< 12	**20**	**26**	**30**	**34**	**36**	**38**	**40**
Date of visit								
Maternal and fetal assessment	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Present Pregnancy History*(LMP, GA, EDD, Complaints including intimate partner violence)*	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Past Pregnancy History	**X**							
Medical History*(ask for DM, renal and cardiac disease, chronic hypertension, substance abuse, etc) and* **Surgical History**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Family/Social History	**X**							
PHYSICAL EXAMINATIONS								
General Appearance and Vital sign *(Pulse, Respiration, BP, Temperature, Weight)*	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Pallor	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Breast	**X**							**X**
Chest	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Abdominal examination*/ Leopold examination, and SFH measurement*	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Pelvic assessment *as required/indicated*	**X**							**X**
Ultrasound		**X**						

Haemoglobin *preferably with hemoglobinometer / CBC when available*	X		X			X		
Blood group, RH	X							
RPR/VDRL	X							
HIV (PICT)	X							
HBsAg *	X							
Urine strip test and microscopy *(Albumin, Sugar, ketone, WBC etc.)* **and midstream urine gram stain***(for asymptomatic bacteriuria)*	X		X		X			
Screening for active TB *for HIV positive*	X							
Indirect coomb□s test *for RH negative women.*	X							
One step screening using 75 gm glucose, *if the woman is high risk for GDM perform*			X	X				
Preventive antihelminthic treatment		X						
Td vaccination	X			X				
Iron and folic acid supplements *Daily oral iron and folic acid supplementation with 30 mg to 60 mg of elemental iron and 400 µg (0.4 mg) of folic acid*	X	X	X	X	X	X	X	X
Nutrition/healthy eating	X	X	X	X	X	X	X	X
PMTCT counselling	X							
Family planning counselling	X	X	X	X	X	X	X	X
Breast feeding counselling	X	X	X	X	X	X	X	X
Hygiene	X	X	X	X	X	X	X	X
Avoidance of harmful traditional practice	X	X	X	X	X	X	X	X
Gender based violence	X	X	X	X	X	X	X	X

specially IPV								
Birth Preparedness and Complication Readiness plan*(danger sign during pregnancy, place of birth, emergency fund and transport)*	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Reduce caffeine intake								
Daily calcium supplementation*(1.5–2.0 g oral elemental calcium) is recommended for pregnant women to reduce the risk of pre-eclampsia)*								
Malaria prevention with ITN and early diagnosis and treatment *(one shop treatment)*								
Antibiotic for asymptomatic bacteriuria using Culture / gram stain: *a seven days antibiotic regimen*								
Antenatal anti-D immunoglobulin administration at 28 weeks and immediately after delivery after cord blood check-up								
Intervention for common physiological symptoms based on a woman's preferences and available options.								

Nausea and vomiting – *Ginger, chamomile, vitamin B6 are recommended for the relief of nausea in early pregnancy.*

Heartburn– *Advice on diet and lifestyle (avoidance of large, fatty meals and alcohol, cessation of smoking, and raising the head of the bed to sleep) is recommended to prevent and relieve heartburn in pregnancy. Antacid preparations can be used depend on the women symptoms.*

Leg cramps – *Magnesium, calcium or non-pharmacological treatment options can be used for the relief of leg cramps in pregnancy.*

Low back and pelvic pain – *Regular exercise throughout pregnancy, treatment options such as physiotherapy, support belts can be used*

Constipation– *dietary (modification, high fiber diet, regular bowel habit and adequate fluid intake*

Varicose veins and oedema– *Non-pharmacological options, such as compression stockings, leg elevation and water immersion*

Woman-held case notes– *It is recommended that each pregnant woman carries her own case notes during pregnancy to improve continuity, quality of care and her pregnancy experience.Ensuring the women holds her own medical record summary starting 36 weeks*

Community – *based interventions to improve communication and support- use of HDA, pregnant women conference.)*

* For those women with positive HBSAg, determine HBV DNA viral load. HBV viral load greater than 20,000 international units per milliliter (IU/mL) of blood indicates that the virus is active and is an indication to give tenofovir for the mother starting from 28 wks of gestationuntil delivery. If lab test for HBV viral loadis not available, determine HBeAg. For mothers with detectable HBeAg, give tenofovirstarting from 28 wks of GA until delivery. Linkage/ referral for medical evaluation is also important (assessment of eligibility for life long treatment and follow up).

Table 4. Template for ANC case note

TEMPLATE FOR ANC CASE NOTE

History

Client Name _____ Age _____ Card No._____

Initial booking Date _____ Gravidity _____ Parity _____ Abortion _____

LNMP _____ Due Date _____

Basic Investigation results

BG&RH _____ HGB/HCT _____ HBsAg _____ VDRL _____

Identified past & current obstetric problems

Multiple pregnancy:		Yes ☐	No ☐
Rh iso immunization:		Yes ☐	No ☐
DM:	Yes ☐	No ☐	
Hypertension:		Yes ☐	No ☐
Cardiac disease:		Yes ☐	No ☐
Anemia:		Yes ☐	No ☐
C/S /Uterine Scar:		Yes ☐	No ☐
Previous bad pregnancy outcome:		Yes ☐	No ☐

Specify if yes

_____

Other (Specify)

_____

Table 5. **ANC CLASSIFYING FORM**

Date:_____ANCReg.No:___Medical RecordNumber(MRN):__ _____NameofClient: _____NameofFacility:____ _ _____Woreda:_ _____ _____Kebele:_____ _____HouseNo:___ _____Age(Years): _____ LMP: _ /_____/_____ EDD: ____/ _/_____ _____Gravida:____Para: ____Number ofchildren alive:_ _____MaritalStatus:_____		
INSTRUCTIONS to Fill Classifying form: Answer all of the following questions byplacing a cross mark in the corresponding box.		
OBSTETRIC HISTORY	**No**	**Yes**
1. Previous stillbirth or neonatal loss?		
2. History of 3 or more consecutive spontaneous abortions?		
3. Birth weight of last baby > 4000g		
4. Last pregnancy: hospital admission for hypertension or pre-eclampsia/eclampsia?		
5. Previous surgery on reproductive tract? (Myomectomy, removal of septum, fistula repair, cone biopsy, CS, repaired rapture, cervical cerclage)		
CURRENT PREGNANCY	**No**	**Yes**
6. Diagnosed or suspected multiple pregnancy?		
7. Age less than 16 years?		
8. Age more than 40 years?		
9. Isoimmunization Rh (-) in current or in previous pregnancy		
10. Vaginal bleeding		
11. Pelvic mass		
12. Diastolic blood pressure 90mm Hg or more at booking?		
GENERAL MEDICAL	**No**	**Yes**
13. Diabetes mellitus		
14. Renal disease		
15. Cardiac disease		
16. Chronic Hypertension		
17. Known 'substance' abuse (including heavy alcohol drinking, Smoking)		
18. Any other severe medical disease or condition TB, HIV, Ca, DVT..		

A "Yes" to any ONE of the above questions (i.e. ONE shaded box marked with a cross) means that the woman is not eligible for the basic component of the new antenatal care mode and require closer follow up or referral to specialty care. If she needs more frequent ANC visits use and attach additional recording sheets.



ECTOPIC PREGNANCY

DEFINITION

An ectopic pregnancy is implantation of a fertilized ovum outside the uterine cavity.

CLASSIFICATION

- Tubal - the fallopian tube is the most common site of implantation.
- Extra-tubal.

RISK FACTORS

- History of PID (e.g secondary to STD), ectopic pregnancy or tubal surgery,
- History of infertility, contraceptive failure.

DIAGNOSIS

Symptoms: The *common* symptoms ascribed to ectopic pregnancy are:

- Amenorrhea
- Vaginal bleeding
- Abdominal / pelvic pain
- Other symptoms: - early pregnancy symptoms, fainting or syncope, features of anemia (e.g. dizziness), pain on defecation and shoulder tip pain.

Signs: Clinical presentations are extremely variable depending on whether the tube has ruptured or not. See table 6 below

Table 6. *Signs of unruptured and ruptured ectopic pregnancies*

Sign	Unruptured	Ruptured
Vital Signs	• Vital signs can be normal or slightly	• Fast, weak pulse • Hypotension

	deranged	• Pallor
Abdominal examination	• Non-tender abdomen	• Direct abdominal tenderness • Rebound tenderness • Abdominal distension • Bowel sounds are decreased
Pelvic examination	• Minimal vaginal bleeding • Adnexal mass	• Minimal vaginal bleeding • Cervical motion tenderness • Adnexal tenderness

DIFFERENTIAL DIAGNOSIS:

- Abortion
- PID
- Ovarian torsion
- Ruptured ovarian cyst
- Acute appendicitis

DIAGNOSTIC TESTS AND PROCEDURES

Diagnostic tests:

- CBC, Blood group and RH
- Urine hCG
- Serum ß-HCG
- Ultrasound (abdominal/ transvaginal)
    - The ultrasound exam should be performed both transabdominal and transvaginal (if available). The transabdominal component provides a wider overview of the abdomen, while a transvaginal scan is important for diagnostic sensitivity.
    - Positive pregnancy test and intrauterine pregnancy finding by US almost always excludes ectopic pregnancy. These US findings are presence of double decidual sac, embryonic pole, yolk sac or embryonic cardiac activity in the uterine cavity.
    - The most reliable and specific sign of ectopic pregnancy is the visualization of an extra-uterine gestation (i.e fetal cardiac activity, yolk sac or embryonic pole) with an empty uterine cavity. These features, however, are seen only in a minority of cases.
    - The presence of free intraperitoneal fluid collection (hemoperitoneum) in the context of a positive pregnancy test and empty uterus suggests ruptured ectopic pregnancy.

- A complex or solid adnexal mass with a positive pregnancy test and empty uterus is highly suggestive of an extrauterine gestation and is the most common sonographic abnormality. However, such adnexal masses can also be corpus luteum, endometrioma, hydrosalpinx, ovarian neoplasm or dermoid cyst.
- Sometimes the extrauterine pregnancy is too small to be visualized during the initial ultrasound examination in the early process of ectopic pregnancy.

- Ultrasound and serum β-hCG (the discriminatory zone)
  - The discriminatory zone is the serum hCG level above which a gestational sac should be visualized by ultrasound examination if an intrauterine pregnancy is present.
  - The 'discriminatory zone' of β-hCG level for abdominal US is 6,000 to 6,500 mIU/mL while for transvaginal US it is 1,500 to 2,000 mIU/mL.
  - The absence of an intrauterine GS at hCG level above the discriminatory zone strongly suggests an ectopic or nonviable intrauterine pregnancy.
  - Serum β-hCG level below the 'discriminatory zone' with no intrauterine pregnancy by US is not conclusive and is consistent with an early viable intrauterine pregnancy, an ectopic pregnancy or non-viable intrauterine pregnancy. This needs serial β-hCG level determination to determine it's doubling time. (see Figure 2 below for management algorithm).

Diagnostic Procedures

- Culdocentesis
  - Culdocentesis should be considered only in resource limited settings i.e. in the absence of transvaginal ultrasound.
  - *Culdocentesis procedure:* Let the woman sit at 30^0 to 45^0 for few minutes just before the procedure; insert speculum and pull the posterior lip of the cervix with a tenaculum; and aspirate cul-de-sac using a 16-18-gauge spinal needle with 5 or 10 cc syringe.
    - ***Positive culdocentesis*** is aspiration of at least 5cc non-clotting blood. Besides ruptured and other causes of hemoperitoneum, 50-60% of unruptured ectopic pregnancies may have positive results. If non-clotting blood is obtained, begin immediate management.

- ***Negative culdocentesis*** is aspiration of at least 5 cc clear-serous fluid. It indicates the absence hemoperitoneum.
- ***Equivocal culdocentesis*** is a difficult aspiration of less than 5 cc blood-tinged fluid. It may represent the incomplete aspiration of a hemoperitoneum or the aspiration of blood from

- Uterine Suction Curettage
  - Uterine suction curetta… when the … been confirmed to be n… location o… cannot be determined by ultrasonography.
  - Quantitative ß-HCG … o saline, in … orionic villi … lacy frond appearance.
  - The tissue can also be sent for histopathologic examination. Presen… i indicates intrauterine pregnancy.

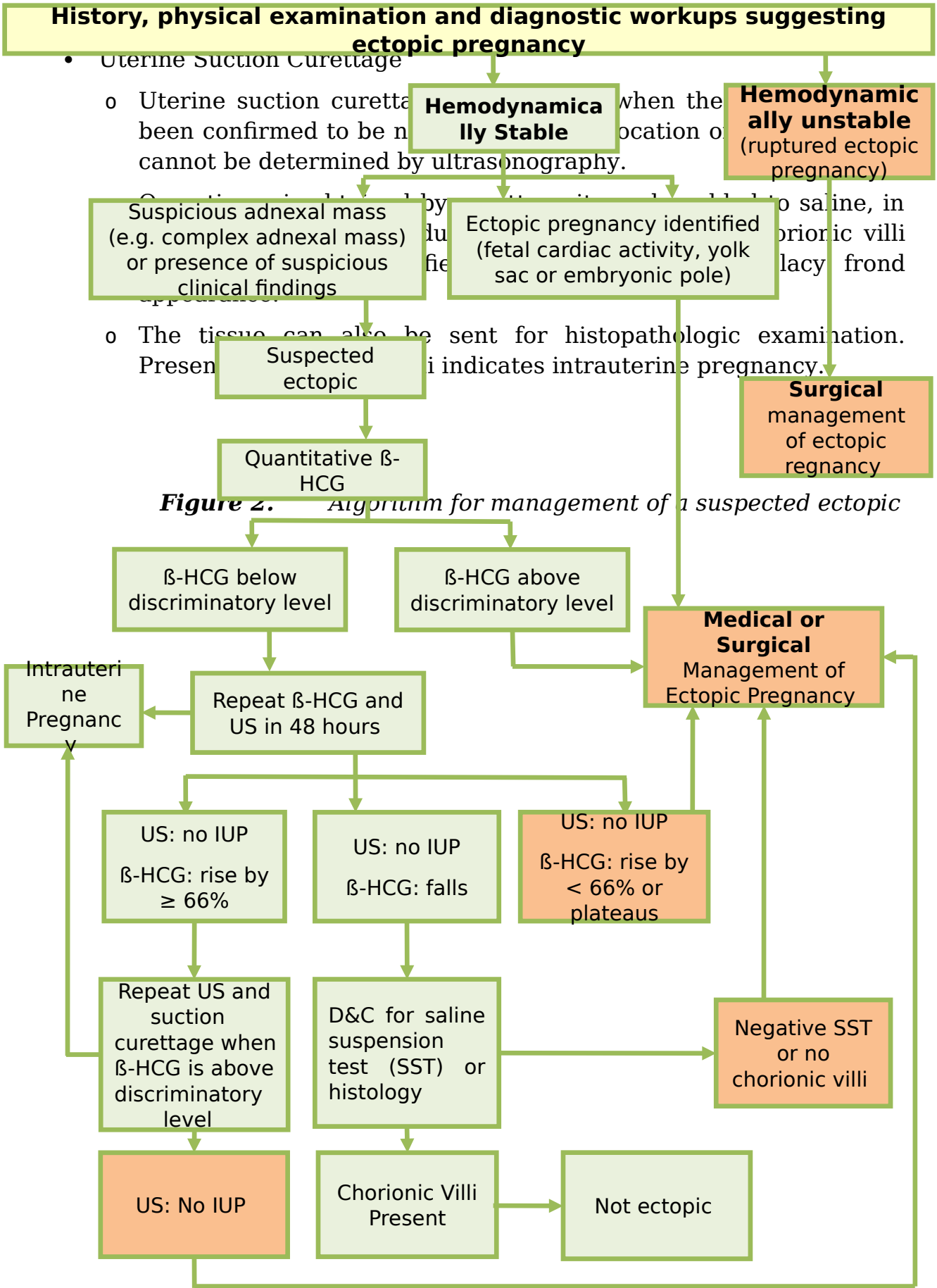


Figure 2. *Algorithm for management of a suspected ectopic*

MANAGEMENT

A. Ruptured ectopic pregnancy

- Secure IV line with large bore canula
- Cross-match blood and prepare for immediate laparotomy.
- Do not wait for blood before performing surgery. During surgery inspect both ovaries and fallopian tubes:
    - If there is extensive damage to the tube, perform salpingectomy.
    - Perform salpingostomy or salpingotomy if the contralateral tube is damaged or when the conservation of fertility is important.
    - Note that conservative surgeries are associated with persistent ectopic pregnancy and higher risk of recurrence.

B. Un-ruptured ectopic pregnancy

For unruptured ectopic pregnancy, both surgical and medical management options can be used.

- *Candidates for medical management of ectopic pregnancy*
    - Hemodynamically stable
    - Low initial serum ß-hCG level (less than 5000 mIU/ml)
    - Small ectopic pregnancy size (less than 3.5 cm mass)
    - Absent fetal cardiac activity
    - Willing and able to comply to post treatment follow-up
- *Contraindications for medical management of ectopic pregnancy*
    - Sensitivity to methotrexate
    - Tubal rupture
    - Breast feeding
    - Presence of intrauterine pregnancy (heterotopic pregnancy)
    - Hepatic, renal or hematologic dysfunction
    - Active pulmonary disease
    - Peptic ulcer disease
    - Immunodeficiency
- *Single-dose methotrexate protocol for ectopic pregnancy*

- Methotrexate 50 mg/m^2 IM on day 1.
- Determine serum B-hCG level on day 1, day 4 and day 7
- Once 15% decline in ß-hCG level is achieved between day 4 and day 7, serum ß-hCG level weekly until undetectable (average time for resolution is 36 days)
- If decline of 15% is not achieved repeat Methotrexate 50 mg/m^2 IM on day 7 or resort to surgical management.

Subsequent Management

- Correct anemia
- Rh-immunoglobulin (Anti-D) should be administered to all Rh-negatives
- Provide family planning counseling and service.
- Provide counseling and advice on prognosis of fertility before discharge,
- Given the increased risk of a future ectopic pregnancy, patients should also be counseled to come as soon as she misses her menses.
- Schedule a follow-up visit.

MOLAR PREGNANCY

DEFINITION

Also known as hydatidiform mole is pregnancy characterized by abnormal proliferation of trophoblasts.

Molar pregnancy is one of type of disease entities in the spectrum of Gestational trophoblastic disease (GTD).

TYPES OF GTD·

- Hyditiditiform mole
  - Partial molar pregnancy
  - Complete Mole
- Invasive mole
  - Choriocarcinoma
  - Placental Site Trophoblastic Tumors (PSTT)

RISK FACTORS

- Age less than 20 and above 35
- History of previous GTD

CLINICAL FEATURES

- Nausea/vomiting
- Vaginal bleeding
- Partial expulsion of grapes like tissue (vesicles) in cases of complete mole
- Cramping/lower abdominal pain
- Uterus larger than the Gestational age (in cases of Complete mole)
- Uterus softer than normal
- Absence of fetal movement

- No palpable fetal part or no FHB
- Hyperthyroidism
- Preeclampsia

INVESTIGATIONS

- CBC
- Blood group and RH
- Serum B-hCG (preferably) otherwise Urine hCG
- LFT and RFT
- Chest X-ray
- Ultrasound: typical sonographic features suggestive of complete molar pregnancy may include:
    - There may absence of an embryo or fetus
    - No amniotic fluid
    - Central heterogeneous mass in the uterine cavity with numerous discrete anechoic spaces.
    - Bilateral theca lutein cysts.

  N.B. In cases of partial mole, there may be fetus with or without placental abnormality, there may be no amniotic fluid and absent theca lutein cysts.

MANAGEMENT (for both partial and complete mole)

Immediate management

- Open an IV line and resuscitate as required.
- Cross-match at least 2 units of blood
- Arrange for evacuation of the uterus.
- Get prepared for possible hemorrhagic shock.
- If the cervix is closed and needs dilatation use cervical block or other analgesics.

  NB: Evacuate the uterus by suction curettage in major OR if uterus is >14 weeks size.
- Infuse oxytocin 20 units in 1 L normal saline or Ringer□s lactate at 60 drops / minute to prevent hemorrhage once evacuation is under way.
- Provide prophylactic antibiotic

- Administer Anti-D for RH negative patients
- Submit the evacuated specimen for histo-pathologic examination

Subsequent management and follow up

- Advice for use of combined oral contraceptive pill, implant or injectable for one year or tubal ligation if the woman has completed her family.
- Get baseline ß-hCG within 48 hours of evacuation.
- Follow-up:
    - Advise to come if she develops any or the combination of the following danger signs: cough, SoB, excessive vaginal bleeding, etc
    - Determine serum ß-hCG every 1-2 weeks until it falls to a normal level.
    - After three consecutive normal ß-hCG level is achieved, monitor monthly for six additional consecutive months, at which time surveillance can be discontinued safely.
- Administer single agent chemotherapy (methotrexate or Actinomycin D) as a prophylaxis for high risk cases who may not avail themselves for follow up.

A. Methotrexate

1. ***MTX***: 0.4 - 0.5 mg/kg IV or IM daily for 5 days or
2. ***MTX***: 30-50 mg/m² IM weekly or
3. ***MTX- Leucovorin***

    → MTX 1 mg/kg IM or IV on days 1,3,5,7
    → Leucovorin 15 mg PO days 2,4,6,8

4. ***High dose IV MTX / FA***

    → MTX 100 mg/m² IV bolus
    → MTX 200 mg/m² 12 hr infusion
    → Leucovorin 15 mg q 12 hr in 4 doses IM or PO beginning 24 hr after starting MTX

B. Actinomycin D

Table 1. Act D 10-12 mcg/kg IV push daily for 5 days or

Table 2. Act D 1.25 mg/m2 IV push q 2 wks

N.B: In places where there is no capacity to determine serum ß-hCG for surveillance, use urine hCG.

Patients could develop Gestational Trophoblastic Neoplasia (either invasive mole or Choriocarcinoma subsequently) as a complication or sequelae of molar pregnancy while on follow up.

Diagnostic criteria for Gestational Trophoblastic Neoplasia (GTN)

- Plateau of serum ß-hCG level (<10 % drop) for four measurements during a period of 3 weeks or longer.
- Rise of serum ß-hCG ≥ 10 % during three weekly consecutive measurements or longer, during a period of 2 weeks or more.
- The serum / urine hCG level remains detectable for 6 months or more.
- Histological diagnosis of invasive mole, PSTT or choriocarcinoma.

  N.B.

  → If the patient is diagnosed with GTN, please refer to the standard management guideline for the management of cases of GTN.

  → If there are resource limitations to treat GTN, please refer patient to the next higher facility.

Early prevention

- During any subsequent pregnancy, she needs to have early ultrasound to offer reassurance of normal development

HYPEREMESIS GRAVIDARUM

DEFINITION

Hyperemesis Gravidarum (HG) is severe form of nausea and vomiting during pregnancy resulting in dehydration and weight loss.

RISK FACTORS:

- Multiple pregnancy
- Previous History
- Family History
- Overweight
- Young age
- Primigravity
- Molar pregnancy / trophoblastic disease

DIAGNOSIS:

Sign/symptoms

- Severe nausea and vomiting
- Dehydration: Loss of skin elasticity, sunken eyeballs, dry mucus membranes and lips
- Head ache /Confusion/
- Fainting
- Symptom and signs of complications

NB: The diagnosis of hyperemesis is considered in the presence of severe nausea and vomiting after exclusion of other causes of nausea and vomiting during pregnancy.

Investigations

- Urinalysis
- Stool Exam
- CBC
- RBS
- Electrolytes- serum potassium, sodium, chloride
- RFT

- Liver enzymes
- Pelvic ultrasound
- Other investigations- guided by history and physical examination finding

DIFFERENTIAL DIAGNOSIS (DDX)

- Peptic ulcer disease
- Pyelonephritis
- Gastroenteritis
- Hepato-Biliary diseases (hepatitis, cholecystitis)
- Diabetic ketoacidosis

MANAGEMENT

Principles

- Correction of Fluid and electrolyte deficits
- Identification and treatment of any co-morbidities
- Identification and management of complications

Outpatient management

IV fluids:

- Infuse first liter over 1-2 hours and then 1000 mls over 4 hours (i.e. 2 litres over 5 to 6 hrs), followed by further assessment, including urine ketone testing.
- Discharge the patient from outpatient care with PO medications and dietary advice.
- Or, transfer / admit for inpatient care.

Medications

- Vitamin B6 (pyridoxine):- 10□25mg PO BID-QID and Meclizine 25 mg PO TID, **or**
- Metoclopramide:- 5-10 mg PO TID, **or**
- Promethazine:- 12.5-25 mg PO TID to QID, **or**
- Chlorpromazine 12.5 mg IM BID

Dietary advise

- Advise the patient to avoid empty stomach,
- Advise intake of small and frequent diet,
- Counsel on restriction of coffee, and spicy, odorous, high fat, acidic and very sweet foods,
- Counsel on preferably taking protein dominant, salty (e.g. nuts), low fat, tasteless and dry snacks/meals,

- Encourage on fluid intake (better tolerated if cold, clear, and carbonated or sour)
- Advise on taking peppermint containing products (e.g. chewing gum) to reduce postprandial nausea
- Advise not to take drugs that may cause nausea and vomiting, e.g. iron supplement should be temporarily discontinued.
- Advise on taking ginger or ginger containing preparations.
- Counsel on avoiding of environmental triggers:- stuffy rooms, strong odors (eg, perfume, chemicals, food, smoke), heat, humidity, noise, and visual or physical motion (e.g. flickering lights, driving).

Inpatient management

Indications for admission

- Weight loss > 5% from pre-pregnancy
- Ketonuria above +2
- Electrolyte imbalance
- Deranged renal and liver function tests
- Persistent vomiting / failed OPD management

Fluid management

- Oral feeding withheld for 24 to 48 hrs
- Give 1 to 2 liters of isotonic saline or ringer lactate within 1 - 2 hrs
- Continue fluid repletion at a rapid rate (1-2 L over the next 2-3 hrs) until the clinical signs of hypovolemia improves (e.g. low blood pressure, low urine output, and / or impaired mental status,).
- Avoid dextrose containing fluid until thiamine is supplemented with the initial rehydration fluid
- Give maintenance fluid after deficit is corrected
    - 4 ml / kg / hr- for the first 10 hrs
    - 2 ml / kg / hr for the next 10 hrs
    - 1 ml / kg / hr for the rest
- In addition replace ongoing loss

Vitamins

- Thiamine (vitamin B1):
    - Give 100 mg IV with the initial rehydration fluids before administration of dextrose containing fluids and another 100 mg daily for the next two or three days i.e 10 ampoules of Vita. B complex containing 10 mg of thiamine per 24 hr (3 ampoules / liter).
- Vitamin B6:
    - Give 10-25 mg in every liter (i.e at least 5 ampoules of vitamin B complex containing 2 mg of vitamin B-6 in each bag of fluid)

Electrolyte management

Depends on the electrolyte abnormality detected on lab tests

Potassium supplementation:

- For mild to moderate hypokalemia (serum potassium 2.5-3.5 meq)
    - Give potassium - 20-80 meq / 24 hrs.
    - Add 1vial of KCL in each bag of maintenance fluid
- For severe hypokalemia (serum potassium <2.5 meq/l) or symptomatic hypokalemia
    - Give potassium – 20 meq/2-3 hrs with careful monitoring every 2-4 hrs,
    - Add 2-3 vials of KCL (40-60 meq) in each bag of maintenance fluid.
    - Adjust the amount based on the serum potassium level.

Antiemetics

- *First line*
    - Meclizine 25mg IV TID, or
    - Metoclopramide- 5□10 mg IV TID
    - Promethazine 5-10 mg IM every 6-8hrs
- *Second line*
    - Serotonin antagonists - ondansetron 4-8 mg IV or PO, TID
- *Third line*
    - Chlorpromazine 25mg IV or IM QID.

Note:

** Combinations of different drugs should be considered in women who do not respond to a single antiemetic.*

** Shift from first to second line if emesis continues without improvement after 24 hrs of therapy.*

Diet

- PO diets that minimize nausea and vomiting can be resumed after a short period of gut rest.
- Dietary recommendations stated above for outpatient management similarly applies for in patient cases.

Adjunctive treatment:

- If the patient has acid reflux or PUD administer anti-acid suspensions or H2 receptor blockers as needed.

Follow up:

- Vital signs (twice daily)
- Weight (at presentation, then daily)
- Features of dehydration
- In put & out put
- Urine ketone (daily)
- Appetite

Refractory patients

- Corticosteroids
  - Give methyl prednisolone IV 16 mg TID for 48 to 72 hrs. Then oral prednisone with tapering dose regimen of 40 mg per day for one day, followed by 20 mg per day for three days, followed by 10 mg per day for three days, and then 5 mg per day for seven days.
  - Hydrocortisone 100 mg IV bid (or 300 mg a single daily dose) until clinical improvement. Then oralprednisolone 40□50 mg daily, with the dose gradually tapered until the lowest maintenance dose that controls the symptoms is reached
  - Dexamethasone (if the above drugs are not available)
- Initiate nasogastric tube feeding

- Discuss on individualized decision on pregnancy termination if a patient doesn't show improvement and deteriorating despite taking all available therapeutic measures (in cases of life-threatening conditions such as Wernicke's encephalopathy, liver and renal failure).

Criteria for Discharge

- Improvement of ketone level in the urine
- Tolerating oral fluids and possibly food for at least 24 hrs hours after urine is free for ketone and with PO antiemetics
- Appropriate anti-emetic to be taken at home
  - Vitamin B6 (pyridoxine):- 10–25 mg PO BID-QID PLUS meclizine 25 mg PO TID **or**
  - Promethazine 12.5-25 mg every 6 hours **or**
  - Metoclopramide 10 mg every 6-8 hours

NB: *Should be taken for at least one week and with proper advice.*

COMPLICATIONS

Maternal

- Esophageal tear or rupture
- Peripheral neuropathy due to B6 and B12 deficiency
- Wernicke's encephalopathy
- Liver and renal failure

Fetal

- Preterm deliveries
- Stillbirths
- Miscarriages
- Fetal growth retardation
- Fetal death



ANTEPARTUM HEMORRHAGE

DEFINITION

Ante-partum hemorrhage (APH) is vaginal bleeding from the 28th week of gestation till the fetus (last fetus in case of multiple pregnancies) is delivered.

CLASSIFICATION (CAUSES)

Placental causes

- Abruptio placentae
- Placenta previa
- Rare causes: vasa previa and other placental abnormalities

Non-Placental causes

- Heavy show
- Uterine rupture / dehiscence
- Local lesions of the cervix, vagina and vulva
- Systemic bleeding disorders
- Indeterminate: causes of bleeding not identified even after delivery and examining the placenta

PLACENTAL ABRUPTION

DEFINITION

Placental abruption (also called abruptio placentae) is a separation of the normally implanted placenta before delivery of the fetus.

RISK FACTORS

Previous history of abruptio placentae, hypertension, multiparity, maternal age greater than 35 years, multiple pregnancy, PROM, distorted uterine cavity, abnormal placenta, low socio-economic status, smoking, trauma (e.g., ECV), polyhydramnios, short cord, amniocentesis and others.

CLASSIFICATION

Table 7. Classification of abruptio placenta

Clinical	***Mild (Grade1)***	***Moderate (Grade 2)***	***Severe (Grade 3)***
Amount of	<400 mL	400-1000mL	>1000mL
Uterine irritability	Normal / slightly	Increased	Tetanic, reactive,board like,
Fetal condition	No fetal heart	Abnormal / rarely	Fetal distress or
Shock	Absent	Mild, posturalhypotens	Severe and always present
Fibrinogen	Normal	Slightlydecrease	Decreased

DIAGNOSIS

The clinical presentation of abruptio placenta mainly depends on the extent of placental separation, rate of separation and flow of blood through the cervix (concealed/ revealed).

- Vaginal bleeding: menstrual-like (dark), totally concealed or the amount is less than the degree of the shock
- Abdominal pain/ (uterine) tenderness:
- NRFHRP or absent fetal heart beat
- Coagulation defect: frank bleeding (epistaxis, ecchymosis, petechiae)

INVESTIGATIONS:

- HCT
- Blood group and Rh,
- Coagulation profile: Platelet count, PT, PTT, fibrinogen or bedside clotting and bleeding test
- Ultrasound: Fetal assessment, retroplacental clot and for exclusion of placenta previa.

TREATMENT:

- Resuscitate and stabilize on arrival, and admit the patient
- Assess maternal and fetal wellbeing
- Prepare cross matched blood (at least 2 units)

Expectant management: <37 weeks, patient in stable condition and reassuring fetal condition

- Give dexamethasone 6 mg IM BID or Betamethasone 12 mg IM every 24 hours for 48 hours if GA< 37 weeks
- Anti D 300µg IM if Rh negative and not sensitized
- Closely monitor maternal and fetal conditions
- Prevent and treat anemia

Immediate delivery: Gestational age is ≥37 weeks/estimated fetal weight ≥2.5 Kg, deranged vital signs, heavy bleeding, NRFHRP, IUFD, malformed fetus, established labor

- *Mode of delivery:* Vaginal delivery is preferred.
- Cervical ripening and induction of labor, amniotomy
- *Emergency cesarean section:* For severe bleeding endangering maternal life, NRFHR or other Obstetrics indications

COMPLICATIONS

- Hemorrhagic shock (acute kidney injury, congestive heart failure),
- DIC
- Utero-placental insufficiency that may lead to IUGR, fetal distress or IUFD.
- PPH

PLACENTA PREVIA

DEFINITION

Placenta previa is defined as the presence of placental tissue over or adjacent to the cervical os.

CLASSIFICATIONS

Placenta previa: Internal cervical os is covered partially or completely by placenta (synonyms: central PP, major PP)

Low lying: Placenta lies within 2 cm of the cervical os but doesn't cover it. (synonyms: marginal PP, minor PP)

RISK FACTORS

- Scarred uterus: previous uterine surgery (CS, myomectomy),uterine curettage.
- Previous history of placenta previa
- Large placenta: Multiple pregnancy, diabetes, smoking, syphilis, Rh incompatibility
- High parity and advanced maternal age

DIAGNOSIS

Vaginal bleeding: bright red, painless and recurrent.

Ultrasound (trans abdominal/ trans vaginal): for placental location and fetal wellbeing assessment.

Double setup examination: Used only in areas where U/S is not available/or the U/S is not done by experienced person.The procedure is done only after termination is decided to diagnose the cause of bleeding and decide the mode of delivery.

TREATMENT

- Resuscitate and stabilize on arrival and admit the patient
- Assess maternal and fetal wellbeing
- Prepare cross matched blood (at least 2 units)

Expectant management:<37 weeks, patient in stable condition and reassuring fetal condition

- Give dexamethasone 6 mg IM BID or Betamethasone 12 mg IM every 24 hours for 48 hours if GA < 37 weeks
- Anti D 300µg IM if Rh negative and not sensitized
- Closely monitor maternal and fetal conditions with APH chart
- Prevent and treat anemia

Immediate delivery: Gestational age is ≥37 weeks deranged vital signs, heavy bleeding, NRFHRP, IUFD, lethal congenital anomaly of the fetus, established labor

Mode of delivery:

- *Vaginal delivery* can be allowed cautiously for marginal placenta
- *Cesarean delivery:* Placenta previa, excessive bleeding, NRFHR or other obstetric indications in low-lying placenta

COMPLICATIONS

- PPH
- Hemorrhagic shock,
- Adherent placenta
- Fetal distress or IUFD

ADHERENT PLACENTA

DEFINITION

Morbidly adherent placenta occurs when the placenta fails to detach from the uterine wall due to abnormal implantation at the basal plate.

CLASSIFICATION

- Placenta accreta
- Placenta increta
- Placenta percreta

RISK FACTORS

- Previous caesarean section
- Placenta praevia
- Previous uterine surgeries

DIAGNOSIS

- Ultrasound
- MRI (if available and U/S findings are inconclusive)

MANAGEMENT

The optimum time for planned delivery for a woman with suspected adherent placenta and placenta previa is at 36 weeks.

- Plan the type of skin incision
    - A low transverse skin incision allows access to the lower half of the uterus.
    - If, the placenta is anterior and extending towards the level of the umbilicus, a midline vertical skin incision may be needed to allow for a high upper-segment uterine incision.
- Open the uterus at a site distant from the placenta, and deliver the baby without disturbing the placenta to enable conservative management of the placenta or elective hysterectomy if the accreta is confirmed.
    - Going through placenta is associated with more bleeding and chance of hysterectomy,
    - Conservative management of placenta accreta in a bleeding woman should be avoided.
- If the placenta fails to separate with the usual measures proceed to hysterectomy.
- If the placenta separates, it needs to be delivered and any haemorrhage that occurs needs to be managed.

MULTIPLE PREGNANCY

DEFINITION

Multiple pregnancy is defined as development of more than one fetus in a pregnant uterus. It includes twins (two fetuses), triplets (three fetuses) and higher order multiples (more than three fetuses).

VARIETIES OF MULTIPLE PREGNANCY

Twin pregnancy can be *dizygotic* or *monozygotic*

- **Dizygotic twins:** results from fertilization of two separate ova by two spermatozoa.
- **Monozygotic twin:** results from the division of a single zygote.

For higher order multiples, either of the two mechanisms mentioned above can operate. For example, triplets can be monozygotic (from one ovum), dizygotic (from two ova) or trizygotic (from three ova).

RISK FACTORS

- Family history of twins particularly on the maternal side;
- Previous history of multiple pregnancy
- History of artificial reproduction (Ovulation induction, in vitro fertilization).
- race, old age, Obesity

DIAGNOSIS

Diagnosis require a high index of suspicion if obstetric ultrasound isn't being done routinely. The following symptoms and sign should trigger the suspicion of multiple pregnancy:

Symptoms

- Excess maternal weight gain
- Breathlessness, palpitation during later months of pregnancy
- Excessive nausea and vomiting.

- Exaggerated fetal movements (Kicks)

Signs

- Signs of Anemia,
- PIH
- Fundal height is large for date
- Palpation of multiple fetal poles
- Fetal head small in relation to the uterus
- Two fetal heart beats heard at the same time by two observers & differing in rate by at least 10 beats per minute.

Ultrasound

Prenatal ultrasound is important to diagnose multiple gestation, to determine placentation (chorionicity), to ascertain gestational age and toidentify fetal anomalies

Diagnosis of multiple pregnancy: separate gestational sacs, more than one yolk sac, embryo or fetus.

Diagnosis of chorionicity and amnionicity:

*Dichorionic (DC):*the presence of two separate placentas, thick (2 mm or greater) dividing membrane and lambda sign (twin-peak sign) are the hallmark features of DC twins. Discordant fetal gender may assist in the late identification of DC pregnancies.

Monochorionic (MC): T sign and thin (less than 2 mm thick) wispy dividing membrane are features for MC twins. *Monoamniotic Monochorionic (MA-MC)* twinning is diagnosed in the presence of two separate fetuses with single placenta and absent intertwin membrane.

Undetermined Chorionicity: After 2nd trimester, the sensitivity and specificity of ultrasound to diagnose chorionicity decreases. Pregnancies are described as undetermined chorionicity in cases of concordant fetal gender and difficult/delayed assignment of chorionicity and in such cases monochorionicity is assumed unless proven otherwise.

Gestational age: use the measurement of the largest fetus to date twin pregnancy

Fetal anomalies:Fetuses of multiple pregnancies are at increased risk for structural malformation and genetic abnormalities.

ANTEPARTUM MANAGEMENT

Supportive care:

- Supplementation of Iron & folic acid: Iron 60 to 120 mg per day, Folic acid 1mg/day

- Nutrition - increased caloric intake by 300 kcal/day, equivalent to an extra snack, above that of singleton pregnancy.
- Rest - Limited physical activities; early work leave.
- Frequent ANC follow up: For uncomplicated twin pregnancy- Weeks 4 to 24: a prenatal visit once a month. Weeks 24 to 32: a prenatal visit every two weeks. Weeks 32 to 38: a prenatal visit every week. For higher order multiples and complicated multiple pregnancies, more frequent follow up is required.
- At each visit perform thorough evaluation for signs and symptoms suggestive of complications (like pregnancy induced hypertension (PIH), preterm labor, premature rupture of membranes (PROM))
- Give advice on danger symptoms/signs of preeclampsia, abruptio placentae, preterm labor and PROM
- Birth preparedness and on the need for hospital delivery with Cesarean Section facility and in the presence of skilled birth attendant and neonatal resuscitation. Referral to tertiary centers is recommended for MC and/or MA twins.

Test of fetal well being

- Serial growth monitoring (ultrasound every 3-4 wks) especially in monochorionic twins
- Antepartum fetal surveillance starting from 28wks for monochorionic, undetermined chorionicity and other complicated twins, from 32 weeks of gestation for uncomplicated twins, *every week* is indicated.
- Non-stress testing (If there is CTG in the facility)
- Biophysical profile/modified biophysical profile
- Assessing amniotic fluid (deepest vertical pool)

Timing of delivery

- MA twins should be delivered at 32-34wks of GA after a course of steroids by *cesarean section*
- Monochorionic twins should be delivered between 36-38 wks of gestation
- For complicated MC twins, the timing depends on the underlying pathology.
- Dichorionic twins should be delivered by 40 weeks of gestation
- Elective cesarean sections for twin pregnancyshould be done at 38wks of gestation
- Note that Induction & augmentation of labor are contraindicated in twins.

- For term single intrauterine death (cotwin death), deliver without delay but if it is preterm, prolonging the pregnancy for the benefit of increased maturity of the surviving twin is recommended.
- In triplet pregnancies, delivery is recommended if pulmonary maturity is assured or at gestational age of not more than 36 wks.

Mode of delivery

The route of delivery of a multiple gestation depends on the number of fetuses, presentation of the fetuses and whether spontaneous onset of labor is present.

For all twins with 1st vertex, allow delivery by vaginal route and manage the delivery of the second as for singleton - depending on the presentation. For all twins with 1st non-vertex, irrespective of the presentation of the 2nd, delivery should be by cesarean section.

The route of delivery for higher order gestations should be cesarean section.

INTRA-PARTUM MANAGEMENT

General

- Follow labor using partograph.
- Secure IV line and anticipate PPH.
- Make all preparations for delivery.
- Prepare delivery room and equipment for the birth of multiple babies.
- Arrange for a helper to assist you with the births and care of the babies.

First stage of labor

- Admit in early labor
- Open IV line; hydrate as needed
- Ascertain fetal number, presentations, estimated fetal weight and placental location.
- Close monitoring of fetal heart rate (FHR) in both fetuses.
- Augmentation is contraindicated before delivery of the 1st twin

Second stage of labor

- Deliver the first baby following the usual procedure. Label - Twin-A
- Ask helper to attend to the first baby.

- Leave the other clamp on the maternal end of the umbilical cord and do not attempt to deliver the placenta until the last baby is delivered.
- Do not give the mother bolus IM/ IV oxytocin until after the birth of all the babies
- Immediately after the first baby is delivered, palpate the abdomen to determine the lie and presentation of the second twin;
- Check fetal heart rate
- Perform a vaginal examination to determine the presentation of the second twin, presence or absence of prolapsed cord and whether membranes are intact or ruptured. Bedside ultrasound can be used to confirm the presentation and lie of the fetus.
- After spontaneous or artificial rupture of the membranes, perform vaginal examination to check for prolapsed cord. If the cord has prolapsed, manage as a case of cord prolapse.
- If the membranes are intact and if there is no contraindication (e.g., high station), artificial rupture of membranes (ARM) of the second sac facilitates the labor.
- Birth interval of about 30 minutes is considered a reasonable time, after which delivery should be expedited. This requires:
    - If contractions are inadequate after birth of first baby, augment labor with oxytocin in vertex presentation using rapid escalation to produce good contractions.
    - Operative vaginal or abdominal delivery depending on the case.
- Stay with the woman and continue monitoring her and the fetal heart rate closely.
- When strong contractions restart, ask the mother to bear down when she feels ready.
- If spontaneous delivery does not occur within 2 hours of good contractions, do operative vaginal delivery or CS depending on the case.
- After delivery of the second baby, resuscitate if necessary. Label - Twin B.
- Make sure there is no more baby and proceed to 3rd stage management.

Third stage of labor

- Manage third stage of labor actively after the delivery of the last fetus following the steps in active management of the third stage of labor (AMTSL).
- Before and after delivery of the placenta and membranes, observe closely for vaginal bleeding because this woman is at greater risk of postpartum hemorrhage.
- Examine the placenta for completeness, vascular anomalies, and communications, and zygosity (mono or Dizygotic twin)

Immediate postpartum care

- Monitor closely as risk of postpartum bleeding is increased.
- Provide immediate postpartum care.
- Plan to measure hemoglobin postpartum if possible
- Special support and follow up for feeding and care of preterm/low birth weight babies

COMPLICATIONS

Multiple pregnancy is associated with all obstetric complications with the possible exception of macrosomia and post term pregnancy:

Maternal complications:

- Hyperemesis
- Anemia;
- Miscarriage;
- Pregnancy-induced hypertension and pre-eclampsia;
- Polyhydramnios (excess amniotic fluid);
- Uterine inertia (poor contractions during labor);
- Post-partum hemorrhage (uterine atony, retained placenta).

Placental/fetal complications:

- Placenta previa;
- Abruptio placentae;
- Placental insufficiency;
- Preterm delivery;
- low birth weight;
- Malpresentations;
- Cord prolapse;

- Congenital anomalies (especially in monozygotic).

Complications unique to multiple pregnancies:

- Conjoined twins
- Monoamniotic Twins
- Interlocking of twin
- *TAPS:*Twin anemia-polycythemia sequence
- *TRAP sequence:*Twin reversed arterial perfusion
- *Cotwin death:* Single intrauterine fetal death
- *Discordant Twins:*A difference in EFW of greater than 20% between twin A & Twin B expressed as (EFW larger fetus EFW smaller fetus) / EFW larger fetus
- *Twin-Twin Transfusion:*MC twins with an oligohydramnios/polyhydramnios sequence and the presence of a large fetal bladder in the polyhydramnios twin and a small or absent fetal bladder in the oligohydramnios twin are consistent with TTTS.

Conditions requiring referral to a tertiary center

- *Triplets and higher order pregnancies*
- *Monoamniotic twins*
- *Discordant twins or suspected twin-twin transfusion cases*
- *Selective IUGR*



PREMATURE RUPTURE OF MEMBRANE

DEFINITIONS

Premature/pre-labor rupture of fetal membranes is rupture of membranes (ROM) before the onset of labor

Prolonged PROM is rupture of membranes for > 12 hours

CLASSIFICATION

Term PROM: is rupture of membranes after 37 completed weeks of gestation

Preterm PROM: is rupture of membranes before 37 completed weeks of gestation

RISK FACTORS

- *Mechanical factors:* multifetal gestation, polyhydramnios, pulmonary diseases, preterm labor, cervical conization/LEEP/cerclage.
- *Urogenital infections :* UTI, cervicitis, GBS, bacterialvaginosis.
- Previous history of preterm PROM, preterm labor
- Second trimester and third trimester bleeding (e.g. abruptio placenta).
- *Other risk factors:* low socioeconomic status, nutritional deficiencies, low BMI, smoking and connective tissue disorders.

COMPLICATIONS

Maternal: Chorioamnionitis, abruptio placentae, retained placenta and hemorrhage, maternal sepsis, maternal death and higher risk for cesarean delivery

Fetal and Neonatal: Infection, umbilical cord compression as a result of oligohydramnios, frank or occult umbilical cord prolapse, fetal death, preterm birth and associated complications (RDS, NEC, IVH, etc), neonatal infections, long-term sequelae such as cerebral palsy, pulmonary hypoplasia and restriction deformities

APPROACH TO MANAGEMENT OF PROM

1. Confirm the diagnosis of ROM
2. Evaluate for the presence of chorioamnionitis and labor
3. Determine the gestational age and evaluate the fetal condition
4. Subsequent Mx based on the above findings

CONFIRM THE DIAGNOSIS OF ROM

History

The classic clinical presentation of PROM is a sudden "gush" of clear or pale-yellow fluid from the vagina.

Patients can present with intermittent or constant leaking of small amounts of fluid or just a sensation of wetness within the vagina or on the perineum.

Diagnostic evaluation:

Sterile speculum examination:

- The best method of confirming the diagnosis of PPROM is direct observation of amniotic fluid coming out of the cervical canal.
- If amniotic fluid is not immediately visible, the woman can be asked to push on her fundus, valsalva, or cough to provoke leakage of amniotic fluid from the cervix.
- Pooling in the vaginal fornix needs further evaluation as the collection may be due to excessive vaginal discharge or urine.
- Presence of meconium, vernix caseosa or lanugo hair in the fluid pooling indicates PROM and presence of uriniferous smell suggests urinary incontinence.
- Note that sterile speculum examination can also help us to rule out the presence of a cord prolapse and to asses cervical status. Amniotic fluid can also be sent for maturity tests (if available).
- **Digital examination should be avoided** because it may decrease the latency period (ie, time from rupture of membranes to delivery) and increase the risk of chorioamnionitis.
- If PROM is not obvious after visual inspection, examine the fluid for ferning or PH.

Ferning test:

- Obtain fluid by swabbing the posterior fornix (avoid cervical mucus to decrease chance of false positive result).
- Spread some fluid on a slide & let it dry for at least 10 minutes. Examine it with a microscope and look for a fern-leaf pattern (arborization).
- The test is not affected by meconium, vaginal PH & blood.

Nitrazine paper test:

- Hold a piece of nitrazine paper in a hemostat (artery forceps) & touch it against the fluid pooled on the speculum blade. A change from yellow to blue indicates presence of amniotic fluid (a PH >6 - 6.5).
- False negative tests results can occur when leaking is intermittent or the amniotic fluid is diluted by other vaginal fluids.
- False positive results can be due to the presence of alkaline fluids in the vagina, such as blood, seminal fluid, or soap. In addition, the pH of urine can be elevated to near 8.0 if infected with Proteus species.

Pad test:

- Can be helpful when there is no pooling & no leakage from cervix.
- Place a vaginal pad over the vulva & examine it one hour later visually & by odor.
- Wetting with no urine and no vaginal discharge (vaginitis) may suggest PROM.
- If the diagnosis remains in question, repeat the test.

Ultrasound examination:

- Ultrasound examination should be performed to look for reduction of amniotic fluid volume.

EVALUATE FOR THE PRESENCE OF CHORIOAMNIONITIS AND LABOR

Clinical signs and symptoms of chorioamnionitis

Once PROM is confirmed, a careful P/E is necessary to search for other signs of infection.

The criteria for the diagnosis of clinical chorioamnionitis include:

- Maternal fever
- Tachycardia
- Leukocytosis
- Uterine tenderness
- Offensive vaginal discharge and

- Fetal tachycardia

Because of the low specificity of clinical findings, a consideration of other potential sources of fever and other causes of clinical symptoms is essential for the diagnosis of chorioamnionitis.

The combination of clinical criteria provides a highly accurate diagnosis of chorioamnionitis.

Laboratory tests

Complete blood count

- Maternal leukocytosis (defined as WBC >12,000/mm3) or the presence of a left shift (> 9%) often supports the diagnosis of chorioamnionitis.
- Isolated leukocytosis in the absence of other signs or symptoms is of limited value since it may be induced by several other conditions including labor and steroid use.

C-reactive protein

- High levels of (CRP) is associated with a higher risk of chorioamnionitis in the setting of PPROM

Amniotic fluid testing

- Tests on amniotic fluid, usually obtained by amniocentesis, can be used for the diagnosis of subclinical chorioamnionitis and to confirm lung maturity.

DETERMINE THE GESTATIONAL AGE AND EVALUATE THE FETAL CONDITION

- Confirm the gestational age of the fetus (using LMP, early U/S)
- Perform ultrasound to determine fetal presentation and lie
- Electronic fetal monitoring to identify occult umbilical cord compression
- Do biophysical profile/ NST

SUBSEQUENT MANAGEMENT

Indications for expedite delivery

Indications for expedite delivery are onset of labor, gestation age ≥ 37wks, evidence for non-reassuring fetal status, evidence for chorioamnionitis, lethal congenital anomalies, intrauterine fetal death, if there is high risk of cord prolapse (e.g., transverse lie) and abruptio placenta

Note that if the gestational is below 34 weeks and both the fetal and maternal conditions are stable, expectant management can be considered for abruption placenta in a setting where close follow up is possible.

Expectant management

- Admit to the ward (Transfer patients with early preterm PROM to a higher health facility with newborn intensive care, if possible)
- Avoid digital cervical (pelvic) examination.
- Advise bed-rest, to potentially enhance amniotic fluid re-accumulation & possibly delay onset of labor.

Corticosteroids

- Administer antenatal corticosteroids (betamethasone 12 mg intramuscularly 24 hours apart for two doses or dexamethasone 6 mg IM 12 hours apart for four doses) for lung maturity.
- Note that if preterm birth is considered imminent, treatment for short duration still improves fetal lung maturity and chances of neonatal survival. Therefore, the first dose of corticosteroids should be administered even if the ability to give the second dose is thought to be unlikely.
- Antenatal corticosteroid therapy should not be administered in women with chorioamnionitis

Antibiotics

- Ampicillin 2gm IV QID and Erythromycin 250 mg P.O QID for 48 hours followed by Amoxicillin 500 mg P.O TID & Erythromycin 250 mg. P.O QID for 5 days.
- Azithromycin may be substituted for Erythromycin with regimen of 500mg po on day 1 followed by 250mg po daily for 6 days.
- If there is onset of labor and in the absence of signs of uterine infection, discontinue antibiotics after delivery.

Neuroprotection

- If gestational age is less than 32 weeks and preterm birth is likely within the next 24 hours, consider magnesium sulfate for neuroprotection

Monitoring and Follow up

Monitor the following clinical features during expectant management of PROM:

- Maternal pulse & temperature - every 4-6 hours

- FHR - every 4-6hrs (& if possible CTG 2x daily)
- Uterine tenderness or irritability (or pain) - daily
- WBC count & differential - changes, every 2-3 days
- Amniotic fluid appearance & odor - daily
- If possible, examine for presence of subclinical intraamniotic infection with amniocentesis.
- If there is a need for termination of expectant management, deliver the baby. If there is no contraindication for priming, induction or vaginal delivery, ripen the cervix and induce labor.

Treatment of chorioamnionitis

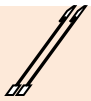
- Give a combination of antibiotics until the woman gives birth. **Note** that metronidazole should be added if the route of delivery is cesarean section to cover the anaerobic organisms.
- ***Option 1:*** Ampicillin 2 g IV every six hours PLUS gentamicin 5 mg/kg body weight IV every 24 hours ± metronidazole 500 mg IV TID
- ***Option 2:*** Ceftriaxone 1 gm IV BID for 10 days ± metronidazole 500 mg IV TID
- After delivery, shift the antibiotics to PO medication after the symptoms and signs of infection have subsided for 48 hours.
- Emergency priming and induction of labor if there is no contraindication for vaginal delivery.
- If conditions for vaginal delivery are not met, perform C/S. (Before procedure, cleanse the vagina with povidone-iodine)
- Newborn requires evaluation and management in NICU.

Labor and delivery for term PROM without infection

- If cervix is favorable, labor is induced, unless there are contraindications to labor or vaginal delivery, in which case cesarean delivery is performed.
- If cervix is unfavorable, ripen the cervix (preferably with PO misoprostol).
- Institute prophylactic antibiotic when the duration of ROM >12hrs.
- Follow for features of chorioamnionitis (maternal fever, tachycardia, leukocytosis, uterine tenderness, offensive vaginal discharge and fetal tachycardia)
- Antibiotic therapy should continue throughout labor and for at least one dose after delivery

Management of near-term PROM (34-37 weeks)

- Induction or expectant management are acceptable management options depending on local resources.



Management of labor and Delivery

DEFINITION

Labor is a process regular uterine contraction results in progressive dilatation effacement which ends in the delivery of the fetus and placenta and membranes.

NORMAL LABOR AND DELIVERY

Labor is considered normal when the following conditions are fulfilled:

- Parturient without any risk (e.g., Pre-eclampsia, Previous scar, etc.),
- Labor should start spontaneously and at term,
- Fetal presentation must be by vertex,
- Delivery should be by spontaneous vertex delivery, with minimal aid,
- All stages of labor are lasting normal duration, and
- The neonate is alive, normal and the immediate postpartum course is normal.

N.B The diagnosis of normal labor is established after the evolution of all the stages & 1-2 hours after delivery.

CLASSIFICATION OF LABOR

Normal labor is classified as:

- ***First stage of labor:*** The period between onset of regular uterine contractions to full cervical dilatation. It is subdivided into two phases: -
    - *Latent phase:* The phase of labor between the onset of regular uterine contraction to 5 cm of cervical dilatation (often slow & unpredictable rate of cervical dilatation)
    - *Active phase:* The phase of labor after 5 cm of cervical dilatation to the full cervical dilatation more rapid rate of cervical dilatation)
- ***Second stage of labor****:* The stage of labor between full cervical dilatation and delivery of the last fetus (often associated with involuntary bearing down urge because of expulsive uterine contraction)

- ***Third stage of labor****:* The stage of labor between delivery of the last fetus and delivery of the placenta & membranes.

DIAGNOSTIC CRITERIA

Regular, rhythmic uterine contractions at least 2 contractions in 10 minutes with at least one of the following:

- Rupture of the membranes
- Cervical dilatation of 4 centimeters
- 80 % effacement
- Bloody show (show should be disregarded if there is a membrane rupture or digital vaginal examination within 48 hours prior to show.)

N.B: Always rule out false labor to avoid unwarranted intervention.

ADMISSION CRITERIA

- For a woman without known risk and intact membrane- cervix dilation is≥ 4 cms.
- For those with ruptured membranes & known risk factor could be admitted at any cervical dilatation

ADMISSION PROCEDURE

- Warm and friendly acceptance
- Immediate assessment of the general conditions of the mother and fetus including assessment of whether delivery is imminent or not to act accordingly
- Appropriate history, physical examination / vaginal examination and laboratory investigations
- Inform the client/parturient about her condition and regularly update her.
- Clothing: loose hospital gown
- After review of ANC record and present evaluation, revise her birth preparedness plan
- Revise her ANC plan & prepare accordingly
- During active phase of labor, all admission information should be documented on a partograph sheet.
- Laboratory tests which are not determined during ANC visits should be completed. (Hemoglobin/ hematocrit (if not done within two weeks), Blood group and Rh, urine analysis, VDRL, HbsAg and HIV test). If serology for HIV is positive refer to section on PMTCT guide

N.B. Team approach is important, and all abnormal clinical/ laboratory findings should be informed to the most senior personnel in charge of the labor ward activity.

MANAGEMENT DURING 1st STAGE

LATENT PHASEOF FIRST STAGE OF LABOR

If the client presents before cervical dilatation of 5cm&fulfils admission criteria follow her using normal chart.

Table 8. Latent phase of first stage of Labor Follow Up Chart

Name _____ Age _____ MRN _____ Admission diagnosis_____
Status of membranes_____ If Ruptured duration in hours_____
Admission date _____ Time _____

Date	Time	BP	PR	RR	T^0	FHR	Uterine contrac.	Cervical Dilatation& effacement	Colour ofliquor	Remark	Sign

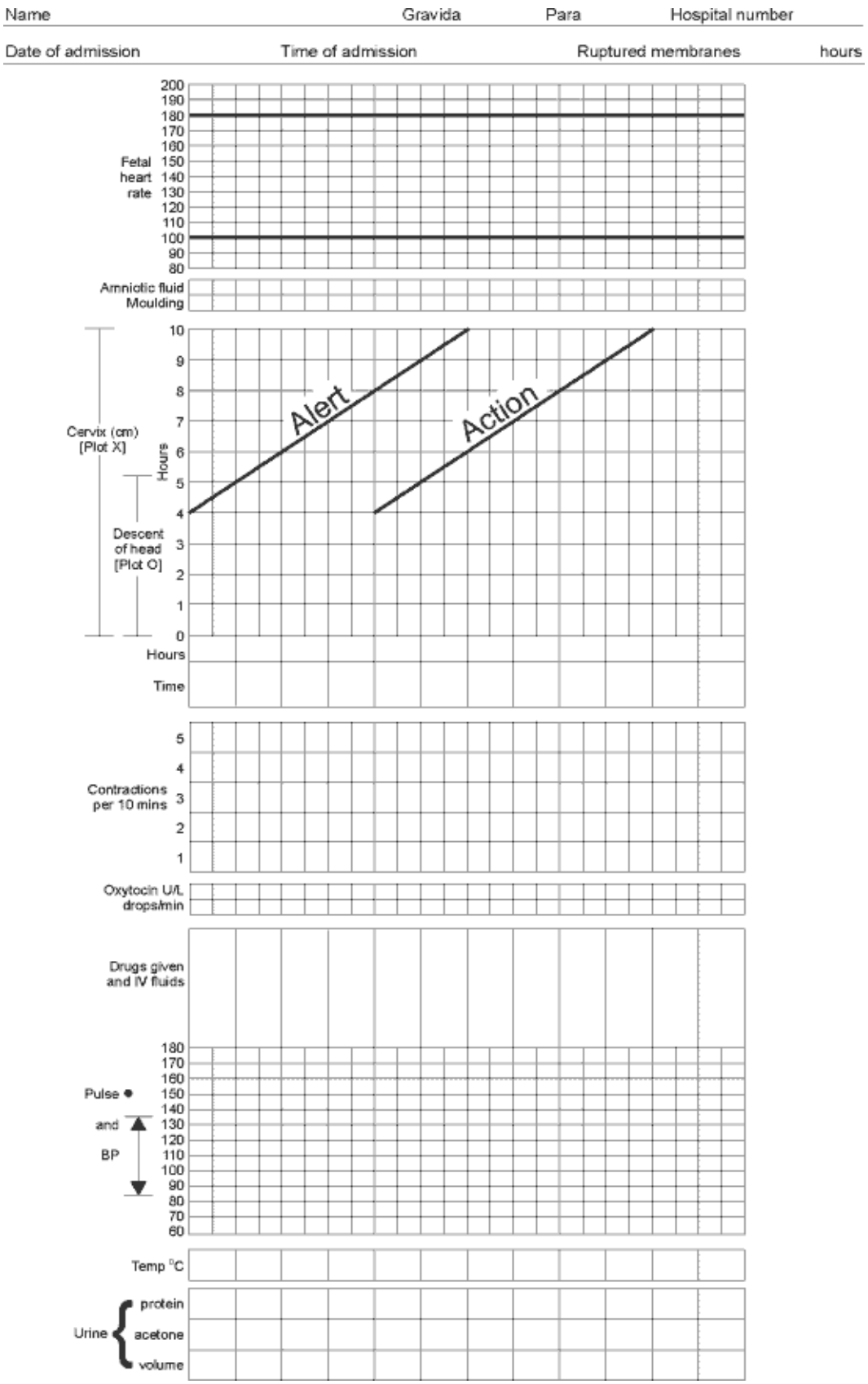
- *Uterine contraction, FHR & PR every 1 hour*
- *BP every 4 hours if not indicated more frequently*
- *Cervical condition every 4 hours but should be doneafter spontaneous rupture of membranes, in the presence of abnormal FHR or before giving analgesia.*

ACTIVE PHASE OF FIRST STAGE OF LABOR

All observations and findings should be recorded on the partograph if the client presents with cervical dilatation of >5 cm (or when she enters this phase after admission)

Parts of the partograph

- Identification
- Fetal status
- Labor progress
- Medication
- Maternal condition



N.B: Start plotting on the alert line. Use the partograph for all mothers. Labor ward personnel should be proficient in the filling & interpretation of the partograph.

Figure 3. Partograph

Fetal Well -Being Monitoring

FHR

- Use Pinnard stethoscope or doppler device for women with no known problem
- Count the FHR immediately after a contraction for 1 min, every 30 min for low risk pregnancy and every 15 min for high risk pregnancy
- Continuous electronic FHR monitoring is preferred to monitor high risk pregnancies.
- FHR 100-180 BPM is normal for term normal fetus. If FHR is less than 100 or higher than 180 manage as Non reassuring fetal heart rate (NRFHR)

Status of liquor (Grading of meconium)

- Clear liquor
- Grade I - Good volume of liquor, lightly meconium stained
- Grade II - Reasonable volume with a heavy suspension of meconium
- Grade III - Thick meconium/particulate matter which is undiluted

NB: A newly appearing meconiumis alarming sign

Grading of Molding

- No molding - The cranial bones are separate along the suture lines
- Grade I- Fetal cranial bones are touching each other along the suture lines
- Grade II- Fetal cranial bones are overlapping but can be separated
- Grade III-Fetal cranial bones are overlapping & are not separable

Monitoring of progress of labor

Uterine contraction

Frequency (uterine contraction per10 min), duration and intensity of each contractionis determined by palpationor toco-dynamometer every 30 minutes.

Descent of fetal head:

Should be done by abdominal palpation before vaginalexamination

Vaginal examination

- To evaluate cervical dilatation, station, position, status of liquor, molding and caput

*Note that*the frequency of vaginal examination is every 4 hours but can be repeated after spontaneous rupture of membranes, when there is abnormal FHR or abnormal FHRP, before givinganalgesia and if symptoms are suggesting 2ndstage of labor(to confirm the diagnosis).

Crossing of the alert line mandates re-evaluation for maternal & fetal conditions thoroughly. When maternal & fetal conditions are reassuring there can be a place for observation without intervention for 2 hours (slow yet normal cervical dilatation patterns can be acceptable in hospital set up)

Maternal wellbeing monitoring

Vital signs:

Pulse rate - half hourly (30□)

Temperature and BP - every 4 hourly or more frequently if indicated

Maternal position:

Avoid supine position

Note that the mother should not be confined to bed unless contraindicated (e.g., sedated patient, for frequent monitoring, high head and ruptured membranes)

She can assume any position comfortable to her (Left lateral position, right lateral Position, sitting)

Nutrition- oral intake

In general, encourage oral intake of liquid diet (tea, juice) but not hard foods. Consider fluid diet as a source of water and energy for those mothers staying longer before delivery (e.g., small sips of sweetened tea or water)

Companionship in labor:

Encourage partner to accompany the spouse who is in labor. Partner support and education should start during ante-natal care and continue throughout child birth.

Pain management

All available pain management options should be informed for the client. Provision of pain relief should be individualized based on preference and request.

Options of pain relief in labor can be non-pharmacologic or pharmacologic

Non pharmacologic

- Provide continuous emotional support
- Inform laboring mothers about the procedures to which they will be subjected during labor and delivery
- Relaxation & Massaging (back rubbing)
- Hot compress (back)

Pharmacological

- The selected analgesia should be available, and should be safe to the mother and fetus
- Timing, route, dosage and frequency of administration should be based on the anticipated time of delivery
- Avoid combination of opioids
- A small dose given more frequently is preferable to a large dose administered less frequently
- Whenever opioids are used during labor (>4 cm),all preparations should be made to treat neonatal respiratory depression. This includes preparation of ventilation, oxygenation, gentle stimulation and judicious use of the opioid antagonist Naloxone.

PHARMACOLOGICAL PAIN MANAGEMENT

Opioids alone (pethidine, diamorphine and fentanyl are options)

Pethidine injection: 50mg IM initially. Assessa fter ½ hr and if not adequate and side effects not troublesome, repeat50 mg. Onset of action within 10 -20 mins and lasts for 2-4 hours

Pethidine injection: 25- 5 0 mg IV, onset of action immediately and effect lasts for 1.5-2 hrs. Repeat doses every 1-2 hours depending on the level of sedation. Always check respiratory depressant effect of pethidine on the mother as well as the neonate.

Lumbar Epidural Analgesia (if available)

MANAGEMENT DURING 2nd STAGE

DEFINITION:

The second stage is the time from full dilation of the cervix to delivery of the last fetus.

MATERNAL CARE AND WELLBEING EVALUATION

- BP monitoring: every 1hour (if indicated more frequently)
- PR, temp. and RR: every 30 minutes
- Evaluate general condition: fatigue, pain, physical depletion and state of hydration
- Evaluate for the presence of the urge to push and /or effort
- Avoid early push
- She can attain any position untilthe presenting part is visible or delivery is imminent

- The woman should be encouraged to empty her bladder before delivery

BIRTHING POSITIONS

- Women can assume any position unless delivery is imminent,there is need for operative vaginal deliveryor episiotomy.
- Options are semi sitting, squatting, kneeling or left lateral position.
- Prolonged recumbent position should be avoided.

FHR MONITORING

- Every 15 min before delivery is imminent
- Every 5 min for high-risk pregnancy (Continuous electronic monitoring is preferred for fetal monitoring of high-risk pregnancies)

LABOR PROGRESS EVALUATION IN SECOND STAGE OF LABOR

- Evaluate the degree of descent and or station every1 hour

PREPARATION FOR DELIVERY

- Notify the labor ward staff that delivery is imminent.
- Take the woman to the delivery room (if it is separate room).
- Make sure all the equipment for delivery and newborn care are available at the delivery room.
- There should be a pre-warmed neonatal corner for neonatal care
- Respect choice of position for delivery
- Attendant should be appropriately prepped (hand washing, dressed and gloved appropriately- wear gloves, gowns, apron, masks, caps, eye protection)
- Sterile draping in such a way that only the immediate area around the vulva is exposed.
- Perineal care: - cleaning of the vulva and perineum with antiseptic /tap water (downward and away from the introitus). Wipe feces downward. Avoid routine vaginal cleansing.

ASSISTANCE OF SPONTANEOUS DELIVERY

Goal

Reduction of maternal trauma, prevention of fetal injury and initial support of the newborn

Perineal protection (hands on birth)

Perineal guard to support perineum is recommended during childbirth for reduction of perineal trauma & facilitation of birth.

Episiotomy:

Routine performance of episiotomy should be avoided and individualization is important.

Indications for episiotomy: threat for a perineal tear, perineal resistance for fetal head descent or presence of fetal/maternal indication for expedited delivery

Timing of episiotomy: when the presenting part distends the vulva 2-3cms (unless early delivery is indicated).

Type: medio-lateral episiotomy is recommended

Note that analgesia/anaesthesia should be given before episiotomy is performed and during repair.

Delivery of the Head

- Prevent rapid delivery and assist extension of the head.
- Check for cord around the neck and if present disentangle it from around the head (loop it if loose) or clamp at two sites and cut the cord.
- After delivery of the head, wipe the mouth and nose (routine suctioning of oropharynx is not recommended).

Delivery of the rest of the body

- After delivery of the head, allow restitution (turning of the head towards one maternal thigh with internal rotation of the shoulders)
- Hold on both sides of the head and deliver the anterior shoulder by gently pulling the head downwards
- Deliver the posterior shoulder by pulling upwards after the delivery of anterior shoulder.
- The rest of the body usually follows easily. Support the baby□s body with both hands and place the baby on maternal abdomen.
- Dry the newborn□s body with clean dry towel. Remove the wet towel and wrap the newborn with dry towel.
- Record the time and sex of the baby. Inform the mother.

Cord clamping

- Delay cord clamping for 1-3 minutes after delivery (unless preterm baby, low birth weight, asphyxiated, Rh isoimmunized pregnancy or HIV exposed infant)
- Clamp the cord 4-5 cm away from the umbilicus
- Take cord blood if indicated.



THIRD STAGE OF LABOR

DEFINITION:

Third stage of labor is the time interval between the deliveries of the last fetus upto the expulsion of the placenta.

ACTIVE MANAGEMENT OF THIRD STAGE OF LABOR (AMTSL)

AMTSL is the administration of a uterotonic medication within one minute after the birth of the baby. It may also include:

- controlled cord traction; and
- Verification of uterine tone and, if the uterus is not well contracted, uterine massage.

WHO SHOULD GET AMTSL?

Every woman who comes for delivery to the health facility. AMTSL is a standard management of third stage of labor.

BENEFIT OF AMTSL

- Duration of third stage of labor will be shortened
- Less maternal blood loss
- Less need for oxytocin in post-partum period
- Less anemia in the post-partum period

DRUGS USED FOR AMTSL

Oxytocin is the preferred drug for AMTSL and 1st line drug for PPH caused by uterine atony

Ergometrine is the 2nd line drug for PPH though associated with more serious dverse events. Ergometrine is contraindicated in hypertensive women and in those with cardiac problems.

Misoprostol is cheap and stable at room temperature. It can be distributed through community-based distribution systems.

Uterotonics require proper storage:

- *Oxytocin:* 2-8°C, protect from freezing

- *Ergometrine:* 2-8°C and protect from light and from freezing.
- *Misoprostol:* room temperature, in a closed container.

STEPS OF AMTSL

Use of uterotonic agents

Within one minute of the delivery of the baby, palpate the abdomen to rule out the presence of an additional fetus(s) and give oxytocin 10 units IM.

- Oxytocin 10 IU IM/IV within 1 minutes of the delivery of the last fetus. It is a preferred over other uterotonic drugs and it is effective 2-3 minutes after injection, and has minimal side effects and can be used in all mothers.
- Carebitocin 100 micrograms IV or IM within 1 minutes after the delivery
- Ergometrine 0.2 mg IM within 1 minute of the delivery
- Misoprostol 400-600 mcg sublingual / oral/rectal within one minute of delivery of the fetus can be used in situations when safe administration and/or appropriate storage conditions for the other uterotonic drugs are not possible.

Controlled cord traction

- Clamp the cord close to the perineum (once pulsation stops in a healthy newborn) and hold in one hand.
- Place the other hand just above the woman□s pubic bone and stabilize the uterus by applying counter-pressure during controlled cord traction.
- Keep slight tension on the cord and wait for strong uterine contraction (2-3 minutes).
- With strong uterine contraction, gently pull the cord downwards to deliver the placenta. Continue to apply counter-pressure on the uterus.
- If the placenta does not descend after 30-40 seconds of controlled cord traction, wait until the uterus is well contracted again. With the next contraction, repeat controlled cord traction with counter-pressure.
- As the placenta delivers, hold the placenta in two hands and gently turn it until the membranes are twisted. Gently pull the placenta to complete the delivery.

- If the placenta fails to separate within 30 minutes after delivery, manage as retained placenta (see portion on PPH)
- If the membranes tear, gently examine the upper vagina and cervix wearing sterile/disinfected gloves. Use a sponge forceps to remove any pieces of membranes.
- Look carefully at the placenta and membranes for missing tissue. If a portion of the maternal surface of the placenta is missing or if there are torn membranes with vessels, suspect retained placenta fragments (see portion on PPH).

Verification of uterine tone

Immediately assess uterine tone. If the uterus is soft, massage the fundus of the uterus through the woman□s abdomen until the uterus is well contracted

- Ensure that the uterus does not lose its tone after stopping the uterine massage.
- Assess uterine tone every 15 minutes for the first 1 hour after delivery. If the uterus is atonic, massage the uterus.
- Teach the woman how to assess uterine tone and massage her own uterus.
- Estimate and record blood loss.
- Note that sustained uterine massage is not recommended as an intervention to prevent postpartum haemorrhage in women who have received a prophylactic uterotonic.

Provide post-natal family planning counselling for informed choice & decisions. (Implement when applicable)



NEWBORN CARE AT THE TIME OF BIRTH

ESSENTIAL NEWBORN CARE (ENC)

DEFINITION

It is care given to all newborn infants at birth to optimize their chances of survival and wellbeing.

ENC starts before birth (Teaching of parents to be about the unborn child should start at Antenatal Care level).

COMPONENTS OF ENC AT BIRTH FOR ALL BABIES

- Prevent hypothermia
- Observe for the first breath (spontaneous breathing)
- Any difficulty to establish spontaneous breathing, immediately start bag and mask ventilation
- Cord and eye care
- Provide vitamin k
- Put the baby skin to skin contact with mother
- Start exclusive breast feeding within one hour of life.
- Vaccination of BCG, HBV and polio 0.

STANDARDIZED PROCEDURES IN ESSENTIAL NEWBORN CARE (ENC)

Step 1: Dry and stimulate

- Immediately dry the whole body including the head and limbs.
- Keep the newborn warm by placing on the abdomen of the mother
- Stimulate by rubbing the back or flicking the soles of the feet
- Remove the wet towel
- Don□t let the baby remain wet, as this will cool the body and make it hypothermic.

- Let the baby stay in skin to skin contact on the abdomen and cover the baby quickly including the head with a clean dry cloth.

Step 2: Evaluate Breathing

- Check if the baby is crying while drying it.
- If the baby does not cry, see if the baby is breathing properly.
- If the baby is not breathing and/or is gasping: Call for help. The assistant can provide basic care for the mother while you provide the more specialized care for the baby who is not breathing. Cut the cord rapidly and start resuscitation.
- If the baby breathes well, continue routine essential newborn care.
- Do not do suction of the mouth and nose as a routine. Do it only if there is thick meconium, mucus or blood obstructing the airway.

NORMAL BREATHING

Normal breathing rate in a newborn baby is 30 to 60 breaths per minute. The baby should not have any chest in-drawing or grunting. Small babies (less than 2.5 kg at birth or born before 37 weeks gestation) may have some mild chest in-drawing and may periodically stop breathing for a few seconds.

Step 3. Cord care

Optimal cord care consists of the following:

Clamping /tying the cord: If the baby does not need resuscitation, wait for cord pulsations to cease or approximately 1-3 minutes after birth, whichever comes first, and then place one metal clamp /cord tie 2 centimeters from the baby□s abdomen and the second clamp / tie another 2 centimeters from the first clamp/tie. Cutting the cord soon after birth can decrease the amount of blood that is transfused to the baby from the placenta and, in preterm babies; it is likely to result in subsequent anemia and increased chances of needing a blood transfusion.

Cutting the cord: Cut the cord with sterile scissors or surgical blade, under a piece of gauze in order to avoid splashing of blood. At every delivery, a clean separate pair of scissors or blade should be designated for this purpose. Counseling on cord care:

- Check for bleeding/oozing and retie if necessary.
- The cord may be tied by using sterile cotton ties, elastic bands, or pri -sterilized disposable cord tie.

- Advise the mother not to cover the cord with the diaper
- Don't use bandages as it may delay healing and introduce infection.
- Don't use alcohol for cleansing as it may delay healing.
- Don't apply traditional remedies to the cord as it may cause tetanus and other infections.
- Apply 4% chlorhexdine immediately after cutting the cord and continue daily for 7 days (3-5).

Watch out for

- Pus discharge from the cord stump.
- Redness around the cord especially if there is swelling.
- Fever (temperature more than 38°C) or other signs of infection.

Step 4. Keep the newborn warm (Prevent Hypothermia)

- Keep the baby warm by placing it in skin-to-skin contact on the mother's chest.
- Cover the baby's body and head with pre-warmed clean cloth including hat and socks. If the room is cool (<25 ºC), use a blanket to cover the baby over the mother.

Step 5. Initiate breastfeeding in the first one hour

Skin-to-skin contact and early breastfeeding are the best ways to keep an infant warm and prevent hypoglycaemia.

Early breastfeeding means breastfeeding within the first hour, with counseling for correct positioning.

- Early breastfeeding reduces the risk of postpartum hemorrhage for the mother.
- Colostrum (the "first milk") has many benefits for the baby, especially anti-infective properties.
- Skin to skin contact while feeding helps the baby to stay warm.
- Breastfeeding delays the mother's return to fertility because of lactation.
- Breastfeeding provides the best possible nutrition for the baby.
- Feed day and night, at least 8 times in 24 hours, allowing on-demand sucking by the baby.
- If the baby is small (less than 2,500 grams), wake the baby to feed every 3 hours.

- If the baby is not feeding well, seek help.
- Successful breastfeeding requires support for the mother from the family and health institutions.
- There is no need for extra bottle feeds or water for normal babies, even in hot climates
- Avoid the use of the bottles and pacifiers.

Step 6. Administer eye drops/eye ointment

- Wash your hands with soap and water
- Clean eyes immediately after birth with swab soaked in sterile water, using separate swab for each eye.
- Clean from medial to lateral side.
- Give tetracycline eye ointment/drops within 1 hour of birth usually after initiating breast feeding.
- Don't put anything else in baby's eyes as it can cause infection.
- Watch out for discharge from the eyes, especially with redness and swelling around the eyes.

Step 7. Administer vitamin K Intramuscularly (IM)

- 1 mg for babies with gestational age of 34 weeks or above
- 0.5 mg for premature babies less than 34 weeks gestation

Step 8. Place the newborn's identification bands on the wrist and ankle

- Putting the identification bands on the hands and ankle will save you from misshaping babies in busy delivery rooms.

Step 9. Weigh the newborn when it is stable and warm

- Place a clean linen or paper on the pan of the weighing scale.
- Adjust the pointer to zero on the scale with the linen/paper on the pan.
- Place the naked baby on the paper/linen. If the linen is large, cover the baby with the cloth.
- Note the weight of the baby when the scale stops moving.
- Never leave the baby unattended on the scale.
- Record the baby 's weight in partograph/maternal/ newborn charts and delivery room
- Register and inform the mother

Step 10. Record all observations and treatment provided in the registers/appropriate chart/cards

- NB. Defer the bath for at least 24 hours.
- Clean the newborn of an HIV-infected mother as recommended
- Organize transport if necessary
- Inform the mother of the newborn□s weight

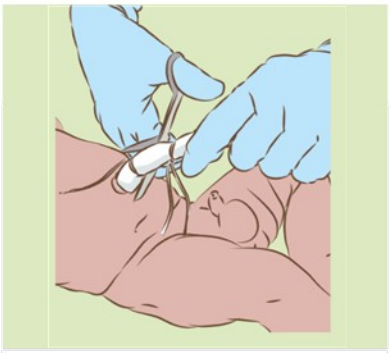
Step 1: Deliver baby on to mother's abdomen or into her arms



Step 2: Dry baby's body with dry towel. Wipe eyes. Wrap with another dry one and cover head



Step 3: Assess breathing and color. If <30 breaths per minute, blue tongue, lips or trunk or if gasping then start resuscitating



Step 4: Tie the cord two fingers from abdomen and another tie two fingers from the 1st one (if no clamp). Cut the cord between the 1st and 2nd tie (clamp)



Step 5: Place the baby in skin-to-skin contact and, on the breast, to initiate breastfeeding.

Step 6: Apply Tetracycline eye ointment



Step 7: Give Vitamin K, 1mg IM on anterior mid-thigh



Step 8: Place the newborn's identification bands on the wrist and ankle



Step 9: Weigh baby (if <1500 gm, refer urgently)

Note: Delay bathing of the baby for 24 hours after birth
Do not remove vernix
Provide postnatal visits during at 6-24 hours, 3 days and 6 weeks
Place the baby in skin-to-skin contact and, on the breast, to initiate breastfeeding.

Figure 4. **Figure showing steps of Essential Newborn Care**

NEONATAL RESUSCITATION

Neonatal resuscitation means to revive or restore life to a baby.

It is a lifesaving intervention for newborns who fail to initiate and maintain spontaneous and adequate breathing at birth.

While providing essential care identify babies in need of resuscitation according the following table.

Table 9. **Neonatal resuscitation**

Assessment	Decision
Baby is crying	No need for resuscitation or suctioning. Start skin-to-skin contact and breastfeeding.
Baby is not crying but his chest is rising regularly between 30 to 60 times in a minute	No need for resuscitation or suctioning. Start skin-to-skin contact and breastfeeding.
Respiratory rate below 30	Start resuscitation immediately.
Baby is gasping	Start resuscitation immediately.
Baby is not breathing	Start resuscitation immediately.

Table 10. **Risk factors associated with need for resuscitation**

Maternal Risk Factors before Labor	Risk Factors during Labor
Pre-eclampsia and eclampsia	Foul smelling amniotic fluid
previous fetal or neonatal death	unusual vaginal bleeding before delivery
Maternal infection (HIV, STD, Malaria)	Prolonged rupture of membranes > 18 hours
Multiple gestation	precipitous labor
Premature rupture of membranes	Shoulder dystocia
Diminished fetal activity	Prolonged labor (>24 hours)
Post-term gestation	Prolapsed cord
bleeding in second or third trimester	Fetal bradycardia (slowing of heart rate)

Maternal diabetes	Meconium
Age <16 or >35 years	Narcotics administered to mother
Anemia	Instrumental delivery
No prenatal care	

Maternal complications are often unpredictable, but newborn complications are usually predictable based on these factors. Therefore, it is usually possible to anticipate and prepare for resuscitation.

THE 3A□S, GOLDEN RULES OF RESUSCITATION

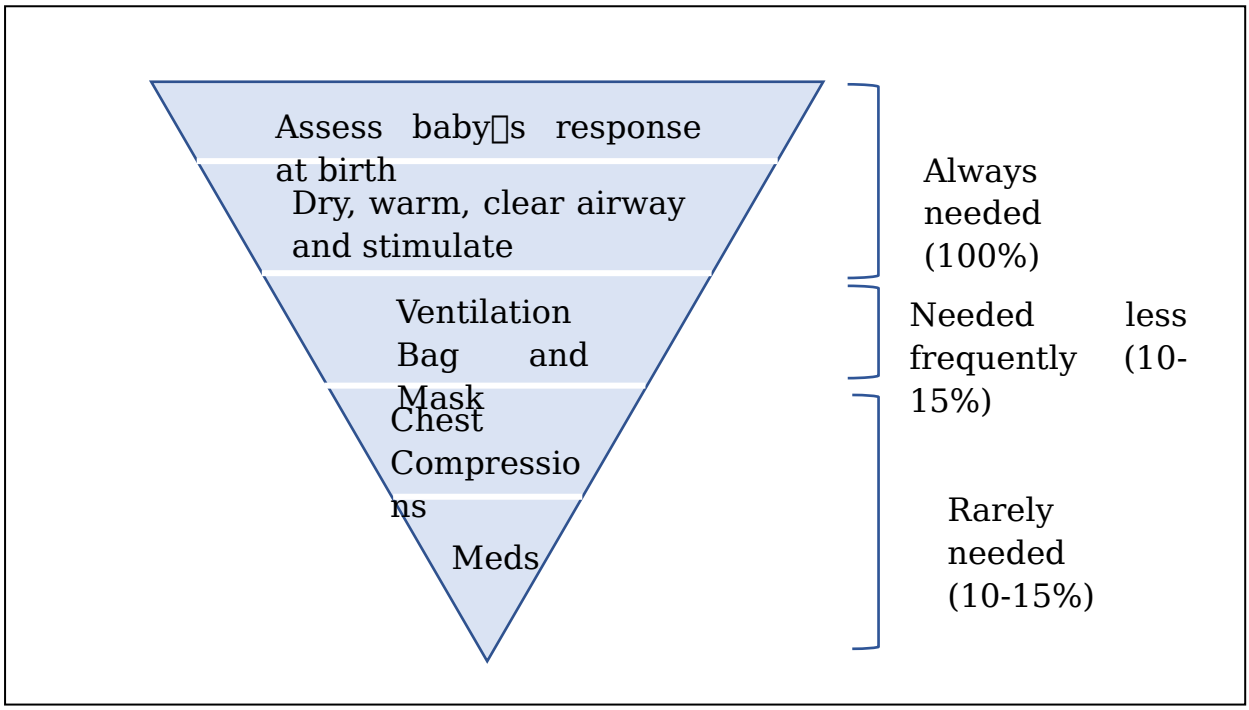
1. **Anticipation:** identify those newborns that are at high risk for birth asphyxia (Intrauterine growth restriction, preterm birth, breech delivery, post term pregnancy, prolonged labor)
2. **Adequate preparation:** Skilled manpower can undertake the steps of resuscitation (warm well organized new born corner with resuscitation equipment, observation of infection prevention practice)
3. **Act on time:** There should not be any delay in identifying newborns that need resuscitation and action should be taken immediately.

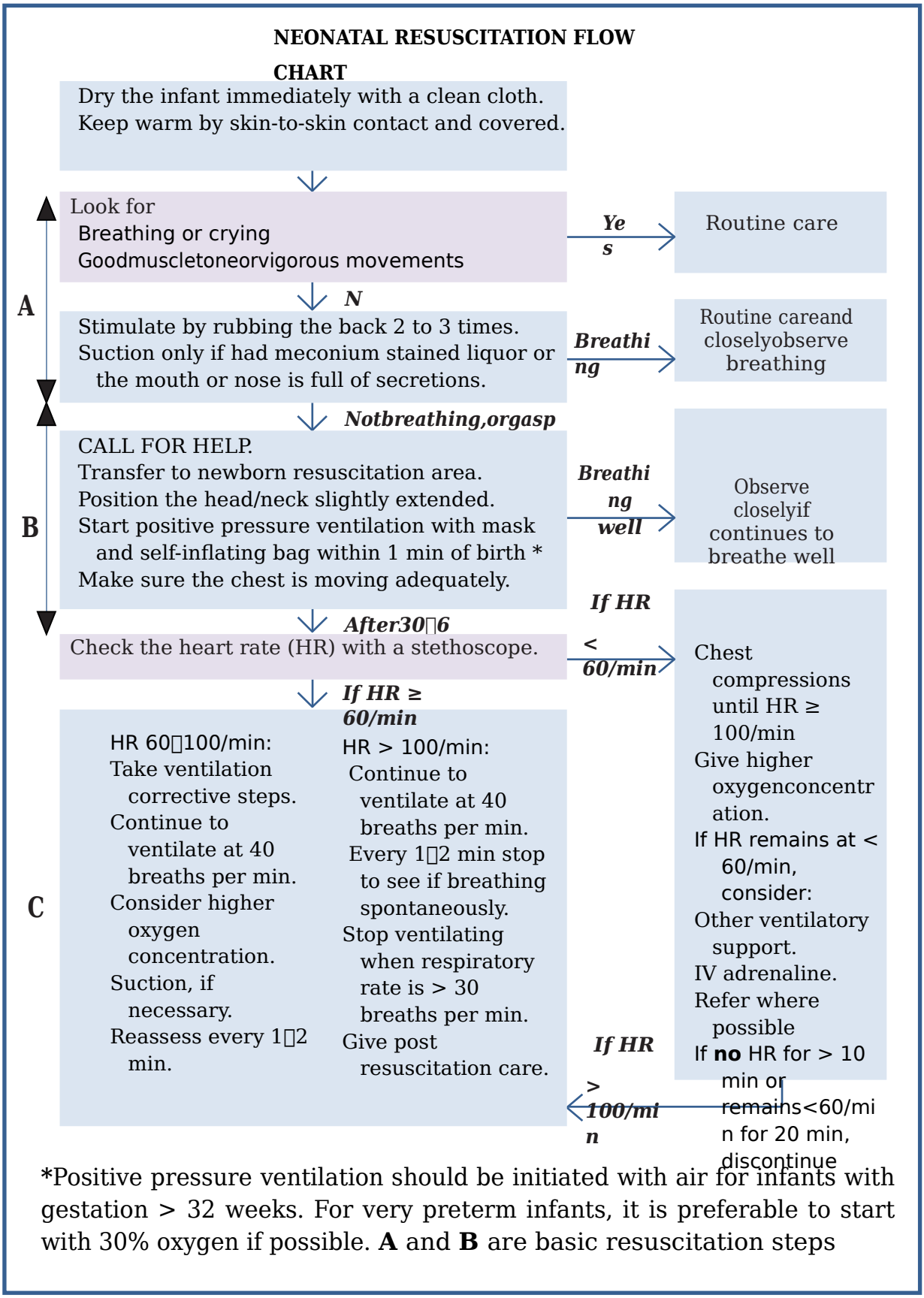
PREPARATION FOR RESUSCITATION

- Change your gloves.
- Tie and cut the cord first.
- Tell the mother that her baby is having difficulty to breath and that you are going to help the newborn. Tell her quickly but calmly.
- Lightly wrap the baby in a warm dry towel or cloth.
- Leave the face and upper chest free for observation.
- If necessary, transfer the baby to a newborn corner which is warm, clean and dry surface, under an overhead heat source.

BASIC STEPS IN RESUSCITATION

The diagram below illustrates the relationship between resuscitation procedures and the number of newly born babies who need them. At the top are the procedures needed by all newborns. At the bottom are procedures needed by very few.


Assess baby's response at birth
Dry, warm, clear airway and stimulate
Ventilation Bag and Mask
Chest Compressions
Meds
Always needed (100%)
Needed less frequently (10-15%)
Rarely needed (10-15%)



*Positive pressure ventilation should be initiated with air for infants with gestation > 32 weeks. For very preterm infants, it is preferable to start with 30% oxygen if possible. **A** and **B** are basic resuscitation steps

Figure 6. **Neonatal resuscitation flow chart**

POST RESUSCITATION CARE

Infants who require resuscitation are at risk for deterioration after their vital signs have returned to normal. Once adequate ventilation and circulation has been established:

- Stop ventilation.
- Return to mother for skin-to-skin contact as soon as possible.
- Closely monitor breathing difficulties, signs of asphyxia and anticipateneed for further care.

CESSATION OF RESUSCITATION

It is appropriate to consider discontinuing after effective resuscitation efforts if:

- If the baby is breathing or crying,
- If breathing is >30/min and regular
- Infant is not breathing and heart beat is not detectable beyond 10 min, stop resuscitation.
- If no spontaneous breathing and heart rate remains below 60/min after 20 min of effective resuscitation, discontinue active resuscitation.
- Record the event and explain to the mother or parents that the infant has died.
- Give them the infant to hold if they so wish.



POSTPARTUM CARE

DEFINITION

Post-natal care is care that is provided to a mother and newborn baby after delivery and within the first 42 days after child birth.

CLASSIFICATION

A. Type of care

i. *Postpartum care:* care that is provided to a mother
ii. *Postnatal care:* care that is provided to a newborn

B. Timing of care:

i. *Immediate PNC:* Care provided to the mother and/or newborn within the first 24 hours after delivery
ii. *Early PNC:* Care provided to the mother and/or newborn between 3rd to 7th day after delivery or birth
iii. *Late PNC:* At least three additional postnatal contacts are recommended for all mothers and newborns, on day 3 (48–72 hours), between days 7–14 after birth, and six weeks after birth.

ROUTINE POSTPARTUM/ POSTNATAL CARE

Table 11. **Immediate postpartum/ postnatal care (first 24 hours after birth)**

MOTHER: IMMEDIATE PPC

Monitor mother every 15 for the first hour; at 2, 3, and 4 hrs. then every 4 hrs

- Measure and document blood pressure (BP), temperature and pulse every 30 min with in the first 2 hours
- If first BP measurement is normal, take the second measurement within six hours
- Check uterine tone
- Check for bleeding
- Check for pallor
- Check for any perineal problem, inspect episiotomy site if done
- Monitor urine output within 6 hours
- Encourage voiding of urine
- Encourage for mobility

Give preventive measures

- Counsel on BF, Encourage early initiation of BF
- Counsel about family planning and provide if needed
- Counsel on danger signs of the mother and NB
- Counsel on nutrition
- Advise on postpartum care and hygiene
- If RPR positive, treat woman, partner and newborn
- Provide tetanus toxoid (TT) per immunization status
- Give mebendazole once in 6 months based on when last dose of mebendazole was given
- Check woman's supply of iron/folate and give 3 month's supplies
- Advise on insecticide treated bed net use for mother and baby as required
- Counsel on safer sex including use of condoms
- Counsel on continued abstinence from tobacco, alcohol and drugs
- Counsel for return visit
- Give appropriate supportive care for mothers with stillborn or dead baby
- Provide PPFP if not initiated earlier as Implants and Post placental insertion of IUCD using Kelly placental forceps based on counseling during ANC and availability of commodity, instruments and trained personnel. PM could be BTL by mini-laparotomy or vasectomy in those who want to limit in the presence of instruments and trained personnel.

NEWBORN: IMMEDIATE PNC

Monitor newborn every 15□ until the first hr. then before discharge

- Assessment of the newborn as per standards on breathing; movements; the presenting part for swelling and bruises; abdomen for pallor and distension; malformations; feel the tone; feel for warmth: if cold, or very warm, measure temperature; weigh the baby.
- Provide essential new born care
- Warm baby by keeping mother and baby together, skin to skin contact
- Initiate BF with in the first one hour
- Frequent observation of baby by the mother for danger signs (unable to feed, convulsion, fast breathing, lethargy….)
- Check color, umbilical cord for oozing, sucking/feeding.
- Immunization with BCG, and OPV0
- Advise on cord care
- Counsel to delay bathing until after 24 hours
- Counsel on appropriate clothing of the newborn for ambient temperature (one to two layers of clothes more than adults and use of hats/caps)
- Encourage Communication and play with the newborn
- Preterm and low-birth-weight babies should be identified immediately after birth and should be provided special care as per existing guidelines
- Schedule return visit

Table 12. **Early postpartum/ postnatal care (at day 3 and 7 □ 14 days)**

MOTHER: EARLY PPC

- Check blood pressure; for urination and urinary incontinence, bowel function, healing of any perineal wound, headache, fatigue, back pain, perineal pain and perineal hygiene, breast pain, engorgement, fever and uterine tenderness and status of lochia
- Advise on mobility, exercise and adequate rest
- Check for leg swelling to look for DVT

- Breastfeeding progress should be assessed at each postnatal contact
- Counsel on post-partum nutrition
- Counsel on hygiene
- Counsel on safer sex including use of condoms
- Advise on insecticide treated bed net use for mother and baby as required
- Assess and support emotional and psychological wellbeing
- Counsel on danger signs
- Counsel about family planning and provided if needed serve for any risks, signs and symptoms of domestic abuse and inform whom to contact for advice and management.
- Counsel on PPFP if not done earlier and initiate mini- pllls, or implants based on the availability of method based on availability of commodities, instruments and trained personnel. BTL by ML or vasectomy could be considered if there is a trained manpower and instruments.

NEWBORN: EARLY PNC

- Assessment of the newborn as per standards on breathing; movements; the presenting part for swelling and bruises; abdomen for pallor and distension; malformations; feel the tone; feel for warmth: if cold, or very warm, measure temperature; weigh the baby.
- Respond to any abnormal findings. Observe how baby is breast feeding*
- Advise exclusive BF
- Immunization with BCG, if not provided already at birth
- Immunization with OPV 0 if not provided already at birth and newborn seen <1 week after birth
- Advise on exposure to sunlight
- Counsel on danger signs
- Counsel on appropriate clothing of the newborn for ambient temperature (one to two layers of clothes more than adults and use of hats/caps)
- Encourage Communication and play with the newborn

Table 13. **Late postpartum/ postnatal care (care at 6 weeks)**

MOTHER: LATE PPC

- Routine postpartum assessment: ask for general well-being and

assess the following: micturition and urinary incontinence, bowel function, healing of any perineal wound, headache, fatigue, back pain, perineal pain and perineal hygiene, breast pain and uterine tenderness and lochia.

- Assessment for signs of postpartum complications
- Ask for resumption of sexual intercourse and possible dyspareunia
- Counseling on appropriate nutrition, and micronutrient supplementation
- Counseling on safe sex practices
- Counseling on breastfeeding and support as needed
- Counseling on personal hygiene and disposal of soiled pads.
- Encourage on continued use of ITN for women living in malaria endemic areas
- Assess and support emotional and psychological wellbeing
- Observe for any risks, signs and symptoms of domestic abuse and inform whom to contact for advice and management
- Routine offering of HIV testing if not already done
- Plan for revisit and immunization of baby
- Counsel and provide FP methods if not done earlier as needed. - Counselling should during ANC or early Postpartum period-Options to be initiated immediately includes implants, mini-pills, IUCD, or PM if the client wanted to limit (Tubal ligation by Mini-laparoyomy or vasectomy).

NEWBORN LATE PNC (CARE AT 6 WEEKS)

- Identify warning signs of complications
- Routine examination of the baby
- Advise on exposure to sunlight
- Immunization according to the national EPI program

PUERPERAL FEBRILE MORBIDITIES

DEFINITION

Puerperal fever, also known as postpartum fever is defined as temperature of 38.0°C or higher during the first 10 days postpartum, exclusive of the first 24 hours.

Fever in the first 24 hours after delivery often resolves spontaneously and cannot be explained by an identifiable infection. A mother may have a fever owing to prior illness or an illness unconnected to childbirth. However, any fever during 10 days postpartum should be aggressively investigated and timely managed.

Most persistent fevers after childbirth are caused by genital tract infection. Other causes of puerperal fever include breast engorgement, urinary infections, infections of episiotomy, abdominal incisions and perineal lacerations, and respiratory complications after caesarean delivery and septic thrombophlebitis.

It is very important to note that endemic febrile illness like malaria may also be the cause of fever in mothers in these days. Appropriate diagnostic approach and management should be instituted based on relevant guidelines.

RISK FACTORS

- Prolonged and premature rupture of the membranes,
- Prolonged (more than 24 hours) labor,
- Frequent vaginal examination,
- Retained placental fragments or membranes,
- Anemia and poor nutrition during pregnancy,
- Immunocompromised,
- Genital or urinary tract infection prior to delivery,
- Cesarean birth (20-fold increase in risk for puerperal infection),
- Obesity,
- Diabetes, and
- Indwelling urinary catheter

DIAGNOSIS

For diagnosis of puerperal fever see table 14 below.

Table 14. **Diagnosis of puerperal fever**

CLINICAL PROBLEM	PRESENTATION	COMPLICATIONS
UTERINE INFECTION *(Postpartum Endomyometritis, Metritis with pelvic cellulites)*	*Fever, lower abdominal pain, offensive lochia, sub involuted uterus, lower abdominal tenderness and uterine tenderness* ***Less common presentation:*** *abdominal distension, nausea and vomiting, diarrhoea, abdominal fluid collection, generalized abdominal adnexal mass, tenderness and guarding*	*sepsis, peritonitis and pelvic abscess*
BREAST ENGORGEMENT	*fever, bilaterally and diffusely swollen painful breasts, tense, warm and tender breasts on palpation in the first three postpartum days* ***Less common presentation*** *Inverted nipples*	*mastitis, breast abscess and lactation failure*
MASTITIS	*Fever, unilateral breast swelling and/or pain, unilateral erythema, warmth, swelling and tenderness* ***Less common presentation*** *Nipple excoriations/ cracking, shock*	*breast abscess, sepsis, lactation failure*
BREAST ABCESS	*Fever, unilateral breast swelling and pain, localized and fluctuant mass with erythema of overlying skin* ***Less common presentation*** *Draining pus, pus discharge per nipple*	*Sepsis*
URINARY INFECTION/ PYELONEPHRITIS	*Spiking fever/chills, dysuria, increased frequency and urgency of urination, flank pain* ***Less common presentation*** *Retropubic / suprapubic pain, loin pain/tenderness, tenderness at costovertebral angle area, anorexia and nausea/vomiting*	*Sepsis*

ATELECTASIS / PNEUMONIA *(Atelectasis after entubation& ventilation after general anesthesia)*	***Common presentation*** *Fever, tachypnea, tachycardia, difficulty in breathing, cough with expectoration and chest pain* ***Less common presentation*** *rhonchi/rales, reduced oxygen saturation*	*Respiratory failure, Sepsis*
WOUND INFECTION(abdominal, episiotomy or perineal) ± cellulitis	***Common presentation*** *Fever, painful and tender wound, erythema and edema beyond edge of incision* ***Less common presentation*** *hardened edges of wound, purulent discharge, reddened area around wound*	*Necrotizing fasciitis, sepsis*

INVESTIGATION

- Blood film
- CBC
- C reactive protein
- Urinalysis,
- Stool exam
- Abdominopelvic Ultrasound

PREVENTION

- Avoid risk factors.
- Keep the episiotomy site clean.
- Careful attention to antiseptic procedures during childbirth
- Administration of prophylactic antibiotics against (e.g. cesarean section, manual removal of placenta)

MANAGEMENT

UTERINE INFECTION

Also referred to as *Endomyometrites* or *Metrites with Pelvic Cellulites.*

Supportive care

- Institute supportive measures if necessary. This includes transfusion of blood, correction of fluid & electrolyte imbalance.

Antibiotics

- Give the woman a combination of antibiotics starting from presentation up to 24□48 hours after complete resolution of clinical signs and symptoms (fever, uterine tenderness, purulent lochia, leucocytosis)
- Clindamycin phosphate 600 mg IV every eight hours; - PLUS Gentamicin 5 mg/kg body weight IV every 24 hours.
- If clindamycin is not available administer: - Ampicillin 2 g IV every 6 hours; - PLUS gentamicin 5 mg/kg body weight IV every 24 hours.
- When available, Clindamycin (in combination with Gentamycin) is more effective than Ampicillin or a Penicillin antibiotic for the treatment of postpartum endometritis
- Note that oral antibiotics are not necessary after stopping IV antibiotics

Management of persistent fever

- If fever is still present 72 hours after starting antibiotics, re-evaluate and revise diagnosis.
- Do abdominopelvic ultrasound to assess for retained tissue and to check for other complications like abscess collection.
- If retained placental fragments are suspected, perform a digital exploration of the uterus to remove clots and large pieces. Use ovum forceps, aspiration with large cannula(12-14) ora wide curette if required.(Avoid sharp currete)
- If there is no improvementwith conservative measures (Possible differential diagnosis includes complications of the infection like peritonitis, pelvic abscess or septic thrombophlebitis.)
- If there are signs of general peritonitis(fever, rebound tenderness, general abdominal pain), performlaparotomy to drain the pus(Note that abdominal tenderness in the postpartum period may be subtle). If the uterus is necrotic and septic, perform subtotal hysterectomy

PELVIC ABSCESS

- Give a combination of antibiotics before draining the abscess; continue antibiotics until the woman is fever-free for 48 hours.
- Ampicillin 2 g IV every six hours; - PLUS Gentamicin 5 mg/kg body weight IV every 24 hours; - PLUS Metronidazole 500 mg IV every eight hours.
- If the abscess is fluctuant in the cul-de-sac, drain the pus through the cul-de-sac. If the spiking fever continues, perform a laparotomy.

PERITONITIS

- Provide nasogastric suction.
- Start an IV infusion and infuse IV fluids

- Give the woman a combination of antibiotics until she is fever-free for 48 hours
- Ampicillin 2 g IV every six hours; - PLUS Gentamicin 5 mg/kg body weight IV every 24 hours; - PLUS Metronidazole 500 mg IV every eight hours.
- Identify and treat the underlying cause of the peritonitis. The type of surgical intervention needed depends on the diagnosis of the cause of the peritonitis. For example, closure may need to be performed for an intestinal or uterine perforation, whereas an abscess may need to be drained.

BREAST ENGORGEMENT

If the woman is breastfeeding and the baby is able to suckle: -

- Encourage the woman to breastfeed more frequently, without restrictions, using both breasts at each feeding. Show the woman how to hold the baby and help the baby attach.
- 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.
- Relief measures before feeding or expression may include:
- Applying warm compresses to the breasts just before breastfeeding, or encouraging the woman to take a warm shower;
- Massaging the woman□s neck and back; and - having the woman express some milk manually before breastfeeding, and wetting the nipple area to soften the areola to help the baby latch on properly and easily. Relief measures after feeding or expression may include:
- Supporting breasts with a binder or bra;
- Applying cold compresses to the breasts between
- Paracetamol 500□1000 mg every six to eight hours orally as analgesic (maximum 4000 mg in 24 hours).
- Follow up in three days to ensure response

If the woman is not breastfeeding:

- Encourage her to support breasts with a binder or bra.
- Apply cold compresses to the breasts to reduce swelling and pain.
- Avoid massaging or applying heat to the breasts
- Avoid stimulating the nipples.
- Give Ibuprofen 200□400 mg every six to eight hours (maximum dose 1200 mg in 24 hours);
- OR Paracetamol 500□1000 mg every six to eight hours orally as an appropriate alternative (maximum dose 4000 mg in 24 hours).
- Follow up in three days to ensure response

BREAST INFECTION MASTITIS

- Treat with antibiotics

- Cloxacillin 500 mg by mouth every six hours for 10 days; - OR Erythromycin 250 mg every eight hours for 10 days.
- Encourage the woman to: - continue breastfeeding; - support the breasts with a binder or bra; and - apply cold compresses to the breasts between feedings to reduce swelling and pain.
- Give the woman to eight hours
- Paracetamol 500□1000 mg every six to eight hours as an appropriate alternative (maximum dose 4000 mg in 24 hours).
- Follow up in three days to ensure response.

BREAST ABSCESS

Antibiotic Treatment

- Treat with antibiotics with Cloxacillin 500 mg PO every six hours for 10 daysOR Erythromycin 250 mg every eight hours for 10 days.

Surgical Treatment

- Pus must be drained either by incision and drainage or ultrasound-guided needle aspiration (which may need to be repeated)
- Supportive Treatment Encourage the woman to: Continue breastfeeding even when there is collection of pus; - support breasts with a binder or bra; -
- Apply cold compresses to the breasts between feedings to reduce swelling and pain.
- Give Ibuprofen 200Mid-stream milk culture and sensitivity studies when there is poor response is needed to tailor the antibiotic choice;
- Breast ultrasound should be employed when there is poor response to rule out abcess or other mass lesion
- There may be a need to hospitalize and manage with parenteral antibiotics in severe infections.

BREAST ABSCESS DRAINAGE:

General anesthesia (e.g. ketamine) is usually required. Make the incision radially, extending from near the areolar margin toward the periphery of the breast, to avoid injury to the milk ducts. Wearing sterile gloves, 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 gauze pack in the cavity and bring the edge out through the wound as a wick, to facilitate drainage of any remaining pus or perform ultrasound-guided aspiration for abscesses in which overlying skin is intact and the abscess is less than 5 cm in diameter. Local anesthesia is generally sufficient. This can often be done as an outpatient procedure.

If laboratory capacity is available, send drained or aspirated pus for culture and sensitivity testing.

Note: A large surgical incision should be avoided because it could damage the areola and milk ducts and interfere with subsequent breastfeeding

INFECTION OF PERINEAL AND ABDOMINAL WOUNDS WITH CELLULITES

- If there is superficial fluid or pus, open and drain the wound and debride dead tissue. Inspect carefully for fascial integrity for abdominal wounds. (Wound disruption or dehiscence refers to separation of the fascial layer. This is a serious complication and requires secondary closure of the incision in the operating room after exploration of abdomen)
- Remove infected skin or subcutaneous sutures and 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 antibiotics: based on culture of the wound exudate whenever possible
- Combination antibiotics should be given when above not possible.
- Place a damp dressing in the wound and have the woman return to change the dressing every 24 hours.

NECROTIZING FASCIITIS

- Necrotizing fasciitis may involve abdominal incisions, or it may complicate episiotomy or other perineal lacerations.

- It involves deep tissue necrosis if facia and muscles.
- Early diagnosis, surgical debridement, antimicrobials, and intensive care are paramount to successfully treat this potentially lethal complication. give a combination of antibiotics until necrotic tissue has been removed and the woman is fever-free for 48 hours
- 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 IV every six hours; - PLUS Gentamicin 5 mg/kg body weight IV every 24 hours; - PLUS Metronidazole 500 mg IV every eight hours
- Management of urinary tract infection and respiratory tract infection should be according to the relevant guideline after thorough evaluation with possible interdeciplinary consultation.

PSYCHOLOGICAL MORBIDITIES DURING PUERPERIUM

Postpartum emotional distress is fairly common after pregnancy and ranges from mild blues (affecting about 80% of women), postpartum depression to psychosis. Postpartum psychosis can pose a threat to the life of the mother or baby.

MATERNITY BLUES/POSTPARTUM BLUES

Diagnosis

- Mild and often rapid mood swings from elation to sadness,
- Irritability, anxiety
- Decreased concentration
- Insomnia, tearfulness and crying spells.

40-80% of postpartum women develop these changes within 2-3 days of delivery. Symptoms typically peak on the 5th postpartum day and resolve within 2 weeks.

Management

Postpartum blues typically resolve over time and with conservative management. Supportive treatment is indicated, and sufferers can be reassured that the dysphoria is transient. Advise on:

- Adequate time for sleep and rest, and continuous family support.
- The newborn should be taken care of by someone else during night time.
- Patients should be monitored for development of more severe psychiatric disturbances, including postpartum disorders.
- If the symptoms don□t resolve within 2 weeks, please refer to a hospital.

POSTPARTUM DEPRESSION

Affects up to 30% of women and typically occurs in the early postpartum weeks or months and may persist for a year or longer.

Diagnosis

- In nearly all respects, postpartum depression is similar to other major and minor depressions. Symptoms must be present for most of the day, every day, for at least 2 weeks.
- Symptoms include: Depressed mood Loss of interest or pleasure in most or all activities, Insomnia or hypersomnia,
- Change in appetite, Change in weight,
- Psychomotor retardation and agitation,
- Low energy, poor concentration, thoughts of worthlessness or guilt, recurrent thoughts about death or suicide.
- The prognosis for postpartum depression is good with early diagnosis and treatment. More than two-thirds of women recover within a year.

Management

Providing a companion during labour may prevent postpartum depression. Once established, postpartum depression requires psychological counseling and practical assistance which includes:

- Providing psychological support and practical help (with the baby and through home care).
- Listening to the woman and providing encouragement and support.
- Referral to a hospital for further psychiatric consultation and management.

POSTPARTUM PSYCHOSIS

Postpartum psychosis is the most severe puerperal mental disorder and typically occurs around the time of delivery (within 2 weeks). It affects less than 1% of women. Cause is unknown, although about half of the women with preexisting psychotic illness are at highest risk, and those with prior episodes of postpartum depression.

Diagnosis

Postpartum psychosis is characterized by:

- Abrupt onset of delusions or hallucination
- Insomnia, a preoccupation with the baby
- Severe depression, anxiety
- Despair and suicidal or infanticidal impulses.
- Care of the baby can sometimes continue as usual.

Prognosis for recovery is excellent but about 50% of women will suffer a relapse with subsequent deliveries.

Management

The course of postpartum psychosis is variable and depends on the type of underlying illness. The clinical course of bipolar illness or schizoaffective disorder in puerperal women is comparable to that for non-pregnant women.
They usually require hospitalization for pharmacological treatment and long-term psychiatric care is needed.
In the presence of the above symptoms refer to a hospital where there is mental health unit.



ABNORMAL LABOR

DEFINITION

Abnormal labor is labor that deviates from the course of normal labor and delivery.

CLASIFICATION

Table 15. **Classification of Abnormal Labor**

Labor Pattern	Diagnostic Criteria		Preferred Rx	Exceptional Rx
	Nulliparas	Multiparas		
FIRST STAGE PROLONGATION DISORDER				
Prolonged Latent Phase	>10hrs	>12hrs	Bed rest	Oxytocin C/s delivery for urgent problems
PROTRACTION DISORDERS				
Active phase dilatation	<1.2cm/hr	<1.5cm/hr	Expectant/ Support	C/s for CPD
Descent	<1cm/hr	<2cm/hr		
ARREST DISORDERS				
Prolonged Deceleration phase	>3hr	>1hr	CPD - C/s No CPD - Oxytocin	Rest if exhausted C/ s delivery
Secondary arrest of dilatation	>2hr	>2hr		
Arrest of descent	>1hr	>1hr		
Failure of Descent	No descent in deceleration phase			

SECOND STAGE DISORDERS			
Prolonged second stage	Without epidural > 2 hrs	Without epidural > 1 hr	*depends on identified cause and presence of complications*
	With epidural > 3.5 hrs	Without epidural > 2.5 hrs	
Failure of descent	No descent in second stage		

RISK FACTORS(CAUSES)

are generally denoted by the "**three Ps**"

- *Power:* Dysfunctional Uterine Contraction
- *Passage:* Contracted Pelvis
- *Passenger:* Macrosomia, Malpresentation, malposition

NB: Labor abnormality can be as a consequence of combination of the three Ps. For example, abnormality of passage and passenger can result in Cephalo-Pelvic-Disproportion (CPD) or Feto-Pelvic-Disproportion (FPD)

SIGN AND SYMPTOM

Failure of or poor progress of labor is a sign of abnormal labor (see the classification)

NB: Clinical Pelvimetry is used Intrapartum to check for adequacy of the pelvis in case of prolonged second stage in primigravid.

INVESTIGATIONS

Diagnosis of labor abnormality is mainly clinical by close observation of progress of labor and appropriate use of Partograph.

COMPLICATIONS

If not managed timely, abnormal labor will contribute to bad maternal, fetal and neonatal outcome. Complications include:

- Obstructed labor, obstetric fistula, etc
- Uterine rupture, hemorrhage, sepsis and maternal death
- Fetal distress, asphyxia, and death

MANAGEMENT OF FIRST STAGE ABNORMALITIES

Is directed towards the stage and cause of abnormal labor.

RULING OUT FALSE LABOR

- False labor is characterized by change in cervical effacement and dilatation after 4 to 8hours of revaluation.
- Once false labor is ascertained explain to the woman (and accompanying relatives) about false labor, true labor and danger symptoms of pregnancy and labor.
- Discharge the woman if she has no other problem requiring inpatient management.
- Rehydrate if there is sign of dehydration and give psychological support for the mother

MANAGING LATENT PHASE ABNORMALITIES

- Dysfunctional uterine contraction is treated by augmentation of labor if there is no contraindication.
- Scarred cervix due to operations such as conization or cautery may lead to prolonged first stage of labor. In such scenario C/S delivery should be considered.
- Management of latent phase abnormality in the presence of malpresentations and malposition depends on the specific abnormality.

MANAGING ACTIVE PHASE ABNORMALITIES

Crossing the alert line

If the alert line is crossed, thorough assessment of the mother, fetus and progress of labor should be done to identify the cause.

In the absence of adequate uterine contractions:

- Provide labor support: Sometimes rehydration, emptying the bladder and encouraging the woman to be more active and move around or adopt an upright position.
- Consider ARM and augmentation if no contraindication
- Reevaluation 2-4 hours later

Presence of adequate labor progress with above interventions (Cervicogram remains to the left of the action line):Expect vaginal delivery

Inadequate labor progress despite intervention (Cervicogram crosses the action line): Cesarean delivery.

Crossing the action line:

When cervical dilatation crosses this line, action must be taken immediately depending on identified cause.

Management options of dysfunctional uterine contraction include performing ARM, rehydration, augmentation of labor and caesarean delivery.

Presence of contraindication for augmentation, features of CPD or non-reassuring fetal status (thick meconium, NRFHR) are indications for emergency caesarean section delivery.

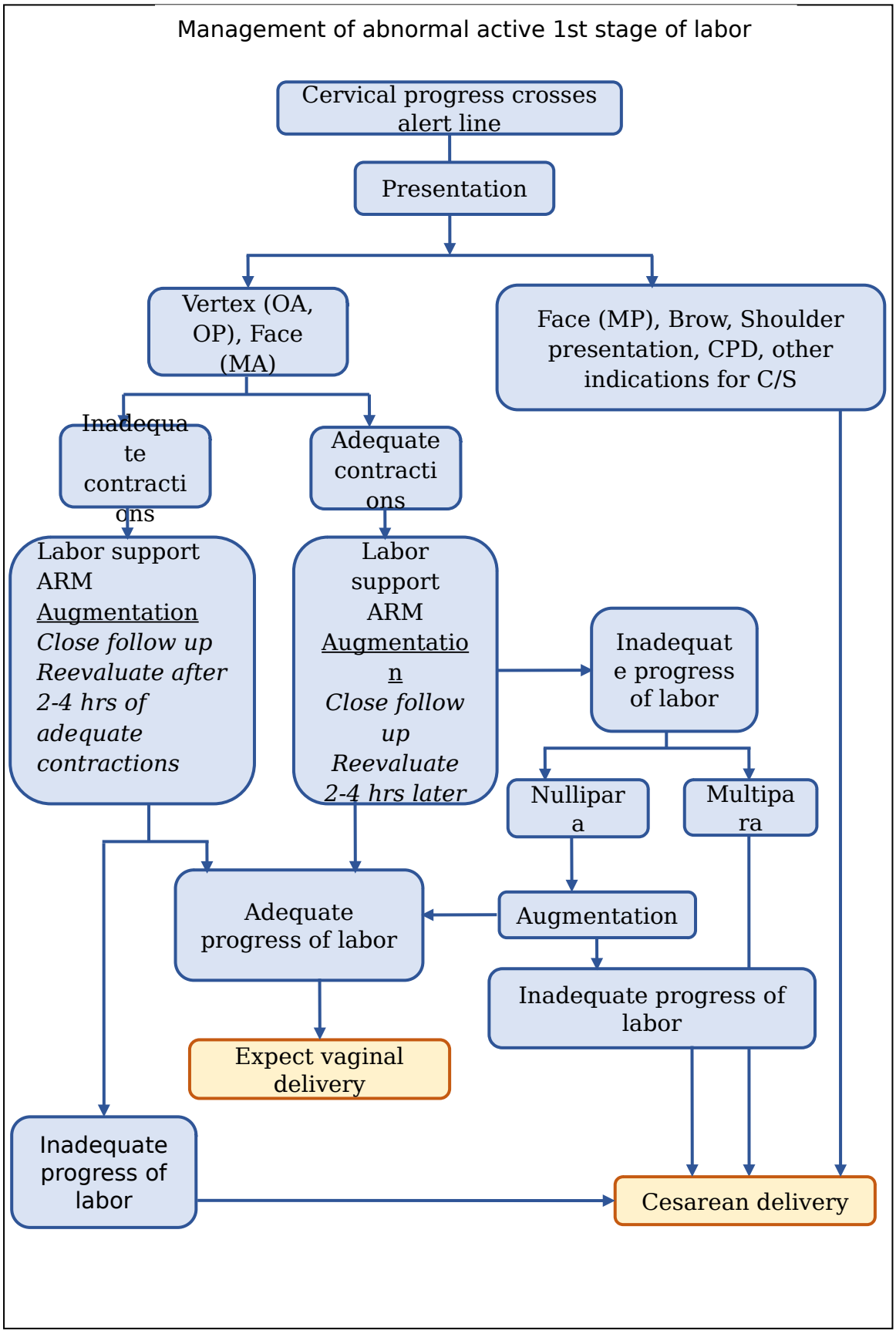


Figure 7. ***Management of abnormal active 1st stage of labor***

MANAGING SECOND STAGEABNORMALITIES

- Abnormal progress in the second stage is entertained if there is not progressive descent (or head rotation to a favorable position) with uterine contraction.
- Management depends on identified cause and presence of complications. The management options are augmentation of labor (particularly in primigravid), caesarean delivery, instrumental vaginal delivery (in the absence of contraindications) or destructive vaginal delivery (if prerequisites are fulfilled).



PRETERM LABOR

DEFINITION

Preterm labor is defined as the presence of uterine contractions of sufficient frequency and intensity to effect progressive effacement and dilation of the cervix prior to 37 weeks of gestation.

CLASIFICATION

Early preterm: 28□32completed weeks
Moderate preterm: 32 plus 1 day to 33weeks plus 6 days
Late preterm: 34 completed weeks □36 weeks plus 6 days

RISK FACTORS

Socio-demographic conditions: low socioeconomic status, extremes of maternal age, unsupported/unwanted pregnancy, smoking, alcohol consumption, excess physical work/activity.

Medical conditions: UTI, malaria, HIV, syphilis, bacterial vaginosis, DM, hypertension, anemia, asthma, thyroid diseases, obesity, undernutrition, depression or death of loved one or intimate partner violence.

Gynaecologic conditions: congenital uterine anomalies, cervical insufficiency, intramural/ submucus myoma, uterine synechiae, other pelvic masses.

Obstetric conditions: previous history, family history, multifetal gestation, short inter pregnancy interval (< 6 months), polyhydramnios, fetal macrosomia, fetal malformations, poor ANC, placental abruption and early vaginal bleeding during the index pregnancy, amniocentesis, ECV, cervical procedures during pregnancy.

DIAGNOSIS

Symptoms:

Presence of one or more of the following Symptoms

- Abdominal cramps and back pain
- Pelvic or lower abdominal pressure

- Changes in type and amount of vaginal discharge (such as mucus, bloody or leakage of watery fluid).

Signs:

Four uterine contractions per 20 minutes or eight contractions per 60 minutes which are accompanied by one of the following:

- PROM
- cervical dilation greater than 2 cm
- effacement exceeding 80%
- change in cervical dilation or effacement detected by serial examinations.

INVESTIGATIONS

- WBC with differential count
- Urine analysis/culture and sensitivity
- Ultrasound (biophysical profile, fetal weight estimation)

TREATMENT

Treatment depends on gestational age, estimated fetal weight, presence of absence of contraindications for tocolytics.

Preterm labor should be managed in a setup where there is best possible neonatal care of the preterm newborn. Hence, in-utero transfer should be considered whenever possible.

Management of preterm labour includes:

Bed rest

Corticosteroids

Dexamethasone 6 mg IM BID for 48 hours or betamethasone 12 mg every 24 hours for 48 hours.

A single repeat course of antenatal corticosteroid is recommended if preterm birth does not occur within 7 days after the initial dose, and a subsequent clinical assessment demonstrates that there is a high risk of preterm birth in the next 7 days. This recommendation should only be applied if the gestational age is less than 34 weeks of gestation.

Tocolytics:

Provide window for administration of antenatal corticosteroids and/or in-utero fetal transfer to an appropriate neonatal health care setting:

Tocolytic therapy is considered when cervical dilatation is less than 4cm, uterine contraction is fewer than 4-5 within an hour with no cervical change.

Nifedipine is the preferred drug for tocolysis. Do not give a combination of tocolytic agents as there is no additional benefit.

Contraindications for tocolytics include preterm prelabor rupture of membranes (PPROM), chorioamnionitis, antepartum hemorrhage, cardiac disease, fetal death, fetal congenital abnormality not compatible with life, cervical dilatation >4cm and effacement >80%.

NIFEDIPINE DOSE

Loading oral dose of 20 mg followed by 10□ 20 mg every 4□8 hours for up to 48 hours or until transfer is completed, whichever comes first.

Inform the woman to be aware of side effects of nifedipine such as headache, flushing, dizziness, tiredness, palpitations and itching.

Monitor maternal and fetal condition: pulse, blood pressure, signs of respiratory distress, uterine contractions, loss of amniotic fluid or blood, fetal heart rate, fluid balance.

$MgSO_4$FOR NEUROPROTECTION

MgSO4 IV 20% 4 gm over 10□15 minutes, followed by IM 5 gm every 4 hours for 24 hours.

Assess urine output, respiratory rate and deep tendon reflexes when administering MgSO4.

Contraindications to MgSO4: Myasthenia gravis, myocardial damage, impaired renal function.

Neuroprotection

Administer $MgSO_4$ up to 32 weeks of gestation to prevent preterm birth-related neurologic complications (neuroprotection).

Antibiotics

Antibiotics should be administered for spontaneous preterm labour with unknown GBS status.

Provide Ampicillin 2gm IV as initial loading dose then 1gm IV every four hours until delivery for GBS prophylaxis

LABOR AND DELIVERY

- Routine caesarean birth is not recommended
- Avoid vacuum-assisted birth for pregnancies less than 34 weeks of gestation

- Prepare for management of preterm or low birth weight baby and anticipate the need for resuscitation.

PREVENTION

Secondary prevention of preterm birth

Identification and management of pregnant mothers who are at a risk of preterm labour

Cerclage

Women who have the following conditions can benefit from application of cerclage

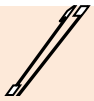
- Pregnant women who have history of recurrent mid trimester pregnancy losses and who are diagnosed with cervical insufficiency*(history indicated cerclage)*
- Pregnant women who are diagnosed to have short cervical length (<25mm) and have history of preterm birth *(ultrasound indicated cerclage)*
- Pregnant women who are accidentally found to have dilated cervix prior to 24 weeks of gestation can benefit from emergency/rescue cerclage.

Progesterone compounds

Some women can also benefit from administration of intramuscular or vaginal progesterone compounds.

The criteria for progesterone compound administration are a history of prior preterm birth or no prior preterm birth but a sonographically identified short cervix.

Progesterone vaginal tablet 100mg to 200mg vaginally each night or progesterone caproate 250 mg IM weekly starting from 16 weeks of gestation until 36weeks of gestation can be considered.



UMBLICAL CORD PROLAPSE

DEFINITION

Umbilical cord (UC) descends alongside or beyond the fetal presenting part in the presence of ruptured membranes.

CLASSIFICATION

- ***Overt UCP:*** Protrusion of the UC in advance of the fetal presenting part with ruptured fetal membranes.
- ***Occult UCP:*** Cord descends alongside, but not past, the presenting part with intact / ruptured fetal membranes.
- ***Cord presentation:*** Prolapse of UC below the level of the presenting part with intact fetal membranes.

RISK FACTORS

- ***General*:** Malpresentations, unengaged presenting part, prematurity, multifetal gestation, PROM, abnormal placentation, multiparity, polyhydramnios, long UC, pelvic deformities, uterine tumors/malformations, congenital anomalies, low birth weight less than 2.5kg.
- ***Procedure related*:** ARM with unengaged fetal presenting part, intrauterine pressure monitor catheter insertion, vaginal manipulation of the fetus with ruptured membranes, amnioinfusion / amnioreduction, ECV, stabilization induction.

DIAGNOSIS

- ***Occult UCP:*** Pressence of severe prolonged fetal bradycardia or moderate to severe variable decelerations after a previous normal tracing on CTG/Pinnard stethoscope or fetal death.
- ***Overt UCP:*** Pressence of palpable cord (pulsatile or non-pulsatile) on pelvic examination or visible cord outside the introitus.
- ***Cord presentation:*** Loops of cord are palpated through the fetal membranes on digital vaginal examination or seen in front of the presenting part on ultrasound examination.

TREATMENT

General measures

- Call for assistance
- Secure IV fluid
- Check for cord pulsation. If absent, confirm fetal heart beat with fetoscope or U/S
- Discontinue oxytocin if being given.
- Careful pelvic examination immediately after spontaneous rupture of fetal membranes.
- Prepare for resuscitation of the newborn.
- In cord presentation, do not rupture fetal membranes at any stage of labor; deliver the fetus by C/S.
- Monitor FHB while preparing for delivery

If the woman is in the first stage of labor, perform the following in all cases:

- Push the presenting part up to decrease pressure on the cord and dislodge the presenting part from the pelvis.
- Place the other hand on the abdomen in the suprapubic region to keep the presenting part out of the pelvis.
- Once the presenting part is firmly held above the pelvic brim, remove the other hand from the vagina.
- Keep the hand on the abdomen until a caesarean section can be performed.
- If available, give tocolytics.
- Perform immediate caesarean delivery.
- Choice of anesthesia should be the quickest and safest for both the mother and the fetus preferably - GA

Manuevers to reduce fetal presenting part pressure on the cord:

- Examiner□s hand is maintained in the vagina to elevate the presenting part off of the umbilical cord while preparations for an emergency C/S are being made.
- Client be placed in steep Trendelenberg or knee-chest position.
- Do not manipulate the cord.
- Avoid exposure of the cord to cold environment to avoid cord spasm (keep in vagina).

- Bladder filling: Insert Foley catheter into maternal bladder then fill bladder with 500-700 ml of normal saline with the patient in Trendelenberg position (used during referral).

If the woman is in the second stage of labor:

- Expedite vaginal birth if deemed quicker than cesarean section
- Obstetric vacuum is preferable over forceps, if prerequisites are met.
- If there is malpresentation or prerequisites for instrumental delivery are not fulfilled, immediate C/S.

REMARK: Delivery of the fetus should be accomplished within 30 minutes from the time of diagnosis.

PREVENTION

- Avoid ARM if the presenting part isn't well applied/engaged or do it with simultaneous fundal pressure.
- Avoid disengaging fetal presenting part when performing procedures.
- Incidental finding of cord presentation on U/S should be followed to decide mode of delivery.



MALPOSITIONS AND MALPRESENTATION

DEFINITION

- Malpositions are abnormal positions of the vertex of the fetal head (other than occipito-anterior position) relative to the maternal pelvis.
- Malpresentations are all presentations other than vertex

CLASSIFICATION / TYPES

Malpositions

- Occiput posterior
- Persistent Occiput Transverse position

Malpresentations

- Breech
- Face
- Brow
- Shoulder
- Compound

PREDISPOSING FACTORS

- *Maternal:*
  - Contracted pelvis
  - Pelvic tumors: uterine myomas, ovarian tumors etc.
  - Uterine anomalies: bicornuate uterus, uterine septum etc.
  - High parity
- *Fetal and placental;*
  - Prematurity
  - Fetal anomaly (e.g., hydrocephalus, anencephalus)
  - Polyhydramnious / oligohydramnious
  - Multiple pregnancy
  - Placenta previa

DIAGNOSTIC APPROACH

- Clinical assessment (History, obstetric palpation and digital vaginal examination in labor)
- Ultrasound is mainly used to confirm clinical diagnosis and to investigate for predisposing factors.

OCCIPUT POSTERIOR POSITION

DEFINITION

When the occiput is posterior in relation to the maternal pelvis.

DIAGNOSIS

- Suggestive abdominal findings
    - Flattened lower part of the abdomen
    - Anteriorly palpable fetal limbs
    - Fetal heart heard in the flank
- On vaginal digital examination
    - Posterior fontanelle towards the sacrum
    - Anterior fontanelle felt anteriorly if neck is flexed

MANAGEMENT

- Grossly adequate pelvis:- follow labor closely;
    - If there is rotation to occiput anterior, expect vaginal delivery as occiput anterior
    - If there is incomplete rotation leading to occipito-transverse position:
        - *Expect vaginal delivery* if there is stable fetal condition with adequate pelvis and good progress of labor with progressive fetal descent.
        - *Deliver by cesarean section* if there is:-
            - → arrest of fetal descent in the presence of adequate uterine contraction especially in primigravids and in those with borderline pelvis.
            - → arrest of fetal descent at high station (station above +2),
        - *Vacuum delivery can be tried* if there is arrest of fetal descent at low station (station at or below +2), especially in multiparous woman with adequate pelvis.

- If no rotation :
  - *Expect vaginal delivery* as long as fetal condition is stable, maternal pelvis is adequate and there is progressive descent of the fetal station.
  - *Augment with oxytocin* if there is no adequate uterine contraction
  - *Vacuum delivery can be tried* if there is labor abnormality in second stage of labor and the prerequisites are met.
  - *Deliver by cesaran section* if there is no rotation or there is arrest of fetal descent and the prerequisites for vacuum delivery are not met,.

PERSISTENT OCCIPUT TRANSVERSE POSITION

DEFINITION

Persistent occiput transverse position is defined as an occiput transverse position that is maintained for an hour or more in the second stage of labor.

Usually small fetuses can be delivered in occiput posterior position while others rotate anteriorly or posteriorly after the fetal head descends in to the pelvic floor.

CLASSIFICATION

- High transverse arrest (arrest above station +2 on a -5 cm to + 5 cm scale)
- Deep transverse arrest (arrest below station +2 on a -5 cm to + 5 cm scale)

CAUSES AND RISK FACTORS

- Inadequate power (contraction and poor pushing)
- Plateploid and android pelvis.
- Fetal head, long occipitofrontal diameter

DIAGNOSIS

- Suspect when fetal descent is protracted or arrested.
- On vaginal examination the fetal sagittal suture and fontanelles are palpable in the transverse diameter of the pelvis; the fetal ears can be palpated superiorly under the symphysis and inferiorly above the sacrum/coccyx.

- There may be anterior or posterior asynclitism,

MANAGEMENT

  - *Expectant management* if there is any progress in descent and the fetal heart rate is reassuring, expectant management is the preferred option. Partial or complete rotation may still occur spontaneously
- *Augmentation*
- *Cesarean delivery* if there is high transverse arrest despite adequate uterine contraction and maternal expulsive effort.

BROW PRESENTATION

DEFINITION

Partial extension of the fetal head making the occiput higher than the sinciput and brow is the presenting part (the part of the head between orbital ridge and anterior fontanel). See figure 8.

DIAGNOSIS

- Suggestive abdominal finding
  - Occiput felt above sinciput
- On vaginal examination
  - Anterior fontanelle and orbit are felt

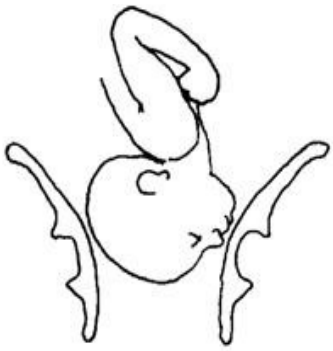


Figure 8. **Brow presentation**

NATURAL COURSE

- In brow presentation, engagement is usually impossible and arrested labor is common.
- Spontaneous conversion to either vertex or face presentation can occur when brow presentation is identified in early labor.

MANAGEMENT OF PERSISTENT BROW

- Persistent brow presentation is brow presentation in the later part of the first stage (after 6 cm of cervical dilatation) and second stages of labor.
- *If the fetus is alive* deliver by cesarean section.

- *If the fetus is dead*:
  - *Deliver by cesarean section i*f the cervix is not fully dilated or if station is high.
  - *Perform a craniotomy* if the cervix is fully dilated and the head is accessible and other prerequisite are met:
    - If the operator is not proficient in craniotomy, perform CS.

Note:

→ *Do not use an obstetric vacuum or forceps with brow presentation.*

→ *Augmentation of labor is also not generally recommended in brow presentation*

FACE PRESENTATION

DEFINITION

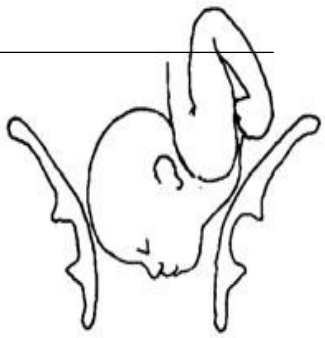


Figure 9. ***Face presentation***

- Hyperextension of the head with the face being the leading part.
- Fetal chin (mentum) is used as a reference point.

DIAGNOSIS

- Suggestive abdominal finding: Groove may be felt between the occiput and the back (Leopold III)
- On vaginal examination
  - Fetal chin, mouth and nose palpated.
  - The mouth with the two malar bone prominences make a triangle (unlike in breech where the anal orifice with two trochanteric eminences are in a line).
  - Mento-anterior: Chin anterior position
  - Mento-posterior: Chin posterior position

MANAGEMENT

Mento-anterior:

- Grossly adequate pelvis → follow the progress of labor but augmentation is not recommended.

- Forceps delivery can also be used when indicated (prerequisites for out let forceps met), but vacuum delivery is contraindicated.

Mento-posterior:

- Early admissions with rotation to mento-anterior → follow labor progress with anticipation of vaginal delivery.
- Persistent mento-posterior presentation: Mento-posterior in the later part of the first stage (after 6 cm of cervical dilatation) and second stages of labor.
    - If fetus is alive → Cesarean delivery
    - If the fetus is dead → Craniotomy if all the prerequisites are met

COMPOUND PRESENTATION

DEFINITION

Compound presentation is when a fetal extremity prolapses alongside the main presenting part. It usually is the hand alongside the fetal head.

DIAGNOSIS

- On vaginal examination: Irregular mobile fetal part adjacent to the larger presenting part.

MANAGEMENT

- Closely monitor labor. The prolapsed extremity should not be manipulated as it may retract with the descent of the main presenting part.
- Spontaneous vaginal birth can occur only when the fetus is very small or dead and macerated.
- Cesarean delivery S is indicated if there is protraction or arrest of labor.
- Augmentation of labor is not recommended.

TRANSVERSE LIE (SHOULDER PRESENTATION)

DEFINITION:

Transverse lie is when the long axis of the fetus is longitudinal axis is perpendicular to the long axis of the uterus. See figure 10 below.

Shoulder presentation is when the shoulder is the presenting part in a transverse lie.

DIAGNOSIS

- Abdominal findings:
  - Neither the fetal head or breech are felt in the upper and lower part of the uterus
  - The abdomen is transversely elongated than longitudinally.
  - Fundal height is less than gestation age.
- Vaginal finding:
  - The shoulder or the prolapsed arm is felt

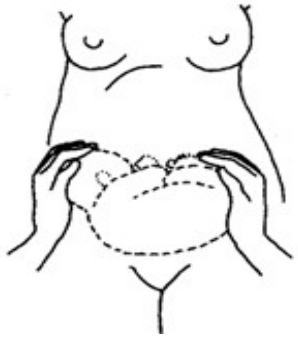


Figure 10. **Transverse lie**

MANAGEMENT:

- *CS delivery* if a transverse lie presents in labor in a term pregnancy.
- *Consider ECV* during pregnancy after 36 weeks GA till early in labor with intact fetal membranes, if operator is experienced. If ECV:
  - Succeeds: Expect vaginal delivery
  - Fails: Deliver by CS

Note: *Neglected shoulder presentation leads to obstructed labor and associated complications.*

BREECH PRESENTATION

DEFINITION

When the fetal buttock and/ or feet are the presenting part occupying the lower pole of the uterus.

CLASSIFICATION

- Frank breech
- Complete or flexed breech
- Footling breech /incomplete breech

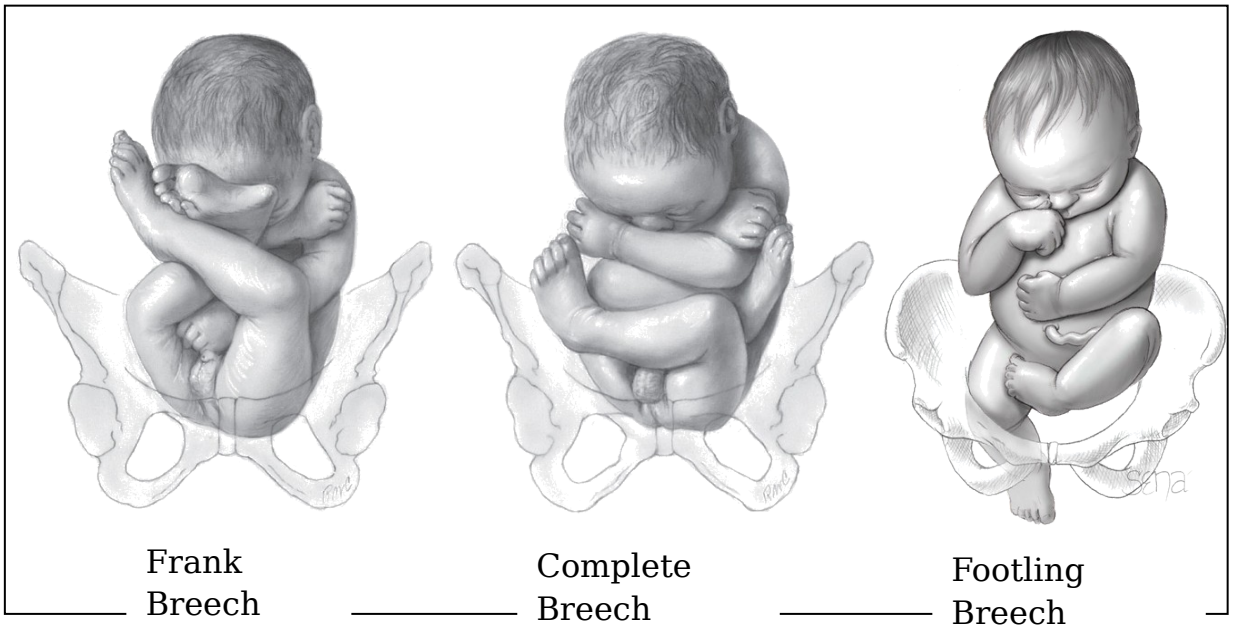


Figure 11. *Types of breech presentation*

DIAGNOSIS

Clinical assessment

- The mother may report subcoastal discomfort when the head occupies the fundus rather than the lower segment.
- Identify the following predisposing factors

- Multiparty
- Previous history of breech presentation.
- Preterm pregnancy
- Contracted pelvis
- Fetal congenital anomalies
- Uterine malformation or presence of tumor previa.

On abdominal palpation (Leopold's maneuvers):

- The head is felt as hard, globular and ballotable at the fundus and the breech will be soft and bulky at the lower pole of the uterus.
- FHB loudest just above the umbilicus (may be lower with engagement). Vaginal examination in labor Soft and irregular parts are felt through the cervical opening at early labor.
- Palpation of ischial tuboriosities, sacrum and the feet by the sides of the buttock.
- In frank breech hard feel of the sacrum is felt often mistaken for the head. Ischial tuboriosities anal opening sacrum will be felt.
- To differentiate from face presentation ischial tuboriosities and anal opening will be identified instraight line. Perform clinical pelvimetry and look for cord presentation or prolapse.

Ultrasound

- To confirm clinical diagnosis,
- To assess fetal attitude,
- To assess amniotic fluid volume to consider ECV
- To estimate fetal weight, and to investigate for fetal anomalies and other predisposing factors.

MANAGEMENT

Ideally, every breech birth should take place in a hospital with the ability to perform an emergency caesarean section.

At 37 or more weeks of gestation (including early labor with intact fetal membranes) assess thoroughly and plan management accordingly:

- If there is no any contraindication for external cephalic version (ECV), consider ECV. If the ECV fails, consider vaginal breech delivery or CS.
- If there is absolute indication for CS (e.g., placenta previa, Fetopelvic disproportion or compounding factors (e.g., multiple

pregnancy, post-term, elderly primigravida, Rh-isoimmunization)), plan for cesarean delivery.

Attempt ECV if: -

- ECV if considered has to be performed by experienced Obstetrician
- ECV should be attempted at or after 36weeks (before 36 weeks, a successful version is more likely to spontaneously revert back to breech presentation)
- Vaginal birth is possible;
- Facilities for emergency caesarean are available;
- Membranes are intact and amniotic fluid is adequate;
- There are no contraindications (e.g., Fetal growth restriction, uterine bleeding, previous caesarean birth, fetal abnormalities, twin pregnancy, hypertension, fetal death).

VAGINAL BREECH DELIVERY

The most experienced provider in breech delivery should attend the delivery.

The mother has to be counselled for the relative risk of perinatal mortality and morbidity compared with vertex presentation and ensuring availability of emergency set up.

FIRST STAGE OF LABOR

First stage of labor is monitored using partograph with close fetal monitoring as in cephalic presentation.

- Secure IV line
- Consider analgesics as labor pain management
- Immediate vaginal examination at rupture of membranes to rule out cord prolapse
- Avoid ARM
- Meconium is common with breech labors and presence of meconium alone is not considered as a sign of fetal asphyxia.
- The mother should be instructed not to push until the cervix is fully dilated.

SECOND STAGE OF LABOR

Once the cervix is fully dilated and the buttocks have entered the vagina tell the woman to bear down with the contractions.

Delivery of the buttocks and legs:

If indicated (e.g., tight perineum), perform an episiotomy.

As the buttocks get delivered, gently guide the sacrum anteriorly. Wait till body is born to the level of the umbilicus (no other manipulation at this stage).

Sweep each leg away from the midline. If the legs do not deliver spontaneously, assist delivery of one leg at a time, by lateral rotation of thighs and flexion of knees.

- Splint the median thigh of the fetus with fingers positioned parallel to the femur and exert pressure laterally so as to sweep the legs away from the mid line or (Pinard's maneuver)
- Pushing behind the knee so that it bends; then grasp the ankle and deliver the foot and leg.

.

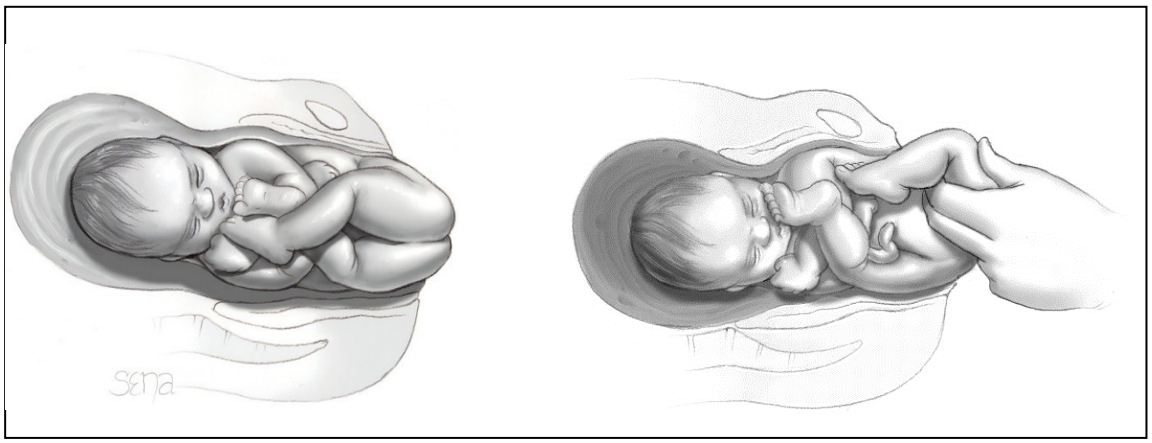


Figure 12. Pinard's maneuver

Wait till body is born to the level of the umbilicus. Put fingers on the anterior superior iliac crests and thumbs on the sacrum to apply downward rotational traction (Use a dry towel to wrap around the hips (not the abdomen) to help with gentle traction of the infant). Do not hold the baby by the flanks or abdomen as this may cause kidney or liver damage.

Delivery of the arms and shoulders

When both scapulae are visible the body is rotated 90^0. Allow the arms to disengage spontaneously one by one. Only assist if necessary.

If the arm does not spontaneously deliver, locate the humerus, place one or two fingers in the elbow and laterally sweep the arm across the chest.

Rotate the body 180^0 to deliver the other arm.

Figure 13. ***Holding the baby***



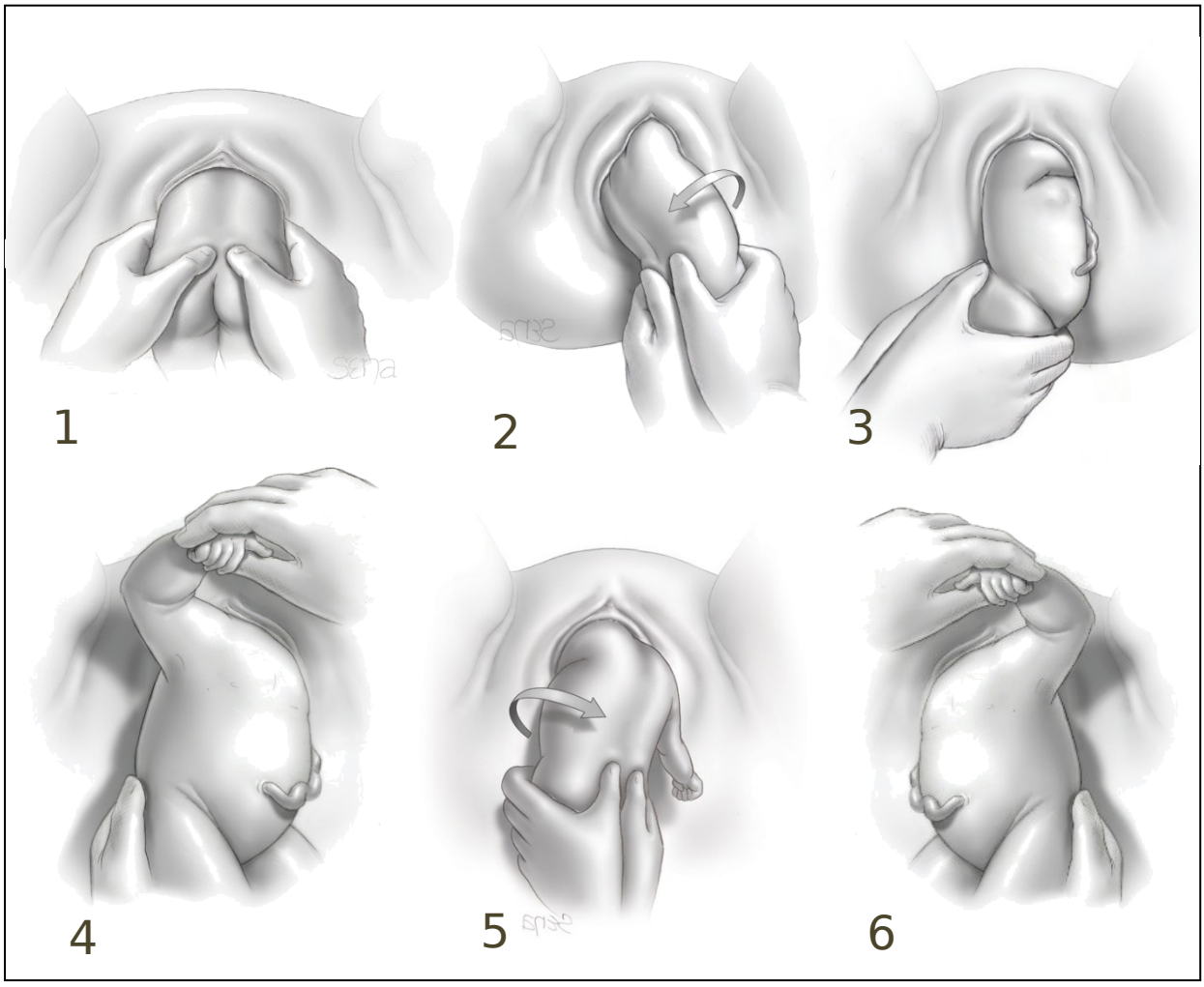


Figure 14. ***Delivery of Arms and Shoulders***

If the arms are trapped in the birth canal, use classical method (delivering posterior shoulder) or Lovset□s maneuver.

Lovset□s maneuver: Hold the fetus around the bony pelvis with thumbs across the sacrum. The fetus is turned through half a circle (180^0) while downward traction is applied at the same time, so that the posterior arm emerges under pubic arch and then hooked. The position is restored and anterior arm is delivered in the same manner.

Delivering posterior shoulder: Hand is introduced along the curve of sacrum while the baby is pulled slightly upwards. First post arm is delivered by applying firm pressure over the arm and pushing over the baby□s face.

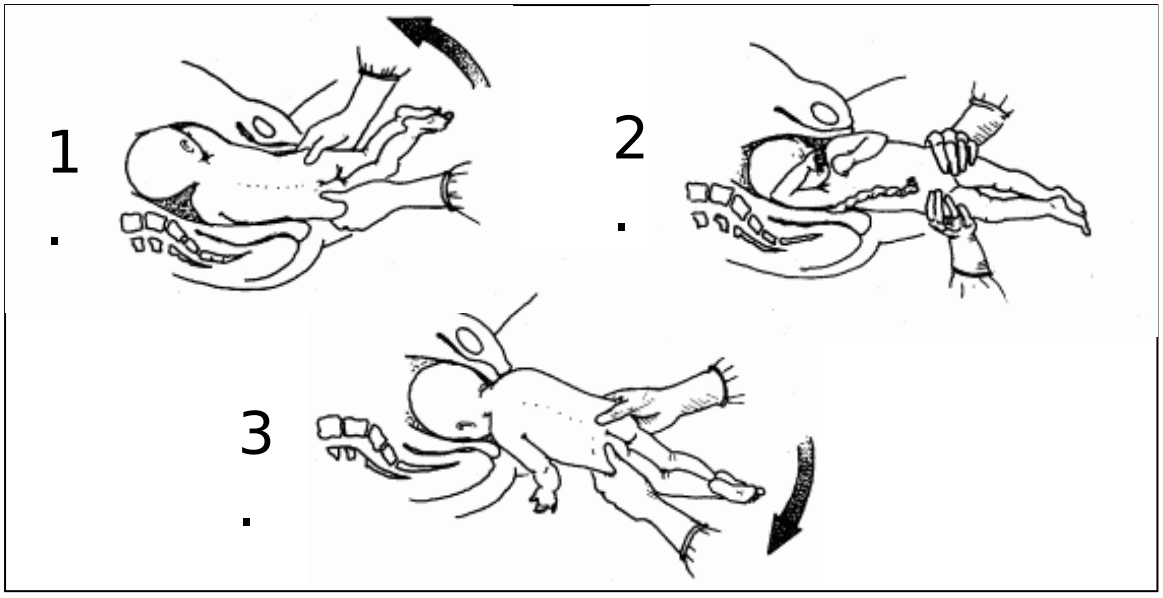


Figure 15. ***Lovset□s Manoeuvre***

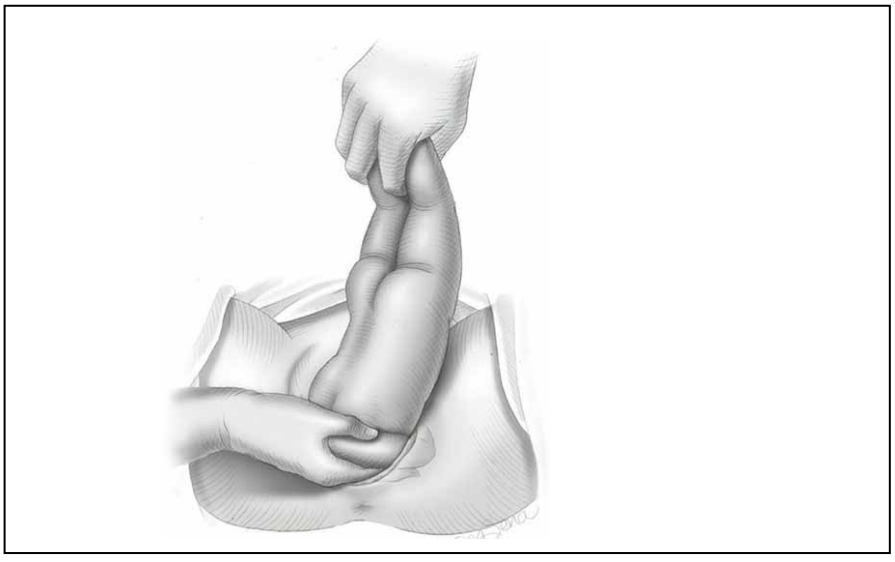


Figure 16. ***Classical method (delivery of posterior***

shoulder)

Delivery of the after coming Head

When the nape of the neck is visible, apply fundal pressure to maintain flexion and deliver the upcoming head.

Mauriceau Smellie VeitManeuver (MSV): Index and middle finger of one hand are applied over the maxilla, to flex the head, while the fetal body rests on the palm of the same hand and forearm. Fetal legs straddle the forearm. Two fingers of the other hand are hooked over the fetal neck and grasp the fetal shoulders. Apply gentle downward traction to deliver the head.

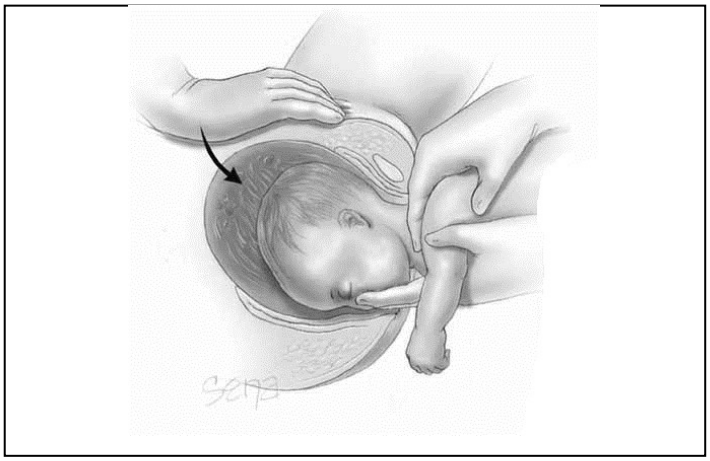


Figure 17. **Mauriceau Smellie VeitManeuver (MSV)**

Forceps delivery: specialized type of obstetric forceps (Piper forceps) can be used to deliver after-coming head when the MSV cannot be accomplished easily.

CESAREAN DELIVERY

Some of the indications for cesarean delivery are:

- Presence of any indication for CS such as placenta Previa, fetal distress
- Specific breech-related indications:
  - Footling breech at first stage of labor. Or before initiation of labor.
  - Estimated fetal weight of ≤1500gm and ≧ 3500 gm
  - Extended or deflexed neck

- Presence of compounding factor such as: previous CS, elderly primigravida, history of infertility, bad obstetrics history, severe IUGR, Rh-isoimmunization, any degree of CPD, uterine dysfunction, prolonged labor and failure to progress in labor during breech vaginal delivery



CEPHALOPELVIC DISPROPORTION

DEFINITION

Cephalopelvic disproportion (CPD) is disparity between the fetal head and maternal pelvis which leads to inability of the fetal head to pass through the maternal pelvis for mechanical reasons.

CAUSES OF CPD (clinical classification)

- **Absolute CPD:** true mechanical obstruction as a result of
  - ***Permanent (maternal factors):*** contracted pelvis (commonest), pelvic exostoses, spondylolisthesis, anterior sacrococcygeal tumors or
  - ***Temporary (fetal factors):*** Hydrocephalus, Large infant
- **Relative CPD:** where the fetus may be delivered vaginally if a favorable combination of other factors can be achieved. E.g brow presentation, face presentation and occipito-posterior positions (rotation / flexion of the head may occur during labor progress).

DIAGNOSIS OF CPD

Properly taken history, physical examination and completed labor graph allow easy and early identification and diagnosis of CPD.

History

- Primigravida (especially teenage pregnancy)
- Prolonged labor
- Previous history of prolonged labor
- Previous history of perinatal death
- Previous history of obstetric trauma
- Properly documented obstetric record (e.g intraoperative measurement of the direct conjugate)

Antepartum evaluation

- Measurement of the mother and the fetus has been attempted as a means of detecting CPD before the onset of labor but is found

to have poor prediction value. Therefore, antepartum examination, measurement and imaging cannot reliably diagnose CPD to preclude a trial of labor.

Intrapartum evaluation

Generally, CPD, with very few exceptions, is diagnosed after a properly conducted trial of labor. Abdominal and pelvic assessment should be done in all laboring mothers to rule out CPD. Findings that may indicate CPD are:-

- ***Abnormal progress of labor***
  - Arrest and protraction disorders of cervical dilatation, or crossing an alert or action line on a partograph.
  - Failure of head descent especially in the presence of arrested or protracted cervical dilatation. Note that failure of head descent in the first stage of labor is not necessarily a cause for alarm, but may be suggestive of CPD.
  - High station of the head during late active first stage of labor or second stage of labor may suggest presence of CPD, particularly in primigravid woman.
  - Failure of progress of labor after correction of inadequate uterine activity (by amniotomy or oxytocin infusion or both)
- ***Abnormal clinical pelvimetry***
  - If the true conjugate is less than 10 cm (a true conjugate or inter-tuberous diameter of less than 8 cm (a fist size), it indicates a grossly contracted pelvis through which a fair-sized fetus (with BPD of 8.5 cm) cannot be delivered safely.
  - Abnormal measurements of clinical pelvimetry also include easily reachable sacral promontory, prominent ischial spines, convergent pelvic side walls, flat sacrum, narrow sub pubic angle and narrow sacrosciatic notch.
- ***Molding:***
  - An increasing degree of molding, in the absence of descent of the head is the hallmark feature of CPD (the "ultimate index" of CPD).
  - Severe moldings (+2/+3) at a higher station (3/5th or more above the pelvic prim)
  - Parieto-parietal molding (overlap) is highly associated with CPD. Severe parieto-parietal molding is never normal.
- ***Caput Succedaneum:***

- A severe degree of caput has been associated with prolonged labor and CPD. Severe degree of caput is diagnosed when the scalp oedema hampers identification and assessment of the suture lines.

- ***Abnormal degree of head flexion:***
  - Deflexion of the fetal head results in greater cephalic diameters presenting at the pelvic brim.
  - Extreme deflexion on vaginal examination (as in brow presentation) can result in relative CPD.
- ***Asynclitism***
  - Asynclitism is lateral flexion of the fetal head as it negotiates the birth canal in the OT position.
  - Posterior asynclitism (Litzmann's obliquity) is frequently associated with CPD.
- ***Fetal Macrosomia***
  - Clinical, maternal or ultrasound estimation of fetal size have the potential for identifying macrosomic pregnancies at risk for CPD.
- ***Fetal distress:***
  - In the presence of marked CPD, the fetus responds with fetal heart rate abnormalities, falling PH and passage of meconium.

Imaging:

- Ultrasound examination may reveal macrosomia or congenital anomalies e.g hydrocephalus.

MANAGEMENT OF CPD

Trial of labor:

- Trial of labor is conducted in a woman with suspected CPD to determine whether it is safe for the woman to deliver vaginally or not. It is done in an equipped and staffed hospital for operative procedures in case vaginal delivery fails.
- CPD is suspected if there is previous history of prolonged labor with bad obstetric history or operative delivery, if the parturient is teenage, in the presence of borderline pelvis or if the cervicogram is crossing the alert line without signs of CPD.
- Borderline pelvis is entertained if the obstetric conjugate is 8 to 10 cm or in the presence of other less specific clinical findings. If there

is no other risk factor (such as previous CS), trial of labor is the best diagnostic approach.

- The trial continues as long as labor progresses well and as long as there is reassuring fetal and maternal status.

Route of delivery:

- Generally, presence of CPD during labor is an indication for caesarean delivery.
- In permanent absolute disparities (e.g severe pelvic contracture (OC of 6-8 cm) or extreme pelvic contracture (OC < 6 cm)), there is no possibility of vaginal delivery and elective cesarean section should be done.
- Induction and augmentation of labor is contraindicated in fetal macrosomia
- Cesarean delivery is recommended for macrosomic fetus with estimated fetal weight of greater than 4.5 kg (4.0 kg if the mother is diabetic) regardless of the status of labor.
- Fetal hydrocephalus may be managed by cephalocenthesis.
- Craniotomy is indicated if the fetus is dead and prerequisites for destructive delivery are fulfilled.

COMPLICATIONS

Maternal: -

- Prolonged / obstructed labor: If CPD is not diagnosed & properly managed the end result is obstructed labor and its associated complications.
- PPH
- Maternal sepsis

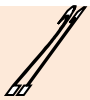
Fetal / neonatal

- Fetal distress
- Perinatal asphyxia
- Neonatal infections
- Perinatal death

DISCHARGE COUNSELING AND EDUCATION

- A woman who delivered by CS should be explained about the indication (CPD) and the need for repeat CS in future pregnancy.

- Besides verbal explanation, a written note should be given that could also serve as referral feedback to referring health centers.
- Previous CS for CPD can be followed at a nearby health center and referred after 36 - 37 weeks of gestation.



OBSTRUCTED LABOR AND UTERINE RUPTURE

OBSTRUCTED LABOR

DEFINITION:

Obstructed labor (OL) is failure of descent of the fetus in the birth canal for mechanical reasons in spite of good uterine contraction. It is an outcome of neglected and mismanaged labor.

CAUSES:

Maternal

- Contracted pelvis / cephalopelvic disproportion (commonest)
- Soft tissue abnormalities (e.g tumor previa, vaginal septum, tight perineum, uterine congenital anomalies)

Fetal

- Macrosomia
- Malpresentations- e.g. shoulder presentation
- Malposition persistent occipito posterior or occipito transverse positions
- Locked twins, conjoined twins
- Fetal anomalies e.g. hydrocephalus
- Shoulder dystocia

CLINICAL FEATURES OF OBSTRUCTED LABOR:

The clinical findings depend on the duration, complications, cause of the obstruction and gravidity.

History

- Abnormally prolonged labor
- Early ROM or prolonged rupture of the membranes

- Most do not have antenatal care
- Pain full contractions
- Fever
- Previous pregnancy complicated by prolonged labor, stillbirth or early neonatal death
- Previous operative deliveries (instrumental deliveries, cesarean section)
- Medical history, particularly rickets, osteomalacia, or pelvic injury

Clinical findings

- ***General condition*** of the patient
  - Exhausted due to severe pain and lack of sleep
  - Anxious, terrified and uncontrollable
  - Dehydration is nearly always present. Symptoms of dehydration include dry and furred tongue and cracked lips; hot and dry skin with loss of tissue turgor.
  - Deep and rapid respiration as a result of ketoacidosis
- ***Clinical signs of infection***
  - Pyrexia, and tachycardia
  - Purulent vaginal discharge
  - In advanced cases, infections due to gas-forming organisms may produce a crackling sensation when the uterus is palpated.
  - Terminal severe intrapartum infection results in septic shock with circulatory collapse, hypotension, and a rapid thready pulse with subnormal temperature.
- ***The uterus***
  - Increasing uterine contractions in frequency and duration, that later becomes atonic (mainly in a primigravida).
  - In multiparous women, uterus responds by increasingly frequent and violent contractions resulting in tonic contractions
- ***The bladder***
  - Edematous bladder, displaced out of pelvis
  - Blood-stained urine because of prolonged compression traumatizing the bladder
  - Decreased urine output
- ***Abdominal findings***

- Distention of the bowel as a result of acidosis and hypokalemia.
- *Two/ Three tumor abdomen:*
  - Occurs due to grossly thickened and retracted upper uterine segment above Bandl's ring; thinly distended lower uterine segment below the ring; fully distended and/ or edematous bladder further distending the lower abdomen (see figure 18 below).
  - Retraction ring of Bandl marks the junction between thickened and retracted upper segment and thinned lower uterine segment.
  - The 'two/three tumor abdomen' and retraction ring of Bandl are warning signs of an impending uterine rupture.

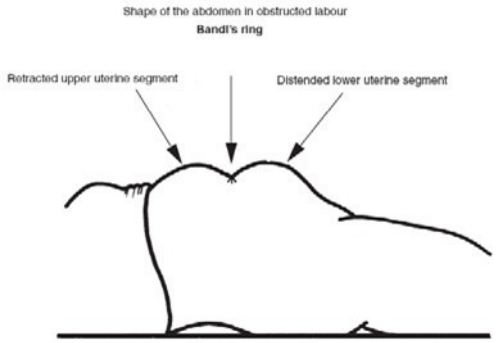


Figure 18. **The three tumors and ring of Bandl**

- ***Vaginal examination findings***
  - Edema of lower vagina and vulva (canula sign)
  - Meconium- stained and foul-smelling discharge
  - Bleeding may be seen
  - Edema of the cervix
  - Cervix poorly applied to the head
  - Full cervical dilatation usually occurs in cephalic presentation,
  - Little or no descent of the presenting part
  - Increasing molding
  - Depending on the type of fetal presentation, findings may include large caput succedaneum in cephalic presentation, shoulder with or without prolapsed arm in transverse lie, brow or face in deflected neck.

- Caput formation makes identification of the presentation and position very difficult

- ***Fetal Status***
  - Abnormal fetal heart rate (tachycardia, bradycardia or deceleration)
  - No fetal heart tone if the fetus dies from anoxia;

Parthograph findings:

- A prolonged first or second stage of labor with no descent, and
- Cervicogram crossing the alert line and then action line despite adequate uterine contractions.

MANAGEMENT

Initial management of OL involves resuscitation and monitoring of the life endangering conditions such as shock and sepsis followed by identification and treatment of the cause of OL and its complications.

Resuscitation and monitoring:

- Secure good venous access with preferably two large-bore cannulae (No. 18).
- Give crystalloids (ringers lactate is the fluid of choice)
  - If the woman is in shock, give normal saline or Ringer□s lactate. Run 1 litre as quickly as possible, then repeat 1 litre every 20 minutes until the pulse slows to less than 90 beats per minute, systolic blood pressure is 100 mm Hg or higher. However, if breathing problems develop, reduce to 1 litre in 4□6 hours.
  - If the woman is not in shock but is dehydrated and ketotic, give 1 litre rapidly and repeat if still dehydrated and ketotic. Then reduce to 1 litre in 4□6 hours.
- Give dextrose solution IV but never give orally.
- Monitor closely
  - Keep an accurate record of all intravenous fluids infused, vital signs and urinary output.
  - Lung bases should be examined at intervals

Send an urgent blood sample:

- Blood group and Rh, cross-match, complete blood count

Give broad spectrum antibiotics:

- Ampicillin 2 g every 6 hours or ceftriaxone 1-2g IV every 12 hours + Gentamycin 80 mg IV every 8 hours (should be adjusted with renal status) + Metronidazole 500mg IV every 8 hours

  or

- Gentamycin 80 mg IV every 8 hours + Clindamycin 900 mg IV every 8 hours

Further management:

- Empty the bladder:
  - Note that catheterization may be difficult or impossible.
  - Metalic catheters should not be used to avoid injury to the urethra and bladder.
- Empty the stomach: insert NG tube, particularly in the presence of distended abdomen
- Prophylactic dose of TAT: 1500 units, if she is not immunized for tetanus during ANC
- Inhalation of oxygen by face mask

Supportive care:

- Family members should be encouraged to stay with her to provide comfort and support.
- Staff should explain all procedures to the woman, seek her permission, discuss results with her, listen and be sensitive to her feelings

Pain management:

- Give analgesics while resuscitating and preparing her for operative delivery.

Delivery of the baby:

- Alive fetus: do emergency cesarean delivery
- Dead fetus with presence of imminent signs of uterine rupture: perform cesarean delivery or destructive delivery under observation (DUO).
- Dead fetus without imminent signs of uterine rupture: perform destructive delivery if prerequisites are fulfilled.

Postoperative care and follow up

- Intensive resuscitation and close monitoring should continue to identify complications (e.g. abscess) early until her condition improves.
- IV antibiotics should be continued until the patient is fever free for 48 hours and shift the medications to PO antibiotics to complete 7-10 days treatment.
- Give analgesics
- Breast care for those with stillbirths or neonatal deaths
- Explain the condition and counsel on future pregnancy
- Severe postpartum infection: possibility of ectopic pregnancy in future pregnancy and need for early check-up if pregnant; infertility
- After prolonged obstructed labor, keep the catheter for at least 10 days. Earlier removal predisposes to chronic retention.
- Fistula care and follow-up:
    - A leak of urine may indicate obstetric fistula (from a tiny hole to massive necrosis).
    - If there is urinary leakage after removal of the catheter, it should be reinserted immediately.
    - Prolonged urethral catheterization (for total duration of 3 weeks to 6 weeks) can be utilized to non-surgically manage "small" (< 2 cm) and "fresh" fistulas (i.e., cases diagnosed within four weeks of injury).
    - Women with fistula are kept in the hospital until infection is controlled. They should be explained about when and where they can have the fistula repair.
    - Usually, the fistula repair is undertaken after infection and edema has subsided.
- Follow up schedule: keep patients until infection and acute conditions are well controlled, especially in women coming from rural and distant areas.
- Besides the basic postpartum care, the follow up care should focus on the specific complication sustained after OL.

COMPLICATIONS:

Early complications:

- Atonic PPH, uterine rupture, peripartum infection (peritonitis, sepsis and septic shock leading to various organ failure (temporary or permanent)), tetanus, maternal death, fetal distress, fetal & neonatal infections, fetal and neonatal death.

Late complications:

- Fistula (e.g vesico-vaginal, rectovaginal) and its aftermath, vaginal stenosis & stricture, foot drop (sciatic, common peroneal nerve), infertility following postpartum PID or hysterectomy, psychological trauma due to the painful labor experience, loss of the baby and social isolation.

UTERINE RUPTURE

DEFINITION

- **Uterine rupture:** A tear through the uterine wall above the cervico uterine junction during pregnancy and labor.
- **Silent uterine rupture:** Rupture of the uterus before the onset of labor. It usually occurs in patients with previous uterine scar involving the upper uterine segment (e.g repaired uterine rupture, previous classical C/S).

RISK FACTORS

- Obstructed labor and previous cesarean section scar are the most common risk factors for uterine rupture.

CLASSIFICATION

- **Complete:** Where all the three layers of the uterus are involved and there is a direct communication between the uterine and abdominal cavities.
- **Incomplete:** In incomplete uterine rupture, the peritoneum covering the uterus remains intact

CLINICAL FINDINGS

- The clinical findings may vary from mild and non-specific to an obvious clinical crisis and abdominal catastrophe.
- The ***classic signs and symptoms of complete uterine rupture*** are:
    - Sudden onset of tearing abdominal pain (sudden feeling of something giving way)
    - Cessation of uterine contractions
    - Recession of the presenting part
    - Absent fetal heart sounds
    - Easily palpable fetal parts
    - Abnormal uterine contour
    - Signs of intra-abdominal hemorrhage
    - Tender abdomen
    - Vaginal bleeding

- Hemorrhagic shock
- Copious bright red blood through the catheter indicate involvement of the bladder

- ***Clinical finding of incomplete rupture*** includes
  - The fetus remains in the uterus and signs of shock may be delayed until after delivery
  - Rapid maternal pulse
  - Labor pain may continue
  - Fetal heart rate abnormalities: This is the most reliable warning sign.
  - Vaginal bleeding

MANAGEMENT

Emergency management

- Secure good venous access bilaterally
- Resuscitation with IV fluids and blood products
- Prepare for operative interventions (e.g., determine hematocrit, blood group and RH, avail cross-matched blood and organize the OR)
- Laparotomy should not be delayed till patient is resuscitated out of shock.

Surgical intervention

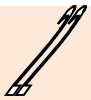
- Abdominal cavity should be entered through vertical skin incision.
- One of the following operative procedures is undertaken to manage the rupture:
  - Repair of uterine tear with preservation of fertility:
    - If preservation of fertility is desired.
    - Performed for recent tear, not too large, with accessible and clean (little or no infection) edges.
  - Repair of uterine tear with bilateral tubal ligation:
    - For less experienced surgeon or
    - If the patient is in critical condition
  - Total hysterectomy
    - Extensive tear, necrotic edges, tears difficult to stitch (such as posterior tears and with extension into the vagina),

grossly infected uterus, rupture after prolonged labor, future cervical cancer concern

- Subtotal hysterectomy
  - Similar indications as total hysterectomy
  - Relative ease of procedure than total hysterectomy

POSTPARTUM CARE

- Intensive resuscitation and monitoring should be continued till the patient's condition improves.
- Blood transfusion
- Hysterectomy/ BTL: Counsel about future fertility
- Repaired uterus:
  - Requires extensive counseling about the increased risk of rupture with future pregnancies.
  - Written note should be given that could also serve as referral feedback to referring health centers.
  - In future pregnancy, women with prior rupture should be admitted early to hospital, monitored closely and offered cesarean delivery at 36 weeks of gestation.
  - For pregnancy with repaired uterus and with relatively higher risk of silent uterine rupture (e.g multiple pregnancies, polyhydramnios, etc), delivery should be planned earlier.



Post partum hemorrhage

DEFINITION:

Excessive bleeding following delivery (>500 ml in vaginal delivery or >1000 ml in Cesarean Delivery) or a drop in Hct> 10% from the baseline or bleeding resulting in derangement of vital signs.

CLASSIFICATION:

Primary PPH: PPH occurring within 24 hrs

Secondary PPH: PPH occurring from 24 hrs until 6 wks after delivery

PRIMARY PPH

CAUSES

The 4Ts plus 1: atonic uterus (Tone), genital trauma (Trauma), retained placenta (Tissue), coagulation failure (Thrombin) and acute inversion of the uterus (Traction)

Atonic Uterus (Tone)

Definition: a loss of tone in the uterine musculature

Risk factors: prolonged labor, precipitated labor, induction or augmentation of labor, over distended uterus (multiple gestation, polyhydramnios, fetal macrosomia), use of drugs (e.g halothane, $MgSO_4$), chorioamnionitis, previous history of PPH (particularly following atony), high parity, uterine hypoxia (eg. Hypotension), mismanagement of 3rd stage

Diagnosis: hypotonic (boggy) uterus with brisk bleeding and expression of clots when the uterus is massaged.

Genital tract trauma (Trauma)

Definition: lacerations and hematoma of the genital tract in the process of delivery (uterus, cervix or vagina).

Risk factors: mismanagement of 3rd stage of labor, feto-pelvic disproportion, instrumental deliveries, precipitated labor, scarred uterus,

large episiotomy, delivery through incompletely dilated cervix, tight perineum

Diagnosis: suspect when bright red (arterial) bleeding occurs in the presence of a contracted uterus. Diagnosis is made following exploration of the genital tract.

Retained placental tissue (Tissue)

Definition: Failure to deliver the placenta and the membranes fully or partially following active management of labor

Retained placenta is defined as placenta that has not undergone placental expulsion after 30 minutes of birth of the last baby where the third stage of labor has been managed actively.

Risk factors: Mismanagement of third stage of labor, abnormal placentation (morbidly adherent placenta, succenturiate lobe), constriction of the cervix or lower uterine segment, untimely use of uterotonics

Diagnosis: Placental examination (incomplete cotyledons and/or membranes), failure to deliver the placenta by CCT, continuous bleeding, ultrasound (retained echogenic tissue in the uterine cavity).

Coagulopathy (Thrombosis)

Definition: any derangement of hemostasis resulting in excessive bleeding

Risk factors: Platelet dysfunction (ITP, HELLP), inherited coagulopathy, use of anticoagulation, disseminated intravascular coagulation (from sepsis, placenta abruption, amniotic fluid embolism or IUFD), dilutional coagulopathy, systemic bleeding disorders (e.g. CLD)

Diagnosis: presence of bleeding from other sites in addition to the genital tract including (but not limited to) mucosal bleeding. Assess for antenatal or intrapartal risk factors, perform bedside coagulation tests, determine platelet count, coagulation profile (PT, PTT, INR) and fibrinogen level,)

Acute inversion of the uterus (Traction)

Definition: the uterus turns inside-out partially or completely during or after delivery of the placenta.

Classification

First degree: Fundus is within the uterus not extending beyond the cervix;

*Second degree***:** the inversion extends out of the cervix and is limited to within the vagina.

Third degree: complete in version to the perineum

Fourth degree: total inversion of the uterus with the vagina

Risk factors: Mismanagement of third stage of labor, adherent placenta, short cord, fundal placenta, morbid placental adherence, precipitated labor, multiparity

Diagnosis: sudden maternal collapse with active vaginal bleeding and a fleshy cherry red mass in or out of the vagina with disproportionately small or absent uterus on abdominal palpation; placenta might or might not be attached.

PREVENTION OF POSTPARTUM HAEMORRHAGE

Prevention is a key intervention in the management of Postpartum Hemorrhage. Prevention methods include prevention/treatment of anemia, skilled birth attendance and active management of third stage of labor. Active management of third stage of labor is the best strategy to prevent postpartum partum hemorrhage.

INITIAL TREATMENT OF POSTPARTUM HEMORRAHGE.

Shout for help: This involves alerting the ward team, calling the most senior, consulting anesthetic team and alerting blood transfusion service

Initiate resuscitation and monitoring

- Establish two IV lines.
- Take blood for hemoglobin (Hg)/ hematocrit (Hct), cross-matching and coagulation tests
- Position the patient flat.
- Oxygen by face mask
- Commence crystalloids infusion.
- Initiate monitoring vital signs: BP, PR, RR.
- Catheterizeandfollowurineoutput
- Consider blood transfusion if there is indication

TREATMENT OF ATONIC UTERUS:

1. **UTERINE MASSAGE**

- to stimulate uterine contraction

2. **UTEROTONIC DRUGS*(table)***

- Give uterotonic drugs while stimulating contraction by gentle massaging of the uterus
- Intravenous oxytocin is the recommended first line uterotonic drug for the treatment of PPH.

3. **TRANEXAMIC ACID (TXA):**

- All women diagnosed with PPH should be given intravenous (IV) tranexamic acid (TXA) (table) as soon as possible after the onset of bleeding and within 3 hours of birth, in addition to the standard care for women with PPH.

UTEROTONIC AGENTS

OXYTOCIN

Intravenous oxytocin is the recommended first line uterotonic drug for the treatment of PPH.

Dose: 20 – 40 units in 1-liter normal saline (NS) or lactated Ringer's (LR) solution infuse IV at fastest flow rate possible.

Give oxytocin 10 units IM in women without IV access.

Maintenance Dose: IV infuse 20 units in 1 L IV fluids at 40 drops per minute

Maximum Dose: Not more than 3 L of IV fluids containing oxytocin

Precautions: Do not give as an IV bolus

ERGOMETRINE/ METHYLERGOMETRINE

Dose: 0.2 mg IM

Maintenance Dose: repeat 0.2 mg IM after 15 minutes (if required, give 0.2 mg IM or IV every 4 hours)

Maximum Dose: Five doses (1g)

Precaution: should not be given in hypertensives, cardiac patients and in retained placenta

MISOPROSTOL (PGE1)

If the bleeding is intractable or in settings in which oxytocin use is not feasible: 800 mcg sublingual or rectal

CARBOPROST (15-METHYL PROSTAGLANDIN F2 ALPHA)

Dose: 0.25 mg IM

Maintenance Dose: 0.25 mg every 15 minutes

Maximum Dose: Eight doses (total 2 mg)

TRANEXAMIC ACID (TXA)

Dose: Administer a fixed dose of TXA 1 gm in 10 mL (100 mg/mL) IV at 1 mL per minute (i.e., administered over 10 minutes)

Continuing dose: If bleeding continues after 30 minutes or if bleeding restarts within 24 hours of completing the first dose, administer second dose of TXA 1gm IV

4. BIMANUAL COMPRESSION AND AORTIC COMPRESSION:

BIMANUAL COMPRESSION: If there is no response, perform bimanual compression of the uterus as a temporizing measure until appropriate care is available for the treatment of PPH after vaginal delivery.

AORTIC COMPRESSION: maintain compression of the abdominal aorta until bleeding is controlled or alternative measures can be taken.

Figure 19. **Abdominal aortic and bimanual compressions**



Abdominal Aortic Compression

Bimanual Compression

5. UTERINE BALLOON TAMPONADE

If bleeding is not arrested by manual compression (bimanual uterine compression or aortic compression), subsequent management of atonic uterus involves the use of UBT (uterine balloon tamponade).

Steps to follow during UBT insertion:

- Explain the procedure to the mother and get a consent.
- Collect the already assembled UBT kit, a basin and clean water. (A complete kit consists of 2 condoms, 2 O-rings/cotton strings, 1 Foley catheter fitted with a one-way valve, a 60ml syringe).
- Unroll the condom. Place the Foley catheter half-way into the condom leaving the condom hanging loosely at the end of the Foley catheter.
- Tie the condom onto the Foley catheter using the two O-rings/cotton strings.
- Locate the cervix using your two fingers and insert the uterine balloon into the uterus to the fundus. Be sure that it is not just in the vagina.

If the balloon is inflated in the vagina, it may not address bleeding from within the uterus.

- Inflate the catheter with 15mls of NS/water.
- Inflate the balloon using NS/clean water at room temperature. Fill the balloon with 300-500mls of NS/water or more as maybe required until bleeding stops /meet resistance.
- Continue to check to see that the UBT has not slipped into the vagina as it is filled. If the bleeding does not stop, re-examine other causes of PPH and then proceed to next steps of management.
- Secure the catheter on the thigh of the woman so it does not pull out with her movement.
- Place the woman in a recovery position.

A prophylactic dose of broad-spectrum antibiotics such as IV/IM ceftriaxone is recommended when the uterine balloon is placed. The uterine balloon should stay in place for at least 6-24 hours. The mother's vital signs and fundal height should be examined every 15 minutes for the first hour (or longer if she is still showing signs of severe anemia) then at least every 4 hours.

Steps to follow during UBT removal

- After 6-24hrs, while the woman is being observed, the balloon should then be deflated.
- Explain the procedure to the mother
- Wash your hands and put on gloves.
- Remove 100mls of water from the balloon and observe closely for one hour to see if bleeding resumes.
- If significant bleeding resumes refill the balloon and re-examine the patient. Other causes of bleeding (retained products, cervical tears, coagulopathy) can be the cause and should be treated.
- If there is no bleeding after one hour, withdraw all the NS/water from the balloon using the syringe.
- Withdraw the 15mls of NS/water from the smaller Foley balloon.
- Gently remove the UBT device and discard.

6. NON-PNEUMATIC ANTI-SHOCK GARMENT (NASG)

NASG applies pressure to the lower body and abdomen, thereby stabilizing vital signs and resolving hypovolemic shock. NASG can be used as a temporizing measure until appropriate care is available.

7. UTERINE COMPRESSION SUTURES

If bleeding does not stop in spite of treatment with uterotonics, other available conservative interventions (e.g., uterine massage, balloon tamponade), and external or internal pressure on the uterus, conservative surgical interventions using uterine compression sutures should be initiated.

This includes applying B-Lynch or modified compression suture.

8. **UTERINE OR UTERO-OVARIAN ARTERY LIGATION**

If bleeding is not resolved, uterine or utero-ovarian artery ligation is tried alone or together with compression sutures

9. **HYSTERECTOMY**

- If bleeding does not stop, further surgical intervention (subtotal or total hysterectomy) is required

TREATMENT OF GENITAL TRAUMA:

- Repair the laceration with adequate exposure.
- Laparotomy: for cervical tear extending in to the uterus or if the apex is not visualized.
- Evacuate hematoma larger than 5 cm
- If bleeding continues, assess clotting status using a bedside clotting test
- Give tranexamic acid

TREATMENT OF RETAINED PLACENTA TISSUE

Treatment of Retained Placenta (PPPH with undelivered placenta)

- Give additional 10 units of oxytocin IM, check the tone of the uterus and attempt CCT.
- If placenta is delivered and uterus is well contracted, closely monitor vital signs and the tone of the uterus.
- If placenta delivery fails, perform manual removal of the placenta: Give analgesia and prophylactic antibiotics (ampicillin 2 gm IV or cefazolin 1 gm IV stat), catheterize the bladder, and remove the placenta gently by holding umbilical cord and identifying the cleavage line.
- If placenta is not delivered by manual removal of the placenta, consider pathological adherence of the placenta.
- If placenta is not delivered as a result of constriction ring or technical difficulty in passing the hand through the cervix and / or lower segment, extract the placenta using ovum forceps or wide curette in the operation theatre

Treatment of Retained Placental Fragments

- Remove placental fragments by hand, ovum forceps or wide curette
- Note: Very adherent tissue may be morbidly adherent placenta. Efforts to extract fragments that do not separate easily may result in heavy bleeding or uterine perforation

TREATMENT OF COAGULATION FAILURE

- For anemia, transfuse type-specific blood (or O - blood)
- For thrombocytopenia, particularly if platelets are less than 50,000, transfuse platelets
- For abnormal bedside coagulation tests or for prolonged PT or PTT or INR > 1.3, transfusion of fresh frozen plasma (15mL/Kg body weight)
- In transfusing more than 6 units of RBCs or is anticipated, give 4 units of FFP, 1 unit of platelets and 1 unit of cryoprecipitate (if available) to avoid a transfusion related dilutional coagulopathy.

TREATMENT OF PPH AFTER ACUTE INVERSION OF THE UTERUS

Treatment of pain and shock:

- Treatment of hemorrhagic shock
- If the woman is in severe pain, give pethidine1 mg/kg body weight (maximum of 100 mg) IM or IV slowly or give morphine 0.5 mg/kg body weight. General anesthesia may be required in certain patients.
- Give prophylactic antibiotics (ampicillin 2 gm IV or cefazolin 1 gm IV stat)

Manual replacement

- Once the diagnosis is made, uterine replacement should be attempted promptly using Johnson□s method
- Once uterine replacement is successful, the uterus should be held in place for few minutes and uterotonics administered.
- Placenta should only be removed after repositioning of the uterus.
- If the uterus cannot be easily replaced, a tocolytic (nitroglycerine 125µg IV) to relax the uterus may be used.

Surgical replacement:

HUNTINGDON□S OPERATION: The abdomen is opened and gentle upward traction can be used with two Allis clamps placed sequentially on the round ligaments to pull out the uterus.

HAULTAIN□S OPERATION: If Huntingdon□s operation fails, then a midline vertical incision in the posterior uterus can be made to aid in lifting the fundus.

Follow up after arresting PPH

- Closely monitor vital signs preferably continuously or every 15 minutes and urine output for at least 2 hours.
- Monitor bleeding and vital signs (PB, PR, RR) for next 6 hours every 30 minutes.
- Check the uterine tone every15minute for the next two hours.
- Continue with IV fluid and oxytocin drip for next 2 hours.
- Continue with blood transfusion if already initiated or start transfusion if indicated.
- If patient is stabilized, assist her to initiate breast feeding if appropriate.

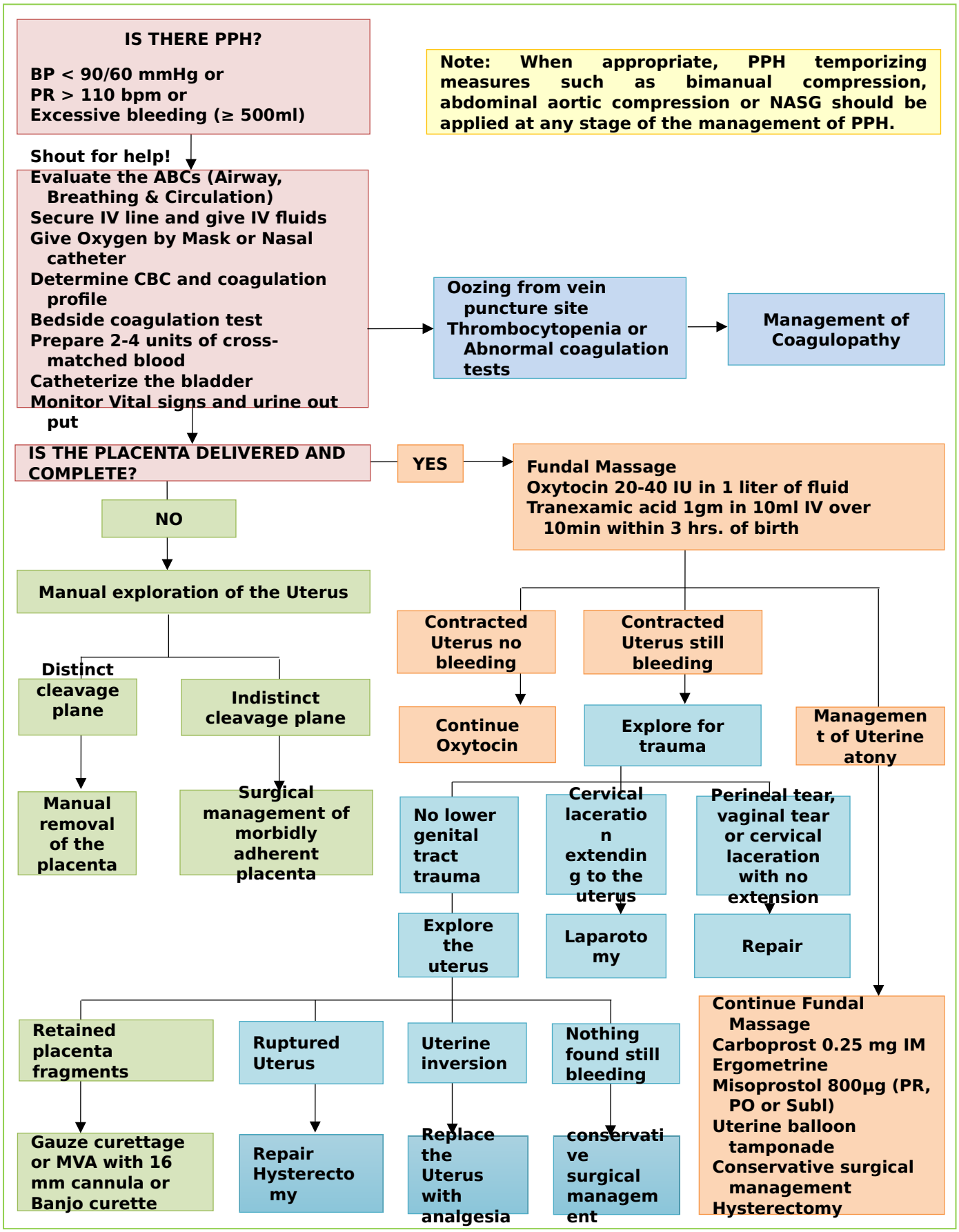


Figure 20. **Postpartum hemorrhage (PPH) management ALGORITHM**

SECONDARY POSTPARTUM HEMORRHAGE

CAUSES

Sub-involution of the uterus, infection, retained pieces of placental tissue or clot, choriocarcinoma (rare), local causes (vaginal or cervical), malignancies, trauma (missed tear or hematoma), wound dehiscence, arteriovenous fistula

DIAGNOSIS

- Sub-involution of the uterus, signs of intrauterine infection and retained pieces of placental tissue are common in the first two weeks.
- Ultrasound to check retained placental tissue
- When bleeding occurs late in the post partum period, (3^{rd} to 6^{th}wk), pregnancy test needs to be performed to rule out choriocarcinoma and the specimen of uterine evacuation needs to be sent for histological examination.

TREATMENT:

Treat anemia and shock as appropriate (see section on hemorrhagic shock).

Specific management depends on underlying cause:

- **Sub-involution:** Oxytocin in drip or ergometrine (PO1 tablet twice a day for 2-3 day). If bleeding is not controlled with these drugs give misoprostol 800 µg sublingually or rectally
- **Infection:** Antibiotics against common organisms of the vagina.
- **Retained placental tissue:** Evacuate the uterus using manual vacuum aspiration with large sized cannula. (if there is active vaginal bleeding or medical management fails).

Hysterectomy may be done if there is indication.



POST TERM PREGNANCY

DEFINITION

Post term pregnancy is a pregnancy that advances to or beyond 42 completed weeks or 294 days of gestation from the first day of the last normal menstrual period (LNMP).

RISK FACTORS

- Previous history of postterm
- Nulliparity
- Male fetus of the index pregnancy
- Obesity
- Genetic predisposition
- Older maternal age
- Maternal or paternal personal history of postterm birth

DIAGNOSIS

- The diagnosis is based on accurate gestational dating. The most common methods to determine the gestational age are
    1. Knowledge of the date of the LNMP
    2. Early ultrasound assessment performed before the 24th week of gestation (preferably CRL measurement before 14weeks).

MANAGEMENT

- The mode of treatment is termination of pregnancy.
    - Induction of labor:
        - Performed at 42 weeks if the cervix is favorable.
        - If the cervix is unfavorable (bishop score≤5), ripen the cervix before induction.
    - Elective cesarean delivery if indicated

- After 41 weeks of gestation the risk of perinatal mortality and morbidity increases. Hence to reduce the risk initiate more frequent antepartum fetal wellbeing assessment at 41 weeks. It can include:-
    - Fital kick count: if less than 10 kicks per 12 hrs. Or less than 3 kicks per hour (Morning, afternoon, evening), further testing required.
    - Non-stress test (NST) or biophysical profile (BPP) or modified BPP twice a week.
- Intrapatum management:
    - During labour and delivery the fetal condition should be followed closely.
    - FHB follow up with CTG or strict one to one follow up.

COMPLICATIONS

Fetal

- Asphyxia
- Meconium aspiration syndrome
- Macrosomia (≥4000 g)
- Shoulder dystocia
- Birth injury
- Fetal dysmaturity (post maturity) syndrome,
- Fetal death.

Maternal

- Prolonged labor,
- Feto-pelvic disproportion
- Increase risk of operative delivery
- Genital tract injury
- Postpartum hemorrhage



INDUCTION AND AUGMENTATION OF LABOR

INDUCTION OF LABOR

DEFINITION

Induction of labor is the artificial stimulation of uterine contractions before the spontaneous onset of true labor to achieve vaginal delivery.

It can be either ***planned (elective) or emergency***.

INDICATIONS

Common indications include: - Hypertensive disorders of pregnancy, maternal medical complications (DM, severe cardiac disease), chorioamnionitis, term PROM, IUFD, post term, abruptio placenta, congenital anomaly, RH isoimmunization.

CONTRAINDICATIONS

Absolute: placenta previa, vasa previa, abnormal lie, malpresentations, previous uterine scar (e.g. myomectomy, CS), contracted pelvis, macrosomia, twin pregnancy, invasive cervical cancer, active genital herpes infection, severe IUGR with confirmed fetal compromise.

Relative: bad obstetric history, grand multiparity

PRECONDITIONS

- Get informed consent.
- Document the indication.
- Make sure that there are no contraindications.
- Determine Bishop score (cervix score) and if unfavorable, consider cervical ripening.
- Ascertain availability of labor ward staff and also the capacity to do emergency caesarean section.

CERVICAL RIPENING

Cervical ripening is the use of pharmacological or mechanical means to soften the cervix.

- The cervical ripening agent may also initiate labor. If not, further pharmacologic agents (i.e. oxytocin) can be used for induction.
- Generally, cervical ripening and induction of labor are on a continuum and not all women undergoing induction of labor need cervical ripening.
- The Bishop scoring system can be used to determine if the cervix is favorable or unfavourable. If the cervix is unfavorable (Bishop score **<** 6), cervical ripening is indicated.

Table 16. *Assessment of cervix for induction of labour (Modified Bishop score)*

Score Parameter	0	1	2	3
Dilatation (cm)	closed	1-2	3-4	≥ 5
Length (cm)	> 4	3-4	1-2	<1
Consistency	firm	average	soft	N/A
Position	posterior	mid	anterior	N/A

Interpretation of the Bishop's score:

Score ≥ 6: Favourable - cervical condition and induction is likely to succeed. There is no need for cervical ripening. Induction using Oxytocin can be planned.

Score ≤ 5: Unfavourable **-** cervix is unlikely to yield for induction; cervical ripening is needed for success with induction; postpone induction for next week if possible or use cervical ripening and plan induction for next day.

PHARMACOLOGIC METHODS FOR CERVICAL RIPENING AND INDUCTION

Prostaglandin E1 (Misoprostol):

- Possible routes of administration:
  - ***Vaginal (place into the posterior fornix):*** 25 mcg (only if misoprostol is available in the form of a 25-mcg tablet), if

required repeat after 6 hours.

- Do not divide or cut a 200-mcg tablet into smaller pieces, as this is inaccurate.

- ***Oral:*** 25 mcg; if required repeat after 3 hours.
  - If 25 mcg is not available, dissolve one 200 mcg tablet in 200 mL of water and administer 25 mL of that solution as a single dose.
  - For patients with PROM, oral route of administration is preferred for priming and induction.

- Discontinue misoprostol and begin oxytocin infusion if:-
  - Membranes rupture or cervical ripening has been achieved; or
  - 12 hours have passed since the first dose of prostaglandin.

Prostaglandin E2 (Dinoprostol):

- ***Prostaglandin E2 (3 mg pessary)*** is placed high in the posterior fornix of the vagina and may be repeated after six hours if required.

MECHANICAL AGENTS FOR CERVICAL RIPENING

Mechanical agents work by directly causing cervical dilation, and by releasing endogenous prostaglandins and oxytocin

Balloon / Foley catheter:

- After insertion, leave the Foley catheter until it is spontaneously expelled or keep it in place for at least 12 hours, or until contractions begin.
- Following priming with catheter, most women require further induction of labour with oxytocin and/or amniotomy.
- Note that oxytocin infusion can be started with a balloon catheter in place or after it has been removed.
- If there is a history of bleeding or ruptured membranes or obvious vaginal infection, do not use a balloon or Foley catheter.

Osmotic dilators:

These are hydrophilic agents that absorb water and thus gradually expand within the cervical canal, which in turn causes the cervix to dilate (E.g. laminaria).

AMNIOTOMY (Artificial Rupture of Membranes)

Amniotomy is a non-pharmacological method where the amniotic membranes can be ruptured artificially to induce or augment labor. Amniotomy may be contraindicated in pregnancy with known or suspected vasa previa, any contraindications to vaginal delivery or unengaged presenting part (although this obstacle may be overcome with the use of a controlled amniotomy or the application of fundal or suprapubic pressure).

OXYTOCIN INDUCTION

- During induction, monitor and record rate of infusion of oxytocin, duration and frequency of contractions, maternal pulse and fetal heart rate every 30 minutes (never leave her alone).
- The effective dose of oxytocin varies greatly among women. Cautiously administer oxytocin in IV fluids; gradually increase the rate of infusion until good labor is established.

Oxytocin infusion

- In women with intact membranes, amniotomy should be performed where feasible before starting oxytocin infusion.
- Allow a delay of six hours after administration of the last dose of vaginal prostaglandins before commencing oxytocin
- Use 0.9% N/S or R/L for infusion. To ensure even mixing, the bag must be turned upside down several times before use.
- The initial infusion rate should be set at 1 to 2 milli units / minute. The infusion rate is increased every 30 minutes up to a maximum of 40 mU / min (250 ml/hour).
- As alternative, for induction of a primigravid woman only, oxytocin with starting dose of 3.0 to 6.0 mU / min can be used.
- Aim to maintain the lowest possible dosage consistent with regular uterine contraction that is until 3-5 contractions are achieved in 10 min, each lasting 40-60 sec.
- Label the bag and keep timely record of the drops used. Monitor mother, fetus and labor according to the labor protocol. Record maternal and fetal conditions and progress of labor.
- Continue the oxytocin infusion for at least one hour after delivery.
- In the event of uterine hyperactivity and/or fetal distress, the infusion must be discontinued immediately.

Prolonged oxytocin infusion: If a new bag of fluid is required and if the oxytocin dose is maintained with the first dose of oxytocin, add 2 IU of Oxytocin in one liter of IV fluid and continue with the last maintenance drop (see table). Oxytocin infusions which are maintained with the second and third dose need adjustment of oxytocin concentration i.e. If the oxytocin dose is maintained with the second dose, add 5 IU of oxytocin in one liter of IV fluid and if the oxytocin dose was maintained with the third dose, add 10 IU of oxytocin in one liter of IV fluid and continue with the last maintenance drip rate.

Table 17. *Oxytocin infusion rates for induction of labor*

Oxytocin Dose	***Oxytocin Concentration*** *(mIU/mL)*	***Time since induction*** *(hours)*	***Drip Rate: (Drops / Minute)***	***Approximate Dose*** *(mIU / minute)*	***Total volume infused*** *(ml)*
First dose: 2 IU of oxytocin in 1000 ml fluid	2 mIU/mL	0:00	20	2	0
		0:30	40	4	30
		1:00	60	6	90
		1:30	80	8	180
Second dose: Add another 2 IU of oxytocin to the remaining first dose fluid	5 mIU/mL	2:00	50	12	300
		2:30	60	15	375
		3:00	80	20	465
Third dose: Add another 2 IU of oxytocin to the remaining second dose fluid	10 mIU/mL	3:30	50	24	590
		4:00	60	30	665
		4:30	80	40	760
	As above	5:00	As above	As above	880
Prolonged oxytocin infusion: If a new bag of fluid is required adjust the concentration based on the maintenance concentration.					
If induction was **maintained with the first dose**, add 2 IU of oxytocin in 1000 ml of fluid	2 mIU/mL		Maintenance Drip Rate		
If induction was maintained with the second dose, add 5 IU of oxytocin in 1000 ml of fluid	5 mIU/mL		Maintenance Drip Rate		

If induction was maintained with the third dose, add 10 IU of oxytocin in 1000 ml of fluid	10 mIU/mL		Maintenance Drip Rate		

Oxytocin infusion with pump: when induction of labor is undertaken with infusion pump the recommended regimen is a starting dose of 1-2 milliunits per minute and increased at intervals of 30 minutes. The minimum dose possible of oxytocin should be used and this should be titrated against uterine contractions aiming for a maximum of 3-4 contractions every 10 minutes. The maximum dose used should not exceed 32 milliunits per minute.

Suggested standardized dilutions and dose regimens for oxytocin infusion with pump include:

30 IU Oxytocin in 500mls of normal saline, hence 1ml/hr = 1 milliunit Oxytocin per minute
10 IU Oxytocin in 500mls of normal saline, hence 3mls/hr = 1 milliunit Oxytocin per minute

COMPLICATIONS OF INDUCTION:

- Failed induction, increased risk of caesarean section, atonic PPH, iatrogenic prematurity, uterine hyper stimulation/ tetanic contractions, uterine rupture, fetal distress, placental abruption, water intoxication, amniotic fluid embolism

FAILED INDUCTION

Definition: failure to achieve regular (e.g. every 3 minutes) contractions and cervical change after at least 6 - 8 hours of the maintenance dose of oxytocin administration, with artificial rupture of membranes if feasible.

- If the induction is not for an emergency condition and the fetal membranes are intact (e.g. IUFD with unruptured membranes), the induction can be postponed.
- If the pregnancy has to be terminated on the day of the induction or the membranes are ruptured, cesarean section is the only available option.

UTERINE HYPERSTIMULATION

Definition:

Six or more contractions in 10 min and/ or durations of 60 or more seconds

Management

- Stop the infusion, position the woman on her left side (left lateral position) and assess the FHR:
    - If the FHR is abnormal, manage for non-reassuring fetal heart rate pattern and relax the uterus using betamimetics (if feasible): terbutaline 250 mcg IV slowly over five minutes OR salbutamol 10 mg in 1 L IV fluids (normal saline or Ringer□s lactate) at 10 drops per minute.
    - If the FHR is normal, observe for improvement in uterine activity and monitor the FHR. If normal activity is not established within 20 minutes and betamimetics have not been administered, relax the uterus using betamimetics.
- Observe for improvement in uterine activity, and monitor the FHR: If both mother and fetus are in good condition, restart at half dose of the last dose causing uterine hyper stimulation.

AUGMENTATION OF LABOR

DEFINITION:

Augmentation of labor is stimulation of the uterus to increase its frequency, duration and/ or strength of spontaneously initiated labor.

METHODS

The methods for augmentation are ARM and oxytocin and procedure is generally similar to induction (see the section above).

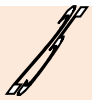
- If there is no urgency to expedite delivery, oxytocin infusion is initiated one hour after ARM and if the ARM failed to correct the weak contractions.

INDICATION

The main indication for augmentation is weak and ineffective uterine contractions leading to abnormal progress of labor.

CONTRAINDICATIONS

Contraindications for oxytocin use include; breech presentation, scarred uterus, multiple pregnancy, feature of CPD, secondary hypotonic contractions due to obstructed labor etc..



OPERATIVE VAGINAL DELIVERY

DEFINITION:

Operative vaginal delivery refers to an assisted delivery in which the operator uses obstetric forceps, vacuum/ventous, or other devices to extract the fetus from the birth canal.

VACUUM DELIVERY

DEFINITION:

Vacuum delivery is an assisted instrumental vaginal delivery using ventouse (vacuum extractor). Its main components are the suction cup (metallic or plastic), vacuum pump and traction devices.

INDICATIONS:

- Prolonged second stage of labor
- Non reassuring fetal heart rate pattern
- To shorten second stage in: Eclampsia, significant cardiac or pulmonary diseases, glaucoma, and cerebrovascular disease (Eg. CNS aneurysms).
- Cord prolapse in 2nd stage where vaginal delivery is believed to be faster than CS.

PREREQUISITES:

- Vertex presentation
- Fully dilated cervix
- Engaged head: station at 0 and below or not more than 2/5 above symphysis pubis
- Ruptured membranes
- Gestational age 34 weeks and above
- No CPD
- No contraindication to vaginal delivery

PREPARATION:

- Counsel and get consent which is documented on the notes
- Empty bladder
- Local anesthesia infiltration for episiotomy if episiotomy is required
- Assemble, check all connections and test the vacuum on a gloved hand

PROCEDURE

Application:

- Identify the flexion point
- Apply the appropriate size cup that can fit near to the occiput.
- The edge of the cup should be at about 1 cm anterior to the posterior fontanel (or the cente of the cup should be at about 3 cm anterior to the posterior fontanel) and on the sagittal suture.
- Check for correct application and ensure that there is no maternal soft tissue (cervix or vagina) within the rim of the cup (Fig. 21). If there is maternal tissue entrapment, release it before creating vacuum.

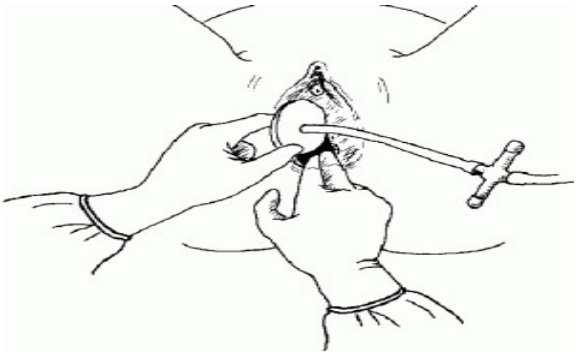


Figure 21. **Applying a vacuum cup**

Vacuum creation

- Create a vacuum of 0.2 kg/cm2 (approximately 200 mmHg) negative pressure and check that maternal tissue (cervix or vagina) is not entrapped.
- Gradually increase the vacuum to 0.8 kg/cm2 (approximately 600 mmHg), and recheck the application and that maternal tissue is not entrapped.

Traction

- Start traction with contraction with a finger on the scalp next to the cup to assess potential slippage and descent of the vertex.
- Pull in line with the pelvic axis and perpendicular to the cup.
- Between contractions, check the fetal heart beat and cup application.
- As soon as the head is

delivered, release the vacuum and proceed with the delivery of the fetus (Fig. 22).

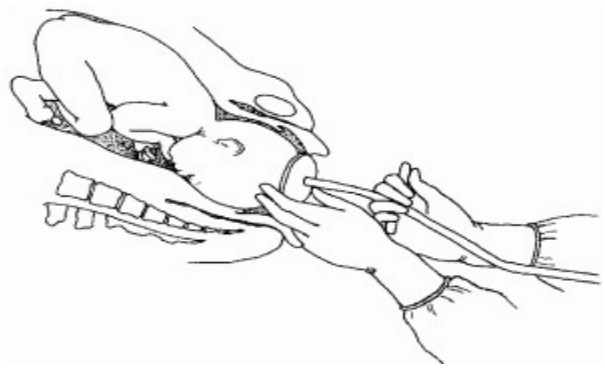


Figure 22. **Applying traction**

Further care

- After delivery inspect the vagina and cervix; and repair if there is any tear or episiotomy.
- Proceed with the immediate neonatal care and examination.

FAILED VACUUM

Diagnosis of failed vacuum is based on any one of the following condition:-

- The head does not advance with each pull.
- The fetus is undelivered after three pulls with no descent.
- The fetus is not delivered within 30 minutes.
- The cup that is applied appropriately and pulled in the proper direction with maximum negative pressure slips off the head twice.

NB: If vacuum delivery fails, the fetus should be delivered by Cesarean section.

COMPLICATIONS AND MANAGEMENT

Fetal complications

- Localized scalp oedema (caput succedaneum or chignon) under the vacuum cup is harmless and disappears in few hours.
- Cephalohaematoma requires observation and usually will clear in three to four weeks.
- Scalp abrasions (common and harmless) and lacerations may occur. Clean and examine lacerations, and suture if necessary.
- Intracranial hemorrhage: very rare but requires immediate intensive care.

- Necrosis is extremely rare.

Maternal complications

- Tears of the vagina or cervix should be repaired as appropriate

FORCEPS DELIVERY

DEFINITION

Forceps delivery is an assisted vaginal delivery effected using obstetric forceps.

CLASSIFICATION:

- ***Low forceps*:** applied when the station is +2 or below.
- ***Outlet forceps*:** applied when the fetal head is at station +3 (at the pelvic floor).

INDICATIONS:

- The same as indications for vacuum delivery. In addition, it can be applied for after-coming head in breech presentation (Piper's forceps) and mentoanterior face presentation.

PREREQUISITES:

- Presentation & position
  - Vertex presentation with occipito-anterior.
  - Face presentation with mento-anterior.
- Station of +2 or below
- Fully dilated cervix
- Ruptured membranes
- No CPD
- No contraindication to vaginal delivery

PREPARATIONS:

- Counsel and get consent which should be documented in the notes.
- Local anesthesia infiltration for episiotomy if episiotomy is required.

PROCEDURE:

Application in OA

- Orientation: Hold completely locked forceps in front of the perineum to orient and identify the right and left blades.
- Lubricate the blades of the forceps.
- 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.
- Repeat the same maneuver on the other side, using the left hand and the right blade of the forceps.
- Depress the handles and lock the forceps.
- Check application is correct and no maternal tissue is entrapped.
- 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 rotation is confirmed.
- After locking, apply steady traction inferiorly and posteriorly synchronized with each contraction following the pelvic curve.
- Between contractions check fetal heart rate and application of forceps.
- When the head crowns, make an episiotomy if necessary.
- Once the fetal head reaches the pelvic floor, lift the head slowly out of the vagina.

  NB: The head should descend with each pull.

  - Only two or three pulls should be necessary.
- Remove first the right forceps followed by the left.

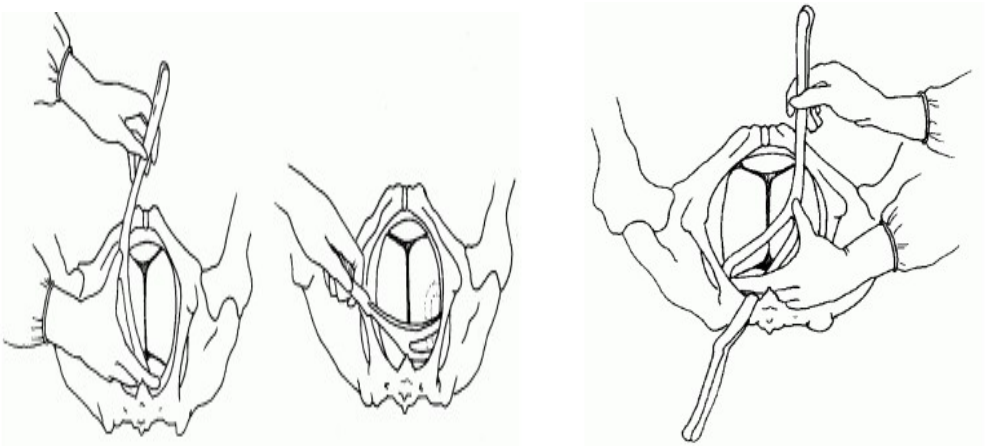


Figure 23. *Applying the right and left blade forceps*

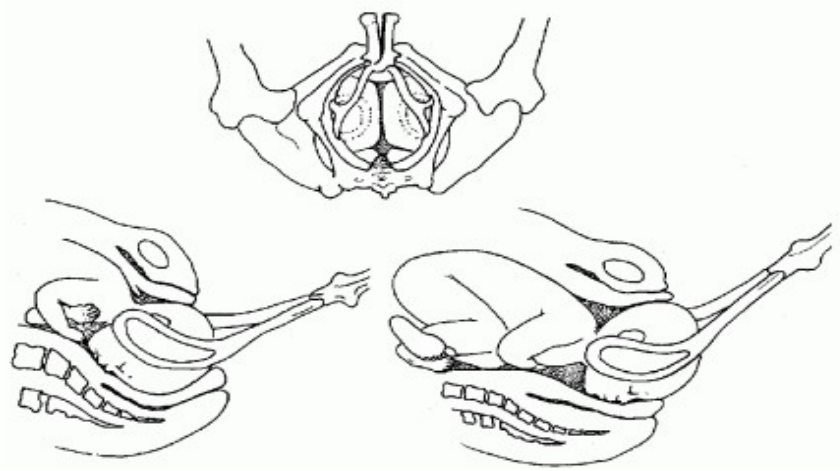


Figure 24. *Locking and applying traction*

Further care

- After delivery inspect the vagina and cervix; and repair if there is any tear or episiotomy.
- Examine the newborn as described for vacuum delivery.

FAILED FORCEPS

A failed forceps is diagnosed if:

- Fetal head does not descend with each pull,
- Fetus is undelivered after three pulls with no descent or after 30 minutes

> *NB: After failed forceps, cesarean delivery is undertaken if the fetus is alive.*

COMPLICATIONS AND MANAGEMENT

Fetal complications:

- Injury to facial nerves requires observation. This injury usually resolves spontaneously.
- Lacerations of the face and scalp may occur. Clean and examine lacerations, and suture if necessary.
- Fracture of the facial bones or skull usually needs observation.

Maternal complications:

- Tear or laceration to the cervix, vagina, or vulva. Examine the woman carefully and repair any tears.

- Uterine rupture may occur and requires immediate treatment.
- Postpartum hemorrhage (traumatic PPH).

CRANIOTOMY

DEFINITION:

Craniotomy is a delivery procedure where the head of a dead fetus is perforated to evacuate the brain tissue; and decrease its size to effect extraction of the fetus.

INDICATION

- Obstructed labor in cephalic presentation with a dead fetus.
- Entrapped after-coming head with a dead fetus.

PREREQUISITES:

- Pelvis with true conjugate diameter of more than 7.5 cm.
- Dead fetus
- Fully dilated cervix
- Descent of 2/5 or below in cephalic presentation or entrapped after coming of head
- Ruptured membranes
- Intact uterus and no imminent uterine rupture.

PREPARATIONS:

- Put up an IV drip; hydrate and resuscitate the woman as required;
- Determine hemoglobin, blood group, cross match and others based on complications
- Give broad spectrum antibiotics
- Counsel and obtain consent
- Give pain medication (pethidine, local, spinal or general anesthesia) as required.
- Alert the OR staff. It is preferred to perform the procedure in the OR.
- Put patient in lithotomy position
- Clean and drape the vulva and perineum

- Catheterize the bladder

PROCEDURE:

Cephalic Presentation

Skull perforation

For vertex presentation

- Make a cross-shaped incision through the skin of the head up to the skull bone with a finger feel for a gap (a suture line or a fontanel) between the bones.
- Push a perforator or scissors between the bones and enter into the cranium.



Figure 25. *Cruciate incision on scalp*

For face presentation:

- Enter the cranium through the orbit/ or hard palate.

For brow presentation:

- Enter the cranium through the frontal bones.

Scalp Traction

- Introduce the perforator, with closed blade, under palmar aspect of fingers protecting anterior vaginal wall and bladder at predetermined site. Avoid sudden sliding of your instrument over the skull and getting into maternal tissue.
- Open the perforator or the scissors and rotate it to disrupt the brain tissue; the brain tissue should now be coming out from the hole.
- Put 3-4 strong vulsellum forceps, kochers or heavy-toothed forceps on the skin and bones and pull on the forceps to achieve vaginal delivery.
- Protect the vagina by avoiding sharp scalp bone edges tearing the vaginal wall by your finger or by removing the offending bones.
- As the head descends, pressure from the bony pelvis will cause the skull to collapse, decreasing the cranial diameter.

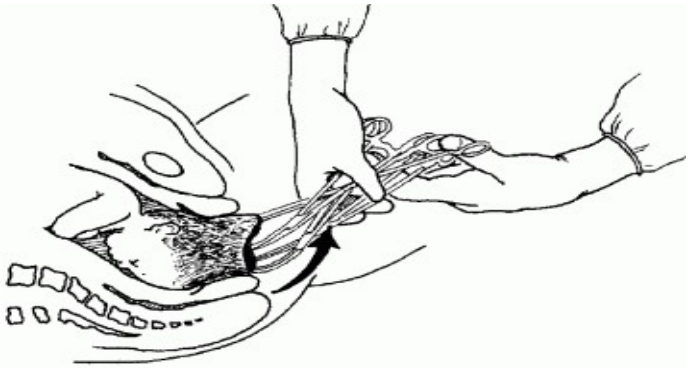


Figure 26. *Extraction by scalp traction*

BREECH PRESENTATION WITH ENTRAPPED AFTER COMING HEAD

After coming head

- Make an incision through the skin at the base of the neck.
- Insert a craniotome (or large pointed scissors or 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.

Further Care

- Leave a self-retaining catheter in place until it is confirmed that there is no bladder injury.
- Ensure adequate fluid intake and urinary output.
- Provide emotional and psychological support

COMPLICATION AND MANAGEMENT

- Tear or laceration to the uterus, cervix, vagina or vulva. Examine the woman carefully and manage accordingly.

NB: *If the head is not delivered easily, perform a caesarean section.*

CRANIOCENTESIS

DEFINITION

Craniocentesis is a procedure where a puncture is performed over the skull in case of hydrocephalic fetus to drain the CSF fluid and achieve vaginal delivery (or to deliver the hydrocephalic head through the uterine incision at time of cesarean section).

INDICATION

- Cephalic or after coming breech presentation with hydrocephalic dead fetus
- A live fetus with congenital malformation incompatible with life and severe hydrocephalus (HC>40cm).

PREREQUISITES

- Dead hydrocephalic fetus
- A live hydrocephalic fetus having congenital malformation incompatible with life.
- Descent of 2/5 or below in cephalic presentation or entrapped after coming of head
- Ruptured membranes
- Intact uterus or no imminent rupture

PROCEDURE

Cephalic presentation with dilated cervix

- Pass a large-bore spinal needle through the dilated cervix and through the sagittal suture line or fontanel of the fetal skull.
- Drain / aspirate the CSF until the skull has collapsed and allow normal delivery to proceed.

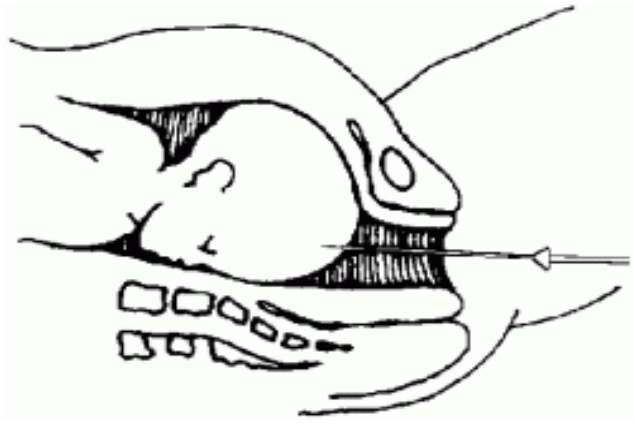


Figure 27. *Craniocentesis with a dilated cervix*

Cephalic presentation with closed cervix

- Palpate for the location of fetal head.

- Apply antiseptic solution to the supra pubic skin.
- Pass a large-bore spinal needle through the abdomen and uterine wall, and through the hydrocephalic head.
- Drain / aspirate the CSF until the skull has collapsed and allow normal delivery to proceed.

After-coming head during breech birth

- After the rest of the body has been delivered, insert a large-bore spinal needle through the dilated cervix and foramen magnum. Alternatively, the CSF can be drained by opening the spinal canal (spondylotomy). If the fetus has spina-bifide, the draining may be achieved by reaching the cranium through the defect and spinal cord.
- Drain / aspirate the CSF until the skull has collapsed and deliver the after-coming head as in a breech birth.

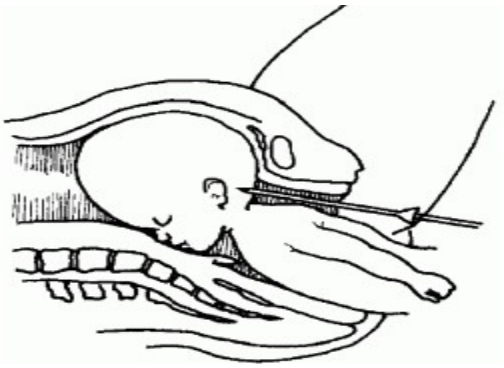


Figure 28. *Craniocentesis of the after coming head*

During caesarean

- 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.

Further care

- Leave a self-retaining catheter in place until it is confirmed that there is no bladder injury.
- Ensure adequate fluid intake and urinary output.
- Provide emotional and psychological support.

COMPLICATION AND MANAGEMENT

- Tear or laceration to the cervix, vagina, or vulva. Examine the woman carefully and repair any tear.



CESAREAN SECTION AND TRIAL OF LABOR AFTER CESAREAN SECTION (TOLAC)

CESAREAN SECTION (CS)

DEFINITIONS:

- **Cesarean section (delivery):-** is the delivery of the fetus (es), placenta and membranes through an incision on the abdominal and uterine wall at or after 28 weeks of gestation.
- **Elective CS:-** is a planned cesarean delivery performed before the onset of labor or the appearance of any complication that might constitute an urgent indication.
- **Emergency CS:-** is when the CS is done in labor or due to any complication that necessitates immediate delivery.

TYPES OF UTERINE INCISION FOR CS

- Lower transverse uterine incision:- commonest and preferable type of incision
- Lower vertical uterine (De Lee) incision
- Upper vertical uterine incision (classical incision)

PREREQUISITES:

- Appropriate indication
- Competent team of providers
- Appropriate facility and equipments

INDICATIONS

Cesarean section is performed when safe vaginal delivery either is not feasible (absolute) or would impose undue risks to the mother and/or the fetus/es. Common indications include:-

- Previous CS not eligible for TOLAC

- Feto-pelvic disproportion (FPD) such as CPD,
- Failure to progress in labor despite adequate uterine contraction
- APH
- Fetal malposition (POP, Deep transverse arrest)
- Malpresentations (breech, brow, face and shoulder presentation)
- Non reassuring fetal heart rate pattern (NRFHRP)
- Cord prolapse or presentation
- Previous uterine incision (myomectomy, metroplasty, uterine perforation)
- Failed induction
- Failed TOLAC
- Multiple pregnancy (first non-vertex, triplet or more)
- Macrosomia with EFW >4.5 kg

INVESTIGATIONS:

- Hemoglobin / haematocrit
- Blood group (ABO) and Rh
- Basic investigations done during pregnancy (e.g. HIV, HBsAg testing,), if not done previously
- Investigate specific clinical complications as required
- At least 2 units of cross matched blood should be prepared for conditions that have high possibility of transfusion need such as:
    - Active bleeding
    - Placental abnormalities (previa, abruption, adherent placenta)
    - Preeclampsia/HELLP syndrome
    - Anemia
    - Coagulopathy
    - Previous uterine scar
    - Over distended uterus and other predisposing factors for atonic PPH

PREOPERATIVE PREPARATION / PLAN:

Schedule:

- ***Elective CS*:-**
    - Plan on days when the facility is fully functioning (working hours) preferably early in the morning.
    - Elective repeat CS is done at 39 weeks.

- ***Emergency CS*** cannot be planned.

Feeding:

- ***Elective CS:*** NPO for 8 hours for regular meal and 2 hours for clear fluid (commonly done after mid-night for morning planned CS)
- ***Emergency CS:*** Limit feeding to fluid diet in laboring women with increased risk of emergency CS (e.g. TOLAC, induction in non-reassuring biophysical score).

Other pre-operative considerations:

- Revise the clinical history including anesthetic risk assessment, drug allergy (any), and medical illness.
- Plan CS procedure ahead of time based on the individual clinical situation.
- Obtain informed written consent
- Type of anesthesia (Spinal / GA)
- Preparation of blood (if required)
- Skin incision type
- Uterine incision type
- Additional procedures (e.g. tubal ligation, IUD)
- Secure IV (16 or more gauge cannula)
- Catheterization
- Prophylactic antibiotic (15 to 60 minutes prior to skin incision give penicillins (eg. ampicillin 2g Iv) or a first generation cephalosporin (eg. cephalexin, cefazolin,□)
- Administer antacid solution PO (or through NG tube)
- Clip the hair (if necessary) at the operation site but DON□T shave
- Make sure the anesthesia team is ready
- Make sure the necessary drugs and equipments are in place
- Neonatal resuscitation set and personnel are in place
- Check fetal heart beat before proceeding to the CS

INTRA-OPERATIVE CARE

- Record maternal vital signs before anesthesia and during the CS
- ***Position on operation table:*** Tilt the table to left or place a pillow under the woman□s right lower back.
- Ensure appropriate monitoring of vital signs.
- After delivery of the baby administer 20 IU oxytocin in 1000 ml of

N/S or R/L at 60 drops per-minute for two hours.

- After delivery of the baby and placenta perform BTL or insertion of IUCD if the woman is already appropriately counseled and has chosen the method.

POSTOPERATIVE CARE / FOLLOW-UP

- Check and record vital signs on arrival to the ward, every 15 min until she is fully awake / stabilized, every hour for 4 hrs and every 4 hours then after.
- Check for vaginal bleeding and make sure the uterus is contracted.
- Check and record urine output every 4 - 6 hours.
- Provide analgesics as required.
- Initiate breast-feeding and skin-to-skin contact with the baby as soon as the mother is awake.
- Start sips of fluid after ascertaining that she is conscious and bowel sounds are active. Provide food when she is drinking and tolerating fluids.
- Discontinue IV fluids once fluid diet is started unless she is on IV medication.
- Ambulate early.
- Look for evidences of PPH, pulmonary infection, UTI and wound infection.
- Inspect the wound site in 48 to 72 hours.
- Discharge after 48-72 hours if vital signs are within normal range, mother has started regular feeding, breast-feeding is initiated and there is no evidence of wound infection.

TRIAL OF LABOR AFTER CESAREAN SECTION (TOLAC)

DEFINITION: -

TOLAC is allowing vaginal birth by a woman who has undergone a caesarean section in a previous pregnancy.

A woman who has had one caesarean section in previous births has two options of mode of delivery in a subsequent pregnancy: ***Trial of Labour After CS (TOLAC)*** or planned ***Elective Repeat Caesarean Section (ERCS)***. Both options have inherent benefits and risks,

BENEFITS AND RISKS (TOLAC Vs ERCS)

TOLAC

- Benefits
  - High success rate (72 to75%)
  - Less postpartum febrile morbidity
  - Reduced anesthesia related risk -
  - Shorter hospital stay and recovery
  - Early smooth mother-infant interaction
  - Increased likelihood of future vaginal delivery
- Risks
  - Uterine scar dehiscence (<1%)
  - If TOLAC fails increased fetal and maternal postpartum morbidity

Elective repeat caesarian section

- Benefit
  - Able to plan delivery date
  - Avoids the risk of uterine rupture
  - Decreases the risk of pelvic organ prolapse
  - BTL (bilateral tubal ligation) can be done at the same time
- Risks
  - Longer hospital stay and recovery time
  - Increased complications related to anesthesia, hemorrhage and postoperative infection
  - Increased likelihood of future CS
  - Increased risk of placenta previa and adherent placenta in subsequent pregnancies, and abdomeno-pelvic adhesion with successive CS delivery

ELIGIBILITY FOR TOLAC:

- One previous lower uterine segment caesarian section
- Clinically adequate pelvis
- Labor should start spontaneously
- Singleton pregnancy
- Cephalic presentation
- No malposition and malpresentation
- No other uterine anomalies, scars or previous uterine repair for rupture

- Estimated fetal weight <4000gms
- Informed consent.

CONTRAINDICATIONS FOR TOLAC

- Clinically contracted pelvis
- Prior complicated caesarian section (extensions), classical or T-shaped incision
- Prior uterine repair for rupture and trans fundal surgery
- Obstetric (e.g. placenta previa), medical or surgical condition that prevent vaginal delivery

MANAGEMENT

Antenatal follow-up:-

- Does not differ from that of routine ANC but emphasize on:
  - Indication for previous caesarian section
  - Post-operative course
  - Review medical records
  - If accessible, in doubtful situations, try to get relevant information from previous document.
  - Clinical pelvic assessment at 36 weeks
  - Estimation of fetal weight
- Counseling -
  - Asses and inform all individual risks and benefits of TOLAC
  - Document the counseling process and plan of management
  - Get informed consent
- Investigations:
  - U/S - Fetal weight estimation, Placental localization
  - Others (see protocol on ANC)
- Visits - routine unless otherwise indicated

N.B. Mothers should be instructed to come to hospital at the onset of labor or if labor does not start after 41 weeks of gestation or if any complications arise without delay.

Intrapartum

- ***Latent phase***
  - Admit to labor suite, evaluate parturient promptly
  - Normal activity with no restriction
  - Update Hct/Hgb

- ***Active phase –***
  - Reevaluate parturient
  - Follow labor using partograph
  - Fetal Monitoring
    - FHB: - record every 15 minutes
    - If available, use continuous electronic monitoring
      → Closely follow FHB pattern (decelerations/ bradycardia)
  - Labor Progress
    - Assess cervical dilatation and descent every 2-4 hrs
    - Be alert to pick up active phase arrest timely
- ***Maternal condition -***
  - Closely watch for evidence of scar dehiscence. The clinical features associated with uterine scar rupture/dehiscence include:
    - FHR abnormality /abnormal CTG
    - Severe abdominal pain, especially if persisting between contractions
    - Acute onset abdominal tenderness
    - Vaginal bleeding
    - Hematuria
    - Cessation of previously efficient uterine activity
    - Maternal tachycardia, hypotension, fainting or shock
    - Recession of station of the presenting part
    - Change in abdominal contour
  - Pain management

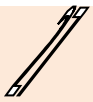
Delivery and Immediate Post delivery

- Delivery Care: - Should be conducted like others.
- Immediate Post-delivery care: -
  - Look for excessive vaginal bleeding and signs of hypovolemia
  - When there is excessive vaginal bleeding or signs of hypovolemia, explore the whole of the genital tract.
  - If defect is detected / suspected do emergency laparotomy and perform repair or hysterectomy.

When to declare failed TOLAC:-

The length of TOLAC should be individualized to declare failure: -

- If labor doesn't progress as expected
- If any evidence of scar dehiscence develops



FAMILY PLANNING

INTRODUCTION

Family planning (FP) allows individuals and couples to anticipate and attain their desired number of children and the spacing and timing of their births. It is achieved through use of contraceptive methods and the treatment of involuntary infertility.

Unintended pregnancy is continuing to be high in developing countries. The unmet need for contraception and modern contraception prevalence for married women in Ethiopia are 22% and 41% respectively with wide variations across the country□s geographic regions.

FP is a key life-saving intervention for mothers and their children. FP can avert more than 42% of maternal deaths and 10% of child mortality if couples space their pregnancies more than 2 years.

CHOOSING A METHOD OF CONTRACEPTION

Factors to consider

- Availability of a given method
- Efficacy
- Convenience
- Safety
- Duration of action
- Reversibility and time to return of fertility
- Effect on uterine bleeding
- Frequency of side effects and complications
- Protection against sexually transmitted diseases
- Medical contraindications

CATEGORIZATION OF FP BASED ON TIMING OF SERVICE PROVISON:

1. Interval / elective FP
2. Post abortion FP

3. Emergency contraception
4. Postpartum family planning

   Postpartum family planning (PPFP) is defined as the prevention of unintended pregnancy and closely spaced pregnancies through the first 12 months following childbirth. Timing could be:

   - ***Post-placental***– within10 minutes after delivery of placenta (e.g. IUD, tubal ligation during CS).
   - ***Immediate postpartum-*** within 48 hours after delivery (e.g. IUD, bilateral tubal ligation with mini-laparotomy, vasectomy, implants).
   - ***Early postpartum*** □ 48 hours up to 6weeks (lactation amenorrhea, condoms, implants, mini pills)
   - ***Extended postpartum*** □ 6 weeks up to one year after birth. Unique considerations for providing PPFP (IUCD, implants, tubal legation, vasectomy, condoms, lactational amenorrhea).

Below are two diagrams depicting the timing and the possible method options for breastfeeding and non-breast feeding mothers. See Figures 29 & 30 below

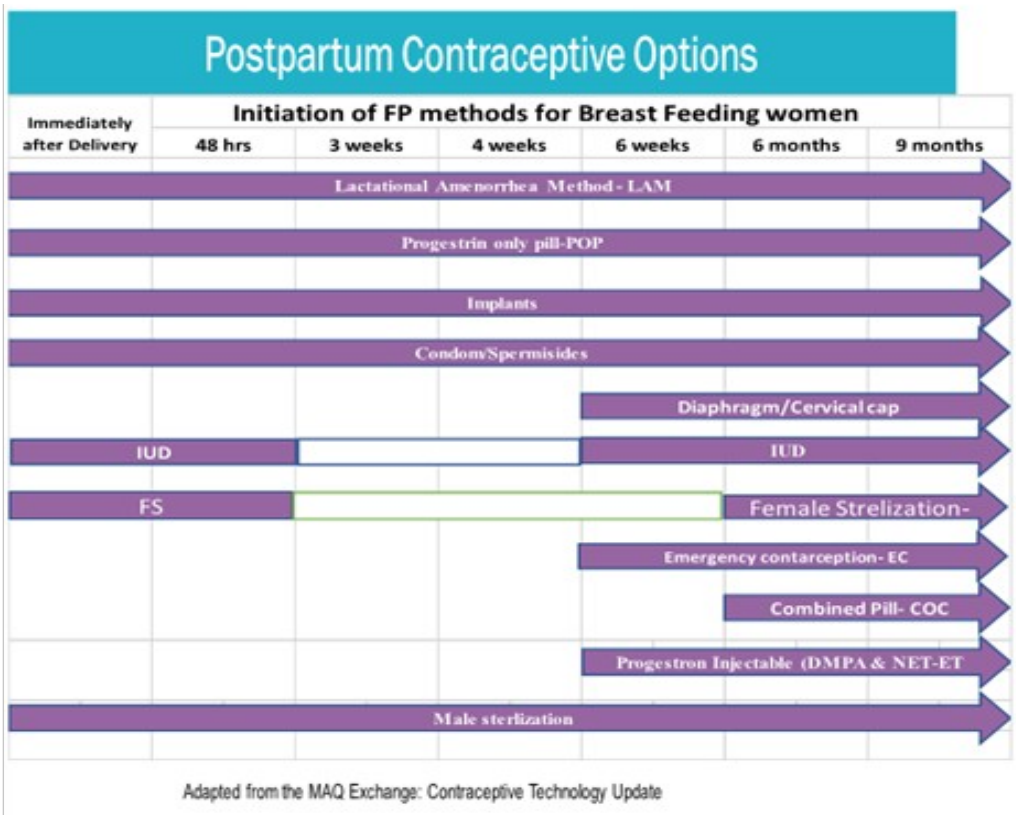


Figure 29. *Post partum contraception options for breast feeding women*

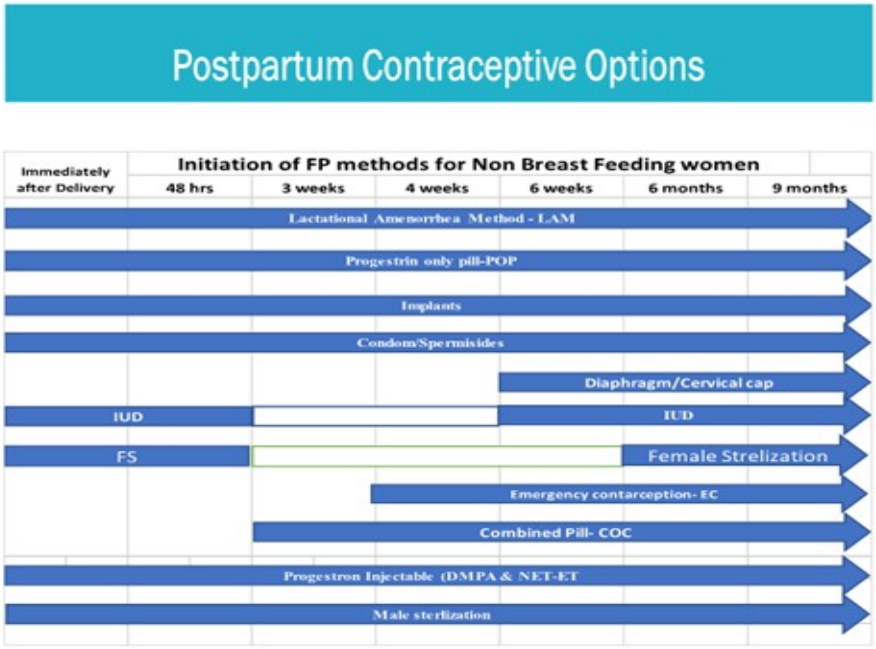


Figure 30. *Post partum contraception options for non-breast feeding women*

COUNSELLING

Clients can be counseled during;

- Preconception
- Antenatal
- Intrapartum but not during active labor
- Immediate post-partum
- During maternal visit for immunization and other visits

During counseling the following issues need to be addressed:

- Explain that she can become pregnant as soon as four weeks after delivery if she has coitus and is not exclusively breastfeeding,. Therefore it is important to start thinking early on about what FP method she will use.
- If she (and her partner) want more children, advice that waiting at least 2 years before trying to become pregnant again is good for the mother and for the baby's health.
- Information on when to start a method after delivery varies depending whether a woman is breastfeeding or not. Make arrangements for the woman to see a family planning counselor, or counsel her directly.

- Counsel on safer sex including use of condoms for dual protection from sexually transmitted infections (STI) or HIV and pregnancy. Promote especially if she is at risk for STI or HIV.
- Her partner can decide to have a vasectomy (male sterilization) at any time.

Post-abortion family planning:

- In the post-abortion period, ovulation can occur as early as 10 days. Accordingly, post-abortion FP should be started immediately.



COMPREHENSIVE ABORTION CARE

DEFINITION:

Abortion is termination of pregnancy before viability; i.e. less than GA of 28 weeks from the LNMP or if GA is unknown fetal weight of less than 1000 gms.

CLASSIFICATION:

Based on gestational age: -

- 1st trimester abortion (less than and 12 weeks of gestation)
- 2nd trimester abortion (12 to 28 weeks of gestation)

Based on service type: -

- *Safe Abortion care:* is a comprehensive termination of pregnancy that is offered to clients as permitted by the law
- *Post abortion care:* is a comprehensive service to treat women that present to a health care facility after abortion has occurred spontaneously or after attempted termination.

PRE-ABORTION ASSESSMENT

- ***A complete patient history*** should be obtained (in person or over the phone). Use an approved form to document:
    - Major medical problems
    - Past surgeries
    - Past obstetric history
    - Current medications and allergies
- ***Assess gestational age*** using reliable LMP and physical examination
    - Abdominal examination: assess fundal height with tape measure for second trimester-sized uterus
    - Vaginal examination: only as needed or with a specific concern.

- If there is a discrepancy > 2 weeks between LMP and uterine size by exam, an ultrasound should be done to determine actual gestational age.

- ***Ultrasound***
  - The preferred method and should be used if available.
  - Can be done abdominally unless pregnancy is too early.
- ***Discuss post-abortion contraception*** and note choice in the chart. Some contraceptive methods can be initiated immediately after administration of mifepristone and prior to completion the abortion process.
- ***Detailed informed consent***
  - Make sure to provide consent in the patient□s preferred language
  - Use written consent form
- ***Investigations***
  - Hematocrit/hemoglobin
  - Blood group and Rh
  - Screen for HIV (optional)
  - Other labs as indicated (hCG if concerned about molar pregnancy, etc.)

MANAGEMENT

The choice of management approach depends on

- Gestational age
- Clinical diagnosis
- Availability of methods of uterine evacuation
- The skill of the providers
- Choice of the women

The management approaches of abortion can be classified as;

- Expectant
- Medical
- Surgical

EXPECTANT MANAGEMENT

- In cases of threatened abortion, pregnancy can continue till term and clients can be managed expectantly.

- Medical treatment is not usually required,
- Avoid strenuous activity and sexual intercourse,

- In cases of inevitable and incomplete abortions expectant management is a reasonable management option if the contraction is strong or adequate to expel the contents of the uterus and no active bleeding.

MEDICAL ABORTION

Medical abortion is termination of pregnancy using drugs. The type and doses of the drugs vary depending on the gestational age.

Medical management of induced abortion at ≤ 24 weeks of gestation

See Table 18 below for medical management regimens for induced abortion at **≤** 24 weeks of gestation.

Table 18. *Medical management regimens for induced abortion at ≤ 24 weeks of gestation.*

GESTATIONAL AGE	COMBINATION REGIMEN (RECOMMENDED[a])		MISOPROSTOL -ONLY (ALTERNATE)	REMARK
	MIFEPRISTONE	MISOPROSTOL		
< 12 WEEKS	200 mg PO once day one AND	800 µg B, PV or SL *	800 µg B, PV or SL 24 - 48 hrs later	Out patient
12 - 24 WEEKS	200 mg PO once day one AND	400 µg B, PV or SL 24 - 48 hrs later Every 3 hrs	400 µg B, PV or SL Every 3 hrs	Inpatient

B: buccal; PO: oral; PV: vaginal; SL: sublingual

Note:

- * Repeat doses of misoprostol (400 µg) every 3 hrs can be considered at <12 weeks of gestation to achieve success of the abortion process. This requires admission.

- For those between 9-12 weeks and on outpatient management, we need to make sure that they have a communication means to reach to the hospital.

Medical management of induced abortion at 24-28 weeks of gestation

- Limited evidence as to the optimal dosing.
- Dose and route of misoprostol: 200 µg vaginal/ sublingual/ buccal every 3 hours.

NB: From 24 up to 28 weeks of gestation there is no standard protocol (refer the national 2nd trimester abortion guideline).

Medical management of patients with previous uterine scar

- All patents should receive the same dose of mifepristone (200 mg oral) 1-2 days before misoprostol.
- The dose of misoprostol depends on the gestational age and number of prior uterine scars.

Medical management of patients with spontaneous abortion or post-abortion care (PAC)

See table 19 below.

Table 19. *Misoprostol regimens for spontaneous abortion or post-abortion care (PAC).*

Indication		Dose	Route	Remark
Incomplete abortion	Up to 13weeks	600 µg misoprostol	Oral	Repeat dose can be considered to increase success
		400 µg misoprostol	Sublingual	
	13 weeks or above	Misoprostol 400 µg	Buccal / sublingual/ vaginal every 3 hrs.	Consider giving vaginal route only in the absence of vaginal bleeding
Missed abortion	Up to 12 weeks	600 µg misoprostol	Sublingual	Repeat dose can be considered to increase success
		800 µg misoprostol	Vaginally	
	13 to 24 weeks	Misoprostol	400 µg Sublingual/Vaginal every 4-6 hrs.	Pretreatment with Mifepristone 1-2 days before misoprostol

Cases not responsive to combination regimen:

- Limited evidence as to most appropriate next step.
- Confirm intrauterine pregnancy
- Consider giving an additional dose of Mifepristone 200 mg oral if it has been more than 72 hours since the first dose of mifepristone.
- Consider placing osmotic dilators or Foley catheter in addition to the misoprostol.
- High dose oxytocin (see table below).

Management of the placenta

- Immediate routine removal is not required.
- If not expelled after 2hours of fetal expulsion give:

- Sublingual/buccal misoprostol same dose as used for the termination.

  Or

- Oxytocin 20 IU in 500 ml or 40 IU in 1000 ml NS/RL run open.

- If the placenta is not delivered within 4 hours after fetal expulsion or if bleeding develops, proceed with gentle removal of placenta with sponge forceps.

SURGICAL ABORTION

For pregnancies up to 12 weeks of gestation the preferred surgical method of termination is manual or electric vacuum aspiration

Pre-procedure precautions steps in surgical evacuation using vacuum aspirator for 1st trimester safe termination of pregnancy

- Preoperative antibiotics 200 mg doxycycline/ metronidazole 1 gm/ Azithromycin 500 mg orally once at least 30 minutes prior to the procedure.
- Routine cervical preparation is not mandatory for first trimester MVA unless in special circumstances.
- Provide pain medication 30 minutes prior to the procedure. Diclofenac 75 mg IM stat or Ibuprofen 800 mg PO stat can be used.
- Do bimanual examination; assess the cervix and position of the uterus.
- Evaluate the product of conceptus up on completion of the procedure.

Dilation and Evacuation (D&E):

- D & E is a surgical method which involves dilatation of the cervix and evacuation of the content of the uterus using specialized forceps.
- It needs highly trained /skilled provider.
- It is performed beyond or at GA of 13 weeks.
- It is done in a tertiary hospital.

Paracervical block

- Use 1-2 ml of 1- 2% lidocaine at the site of tenaculum application (12 o□clock)
- 5 ml of 1-2% lidocaine at 4 and 8 o□clock at the cervical base, or 5 ml of 1-2% lidocaine at 3,6 and 9 o□clock.

- Avoid 3 and 9 o□clock injections to prevent inadvertent intravascular administration.

Subsequent management

- ***Post abortion family planning:***
    - All clients with post abortion and safe abortion should be counseled on all contraception options before, during and after the procedure as part of abortion care. See table 20 below for eligibility for different contraception methods for different contraceptive methods.

Table 20. *Eligibility for different contraception methods for different contraceptive methods*

Contraceptive method	Post-abortion condition		
	1st trimester	**2nd trimester**	**Immediate post-septic abortion**
Combined oral contraceptive pills (COC)	1	1	1
Progesterone only injectable	1	1	1
Progesterone only implants	1	1	1
Copper bearing IUCD	1	2	4
Condoms	1	1	1
LNG-releasing IUD	1	2	4

Definition of categories

1. A condition for which there is no restriction for the use of the contraceptive method.
2. A condition where the advantages of using the method generally outweigh the theoretical or proven risks.
3. A condition where the theoretical or proven risks usually outweigh the advantages of using the method.
4. A condition that represents an unacceptable health risk if the contraceptive method is used.

- Rh-immunoglobulin (Anti-D) should be administered to all Rh-negative un-sensitized women within 72 hours of abortion care if affordable.
    - 50 microgram IM for 1st trimester
    - 300 microgram IM for 2nd trimester
- Identify any other reproductive health services that the woman might need. For example, some women may need:
    - A tetanus prophylaxis or tetanus booster
    - Treatment for sexually transmitted infections or
    - Cervical cancer screening

COMPLICATIONS AND MANAGEMENT

Infection and sepsis: can be managed with IV antibiotics and evacuation. surgical intervention/referral may be needed in case of further complications (abscess collection, peritonitis, uterine perforation etc.).

FOLLOW UP AFTER DISCHARGE

- There is no need for routine follow-up visit.
- Ensure expulsion, summary is documented on the medical chart before discharge.
- Confirm the woman is provided with contraceptive method of her choice.
- Confirm anti-D is given for Rh negative unsensitized woman. Give 50 µg of anti-D in the first trimester and 300 µg in the second trimester.
- Inform the woman it is normal to have minimal vaginal bleeding for few days after second trimester abortion.
- Advice to come back if
    - Too much bleeding
        - Soaking more than two pads per hour for two consecutive hours
        - Any heavy bleeding that makes the woman uncomfortable or symptomatic (dizziness, lightheadedness or fatigue)
        - If the bleeding continues for more than 2 weeks
    - Fever and/or severe abdominal pain/cramp
    - Bad smelling or unusual vagina discharge with or without abdominal pain/cramp

HIV IN PREGNANCY

DEFINITION

Prevention of Mother To Child Transmission (PMTCT) is the prevention of transmission of HIV virus from the mother to the fetus and child during pregnancy, childbirth and breastfeeding.

RISK OF MTCT

The risk of mother to child transmission varies during pregnancy, labor and delivery and breastfeeding (see table 21 below)

Table 21. *Rates of HIV transmission during pregnancy, labor and delivery, and breastfeeding.*

	Estimated Risk of MTCT
Timing	**Transmission rate without Intervention**
During pregnancy	10 - 25*
During labor and delivery	35 - 40%
Overall with breastfeeding to 6-14 months	35 - 40*
NOTE: * Rates of transmission vary because of differences in population characteristics such as maternal CD4+ cell counts, RNA viral load, exclusivity and duration of breastfeeding	

Factors that affect the rate of MTCT

Maternal Factors:-

- High maternal viral load
- New or recently acquired maternal HIV infection
- Low CD4 count
- Advanced maternal disease
- Viral or parasitic placental infections during pregnancy, labor and childbirth

Obstetric and delivery practices:-

- Ante-partum procedures (e.g. amniocentesis, external cephalic version)
- Rupture of membrane for more than four hours
- Vaginal delivery compared to CS

- Maternal malnutrition
- Nipple fissures, cracks, mastitis and breast abscess
- Poor ART adherence
- Active lower genital tract infections like herpes simplex

Infant factors:-

- First infant in multiple birth
- Pre-maturity and low birth weight
- Longer duration of breastfeeding
- Mixed feeding during the first six months of life
- Oral diseases in child
- Injuries to birth canal during child birth (vaginal and cervical tears)
- Invasive childbirth procedures (e.g. episiotomy)
- The first twin in vaginal delivery of multiple pregnancies
- Delayed infant drying with clean towels and eye care
- Routine vigorous infant airway suctioning
- Instrumental deliveries (vacuum & forceps)
- Fetal birth trauma
- Internal fetal monitoring (fetal scalp electrodes/sampling)

EFFECT OF HIV ON PREGNANCY

There is increased risk of Low birth weight, intrauterine growth restriction, preterm delivery and perinatal mortality.

EFFECT OF PREGNANCY ON HIV

There is no known effect of pregnancy on HIV.

PREVENTION OF MTCT OF HIV

There are four prongs to prevent mother-to-child transmission of HIV (PMTCT).

- **Prong 1:** Primary prevention of HIV infection focuses on keeping people HIV-negative. Prevention of new infections means that fewer women and men will have HIV and fewer infants will be exposed to HIV.
    - Promote safer and responsible sexual behavior and practices through BCC using the ABC approach
    - Provide early diagnosis and treatment of sexually transmitted infections
    - Make HTC widely available
    - Provide Pretest test information

- **Prong 2: Prevention** of unintended pregnancies in HIV-positive women emphasizes reducing the number of unplanned or unwanted pregnancies.
    - Effective family planning counseling and service is important to help HIV-infected women prevent unintended pregnancies and space births. It should be conducted sensitively, maintaining confidentiality and privacy, and must demonstrate respect for clients rights.
    - FP/HIV services integration is a valuable approach in reducing the unmet needs of both family planning and HIV care services.
    - Counseling on FP should be started in the antenatal period
- **Prong 3:** Prevention of HIV transmission from women living with HIV to their infants addresses care for HIV-positive women during pregnancy, labour and childbirth, and breastfeeding and care for their infants.
- **Prong 4:** Provision of treatment, care, and support to women living with HIV, and their infants, partner, and families including on-going, chronic care and treatment for HIV-positive pregnant/postpartum women and their HIV-exposed and HIV-positive children both during and beyond the PMTCT intervention period.

DIAGNOSIS:

- All pregnant women attending maternal health services (i.e. antenatal, labour, postpartum) should have screening for HIV with serologic tests following the national PMTCT guideline (using the opt-out approach)
- If test result becomes positive: request laboratory tests (CD4 count & viral load)
- Clinical symptoms and signs of opportunistic infections should be thoroughly looked for and appropriate laboratory tests should be requested & the clinical stage of the disease assigned.
- If the test becomes negative, repeat HIV counseling and Testing in the third trimester preferably between 28 to 36 weeks or during labor as appropriate
- All HIV positive pregnant or lactating women should be retested with a second specimen before initiating ART.

MANAGEMENT

Preconception care

Once a patient is diagnosed to be HIV positive the following should be done:

- Counseling on the diagnosis and linkage to trained personnel for further counseling
- Baseline investigations including CD4 and viral load
- Advise on contraception use with focus on avoiding unintended pregnancy; the preference is to give them dual contraception with one of them being condoms.
- Advise on general health including good nutrition

  * Adequate caloric intake; consumption of iron rich foods (beans lentils, meat, liver); iron and folate for three months; iodized salt
- Prevention of malaria: use of ITN for women living in malaria endemic areas.
- Screening & treatment for opportunistic infections & STIs
- Initiate ART/ Link to PMTCT unit. ART should be initiated in all pregnant and breastfeeding women living with HIV regardless of WHO clinical stage and at any CD4 cell count and continued lifelong. Discuss on future plan for pregnancy and necessary preparations
- Provision of prophylaxis for opportunistic infections
    - Cotrimoxazole for stages 2, 3, 4 HIV/AIDS and those with CD4 <=350.
- Discuss the importance of partner involvement & screening
- Avoid pregnancy for 6 months after recovery from any chronic infections (e.g Tb)
- If the patient has plan of pregnancy council on the following
    - On the impact of HIV on pregnancy
    - Provide accurate information on risk MTCT
    - Explain available methods of reduction of MTCT
    - The above mentioned counseling also apply to pregnant mothers

Antepartum care by visit and trimester of pregnancy

In addition to the focused ANC, HIV positive pregnant women need special care and should have more visits. As soon as the patient has a

missed period she should visit the antenatal care clinic and have pregnancy test.

- Once pregnancy is confirmed, careful clinical evaluation (detailed history and physical examination)
- All HIV positive pregnant, laboring and lactating women should be retested at the initiation of HAART in order to ensure correct diagnosis.
- All HIV positive pregnant, laboring and lactating mothers will be initiated on HAART for life (TDF, 3TC and DTG).
- HIV positive woman already on ART at time of pregnancy should continue and stay on the same regimen.
- Pregnant women with WHO clinical stage 1 and 2 can safely be initiated on ART in ANC; however, those diagnosed with advanced HIV disease at ANC (WHO stage 3 and 4) and opportunistic infections should promptly be referred to ART clinic for diagnosis and treatment of OI and initiation of ART.
- However, following which, at the discretion of the ART clinic provider, they can be transferred back to PMTCT unit for their on-going care and treatment.
- Monitoring and support for HAART adherence
- Early ultrasound for determination of gestational age
- Routine Laboratory screening tests like any pregnant women (VDRL, HBSAg, CBC, Blood group and Rh, and others as needed).
- There is no need to wait for CD4 count to initiate treatment. But CD4 count is important to monitor response to treatment; however, viral load monitoring is more effective to detect emergence of treatment failure
- Viral load monitoring to detect emergence of treatment failure
- Advise the mother on the importance of having strict ANC follow up with updating investigations as needed
- Discuss with the mother the risk of MTCT and the possible complications that can occur due to the HIV infection including (IUGR)
- Administer vaccinations like TT, pneumococcal and if HBSAg negative administer HB vaccine.
- Nutritional supplementation like other pregnant women
- Follow the fetal growth with serial US every 3-4 weeks

- Discuss on the mode of delivery based the national PMTCT guideline (routine CD for the prevention of MTCT is not recommended). But individualized birth plan based on the viral load and the duration of HARRT is recommended.
- Discuss on the postpartum infant feeding plan
- Discuss on the post-partum administration of ART to the neonate for reduction of MTCT
- Assess the patients support system and offer counseling if concerns arise

Intrapartum care

- Intra partum care and infection prevention include:
  - Safe delivery practices and avoiding invasive procedures whenever possible:
    - Avoid artificial rupture of membranes to shorten labour and expedite delivery whenever there is a spontaneous rupture of the membrane.
    - Avoid routine episiotomy.
    - Limit use of vacuum extraction and prefer obstetric forceps whenever instrumental delivery is indicated
    - Avoid repeated vaginal examinations during labour and
    - Treat chorioamnionitis with appropriate antibiotics
  - Provide essential newborn care…
    - Regarding mode of delivery:- For women on HAART, if the viral load is > 1000 copy/ml elective cesarean section at gestational age of 38 weeks should be considered.
    - If the viral load is ≤ 1000copies/ml since there is no added benefit from cesarean section, the mother should be counseled on vaginal birth preparedness like any other pregnant mother
    - In the absence of viral load, a woman adherent to HAART for at least for one month is considered to have lower viral load. Clinical judgment of the provider in consultation with the woman can be the way to decide the route of delivery.
      → The benefits and risks of different modes of delivery should be discussed with women living with HIV, including vaginal delivery, and elective and non-elective C-section.

→ When indicated for other medical or obstetric reasons, C-section should still be offered, as for all women.

- If the mother is already started on ART it should be continued intrapartum
- If she is a newly diagnosed RVI patient with no ART it should be started intrapartum and continued post-partum irrespective of the CD4 count.
- Emergency CS is reserved for patients with obstetric indications

Post-partum care

- Continue initial ART for those who are initiated earlier. Start ART for HIV positive mothers who are breastfeeding even if it was not started before (currently recommended regimen TDF/3TC/ DTG)
- For mothers who fulfill Acceptable, Feasible, Affordable, Sustainable and Safe (AFASS) feeding, formula feeding should be considered after thorough discussion with the family.

- For those who do not fulfill AFASS, breastfeeding must be exclusive for six months and complementary feeding should start at 6th month. Breastfeeding should be continued until the first year of life but not more than two years.
- Give NVP + AZT syrup for the first 6 weeks and continue NVP syrup only for the next 6 weeks for all HIV exposed infants (see table 22 below for dosing).

Table 22. *Enhanced Post-natal Prophylaxis (e-PNP) for HIV Exposed Infants*

Infant age / weight		**Formulation**	**Dosing**
0-6 weeks	< 2500g	NVP 10mg/ml + AZT 10mg/ml	10 mg (1ml) once daily + 10 mg (1ml) twice daily
	> 2500g	NVP 10mg/ml + AZT 10mg/ml	15mg (1.5ml) once daily + 15mg(1.5ml) twice daily
6-12 week		NVP 10mg/ml	20mg (2ml) Once daily

- Educate mothers on the importance of exposed infant follow-up, Co-trimoxazole preventive therapy and early infant diagnosis. (see table 23 below for dosing)
  - DBS for DNA/PCR should be done at sixth week of life and HIV negatives should be followed as HIV Exposed Infant (HEIs).
  - DNA/PCR positive babies should be linked to pediatric ART for chronic HIV/AIDS follow up

Table 23. *Dosage of Co-trimoxazole preventive therapy in infants and children*

Age	**Preparation of the Co-timaxazole suspension and tablets**		
	Suspension per 5 ml 200/40 mg	**Pediatric tablet 100/20mg**	**Single strength adult tablets(400/80 mg)**
< 6 months	2.5 ml	1 tablet	½ tablet
6 months - 5 years	5ml	2 tablets	½ tablet

- Do confirmatory rapid HIV antibodies test for DNA/PCR negative HEIs six weeks after the cessation of breastfeeding
- Discharge negative babies for follow up after rapid HIV antibody test and link the positive babies to chronic pediatric HIV care, treatment and follow up.
- Give postpartum family planning counseling and provide mothers with family planning method of their choice as per the PMTCT guideline and post-partum care section of the protocol.
- Immunization and growth monitoring for the baby should be done the same way as non HIV exposed babies
- The mother and infant should do their follow up at the MNCH clinic, where they can get integrated MNCH and HIV care.
- After discharge link the mother with ART clinic in the following scenarios:
    - If the baby is DNA/PCR positive
    - If the baby is rapid HIV AB test positive
    - If the baby is dead.
    - If the mother develops any HIV/AIDS related complications of the disease or its treatment

Note: Adherence counseling and follow up is mandatory and it should be done for the mother and infant as a pair.



HYPERTENSIVE DISORDERS

DEFINITION:

Hypertension:A systolic blood pressure ≥140 mmHg, diastolic blood pressure ≥90 mmHg or both in two occasions taken 4 hours or more apart; or a single blood pressure recording of ≥160/110 mmHg.

Proteinuria:Two urine dipstick measurements of at least 1+ (30 mg per dL) taken six hours apart; at least 300 mg of protein in a 24-hour urine sample; or a urinary protein/creatinine ratio of 0.3 or greater.

CLASSIFICATION:

1. ***Gestational hypertension:*** hypertension without proteinuria (or other signs of preeclampsia) developing after 20 weeks of gestation in a previously normotensive woman.
2. ***Preeclampsia eclampsia syndrome***

   *Preeclampsia:*new onset of hypertension and proteinuria after 20 weeks of gestation in a previously normotensive woman.

   Eclampsia: grand mal seizure or coma in a woman with preeclampsia. Important causes of convulsion or coma like cerebral malaria, meningitis, hypoglycemia, previous seizure disorder, head injury or intracranial space occupying lesions have to be ruled out.
3. ***Chronic hypertension:***hypertension that antedates pregnancy; is present before 20 weeks of gestation; or persists after 12 weeks postpartum.
4. ***Superimposed preeclampsia***
   - Superimposed pre-eclampsia without severe features
   - Superimposed pre-eclampsia with severe features

GESTATIONAL HYPERTENSION

Manage on an outpatient basis:

- Monitor blood pressure, urine (for proteinuria) and fetal condition weekly.

- If blood pressure worsens or the woman develops features of pre-eclampsia, manage as pre-eclampsia.
- Counsel the woman and her family about danger signs indicating severe pre-eclampsia or eclampsia.
- If all observations remain stable, allow to proceed with spontaneous labour and childbirth.
- If spontaneous labour has not occurred before term, induce labour at term.

PRE-ECLAMPSIA

RISK FACTORS:

First pregnancy, young or old age, multiple gestation, history of hypertension, renal disease, diabetes, obesity, family history of pre-eclampsia

DIAGNOSIS:

Hypertension and proteinuria are the hallmark features of preeclampsia.
Severity features of preeclampsia are:

- Headache, blurred vision, oliguria (<400 ml/24 hours), epigastric pain or pain in right upper quadrant, difficulty breathing (pulmonary edema)
- Low platelet count (<100,000/µl)
- Elevated liver enzymes more than twice the upper limit of normal
- Serum creatinine higher than 1.1mg/dl or a doubling or higher of the baseline serum creatinine concentration in the absence of other renal disease

Laboratory tests such as urine protein, CBC, liver enzymes, LDH and renal function test should be determined.

Ultrasound is used to monitor fetal growth andto assess fetal wellbeing.

CLASSIFICATION

- Pre-eclampsia without severe features
- Pre-eclampsia with severe features

TREATMENT OF PRE-ECLAMPSIA WITHOUT SEVERE FEATURES

Management varies depending on the gestational age

Gestational age less than 37weeks

- Twice weekly outpatient follow-up is preferred as long as clinical features remain unchanged or are normalized(if it is convenient for the patient).

- Monitor blood pressure, fetal condition, CBC, liver and renal function tests twice weekly.
- Counsel about the danger signs associated with features of severe pre-eclampsia.
- Encourage the woman to eat a normal diet.
- Orient on fetal movement counting (kick chart) daily.
- Do not give anticonvulsants or antihypertensives unless clinically indicated.
- Delivery at 37 completed weeks
- If follow up as an outpatient is not possible or if close observation is preferred, or pre-eclampsia progress rapidly, admit to hospital and:
    - Monitor blood pressure (twice daily), and urine output & weight (daily)
    - Auscultation of FHB & kick chart daily
    - Do not give medications (as above)
    - Urine protein, fetal condition twice weekly.
    - Do not give diuretics (diuretics are harmful & only indicated for use in pre-eclampsiawith pulmonary edema or congestive heart failure)
- If the diastolic blood pressure decreases to normal levels or her condition remains stable, send the woman home with the following instructions:
    - Advise her to rest & to watch out for severity features.
    - Continue follow up twice a week (as above).
    - If diastolic blood pressure rises again, readmit her.
- If the clinical features remain unchanged, keep the woman in the hospital and:
    - Continue the same management & monitor fetal growth & well-being (by symphysis fundal height, kick chart & other methods if available).
    - If there are signs of growth restriction, consider early delivery.
    - If not, continue hospitalization and terminate the pregnancy at 37 weeks.
- If clinical features worsen (urinary protein level increased), manage as severe pre-eclampsia

Gestational age ≥37complete weeks

- Deliveryis recommended.
- Anticonvulsant during labor.

TREATMENT OF PREECLAMPSIA WITH SEVERE FEATURES

Includes any one or more of the severity features.The steps of management include:

- General measures:
- Prevent convulsion
- Control hypertension.
- Delivery / expectant management in selected cases.

General Measures

- Admit the patient urgently, preferably to the labor ward
- Manage in left lateral position
- Setup IV line & infuse maintenance fluids
- Monitor urine output and maintain urine output at >30 ml/hr.
- Maintain a strict fluid balance chart,
- Prepare equipment for convulsion management at bed side (airway, suction equipment, mask & bag, oxygen)
- Never leave the patient alone
- Monitor vital signs, FHB & reflexes
- Auscultate the lung bases for fine crepitation. If they occur, withhold fluids &administer a diuretic (furosemide 40 mg IV stat)

Anticonvulsant therapy (seizure prophylaxis)

- Give Magnesium sulfate as shown in the box below.
- In all severe preeclamptic mothers during admission & continued during period of evaluation & observation for 24 hours.
- Diazepam: may be used as alternative, if MgSO4 is not available (as shown below).

Control hypertension

Administration of antihypertensives should be started if the systolic blood pressure is 160 mmHg or higher and/or the diastolic blood pressure is 110 mmHg or higher. Hydralazine or labetalol is the drug of choice for acute control.

Note: An important principle is to maintain blood pressures above the lower limits of normal.

Hydralazine

- Give 5 mg IV slowly every 20 minutes until blood pressure is lowered (to diastolic blood pressure <110 mmhg). The maximum dose is 20 mg per 24 hours.

Labetalol

- *Oral treatment:*Administer 200 mg; repeat dose after one hour until the treatment goal is achieved. The maximum dose is 1200 mg in 24 hours.
- *Intravenous treatment:*Administer 10 mg IV.If response is inadequate after 10 minutes, administer 20 mg IV. The dose can be doubled to 40 mg and then 80 mg with 10-minute intervals until blood pressure is lowered below threshold. The maximum total dose is 300 mg; then switch to oral treatment.

Nifedipine

- As alternative for acute therapy, administer 10 mg orally. Repeat dose after 30 minutes if response is inadequate until optimal blood pressure is reached. The maximum total dose is 30 mg in the acute treatment setting. For maintenance therapy10-20 mg PO bid is given.

Alpha methyldopa

- Administer 250-750 mg every six to eight hours.The maximum dose is 3000 mg per 24 hours.

PLANNING DELIVERY:

Gestational age < 28 weeks:

Termination of pregnancy (expectant management is not recommended)

Gestational age ≥ 28 weeks and <34 weeks:

Expectant management is recommended, provided that there is no indication for delivery.Forexpectant management:

- Transfer to maternity ward
- Follow vital signs every 4 hours
- CBC, every other day
- Liver enzymes, and creatinine twice weekly
- Fetal kick count daily
- Fetal surveillance twice weekly
- Administer Dexamethasone 6 mg IM every 12 hours for 2 days or Betamethasone 12 mg daily for 2 days

Indications for delivery are:

- Failure to control hypertension with two antihypertensive drugs with a maximum dose in 48 hours
- Persistent maternal severity symptoms (severe headache, visual changes and abdominal and/or epigastric pain with elevated liver enzymes)
- HEELP Syndrome

- Eclampsia
- Pulmonary edema or left ventricular failure
- IUFD
- DIC
- Severe renal dysfunction

Gestation 34 to 37 Weeks

In women with severe pre-eclampsia and a viable fetus that is between 34 and 37 weeks of gestation, expectant management may be recommended, provided that uncontrolled maternal hypertension, worsening maternal status and fetal distress are absent and can be closely monitored.

Gestation after 37 Completed Weeks

For women with pre-eclampsia at term (37 weeks), regardless of severity features, giving birth is recommended.

MODE OF DELIVERY

Depends on gestational age, fetal condition, presentation, cervical condition & maternal condition.

Indication for Cesarean Section:

- If the cervix is unfavorable (firm, thick, closed) esp. in seriously ill patients
- With poor progress of labor
- If patient has not entered active labor within 8 hrs of induction of labor
- If there is evidence of fetal distress, or other obstetric indications,

Use of Anesthesia

- Spinal anesthesia can be used, with adequate IV fluid loading (500-1000 ml), to reduce the risk of hypotension (except in patients with thrombocytopenia (platelets<100,000) or bleeding disorders).
- If general anesthesia is chosen use of thiopental, succinylcholine& nitrous oxide is preferable.

INTRA PARTUM MANAGEMENT

- Absolute bed rest in LLP, is essential
- Antihypertensive drugs should be given as necessary to regulate diastolic blood pressure between 90 &110mm Hg
- Careful monitoring of FHB, maternal conditions & progress of labor
- Pain management as required

POSTPARTUM MANAGEMENT:

- Watch closely for at least 2hrs after delivery for complications such as shock, PPH & eclampsia
- Anticonvulsive therapy should be maintained for 24hrs to 48 hrs after delivery or the last convulsion, whichever occurs last
- Continue anti-hypertensive therapy as long as the blood pressure is ≥ 110mmhg
- Continue to monitor urine output & check for coagulation failure, LFT, RFT
- Postnatal follow-up of these cases is very important for the treatment of hypertension & possible complications such as DIC, acute renal failure and pulmonary edema.

ECLAMPSIA:

Treatment of eclampsia consists of:

- General measures
- Control of convulsions (to stop ongoing convulsion & prevent subsequent convulsion)
- Blood pressure control, stabilization of the condition of the mother & fetus
- Fluid balance
- Delivery & intrapartum/postpartum care

GENERAL MEASURES IN THE MANAGEMENT OF ECLAMPSIA

- Set up IV line & maintain intravascular volume & replace ongoing losses; avoid overload (if not done already).
- Position the patient on her side (left lateral) & in Trendelenburg (head down) position to reduce risk of aspiration of secretions, vomitus or blood.
- Aspirate (suction) the mouth & throat as necessary & ensure open airway.
- Give oxygen by mask at 6 liters per minute.
- Avoid tongue bite by placing an airway or padded tongue blade between the teeth & protect the woman from injury
- Place an indwelling catheter to monitor urine output.
- Observe vital signs, FHB & reflexes frequently & auscultate the lung bases hourly for crepitation indicating pulmonary edema. If the pulmonary edema occurs, withhold fluids & administer a diuretic such as furosemide 40 mg IV stat.

- The patient has to be kept in a quiet room. An attendant must be always present beside the patient.
- Administration of broad-spectrum IV antibiotics is recommended.

ANTICONVULSANT THERAPY

Administer anticonvulsant drugs to stop the ongoing convulsion & prevent subsequent attack

$MgSO_4$

Magnesium sulphate is the drug of choice in the management of eclampsia (table). Despite the compelling evidence for the effectiveness of magnesium sulfate, it has potential for toxicity.

Before repeat administration, ensure that respiratory rate is at least 12 per minute, patellar reflexes are present and urinary output is at least 30 ml per hour or 100 ml per 4 hours.

Withhold or delay drug if respiratory rate falls below 12 per minute, patellar reflexes are absent or urinary output falls below 30mL per hour over preceding 4 hours.

Keep antidote ready in case of respiratory arrest.

If there is respiratory arrest, assist ventilation (mask and bag, anesthesia apparatus, intubation) and administercalcium gluconate 1g (10mL of 10% solution) IV slowly.

MAGNESIUM SULFATE SCHEDULES FOR SEVERE PRE-ECLAMPSIA AND ECLAMPSIA

Loading dose

Magnesium sulfate 20% solution, 4g IV over 5 minutes.

Follow promptly with 10g of 50% magnesium sulfate solution, 5g in each buttock as deep IM injection with 1mL of 2% lidocainein the same syringe. Ensure that aseptic technique is practiced when giving magnesium sulfate deep IM injection. Warn the woman that a feeling of warmth will be felt when magnesium sulfate is given.

If convulsion recurs after 15 minutes, give 2g magnesium sulfate (20% solution) IV over 5 minutes.

Maintenance dose

5g magnesium sulfate (50% solution) + 1 mL lidocaine 2% IM every 4 hours into alternate buttocks.

Continue treatment with magnesium sulfate for 24 hours after delivery or the last convulsion, whichever occurs last.

Diazepam

Diazepam is an alternative, but it increases the risk of respiratory depression andnewbornapnea, in babies who may already be suffering from the effects of utero-placental ischemia & pre-term birth. The effect may last several days.

DIAZEPAM SCHEDULE FOR SEVERE PRE-ECLAMPSIA & ECLAMPSIA

Loading dose

Diazepam10mg IV slowly over 2 minutes

If convulsion recur, repeat the same dose

Maintenance dose

Diazepam 40mg in 500ml IV fluids (N/S or Ringer's lactate) no of drops titrated to keep the woman sedated but arousable.

ANTI-HYPERTENSIVE THERAPY

The therapeutic goal is to keep the diastolic blood pressure <110 mmHg (between 90 and 100mmHg & prevent cerebral hemorrhage). For drugs used as antihypertensive medication refer to management of severe pre-eclampsia above (use same drugs & doses).

FLUID BALANCE

- Keeping strict input & output record is essential anddetermine serum electrolyte, if possible
- For unconscious patient, 5% DW & ringer's Lactate are infused for maintenance of nutrition & fluid balance during 24 hrs.
- Replace extra fluid loss through vomiting, diarrhea, sweating or blood loss
- Nothing by mouth is allowed (if unconscious); when the patient becomes conscious & can drink, oral feeding of fluidis started.

DELIVERY

- Delivery should take place within 12 hours of onset of convulsions
- Delivery should take place as soon as the woman's condition has stabilized, regardless of the gestational age

INTRA PARTUM AND POSTPARTUM MANAGEMENT:

- As stated in the management of sever preeclampsia with severe features.

CHRONIC HYPERTENSION

- High levels of blood pressure maintain renal and placental perfusion in chronic hypertension; reducing blood pressure will result in diminished perfusion. Hence, blood pressure should not be lowered below its pre-pregnancy level.
- If the woman was on an antihypertensive medication before pregnancy and her blood pressure is well-controlled, continue the same medication if acceptable in pregnancy or transfer to medication safely used in pregnancy.
- If the systolic blood pressure is 160 mmHg or more or the diastolic blood pressure is 110 mmHg or more, treat with antihypertensive medications.
- If proteinuria or other signs and symptoms of pre-eclampsia are present, consider superimposed pre-eclampsia and manage as pre-eclampsia.
- Monitor fetal growth and condition.
- If there are no complications, induce labour at term.
- If fetal growth restriction is severe and pregnancy dating is accurate plan for delivery.
- Observe for complications, including abruptio placentae and superimposed pre-eclampsia



DIABETES MELLITUS IN PREGNANCY

DEFINITION

Diabetes mellitus (DM) is defined as abnormal metabolism of carbohydrates which results in elevated blood glucose level.

CLASSIFICATION

Pre-gestational Diabetes Melitis (Type I or Type II)
Gestational Diabetes Melitis (GDM): a carbohydrate intolerance resulting in hyperglycemia of variable severity with onset or first recognition during pregnancy

DIAGNOSIS

GDM

A standard 75 gm OGTT is performed after fasting (8 to 14 hours) by giving 75 gm anhydrous glucose in 250 □ 300 ml water. GDM is diagnosed at any time in pregnancy if one or more of the following criteria are met.

- fasting plasma glucose 92□125 mg/dL (5.1□6.9 mmol/L)
- 1-hour plasma glucose 180 mg/dL (10.0 mmol/L) following a 75 g oral glucose load
- 2-hour plasma glucose 153□199 mg/dL (8.5□11.0 mmol/L) following a 75 g oral glucose load

Pregestational DM is diagnosed if one or more of the following criteria are met:

- fasting plasma glucose 126 mg/dL (7.0 mmol/L)
- 2-hour plasma glucose 200 mg/dL (11.1 mmol/L) following a 75 g oral glucose load
- random plasma glucose 200 mg/dL (11.1 mmol/L) in the presence of diabetes symptoms.

MANAGEMENT OF PREGESTATIONAL DIABETES MELLITUS

PRECONCEPTION CARE

- It requires multidisciplinary approach (internist, obstetrician, nutritionist, etc).

  Evaluate and treat diabetic complications before pregnancy (hypertension, retinopathy, nephropathy, neuropathy and cardiovascular disease)

  Measure and optimize thyroid hormone levels in women with type 1 diabetes.

  Review all current medications (e.g. ACE inhibitors, Diuretics, β-Blockers, statins), and change to a form of therapy that has less fetal risk.

  Measure HbA1C (Hemoglobin A1c) monthly until satisfactory control is achieved (below 7%)

  Monitor blood glucose level to achieve the target blood sugar level:

  - Fasting capillary blood glucose: 80 -110 mg/dL
  - 2 hr capillary postprandial blood glucose: < 150 mg/dL

  Give folic acid supplementation, 4mg daily before conception until 12 weeks gestation to minimize risk of congenital anomalies.

  Provide counseling:

  - Inform about risks of miscarriage, congenital malformation, preeclampsia and perinatal mortality with poor glycemic control and unplanned pregnancy.
  - Encourage regular exercise and weight control
  - Encourage a diet with complex carbohydrates, soluble fiber, and reduced levels of saturated fats. Avoid simple sugars.

  Use effective contraception until target blood glucose control is achieved before conception

  Pregnancy is not recommended in the presence of ischemic heart disease, active proliferative retinopathy (untreated), severe renal insufficiency: creatinine clearance <50ml/min, serum creatinine > 2.0 mg/dL or heavy proteinuria (>2g/24hr.) and if Hgb A1c >10%.

  Proliferative retinopathy during pregnancy has substantial risk of visual loss. It should be treated before pregnancy.

ANTENATAL MANAGEMENT OF PREGESTATIONAL DM

Antenatal management of pregestational DM requires multidisciplinary team approach (diabetic clinic and antenatal clinic).

Initial evaluation:

- Screen, monitor and manage for maternal medical complications of DM (retinopathy, nephropathy, hypertension, ketoacidosis, thyroid disease and cardiac disease)
- Have baseline investigations (renal function test, urine protein level, liver function tests)

Follow up

- Patients are seen every 2 □ 3 weeks during the first two trimesters, every 1-2 weeks until 36 weeks then weekly until delivery. But more frequent visits may be necessary.

Ultrasound

First trimester - Ultrasound for pregnancy dating and viability

Second trimester - Anatomic ultrasonogram at 18-22 weeks, including examination of the fetal heart

Third trimester - assess fetal growth every 4-6 weeks. Initiate antenatal surveillance with BPP/NST (starting from 28 to 32 wks) every 2 wks and weekly after 36 WKs of gestation. There may be a need for frequent fetal surveillance and growth monitoring.

Preeclampsia prevention

low-dose aspirin as a preventive medication after 12 weeks of gestation

Blood Glucose Monitoring

The management of diabetes in pregnancy must focus on good glucose control achieved using a careful combination of diet, exercise, and insulin therapy.

The goal is to maintain capillary glucose levels as close to normal as possible,

- Fasting glucose level of 95 mg/dL or less
- Premeal values of 100 mg/dL or less
- 1-hour postprandial levels of 140 mg/dL or less, and
- 2-hour postprandial values of 120 mg/dL or less.
- During the night, glucose levels should not decrease to less than 60 mg/dL.

- Mean capillary glucose levels should be maintained at an average of 100 mg/dL with a glycosylated hemoglobin A1C (Hb A1C) concentration no higher than 6%

An ideal typical glucose monitoring involves capillary glucose checks on rising in the morning, 1 or 2hr after breakfast, before & after lunch, before dinner & at bed time.

If performance of six measurements is not possible, fasting and postprandial monitoring of blood glucose is recommended to achieve metabolic control in pregnant women with diabetes.

In resource poor settings FBS & 2hrs postprandial should be checked at least twice weekly.

Dietary management

Three meals and three snacks of diabetic diet is recommended; however, in overweight and obese women the snacks are often eliminated.

Total calories:The appropriate caloric intake depends upon the pre-pregnancy weight. [30 Kcal/kg/day if the woman is at ideal body weight, 24 Kcal/ Kg /Day if 20-25% above ideal weight, 12-18 Kcal/ Kg /Day if more than 50% above ideal body weight and 36-40 Kcal/ Kg /Day if more than 10% below ideal body weight].

Distribution of calories:*Breakfast:* The breakfast meal should be small (approximately 10% of total calories) to help maintain postprandial euglycemia. Carbohydrate intake at breakfast is also limited since insulin resistance is greatest in the morning. *Lunch*: 30% of total calories, *dinner:* 30% of total calories, *snacks:*30% of total calories are distributed, as needed, as snacks.

Exercise

Non strenuous exercise, 3 times per week for 30 – 60 minutes. Using the upper body and walking appear to be more appropriate. Contraindications to exercise include PIH, PROM, preterm labor, incompetent cervix, persistent 2nd or 3rd trimester bleeding and IUGR.

Insulin Therapy

Insulin requirements will increase throughout pregnancy, most markedly in the period between 28–32 weeks of gestation

Dosage:

- Starting insulin dose is 0.7-1.0 units/kg daily,
- A combination of short & intermediate acting insulin is necessary to maintain glucose levels

- From the total dose two-thirds before breakfast (NPH and regular insulin in a 2:1 mixture) one-third before dinner (NPH and regular insulin and as 1:1 mixture). Then each element of insulin is individually adjusted in order to keep blood glucose level between 70-130mg/dl.
- The regular insulin should be given approximately 30 minutes before eating to reduce glucose elevations associated with eating.

Timing and route of delivery

- Optimal timing of delivery relies on balancing the risk of intrauterine fetal death with the risks of preterm birth.
- Early delivery (at GA of 37wks) may be indicated in some patients with: vasculopathy, nephropathy, poor glucose control, or a prior stillbirth after confirmation of fetal pulmonary maturity.
- Most other cases can be allowed to progress to 38 – 39 wks of GA as long as antenatal testing remains reassuring. But expectant management beyond 40 wks is not recommended.
- Delivery between 34 weeks 0 days and 36 weeks 6 days is reserved for failure of in-hospital glycemic control or abnormal fetal testing.
- Cesarean section is reserved for obstetric indications.

INTRAPARTUM MANAGEMENT

4. Patient is kept NPO after midnight

5. Usual dose of intermediate-acting insulin is given at bedtime.

6. Withhold morning (AM) insulin injection.

7. Begin and continue glucose infusion (5% dextrose in water) at 100 – 150 mL/hr

8. Add 10 U of regular insulin to 1000 mL of solution containing 5% dextrose. Begin infusion of regular insulin if capillary glucose is greater than 80 mg/dL. (see table)

9. Use fluid without dextrose if capillary glucose is greater than 180 mg/dL.

10. Begin oxytocin as needed.

11. Monitor maternal glucose levels hourly. Adjust insulin infusion.

Table 24. Insulin infusion protocol

Plasma/ Capillary Glucose (mg/dL)	Infusion Rate (U/hr)	Approximate Infusion Rate (Drops/min)	IV fluid

<80	Insulin off	40	5% dextrose
80-100	0.5	20	5% dextrose
101-140	1.0	30	5% dextrose
141-180	1.5	50	5% dextrose
181-220	2.0	60	without dextrose
>220	2.5	80	without dextrose

Intermittent Subcutaneous Injection Method

1. Give half of the usual insulin dose in AM.
2. Begin and continue glucose infusion (5% DW) at 100 mL/hr
3. Begin oxytocin as needed.
4. Monitor maternal glucose levels hourly
5. Administer regular insulin in small doses (2-5U) to maintain glucose levels of 80-120 mg/dL

MANAGEMENT OF GESTATIONAL DM

ANTENATAL MANAGEMENT OF GDM

Identification of risk factors

Risk assessment should be done at the first prenatal visit. If one or more of risk factors are present, perform 75-g 2-hour OGTT as soon as feasible. If GDM is not diagnosed, 75 gm 2-hour OGTT should be repeated at 24 to 28 weeks of gestation (or any time a patient has signs and symptoms of hyperglycemia)

Risk factors for GDM include Age ≥ 35, pregestational BMI ≥ 25, PCOS, first degree relative with DM, glucosuria (2+ or above on 1 occasion or of 1+ or above on 2 or more occasions), large for gestational age, polyhdramnios, previous macrosomic baby, previous congenital anomaly, unexplained still birth or previous GDM

Ultrasound evaluation

- Early U/S for dating and to check for congenital anomaly
- Serial US to assess fetal growth every 4 to 6 weeks and initiate fetal surveillance with BPP starting from GA of 32 WKs

Diet and Exercise

Lifestyle change is an essential component of management of gestational diabetes mellitus and may suffice for the treatment of many women. Medications should be added if needed to achieve glycemic targets. (Dietary management is similar to pregestational DM)

Insulin

Insulin is the preferred medication for treating hyperglycemia in gestational diabetes mellitus as it does not cross the placenta to a measurable extent.

Insulin therapy should be considered for patients treated with nutrition and exercise therapy when 1hr postprandial values exceed 130–140 mg/dL or 2hr postprandial values exceed 120 mg/dL or fasting glucose exceeds 92mg/dL persistently over 2weeks (more than half of the tests are beyond normal limits).

Metformin

If a patient cannot take insulin or declines, metformin can be used. Counsel about metformin risks.

Starting dose: 500 mg at night for 1 week, increase to 500 mg twice daily. Check baseline creatinine.

Timing and route of delivery

- Delivery can be planned between 39 and 40wks, but not later than 40wks.
- Induction of labor is recommended at 38wks in patients with poor glycemic control.
- If early delivery is indicated (before 39wks) lung maturity should be checked
- CS is done only for obstetric indications

POSTPARTUM FOLLOW UP

- Determine random blood glucose within 4 hours of delivery
- If FBG exceed 126 mg/dL or RBS exceeds 200mg/dL, insulin in a lower dose (usually one third to half of the antenatal dose) or metformin would be required
- If the mother received insulin in the antenatal period, the dose needs adjustments to pre pregnant doses in those with type 2 diabetes mellitus

- For those with GDM, no treatment is required and usually maintained on diet alone. Note that determination of OGTT at 6 - 12 wks postpartum is required to exclude overt diabetes.
- Ensure that women who have preproliferative diabetic retinopathy or any form of referable retinopathy diagnosed during pregnancy have ophthalmological follow-up for at least 6 months after the birth of the baby

COMPLICATIONS

- ***Maternal:*** preeclampsia, infections (UTI, Chorioamnionitis, Endomyometritis, vulvovaginal candidiasis), PPH, Polyhydraminos, Increased C/S rates
- ***Fetal:*** macrosomia, respiratory distress syndrome, hypoglycemia, hypocalcemia, hyperbilirubinemia, congenital malformations (for pregestational), IUGR (for pregestational)

FAMILY PLANNING

- All reliable method of family planning can be used as appropriate for the needs of the individual woman with diabetes.
- Combined hormonal contraceptives and DMPA should be avoided in women with pregestational DM who have vascular complications
- Permanent methods of contraception are ideal if family size is complete.



MALARIA IN PREGNANCY

DEFINITION

Malaria is an infectious disease caused by protozoan parasites from the Plasmodium family which affects human Red Blood Cells that can be transmitted by the bite of the female Anopheles mosquito (the main mode of transmission). Blood contamination and mother to fetal (vertical transmission) during pregnancy are also potential modes of transmission.

CLASSIFICATION

- ***Based on severity:*** Uncomplicated & Complicated Malaria
- ***Based on the ethologic agent:*** Plasmodium (P.) falciparum, P. vivax, P. ovale, P. malariae and P. knowlesi Malaria. P. falciparum and P. vivax malaria account for the majority of cases.

NB: - Mixed infections involving more than 1 species of Plasmodium may occur in areas of high endemicity and multiple circulating malarial species.

CLINICAL MANIFESTATIONS

The symptoms and signs vary based on the severity of the malaria. Manifestations of Severe malaria (cerebral malaria, pulmonary edema, acute kidney injury, hypovolemic shock, metabolic acidosis andhypoglycaemia) are usually seen in non-immune population including pregnant women.

Uncomplicated Malaria

Symptomatic malaria parasitaemia with no signs of severity and/or evidence of vital organ dysfunction

Complicated Malaria (severe Falciparum malaria)

Acute falciparum malaria with signs of severity and or vital organ dysfunction

DIAGNOSIS

Diagnosis is based on suggestive symptom, signs and laboratory tests.

The general principle is all cases of suspected malaria should have a parasitological test (microscopy or rapid diagnostic test) to confirm the diagnosis.

Table 25. **Clinical findings**

UNCOMPLICATED MALARIA
Fever
Shivering/chills
Headaches
Muscle/joint pains
Nausea/vomiting
False labour pains
Physical examinations may reveal pallor and splenomegally.
COMPLICATED MALARIA
Cerebral Malaria (severe P. Falciparum malaria with coma GCS <11, coma for > 30 minute after a seizure, more than two convulsions in 24 hours)
Severe Anemia Hgb < 5gm (Hct<15%)
Hypoglycemia (blood glucose <40mg/dl)
Acute kidney injury (creatinine >3mg/dl)
Metabolic acidosis (plasma bicarbonate <15mmol/litter)
Pulmonary oedema (rapid breathing >30 BPM or Oxygen saturation <90%)
Respiratory distress, deep breathing (acidotic breathing).
Disseminated Intravascular coagulation (abnormal spontaneous bleeding)
Hyperparacitemia (>2% of RBCs parasitized or > 100,000copies of parasite/ml)
Prostration: - Generalized weakness so that the patient is unable to walk or sit up without assistant.

The following tests will confirm the diagnosis:

1. ***Microscopy of a thick and thin blood film:***
   - Thick blood film is more sensitive at detecting parasites (absence of parasites does not rule out malaria)
   - Thin blood film helps to identify the parasite species.

2. ***Rapid antigen detection (diagnostic) tests:***

NB: If facilities for testing are not available, begin therapy with anti-malarial drugs based on clinical suspicion (e.g., headache, fever, joint pain) especially at risky areas.

DIFFERENTIAL DIAGNOSIS

Any acute febrile illnesses which are prevalent in the geographic context should be considered including pregnancy related diseases (both antepartum & postpartum)

Table 26. Differential diagnosis for malaria

Uncomplicated Malaria	Complicated Malaria
• Acute Pyelonephritis • Typhoid Fever/Typhus • Pneumonia • Chorioamnionitis • Relapsing Fever • Postpartum Endometritis • Acute Hepatitis	• Pyogenic meningitis • Eclampsia • Epilepsy • Encephalitis • CNS tumors • Congestive Heart Failure

OBSTETRIC COMPLICATIONS OF MALARIA

Complications of malaria in pregnancy vary according to transmission intensity and the level of acquired immunity.

Low or unstable malaria transmission areas

In low or unstable malaria transmission areas (like many malarious areas in Ethiopia), the lack or little immunity to malaria will predispose pregnant women to a higher risk of developing severe malaria and subsequent obstetric complications including:

- Spontaneous abortion,
- Stillbirth,
- Premature delivery, low birth weight
- Maternal & Neonatal deaths.

Stable transmission areas

In stable transmission settings, partial clinical immunity acquired during years of exposure reduces the risk of severe disease. The major complications are:

- low birth weight (LBW)/IUGR and
- Maternal anemia.

PREVENTION OF MALARIA

- Use of long-lasting insecticidal nets (LLINs)
- Prompt diagnosis and effective treatment of malaria infections.

MANAGEMENT

Management of malaria needs a multidisciplinary approach including Obstetricians, Internists and Neonatologists.

Uncomplicated falciparum malaria can progress rapidly to severe form of the disease, especially in people with no or low immunity. Severe falciparum malaria is almost always fatal without treatment. Therefore, early diagnosis and prompt and effective treatment with in 24 to 48 hours of the onset of malaria symptoms is very crucial.

To help protect current and future antimalarial medicines, all episodes of malaria should be treated with at least two effective antimalarial medicines with different mechanism of action (combination therapy).

Uncomplicated Falciparum Malaria

First Trimester

- For pregnant women diagnosed with uncomplicated malaria prompt treatment with chloroquine (treatment schedule as with non-pregnant adult patients i.e 4,4,2 tabs base) is recommended. Alternatively, hydroxychloroquine may be given instead plus Clindamycin.
- Give quinine salt (dihydrochloride or sulfate) 10 mg/kg body weight by mouth three times daily plus clindamycin 300 mg every six hours for seven days.
- If clindamycin is not available, treat with quinine monotherapy: Quinine salt (dihydrochloride or sulfate) 10 mg/kg body weight by mouth three times daily for seven days.
- An Artemisinin-based Combination Therapy (ACT) can be used if quinine is not available, or if quinine plus clindamycin fails, or if adherence to seven-day treatment with quinine cannot be guaranteed.

Second and Third Trimesters

Treat orally based on national policy with any of the ACTs (assuming a body weight of 50 kg or more): e.g Artemether (80 mg) plus lumefantrine (480 mg) twice daily for three days.

Uncomplicated P. Vivax, Ovale, Malariae

First Trimester

- Areas with Chloroquine-Sensitive P. Vivax Parasites: Give chloroquine 10 mg/kg body weight by mouth once daily for two days followed by 5 mg/kg body weight by mouth on day three.
- Areas with Chloroquine-Resistant P. Vivax Parasites: Before considering second-line drugs for treatment failure with chloroquine, clinicians should exclude poor patient compliance and a new infection with P. falciparum. If diagnostic testing is not available, treat as for falciparum malaria. The treatment option for confirmed chloroquine resistant vivax malaria is quinine salt (dihydrochloride or sulfate) 10 mg/kg body weight by mouth three times a day for seven days.

Second and Third Trimesters

- Areas with Chloroquine-Sensitive P. Vivax Parasites: Either ACT or chloroquine alone are the two treatment options
- Areas with Chloroquine-Resistant P. Vivax Parasites: Treat with ACT (see dose above)
- Areas of Mixed Falciparum-Vivax Malaria: In areas of mixed transmission, the proportions of malaria species and their drug sensitivity patterns vary. If microscopic diagnosis is available, specific treatment can be prescribed. Where unavailable, assume the infection is due to P. falciparum and treat accordingly.

Complicated (Severe) Malaria

Pregnant women with severe malaria should be given parenteral antimalarial drugs in full dose without delay.

Artesunate (IV or IM) is the preferred drug for all severe forms in all trimesters. Begin treatment with IV or IM route for at least 24 hours and until the woman can tolerate oral medications. Then give a complete oral treatment with ACT for three days.

Parenteral Quinine dihydrochloride can be given in areas where artemether is unavailable. Quinine dihydrochloride loading dose of 20 mg/kg diluted in IV fluid (5% dextrose) over four hours; then 8 hours after the start of the loading dose, give maintenance dose of quinine, 10

mg/kg over 4 hours. This maintenance dose should be repeated every 8 hours

NB: - Avoid premaquine both in pregnant and breastfeeding mothers

REFERENCES

1. Managing complications in pregnancy and childbirth: a guide for midwives and doctors 2nd ed. World Health Organization 2017
2. Basic Emergency Obstetric and Newborn Care (BEmONC) Training manual. FMoH, 2018
3. Up-to-date 21.1
4. Gabbe: Obstetrics: Normal and Problem Pregnancies, 5th ed. 2007
5. Technical and Procedural Guidelines for Safe Abortion Services in Ethiopia. 2014
6. WHO, clinical practice handbook for safe abortion, 2014
7. FMOH, first trimester comprehensive abortion care manual, 2nd edition, 2018
8. Ipas, Clinical Updates in Reproductive Health, 2019
9. GYNECOLOGY MANAGEMENT GUIDELINES IN JUSH, Jimma
10. Gabra A (2018) Complications of Hyperemesis Gravidarum; A Disease of Both Mother and Fetus, Review Article. Crit Care Obst Gyne. Vol.5 No.1:1
11. Macle L, Varlet MN, Cathébras P.Rev Prat. 2010 Jun 20; 60(6):759-64. French
12. Gabra A (2018) Complications of Hyperemesis Gravidarum; A Disease of Both Mother and Fetus, Review Article. Crit Care Obst Gyne. Vol.5. No.1:1.
13. Management protocol on selected obstetrics topics for Hospitals Federal Democratic Republic of Ethiopia Ministry of Health January, 2010
14. Management protocol on selected obstetrics topics for Health Center Federal Democratic Republic of Ethiopia Ministry of Health January, 2014
15. Books (Williams 24th edition, NMS Obstetrics and Gynecology, 6th Edition).
16. EDHS 2016.
17. Global FP hand book 2018
18. WHO MEC 5th Edition.

19. ETHIOPIAN HOSPITAL SERVICES TRANSFORMATION GUIDELINES Volume 1, September 2016

20. ACOG, community opinion Hospital based Triage of Obstetrics Patients, Number, 667, July 2016.

21. London Health Sciences Centre Rob Gratton, MD, FRCS(C), FACOG Department of Obstetrics and Gynecology Western University-Obstetrical Triage Acuity Scale guideline.

22. The design and implementation of an obstetric triage system for unscheduled pregnancy related attendances: a mixed methods evaluation. Sara Kenyon1*, Alistair Hewison2, Sophie-Anna Dann1, Jolene Easterbrook3, Catherine Hamilton-Giachritsis4, April Beckmann5 and Nina Johns6: Kenyon et al. BMC Pregnancy and Childbirth (2017) 17:309 DOI 10.1186/s12884-017-1503-5.