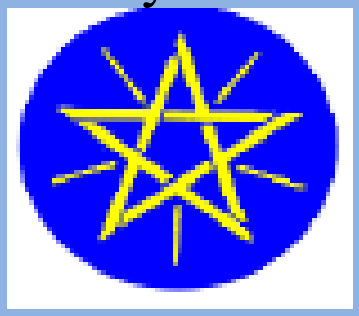
MANAGEMENT PROTOCOL

ON

SELECTED OBSTETRICS TOPICS

Federal Democratic Republic of Ethiopia
Ministry of Health



January, 2010

Acknowledgment

Preface

Acronyms

AIDs	Acquired Immuno deficiency Syndrome
ALAT	Alanine AminoTransferase
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 AminoTransferase
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
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
DPT	Diphtheria, Pertusis, Tetanus
DS	Dextrose in Saline
DTR	Deep Tendon Reflex
DVT	Deep Venous Thrombosis
DW	Dextrose in Water
ECV	External Cephalic Version
EDD	Expected date of Delivery
FBS	Fasting Blood Sugar
FDP	Fibrin Degradation Product
FFP	Fresh Frozen Plasma
FGM	Female Genital Mutilation
FHR	Fetal Heart Rate
FPD	FetoPelvic Disproportion
GA	Gestational Age
GDM	Gestational Diabetes Mellitus
HAART	Highly Active Anti Retroviral Treatment
HBsAG	Hepatitis B Surface Antigen
HCG	Human Chorionic Gonadothrophin
Hct	Hematocrite
HEENT	Head, Eye, Ear, Nose and Throat
HEP	Hepatitis Vaccine
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 Ammenorria 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
MVA	Manual Vacuum Aspiration
NaCL	Sodium Chloride
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
OIs	Opportunistic Infections
OL	Obstructed Labor
OP	Occipito Posterior
OPV	Oral Polio Vaccine
PCP	PneumocystisCarinii
PCWP	Pulmonary Capillary Wedge Pressure
PID	Pelvic Inflammatory Disease
PIH	Pregnancy Induced Hypertension
PMTCT	Prevention of mother to child transmission
PO	Per Oral
PPH	Post Partum Hemorrhage
PPH	Postpartum Hemorrhage
PROM	Premature Rupture of Membranes
PT	Prothrombine Time
PTT	Partial Thromboplastine Time
RFT	Renal Function Test
Rh	Rehsus
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
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

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Focused Antenatal Care

Introduction to Focused Antenatal care

Pregnancy is a very important event from both social and medical points of view. Therefore, pregnant women should receive special care and attention from the family, community and from the health care system. The objective of antenatal care (ANC) is to assure that every pregnancy culminates in the delivery of a healthy baby without impairing the health of the mother.

ANC is defined as the complex of interventions that a pregnant woman receives from organized health care services. The purpose of ANC is to prevent, identify and treat conditions as well as help a woman approach pregnancy and birth as a positive experiences. The care should be appropriate, cost-effective and based on individual needs of the mother.

Antenatal care is a key entry point for pregnant women to receive a broad range of health promotion and preventive health services. ANC is an opportunity to advice women and their families on how to prepare for birth and potential complications and promote the benefit of skilled attendance at birth and to encourage women to seek postpartum care for themselves and their newborn. It is also ideal time to counsel women about the benefits of family planning and provide them with options of contraceptives. In addition, ANC is an essential link in the house – to – hospital care continuum and helps assure the link to higher levels of care when needed.

Rights of the Pregnant Woman

Health care providers should be aware of the client's rights when offering antenatal care services. The pregnant woman has the right to:

- Information about her health
- Discuss her concerns, thoughts, and worries
- Know in advance about any planned procedure to be performed
- Privacy
- Confidentiality
- Express her views about the services she receives

Objectives of Focused ANC

The new approach to ANC emphasizes the quality of care rather than the quantity. For normal pregnancies WHO recommends only four antenatal visits. The major goal of focused antenatal care is to help women maintain normal pregnancies through:

- Health promotion and disease prevention
- Early detection and treatment of complications and existing diseases
- Birth preparedness and complication readiness planning.

Health Promotion and Disease Prevention: Counseling about important issues affecting a woman's health and the health of the newborn is a critical component of focused ANC. Counsel the woman and provide the services as necessary:

- Immunization against tetanus
- Iron and folate supplementation.
- How to recognize danger signs, what to do, and where to get help
- Voluntary counseling and testing for HIV
- The benefit of skilled attendance at birth
- Breastfeeding
- Establish access to family planning
- Protection against malaria with insecticide-treated bed nets
- Good nutrition and the importance of rest
- Protection against iodine deficiency
- Risks of using tobacco, alcohol, local stimulants, and traditional remedies
- Hygiene and infection prevention practices

Early detection and treatment of complications and existing Diseases: As part of the initial assessment, the provider talks with the woman and examines her for pre-existing health conditions that may affect the outcome of pregnancy, require immediate treatment or require a more intensive level of monitoring and follow-up care over the course of pregnancy.

Birth Preparedness and Complication Readiness: Approximately 15% of women will develop a life-threatening complication. So, every woman and her family should have a plan for the following:

- A skilled attendant at birth
- The place of birth and how to get there including how to access emergency transportation if needed
- Items needed for the birth

- Money saved to pay for transportation, the skilled provider and for any needed mediations and supplies that may not been provided for free
- Support during and after the birth (e.g., family, friends)
- Potential blood donors in case of emergency.

Implementation of Focused ANC:
This Focused ANC protocol is designed as a job aid for ANC providers. It includes revised forms and checklists needed to identify those women that can follow *basic care* and those women with special health conditions and/or are at risk of developing complications that needs *a special care*.

Keep in mind to:

- Make all pregnant women feel welcome at your clinic.
- Opening hours for your ANC clinic should be as convenient as possible for mothers to come to the clinic.
- Make every effort to reduce client waiting time.
- However, women who come without an appointment should not be turned away even when there is no emergency.
- As far as possible, any required interventions (for treatment) or tests should be done at the women's convenience, for example, on the same day of the woman's visit.

The Basic Component of the Focused ANC

The Focused antenatal care model categorizes pregnant women into two groups:

- those eligible to receive routine ANC (called the **basic component**); and
- those who need **specialized care** based on their specific health conditions or risk factors (**Figure 1**).

Sets of criteria are used to determine the eligibility of women for the basic component. At first antenatal visit, the provider should use the Focused ANC classifying checklist (**Figure 2**) to classify the pregnant women. If a woman has none of the conditions listed on the classifying form (no single yes marked on the form), she is eligible to follow the *basic component*. If a woman has any one condition she should follow a specialized care. If the specialized service is not available in the facility, refer her to the next level of care.

A woman who was initially classified to follow the basic component of the Focused ANC may be reclassified to follow *specialized care* if she develops any of the conditions at anytime in the ANC follow up. In the same way, a woman who was initially classified to follow a *specialized care* may be reclassified to follow *basic care* if the condition or risk factor initially identified does not exist any longer (Figure 1).

Figure 1: The Focused ANC Model

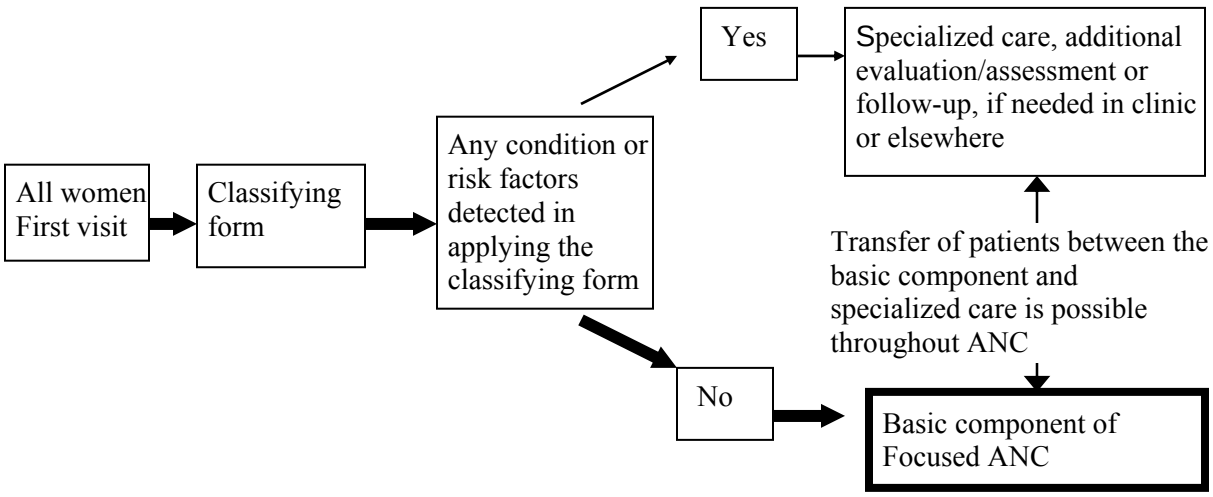


Figure 2: Focused ANC Classifying form

Federal Ministry of Health
Integrated Antenatal, Labor, Delivery, Newborn and Postnatal Care Card

Date: _____ ANC Reg.No: _____Medical Record Number (MRN):_____

Name of Client: _____Name of Facility _____

Woreda: _____Kebele:_____House No: _____

Age (Years) _____ LMP____/____/____ EDD ____/____/____

Gravida____ Para _____ Number of children alive_____ Marital Status_____

INSTRUCTIONS to Fill Classifying form: Answer all of the following questions by placing 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 < 2500g		
4. Birth weight of last baby > 4000g		
5. Last pregnancy: hospital admission for hypertension or pre-eclampsia/eclampsia?		
6. Previous surgery on reproductive tract?(Myomectomy, removal of septum, fistula repair, cone biopsy, CS, repaired rapture, cervical circlage)		
CURRENT PREGNANCY	**No**	**Yes**
7. Diagnosed or suspected multiple pregnancy?		
8. Age less than 16 years?		
9. Age more than 40 years?		
10. Isoimmunization Rh (-) in current or in previous pregnancy		
11. Vaginal bleeding		
12. Pelvic mass		
13. Diastolic blood pressure 90mm Hg or more at booking?		
GENERAL MEDICAL	**No**	**Yes**
14. Diabetes mellitus		
15. Renal disease		
16. Cardiac disease		
17. Chronic Hypertension		
18. Known 'substance' abuse (including heavy alcohol drinking, Smoking)		
19. 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 more close follow up or referral to specialty care.If she needs more frequest ANC visits use and attach additional recoridng sheets

The first visit

The first ANC visit should occur in the first trimester, around or preferably before 16 weeks of gestational age.

Objectives of first visit

- To determine patients' medical and obstetric history with a view to collect evidence of the woman's eligibility to follow the basic component or need special care and/or referral to a specialized hospital (using the classifying form).
- To do pregnancy test to those women who come early in pregnancy,
- To identify and treat symptomatic STI
- To determine gestational age
- To provide routine Iron supplementation
- Provide advice on signs of pregnancy-related emergencies and how to deal with them including where she should go for assistance
- To provide simple written instructions in the local language that gives general information about pregnancy and delivery, HIV as well as any specific answers to the patient's questions.
- To give advice on malaria prevention and if necessary provide ITN
- To provide routine Provider-initiated HIV counseling and testing using the opt-out approach
- To provide PMTCT services

NOTE:

- Ideally, the first visit should occur before 16th week of pregnancy. However, some women may come at a later gestational age in which case the provider has to enroll the woman as first visit but give her all the services required for fist visit as well as services appropriate for her gestational age.
- The first visit can be expected to take 30–40 minutes.
- On average, approximately 75% of women are expected to follow the basic component. At this visit, while the case history conforms to, and even exceeds, traditional standards, the elements of the physical and biochemical examinations are fewer and less resource demanding than those commonly recommended in standard programs.
- Only one routine vaginal examination during pregnancy is recommended. The vaginal examination could be postponed until the second visit if the woman would not accept this during the first visit.
- HIV pre-test information can be provided as part of a group session if the client load is high. If women have additional questions or concerns, individual counseling can be used after the group session (Refer to Guidelines for PMTCT of HIV in Ethiopia).

1. History

Personal history

- Name, Woreda, Kebele, house number, age, marital status, planned or unplanned pregnancy
- Date of Last Menstrual Period (LMP); certainty of dates (regularity of cycle, hormonal contraception used three months prior to LMP). Determine the expected date of delivery (EDD) based on LMP and all other relevant information. **Use 280-day rule (LMP + 280 days).**
- Gravidity, Parity, Number of children alive, number of abortions
- Socioeconomic status: monthly income, family size, number of rooms, toilet, kitchen
- History of Female Genital Cutting

Medical history

- Specific diseases and conditions: diabetes mellitus, renal disease, cardiac disease, chronic hypertension, tuberculosis, past history of HIV – related illnesses and HAART, varicose veins, deep venous thrombosis, other specific conditions depending on prevalence in service area (for example, hepatitis, malaria), other diseases, past or chronic; allergy(-ies),
- Operations other than caesarean section
- Blood transfusions. Rhesus (D) antibodies
- Current use of medicines – specify, any medications

Obstetric history

- Previous stillbirth or neonatal loss
- History of three or more consecutive spontaneous abortion
- Birth weight of last baby < 2500 gm
- Birth weight of last baby > 4000 gm
- Last pregnancy: hospital admission for hypertension or pre-eclampsia/eclampsia
- Periods of exclusive breast-feeding: When? For how long?
- Thrombosis, embolus
- Previous surgery on reproductive tract (myomectomy, removal of septum, fistula repair, cone biopsy, CS, repaired ruptured uterus, cervical circulage)
- Any unexpected event (pain, vaginal bleeding, others: specify) .

2. Physical Examination

- General appearance, look for signs of physical abuse
- Vital signs: BP, PR, Temperature, RR; HEENT: Check for signs of severe anemia: pale complexion, fingernails, conjunctiva, buccal mucosa, tip of tongue and shortness of breath. Look for oral hygiene, dental carries
- Check for signs of jaundice record weight and height to assess the mother's nutritional status
- Do breast examination
- Chest: auscultate for chest and heart abnormality

- Abdomen: measure uterine height (in centimeters). A chart should be used to determine uterine height (**Figure 3**).
- Gynecological Exam: consider vaginal examination (using a speculum), look for vulval ulcer, vaginal discharge, scratch marks, pelvic mass, cervical lesion and estimate uterine size in first trimester, genital malformation, severe FGM.
- Assess for symptoms of AIDS and HIV as per WHO Clinical Staging System for HIV status for HIV positive women.

3. Laboratory tests

- Urine analysis preferably multiple dipstick test for bacteriuria and test for proteinuria to all women.
- Blood: syphilis (rapid test - RPR if available or VDRL) result while waiting in the clinic.
- Blood-group typing (ABO and rhesus).
- Hemoglobin (Hb) or hematocrit.
- Stool exam if the woman can afford or if it is provided for free or when presumptive treatment using mebendazole is not recommended
- Perform HIV test if the woman does not say "NO". Encourage testing of partner
- Perform CD4 count for all HIV positive pregnant women, If CD4 determination is unavailable, HIV positive pregnant women should be staged clinically and using total lymphocyte count for antiretroviral treatment, ART, eligibility.
- Additional investigation that can be considered when available and affordable include: urine culture and sensitivity, ultrasound, Pap smear, HBsAg.

4. Implement the following interventions:

- Iron and folate supplements to all women: one tablet of 60-mg elemental iron and 400 micrograms folate per day. To enhance the absorption of iron, instruct mothers to take iron when eating meat or vitamin-rich foods (fruits and vegetables). Avoid tea, coffee, and milk at the same time when taking iron; it interferes with the body's absorption of iron. Iron can also be taken between meals.
- If rapid test for syphilis is positive: treat, provide counseling on safer sex, and arrange for her partner's treatment and counseling.
- Tetanus toxoid: give first injection.
- In malaria endemic areas provide ITN.
- Perform additional laboratory investigations and provide care and treatment of HIV positive pregnant women according to the Guideline for PMTCT of HIV in Ethiopia.
- Refer clients that need specialized care, according to diagnosis

5. Advice, questions and answers, and schedule the next appointment

- Provide advice on signs of pregnancy-related emergencies and how to deal with them including where she should go for assistance. This should be confirmed in writing in the antenatal card. Provide simple written instructions in the local language general information about pregnancy and delivery. When necessary, materials appropriate for

an illiterate audience should be available, such as simple pictures and diagrams describing the advice given at each visit.

- Give advice on birth plan, including transportation options to health institution.
- Questions & answers: time for free communication.
- Advise the woman to bring her partner (or a family member or friend) to later ANC visits so that they can be involved in the activities and can learn how to support the woman through her pregnancy.
- Discuss on benefit of HIV testing, PMTCT, risk reduction support services including advice on safe sex. Emphasize the risk of acquiring or transmitting HIV or STIs without the use of condoms. Inform woman that their routine laboratory check up includes HIV testing unless they say "NO". The right to say "NO" shall be clearly communicated.
- Provide HIV-post test counseling according to Guideline for PMTCT of HIV in Ethiopia
- Advise women to stop the use of alcohol, tobacco smoking and chewing chat
- Discuss on breast feeding options and advise on exclusive breast-feeding.
- Schedule appointment: second visit, at 24 – 26 weeks state date and hour if possible. This should be written in the woman's appointment card.

6. Maintain complete records

- Complete integrated client card
- Complete appointment card
- Enter information on registration logbook

The second visit

The second visit should be scheduled at 24-28 Weeks. It is expected to take 20 minutes.

Objectives of the second visit is to

- address complaints and concerns
- perform pertinent examination and laboratory investigation (BP, uterine height, multiple dipstick test for bacteruria), proteinuria for those who are nulliparous and for those who have history of hypertension or preeclampsia/eclampsia, determine hemoglobin if clinically indicated
- assess fetal well being
- design individualized plan
- advice on existing social support
- decide on the need for referral based on updated risk assessment

1. History

- Personal history: note any changes since first visit.
- Medical history
  - Review relevant issues of medical history as recorded at first visit.
  - Note intercurrent diseases, injuries, or other conditions and additional histories for HIV positive women since first visit.
  - Note intake of medicines, other than iron, folate and other prescribed drugs.
  - Iron intake: check compliance.
  - Note other medical consultations, hospitalization or sick-leave in present pregnancy.
- Obstetric history
  - Ask the woman how she is feeling
  - Review relevant issues of obstetric history as recorded at first visit.
- Present pregnancy
- Record symptoms and events since first visit: Ask about
    - Vaginal bleeding and vaginal discharge
    - dysuria, frequency, urgency during micturition
    - Severe/persistent headache or blurred vision
    - Difficulty breathing
    - Fever
    - Severe abdominal pain
    - fetal movement; note time of first recognition in medical record.
  - Ask about signs and symptoms of severe anemia,.
  - Ask about other specific symptoms or events such as opportunistic infections in HIV positive women.
  - Note abnormal changes in body features or physical capacity (e.g. peripheral swelling, shortness of breath), observed by the woman herself, by her partner, or other family members.
  - Check on habits: alcohol, smoking other.

2. Physical examination

- Note general appearance, look for signs of physical abuse
- Check vital signs: BP, PR
- Uterine height in centimeters
- Auscultate for fetal heart beat
- Other alarming signs of disease: shortness of breath, coughing, generalized edema, other.
- Do vaginal examination if it was not done at first visit.

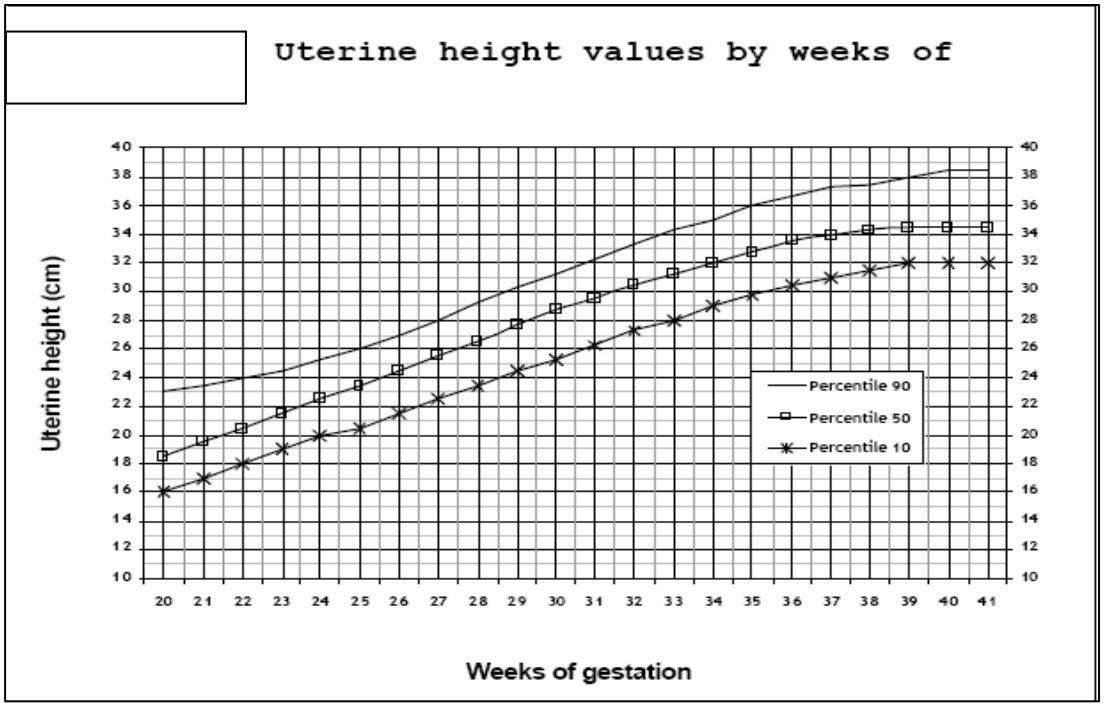
3. Laboratory tests

- Urine: repeat multiple dipstick test to detect urinary-tract infection; if positive treat and appoint for repeat urine analysis and management after two weeks.
- Repeat test for proteinuria if the woman is nulliparous or if she has a history of hypertension, pre-eclampsia or eclampsia in a previous pregnancy.

Note: All women with hypertension in the present visit should have urine test performed to detect proteinuria.

- Blood: repeat Hb only if Hb at first visit was below 7 gm/dl or signs of severe anemia are detected on examination.
- Recommended laboratory investigations for HIV positive women as relevant and indicated in the Guideline for PMTCT of HIV in Ethiopia
- Indirect Coomb's test is done if the woman's blood group is rhesus negative

Figure 3: Uterine Height Chart



4. Implement the following interventions

- Ensure compliance to iron and folate supplement and refill till next visit.

- If bacteriuria was treated at first visit and test is still positive, refer.

5. Advice, questions and answers, and scheduling the next appointment

- Repeat all the advice given at the first visit.
- Questions and answers: give time for free communication.
- Give advice on whom to call or where to go in case of bleeding, abdominal pain or any other emergency, or when in need of other advice.

This should be confirmed in writing (on the antenatal card), as at first visit.
Schedule appointment: third visit, at 30-32 weeks.

6. Maintain complete records

- Complete client card on the Integrated Client Card.
- Complete appointment card
- Enter information on registration logbook

The third visit

The third visit should take place around 30 – 32 weeks and is expected to take 20 minutes.

Objectives of the third visit is to

- address complaints and concerns
- perform pertinent examination and laboratory investigation (BP, uterine height, multiple dipstick test for bacteruria, determine hemoglobin for all, proteinuria for nulliparous women and those with a history of hypertension, pre-eclampsia or eclampsia
- assess for multiple pregnancy, assess fetal well being
- review individualized birthplan and complication readiness including advice on skilled attendance at birth, special care and treatment for HIV positive women according to the National Guideline for PMTCT of HIV in Ethiopia
- advice on family planning, breastfeeding
- decide on the need for referral based on updated risk assessment

1. History

- Personal history
  - Note any changes or events since second visit.
- Medical history
  - Review relevant issues of medical history as recorded at first and second visits.
  - Note intercurrent diseases, injuries or other conditions and additional histories for HIV positive women since first visit. since second visit.
  - Note intake of medicines other than iron and folate.
  - Iron intake: compliance.
  - Note other medical consultations and hospitalization
- Obstetric history

- Review relevant issues of obstetric history as recorded at first visit and as checked at second.

- Present pregnancy
- Record symptoms and events since second visit: Ask about
    - Vaginal bleeding and vaginal discharge
    - Dysuria, frequency, urgency during micturition
    - Severe/persistent headache or blurred vision
    - Difficulty breathing
    - Fever
    - Severe abdominal pain
    - Fetal movement; note time of first recognition in medical record.
    - Other specific symptoms or events such as opportunistic infections in HIV positive women.
  - Changes in body features or physical capacity, observed by the woman herself, her partner or other family members.
  - Check on habits: alcohol, smoking and other.

2. Physical examination

- Measure blood pressure and pulse rate.
- Uterine height: record on graph
- Palpate abdomen for detection of multiple fetuses.
- Fetal heart sounds: Use pinard stethoscope, hand-held Doppler required only if no fetal movements are seen, the woman feels less fetal movement or if she requests it and it is available.
- Generalized edema.
- Other alarming signs of disease: shortness of breath, cough, etc.
- If bleeding or spotting: Do not do vaginal examination (see section on APH).
- Breast examination.

3. Laboratory Test

- Urine: repeat urine analysis for infection preferably multiple dispstick test to detect urinary-tract infection; if still positive after being treated at a previous visit, refer to special unit in the clinic or a hospital. Repeat proteinuria test only if the woman is nulliparous or she has a history of hypertension, pre-eclampsia or eclampsia in a previous pregnancy.
- Blood: Hb to all women.

4. Implement the following interventions:

- Ensure compliance of iron and folate and refill as needed
- Tetanus toxoid injection as needed.
- Anti – D is given if the woman's blood group is Rhesus negative and Coomb's test is negative.

5. Advice, questions and answers, and scheduling the next appointment

- Repeat advice given at first and second visits.
- Give advice on measures to be taken in case labor starts.
- Questions and answers: give time for free communication.
- Reconfirm written information on whom to call and where to go in case of emergency or any other need.
- Plans to ensure transport is available in case of need during labor.
- Provide recommendations on breastfeeding, contraception and the importance of the postpartum visit.
- Schedule appointment: fourth visit, at 36-38 weeks.

6. Maintain complete records

- Complete integrated client card
- Complete appointment card
- Enter information on registration logbook

The fourth visit

The fourth should be the final visit of the basic component and should take place between weeks 36 and 38.

Objectives of the fourth visit is to:

- review individualized birthplan, prepare women and their families for childbirth such as selecting a birth location, identifying a skilled attendant, identifying social support, planning for costs, planning for transportation and preparing supplies for her care and the care of her newborn.
- complication readiness: develop an emergency plan which includes transportation, money, blood donors, designation of a person to make a decision on the woman's behalf and person to care for her family while she is away.
- re-inform women and their families of the benefits of breastfeeding and contraception, as well as the availability of contraceptive methods at the postpartum clinic.
- perform relevant examination and investigations
- review special care and treatment for HIV positive women according to the Guidelines for PMTCT of HIV in Ethiopia.

At this visit, it is extremely important that women with fetuses in breech presentation should be discovered and external cephalic version be considered.

All information on what to do and where to go (which health facility) when labor starts or in case of other symptoms should be reconfirmed in writing and shared with the patient, family members and/or friends of the patient.

1. History

- Personal information

- Note any changes or events since the third visit.

- Medical history

- Review relevant issues of medical history as recorded at the three previous visits.
- Note intercurrent diseases, injuries or other conditions since third visit.
- Note intake of medicines other than iron and folate.
- Iron intake: compliance.

Note other medical consultations, hospitalization or sick-leave in present pregnancy, since the third visit.

- Obstetric history

- Final review of obstetric history relevant to any previous delivery complications.

- Present pregnancy

- Record symptoms and events since third visit: Ask about
  - Vaginal bleeding and vaginal discharge
  - Dysuria, frequency, urgency during micturition

- Severe/persistent headache or blurred vision
- Difficulty breathing
- Fever
- Severe abdominal pain
- Fetal movement; note time of first recognition in medical record.
- Other specific symptoms or events such as opportunistic infections in HIV positive women.

- Changes in body features or physical capacity, observed by the woman herself or by her partner, or other family members.

2. Physical examination

- Measure blood pressure and pulse rate.
- Uterine height: record on graph.
- Check for multiple fetuses.
- Fetal lie, presentation (head, breech, transverse).
- Fetal heart sound(s): use pinard stethoscope.
- Generalized edema.
- Other signs of disease: shortness of breath, cough, etc.
- If bleeding or spotting: Do not do vaginal examination (see section on APH).

3. Laboratory

- Urine: Urine analysis for infection (preferably multiple dispstick test to detect urinary-tract infection); if still positive after being treated at a previous visit, refer to hospital. Repeat
- Proteinuria test only if the woman is nulliparous or she has a history of hypertension, pre-eclampsia or eclampsia in a previous pregnancy.
- U/S to exclude placenta previa, if external cephalic version is considered

4. Implement the following interventions:

- Iron: continue

5. Advice, questions and answers, and advice on post-term management

- Repeat the advice given at previous visits.
- Give advice on measures to be taken in case of the initiation of labor or leakage of amniotic fluid.
- Give advice on breast-feeding.
- Questions and answers: give time for free communication.
- Reconfirm written information on what to do and where to go (place of delivery) in case of labor or any other need.
- Schedule appointment: if the woman do not deliver by end of week 41 (state date and write it in the ANC card).
- Schedule appointment for postpartum visit. Provide recommendations on lactation and contraception.

6. Maintain complete records

- Complete the Focused ANC part of the integrated client card
- Complete the registration log book
- Give the appointment card to client and advice her to bring it with her to the hospital or to any additional appointments she may have with any health services.

Late enrolment and missed visits

It is very likely that a good number of women will not initiate ANC early enough in pregnancy to follow the full basic component of the Focused ANC presented above. As stated before, these women, particularly those starting after 32 weeks of gestation, should have in their first visit all activities recommended for the previous visit(s), as well as those which correspond to the present visit.

Attendance on the part of the patient is a critical element of the basic component of the focused ANC, yet it is inevitable that some appointments will be missed. A formal system should be organized by clinics to determine the reason or reasons for missed appointments. The patient should be traced and another visit arranged, when appropriate. A visit after a missed appointment should include all the activities of the missed visit(s), as well as those that correspond to the present visit.

Completion of Client Records

For the Provider Accepting a Referral

A trained midwife or provider should complete and sign client records.

- Keep client records complete with all relevant information.
- Document findings and management at each visit.

Annexes

Annex 1: Integrated Client Card (Focused ANC, delivery and postnatal care)

Annex 2: Common Complaints of Pregnancy.

Annex 3: Nutritional advise and body mass index (BMI) assessment and recommended gain

Annex 4: Birth Preparedness and Complication Readiness

Annex 5: Tetanus Toxoid Immunization Schedule.

Annex 6 Drug Education and Drug Classification

Annex 7: Breastfeeding (lactation) Counseling

Annex 8: Family Planning Counseling

Annex 9: Lie and Presentation

Annex 10: Pelvic Examination

Annex 11: Indications for Ultrasound

Annex 12: Drug Classification Table

Annex 1: Integrated client card

II. Initial Evaluation plus Promotive and Preventive Care

General Exam	Gyn Exam	Counseling /Testing, HIV+ Care and follow up
General_____ _____	Vulvar Ulcer Y N	Danger signs in pregnancy & delivery advised Y N
Pallor Y N	Vaginal discharge Y N	Birth Preparedness advised Y N
Jaundice Y N	Pelvic Mass Y N	**MOTHER** HIV test accepted Y N
Chest Abn. Y N	Uterine size (Wks) _____	HIV test result R NR I
Heart abnormality Y N	Cervical Lesion Y N	

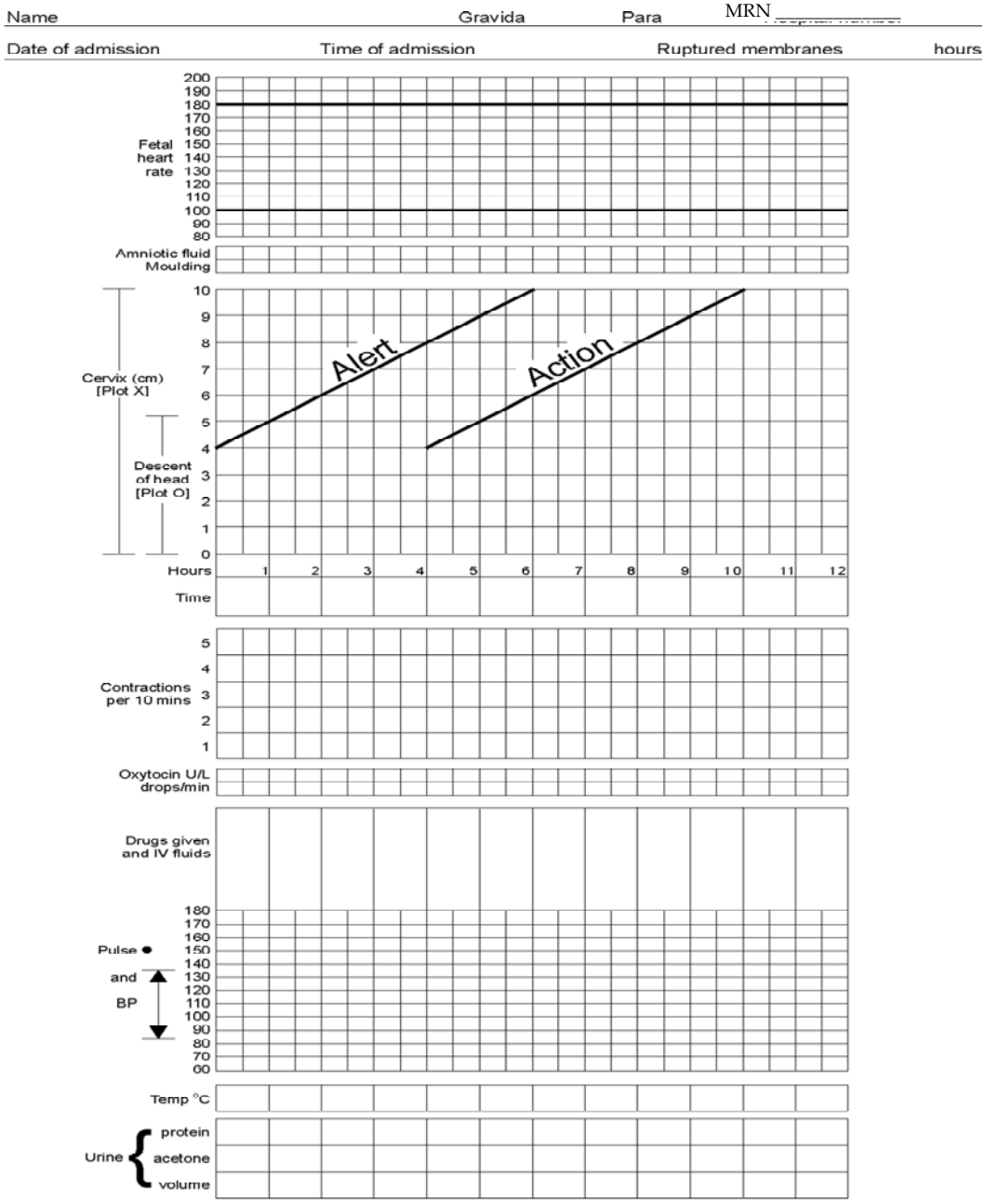
	HIV test result received with post test counseling Y N
	Counseled on Infant feeding Y N
	Referred for care, treatment and support Y N
	PARTNER Partner HIV test result R NR I

III.Present Pregnancy: Follow Up

	1st visit (better before 16 wks)	2nd visit (better 24 - 28 wks)	3rd visit (better 30 -32 wks)	4th visit (better 36-40wks)
Date of visit				
Gestation age (LMP)				
BP				
Weight (Kg)				
Pallor				
Uterine height (Wks)				
Fetal heart beat				
Presentation				
Urine test for infection				
Urine test for protein				
Rapid syphilis test				
Hemoglobin				
Blood Group and Rh				
TT (dose)				
Iron/Folic Acid				
Mebendazole				
Use of ITN				
ARV Px (type)				
Remarks				

	First visit	*Second visit*	*Third Visit*	*Fourth Visit*
Danger signs identified and Investigation:				
Action, Advice, counseling				
Appointment for next follow-up				
Name and Sign of Health care Provider				

III: Intrapartum Care and followup: Monitoring progress of labor Using Partagraph



Delivery Summary

Date_____**Time:**_____**SVD** ☐ **C/Section** ☐ **Vacuum/Forceps** ☐ **Episiotomy** ☐

AMTSL: Ergometrine ☐ **Placenta:** Completed ☐ **Laceration rep**: 1st degree ☐

Oxytocine ☐ Incomplete ☐ 2nd degree ☐

Misoprostol ☐ CCT ☐ 3rd degree ☐

MRP ☐

NEWBORN: Single ☐ **Multiple** ☐ **Alive** ☐ **Apgar score**_____ **SB: Mac** ☐ **Fresh** ☐

Sex: Male ☐ **Female** ☐ **Birth wt.(gm.)**_____ **Length (cm.)**_____ **Term** ☐ **Preterm** ☐

BCG (Date)_____ **Polio 0**_____ **Vit K** ☐ **TTC** ☐ **Baby mother Bonding** ☐

Obstetric Cx:	*Maneged*	*Referred*		*Maneged*	*Referred*
Eclampsia	☐	☐	PPH	☐	☐
APH	☐	☐	PROM/Sepsis	☐	☐
Ruptured Ux	Repaired	Hysterect.	Obst/prolg labor	☐	☐

HIV Testing accepted Y N **HIV Couns. and testing offered** Y N

HIV Test result R NR I

ARV Px for mothers (by Type) _____ **ARV Px for NB (by type)**_____

Feeding Option EBF_____ **RF**_____

Mother & Newborn referred for care & sup. Y N

Remark:_____

Delivered by: **Sign:**

Post Partum Visit

	1st visit (better at 6 hrs)	**2nd** (better at 6th day)	**3rd visit** (better at 6th wks)
Date			
BP			
TPR			
Temp			
Uterus contracted/look for PPH			
Dribbling/leaking urine			
Anemia			
Vaginal discharge (after 4			
Pelvic Exam (only if vaginal discharge)			
Breast			
Vitamin A			
Counseling danger signs, EPI, use of ITN given			
Baby Breathing			
Baby Breastfeeding:			
Baby Wt (gm)			
Immunization			
HIV tested			
HIV test result R/NR			
ARV Px for mother			
ARV Px for Newborn			
Feeding option EBF/RF			
Mother referred to c&sup.			
Newborn referred to chronic HIV infant care			
FP Counseled & provided			
Remark			
Action Taken			
Attendant Name and Sig.			

Annex 2: Common Complaints of Pregnancy.

Complaint	What to Tell the Client	Provider Management
Constipation	• Increase your water intake (8 glasses); eat high-fiber foods, and take daily exercise. • Use mild laxatives as a last resort.	• Counsel the client on diet. • Suggest mild laxatives only if the other measures have failed.
Headache	• Take mild pain relievers; *e.g.*, paracetamol. Avoid aspirin. • Inform provider if pain becomes severe. She should attend the health facility	• Determine that the headache is not a *Danger Sign* (see below). • Offer paracetamol (Panadol,) 300 mg every 3-4 hours. • For severe headache or migraine, offer codeine or other related narcotic might be used. ***Remember***: headache can be associated with hypertension.
Backache	• Avoid excessive bending, lifting, or walking without a rest period. • Rock pelvic periodically during the day for relief. • Wear supportive, low-heeled shoes. • If severe, wear a maternity girdle for additional support. • Heat or ice to back for relief, whichever is more comforting.	• Counsel regarding comfort measures. ***Remember***: the symptoms of UTI and onset of labor include backache.
Nausea and vomiting	• Eat small, meals frequently. Keep crackers at bedside and eat before getting out of bed. Eat fruit or drink fruit juice before going to sleep. • Avoid oily, spicy foods. • Get out of bed slowly. • Symptoms should not extend beyond the first three months; if severe and persistent, see your health care provider.	• Counsel about comfort measures. • Provide Vitamin B6, 50 mg, twice daily. • If symptoms are severe, refer for possible hospitalization and intravenous fluids. Medications for management may include: promethazine (Phenergan) -Diphenhydramine (Benadryl) -Other antihistamines • Birth defects have not been associated with the use of these drugs.
Varicosities	• Elevate legs periodically during the day. • Wear support hose (elevate legs before putting on hose for maximum support).	• Prescribe support hose, as necessary. • Refer if varicosities are severe and painful.
Vaginal discharge	• Cleanse genitalia daily. Wear cotton underwear. • Use light sanitary pads if discharge is heavy. • Avoid vaginal douching. • If discharge develops with itching, irritation or unpleasant odor, see the provider as soon as possible for treatment.	• If not infection, counsel for genital hygiene. • With symptoms of infection, treat according to guidelines or refer for treatment.
Leg cramps	• During cramping, straighten leg slowly with the heel pointing and the toes upward or push the heel of the foot against the footboard of the bed or floor, if standing. • Exercise daily to enhance circulation. • Elevate legs periodically throughout the day. • Take calcium tablets daily. Eat calcium rich foods such as dairy and dark green leafy vegetables.	• Prescribe calcium carbonate or calcium lactate tablets.

Annex 3: Nutritional advice and body mass index (BMI) assessment and recommended gain

Eat foods from each of the six major food groups:

1) Fat (sparingly)
2) Milk, yogurt, cheese
3) Vegetable
4) Meat
5) Fruit
6) Bread, cereals, and other carbohydrates

Drink plenty of liquids (especially water—8 to 10 large glasses, or 2 liters), increase fiber, and increase calcium and iron intake. For women whose BMI is normal before pregnancy, maintain a normal weight gain according to BMI. This is usually achieved by a well-balanced diet containing 60-80 gm protein, 2400 or more calories, low sugar and fats, high fiber, milk and other dairy products; higher weight gain may be required. Excessive weight gain or high pre-existing maternal weight is associated with increased risk factor for the infant in terms of birth trauma and delivery by Caesarean section.

BMI Assessment and Recommended Weight Gain

BMI	Assessment of Weight	Recommend Weight Gain
Less than 18.5	Underweight	12.5-18 Kg
18.5-24.0	Normal weight	11.5-16 Kg
24.0 and above	Overweight	7.0 - 11.5 Kg

Annex 4: Birth Preparedness and Complication Readiness

Women and newborns need timely access to skilled care during pregnancy, childbirth, and the postpartum/newborn period. Too often, however, their access to care is impeded by delays—delays in deciding to seek care, delays in reaching care, and delays in receiving care. These delays have many causes, including logistical and financial concerns, unsupportive policies, and gaps in services, as well as inadequate community and family awareness and knowledge about maternal and newborn health issues.
Delays in deciding to seek care may be caused by failure to recognize signs of complications, failure to perceive the severity of illness, ignorance about existing of obstetric services, cost of transport and health care, previous negative experiences with the healthcare system, and transportation difficulties.

Delays in reaching care may be created by the distance from a woman's home to a facility or provider, distance to roads, the condition of roads, and lack of emergency transportation.
Delays in receiving care may result from negative attitudes of providers, shortages of supplies and basic equipments, shortage of healthcare personnel, and lack of knowledge and skills of healthcare providers.
The causes of these delays are common and predictable. However, in order to address them, women and families—and the communities, providers, and facilities that surround them—must be prepared in advance and ready for rapid emergency action.

Birth Preparedness and Complication Readiness is the process of planning for normal birth and anticipating the actions needed in case of an emergency.

Assisting the woman to prepare for birth including:

- Items needed for clean birth
- Identification of skilled attendant for the birth
- Plan for reaching skilled attendant at the time of labor and delivery
- Identification of support people to help with transportation, care of children/household, and accompaniment to health facility
- Complication Readiness Plan in case of emergency: emergency funds, transportation, blood donors, and decision-making
- Counseling/educating the woman and family on danger signs, nutrition, family planning, breastfeeding, HIV/AIDS
- Informing woman and family of existence of emergency funds if available
- Referring to higher levels of care when appropriate
- Honoring the pregnant woman's choices

The provider ensures that he/she:

- Supports the community s/he serves
- Respects community's expectations and works within that setting
- Educates community members about birth preparedness and complication readiness
- Promotes concept of birth preparedness and dispels misconceptions and harmful practices that could prevent birth preparedness and complication readiness
- Help the woman p*repare for birth, values and seeks skilled care during pregnancy, childbirth and the postpartum period.*
- enables recognizes danger signs and implements the Complication.

Readiness plan

- identifies transportation systems and where to go in case of emergency, support persons to accompany and stay with family
- speaks out and acts on behalf of her and her child's health, safety and survival
- knows that community and facility emergency funds are available
- ensures personal savings and how to access it in case of need
- knows who the blood donor is
- chooses skilled attendant and place of birth in antenatal period.

- recognizes normal labor and complications

Danger Signs During Pregnancy

Teach the pregnant woman and her family to report any of the following conditions immediately:

- Vaginal bleeding
- Sudden gush of fluid or leaking of fluid from vagina
- Severe headache not relieved by simple analgesics
- Dizziness and blurring of vision
- Sustained vomiting
- Swelling (hands, face, etc.)
- Loss of fetal movements
- Convulsions
- Premature onset of contractions (before 37 weeks)
- Severe or unusual abdominal pain
- Chills or fever

Educate the mother and her family on signs of labor

Delivery may take place several days or even weeks before or after the date calculated by the health provider as determined from the date of your last menses.

Knowing what labor means will help you know what will happen, this in turn helps you feel comfortable and remain assured during the last days or weeks of the pregnancy.

What happens in this phase?

The fetus begins changing its position in preparation to come into the world. This is the time when we hear the use of the traditional phrase "the baby is down." its head pushes down on the uterus. This may cause you some discomfort or some mild pain. These unpleasant pains may continue for a day or more. You may notice an increased vaginal discharge. If you go to the health facility, the nurse can examine you and inform you about your progress.

Real labor and delivery pains may begin on the same day/night or within one to two weeks. No one can absolutely determine the time of delivery. However, few things can help decide the time of delivery. These are:

1 . The regularity of contractions

Contractions may occur every 15 or 20 minutes and last for about a minute. Within a couple of hours, the intervals between contractions become shorter. These contractions can be easily identified. They begin in the back and become stronger and extend towards the abdomen. The pain is caused by the vaginal muscles contracting in preparation for pushing the fetus out.

2. Bloody discharge or mucus

During pregnancy, thick mucus play the role of a "plug" that closes the cervix. When labor contractions begin, these plugs fall through the vagina, thus they can be seen. This phenomenon may take place before or after the beginning of labor.

3. Leaking of a watery vaginal fluid

The amniotic fluid protects the fetus. The amniotic sac usually ruptures during the last phase of delivery, but it may rupture before that phase. In this case, you should visit your health provider or the health facility.

In addition to these signs, there are other signs that the health provider waits to see. Despite the breaking of the bag of waters, labor contractions may be delayed until the vagina is dilated enough for your baby to pass through. Sometimes, your waters "break," but delivery does not take place soon: days or weeks may elapse before delivery, depending on how ready the vagina is.

Also remember to prepare yourself for delivery.

Fetal movement

Fetal activity is usually of cyclic frequency or pattern and may vary throughout pregnancy. Lack of fetal movement or marked decrease in frequency may be a warning signal of fetal distress; so, you should inform provider immediately.

Health Hazards to Pregnant Women and Infants: Smoking and Alcohol

Smoking should be discontinued during pregnancy. It is important to counsel patients about this and record their compliance. The potentially harmful effects of cigarette smoking during pregnancy include low birth weight, premature labor, miscarriage, stillbirth, neonatal death, birth defects, and increased respiratory problems in neonates. Patient education is important, with counseling or referral to appropriate community groups.

Alcohol use should be discontinued in pregnancy. Alcoholism has been shown to cause fetal mal-development that is commonly referred to as fetal alcohol syndrome. The more alcohol the mother drinks, the more the fetus is at risk of damage. Encourage mother to avoid social drinking.

Avoid Exposure to X-rays and contact with persons with infectious diseases

Warning Signs of Preterm Labor

Infant outcomes are improved when preterm labor is diagnosed and treatment is started early. Educate the mother the signs of preterm labor. These signs include:

- A feeling that the baby is "balling up" which lasts more than 30 seconds and occurs more than four times per hour.
- Contractions or intermittent painslasting more than 30 seconds, and recurring four or more times per hour.
- Menstrual-like sensations, occurring intermittently.

- Change in vaginal discharge, including bleeding.
- Indigestion.

Annex 5: Tetanus Toxoid Immunization Schedule.

Dose	Schedule
TT1	At first contact, or as early as possible during pregnancy
TT2	Four weeks after TT1
TT3	Six months after TT2,
TT4	One year after TT3,
TT5	One years after TT4,

Annex 6: Drug Education and Drug Classification

The following are guidelines for the clinician who prescribes medication during pregnancy or lactation:

- Try to avoid any medication during the first trimester.
- Use single, non-combination, short-acting agents.
- Choose topical (if available) over-the-counter medications.
- Use the lowest effective dosage of the safest known medication.
- Instruct breastfeeding mothers to use a single dose or short acting medication so they can feed again, past the peak blood level to minimize the risk to infants.
- Encourage breastfeeding mothers to watch and see whether the infant seems to have any problems related to any medication the mother may be taking.

Annex 7: Breastfeeding (lactation) Counseling

Counsel the client on infant feeding during the third trimester, using client materials and videos covering the advantages and behaviors of successful breastfeeding and care of the breasts. Review breastfeeding preparation messages at the 36th week of gestation. Breastfeeding is vital for child survival, maternal health, and birth spacing. Introduce or reinforce LAM criteria and optimal breastfeeding practices.

Annex 8: Family Planning Counseling

Introduce client to family planning and its purposes during the second trimester, using health education talks, pamphlets and posters, and videos. During the third trimester, counsel the client regarding all available methods. This will be particularly important for women wanting immediate postnatal IUD insertion or immediate postnatal voluntary surgical contraception. Counseling should continue after delivery until the mother is discharged and provide her chosen method, if appropriate.

LAM Criteria

A woman can use LAM if she answers "No" to ALL of these questions:

- Is your baby 6 months old or older?
- Has your menstrual period returned? (Bleeding in the first 8 weeks postnatally does not count.)
- Is your baby taking other foods or drink or allowing long periods of time (4 or more hours) without breastfeeding, either day or night?

If the woman answers "Yes" to any one of these questions, she cannot rely on LAM for prevention of pregnancy, but she can continue to breastfeed her baby while using a method of contraception that will not interfere with lactation.

Emphasize to the client that the recommended interval for spacing of children is a minimum interval of at least two years.

Birth spacing is vital for maternal health and child survival. Benefits of birth spacing are:

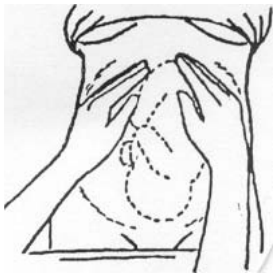
- Gives the mother time to renew nutrient stores.
- Reduces the risk of death and illness of the mother and infant.
- Promotes the health of the entire family by ensuring a healthy mother.
- Saves lives.

Annex 9: Lie and Presentation

Feel for the baby's head and body. By 30-32 weeks, the baby is usually lying with the head down towards the mother's pelvis (vertex presentation). Most babies lie more on one side of the mother than the other.

Look and feel for movement of the baby as shown in the diagrams below:

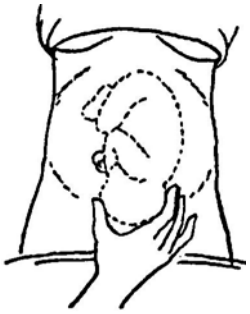
Step 1: Feel what part of the baby is in the upper uterus.



Step 2: Feel for the baby's back.



Step 3: Feel what part of the baby is in the lower uterus.



Step 4: Feel for descent of baby's presenting part.



Annex 10: Pelvic Examination

In preparing to perform the pelvic examination:

- Confirm that the client has recently emptied her bladder.
- Explain to the client what you are going to do and answer questions.
- Layout all instruments and equipment that you will need.
- Ensure that the examination space is private, that the examining table does not face the door; that curtains or a barrier protects the client from exposure.
- Position woman appropriately on examination table with feet in stirrups.
- Drape the client's abdomen and pelvis with a cloth, towel or her own clothing. In all cases, respect her modesty and treat her with dignity.
- Position light for good illumination of the cervix.
- Open instruments or examination pack with instruments.
- Wash your hands, dry them with a clean towel or air-dry, and put on high-level disinfected gloves.

Step 1: Inspection of External Genitalia:

Purpose: to check for any inflammation, discharge, growth or lesions.

Ask the client to separate her legs and look at the external genital structures:

- Mons pubis – presence and distribution of hair; presence of lice or nits.
- Labia majora and minora – presence, intact; color; presence of discharge, mass (growth), or discoloration.
- Bartholin glands opening – normally not visible; abnormal finding include, presence of redness or discharge.
- Perineum – smooth and unbroken, presence of mediolateral episiotomy scar; presence of fistula or abnormal mass.

Gently separate the labia major and labia minora and look at the deeper external structures (tell the client you will be touching her before your touch her):

- Clitoris – presence, size; abnormal masses.
- Hymen – presence or absence; if present, open, closed, presence of a mass.
- Para-urethral gland openings – normally invisible; if visible, look for redness, discharge, or masses.

- Urethral opening – color without discharge; abnormal findings include redness, discharge, or masses.
- Vaginal opening – visible; abnormal findings include protrusion of the vaginal walls (rectocele, cystocele).

Step 2: Inspection of Internal Structures:

Purpose: to inspect vagina and cervix for inflammation and/or discharge, growths or lesions.

Inform the client of what you are going to do next.

Separate the labia minora and gently insert a closed speculum obliquely into the vaginal opening, directing it downwards until you meet gentle resistance. Gently open the blades, lock them in position, and look at:

- Cervix – shape, color; if the ectocervix is smooth with a colorless discharge; abnormal finding include discharge, masses, irregular borders around the cervical opening; blood of unknown origin, ulceration.
- Cervical os – for presence of masses protruding from the opening (abnormal).
- Vaginal mucosa – intact, color, without odor; presence of discharge, blood of unknown origin, redness, fistula, areas of white coloration, ulcerations.

Take specimens for Pap smear and/or culture, if indicated and available (gonorrhea, chlamydia, wet mount).

When finished with this step, loosen the screws to allow the spreading of the speculum. Gently remove the speculum obliquely, rotating it to a partially open position to inspect the vaginal mucosa while withdrawing the speculum. If abnormal discharge was present, put a few drops of KOH (potassium hydroxide) solution on the accumulated discharge in the lower blade to determine the presence of a fishy odor consistent with Bacterial vaginosis.

Place the speculum in a container with decontamination solution.

Step 3: Palpation of External Genitalia

Gently separate labia majora and minora with the first two fingers of one hand, gently insert the forefinger of the examining hand at the opening of the vagina about one inch, press the anterior vaginal wall and draw it toward the vaginal opening. Look for presence of discharge (abnormal).

Rotate the examining hand downward and place the forefinger at the 4 o'clock position with the thumb on the same area on the vulva. Palpate the right Bartholin's gland. Repeat this maneuver at the 8 o'clock position to palpate the left Bartholin's gland. Feel for enlargement, mass, or painful response by client.

Tell the client that you will insert your fingers deeper to feel her internal organs.

Step 4: Palpation of Internal Structures

Insert the first two fingers of the examining hand, until resistance is felt. Place the other hand on the client's abdomen just above the pubis.

- Feel the cervix – consistency, smoothness, condition of the cervical opening, and presence of pain when gently moved.
- Gently palpate the anterior and posterior fornices to examine the uterus. Feel for shape, size, smoothness of surface, consistency (firm or soft), and position (anteverted/retroverted/midposition).
- Gently palpate the right and left fornices to examine the ovaries and tubes. Feel for masses, tenderness.

Use the hand you placed on the client's abdomen to gently push the internal organs down toward the fingers in the vagina to help feel the organs completely.

Assess the Pelvic Muscles

- Withdraw fingers from the vagina halfway and ask the client to squeeze your fingers. Feel the strength of her pelvic muscles during this part of the examination.
- Rotate the vaginal hand palm-down and separate the fingers lightly, asking the client to cough or bear down. Look for bulging of the anterior and/or posterior vaginal walls, or loss of urine.

Withdraw the fingers completely from the vagina and look at the gloves for any blood or abnormal discharge that may have collected. Evaluate any abnormal discharge.

Step 5: Recto-Vaginal Palpation

After palpation of the internal organs, inspect the anal opening, and palpate the anal sphincter and the rectum.

- Inspect the anal opening: it should be free of blood, without tissue protruding. Abnormal findings include red, swollen mass (hemorrhoids) or brownish mass (prolapse of the rectum).
- Inform the client of what you are going to do next. Ask her to bear down while you gently insert your index finger into the anal opening. Note the tone of the sphincter (tight). Confirm a retroverted uterus that was felt during the vaginal examination by feeling it through the anterior wall of the rectum. Feel all surfaces of the rectal wall for masses.
- Gently withdraw your finger and discard the glove.
- Wipe the client's genitalia and assist her to a sitting position. Share your findings with her.
- Document your findings immediately in the client record.

Annex 11: Indications for Ultrasound

Ultrasound is an excellent means of assessing fetal well being; however, it can be inappropriately used, leading to excessive reliance on technology and increasing health care costs. Consequently, it is crucial to know the indications for ultrasound, its true value and limitations.

- Estimated gestational age for clients with uncertain dates of LMP.
- Evaluation of fetal growth.
- Vaginal bleeding of undetermined etiology in pregnancy.
- Determination of fetal presentation.
- Suspected multiple gestation.
- A support to amniocentesis.
- Significant uterine size and clinical dates discrepancy.
- Pelvic mass.
- Suspected Hydatidiform mole.
- Suspected ectopic pregnancy.
- A support to special procedures; *e.g.*, fetoscopy, chorionic villus sampling, cervical cerclage placement.
- Suspected fetal death.
- Suspected uterine abnormality.
- Localization of IUD.
- Surveillance of ovarian follicle development.
- Biophysical evaluation for fetal well being.
- Observation of intrapartum events; *e.g.*, extraction of second twin.
- Manual removal of placenta.
- Suspected polyhydramnios or oligohydramnios.
- Suspected abruptio placenta.
- A support to external cephalic version.
- Estimation of fetal weight.
- Abnormal serum alpha-fetoprotein value.
- Follow-up observation of identified fetal anomaly.
- Follow-up evaluation of placenta location for identified placenta previa.
- History of previous congenital anomaly.
- Serial evaluation of fetal growth in multiple gestation.
- Evaluation of fetal condition in late registrants for antenatal care.

[3] Varney, Helen, CNM, MSN, FACNM (1997), *Varney's Midwifery*. Jones and Bartlett Publishers, Boston. 307, Tables 19-16

Annex 12: Drug Classification Table

Drugs by category. *Refer to the Drug Classification Scale in table 1* when using drugs in pregnancy and also refer to the Ethiopian National Drug Formulary in prescribing drugs in pregnancy

Table 1 classification of drug safety

Drug category	Risk in pregnancy
A	Controlled studies show no risk Adequate, well-controlled studies in pregnant women have failed to demonstrate risk to the fetus
B	No evidence of risk in humans Either animal findings show risk (but human findings do not) or, if no adequate human studies have been done, animal findings are negative.
C	Risk cannot be ruled out Human studies are lacking and animal studies are either positive for fetal risk or lacking as well. However, potential benefits may justify the potential risk.
D	Positive evidence of risk Investigational or post marketing data show risk to fetus. Nevertheless, potential benefits may outweigh the risk.
X	Contraindicated in pregnancy Studies in animals or humans, or investigational or post marketing reports have shown fetal risk which clearly outweighs any possible benefit to the patient.

Management of labor and Delivery

Definition of normal labor and delivery:
Labor is considered normal when the following conditions are fulfilled.

- Parturient without any risk (eg. Pre-eclampsia, Previous scar),
- Labor should start spontaneously and at term,
- Fetal presentation must be by vertex,
- Delivery should be by spontaneous vertex delivery ,
- All stages of labor are lasting normal duration
- The neonate is alive, normal and the woman has uncomplicated pueperium

N.B. Team approach is important in caring for laboring mothers, and all abnormal information should reach to the most senior personnel in charge of the labor ward activity.

Diagnostic criteria

- Pain full contractions at least 2 contractions in 10minute
- Rupture of the membranes or
- Cervical dilatation after 100% effacement.

N.B. Show should be disregarded if there is a membrane rupture or digital vaginal examination with in 48 hours prior to show.

Admission Criteria

1. All women with diagnosis of labor (latent and active) with known risk or ruptured membranes
2. For a woman without known risk and intact membrane - cervix dilation is ≥ 4 cms with complete effacement

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(preparation issues) and laboratory investigations
- Inform the client/parturient about her conditions and regularly update her.
- After review of ANC record and present evaluation, plan a scheme of management during labor and immediate postpartum depending on risk
- All admission information should be transferred to a partograph (page 25).
- Laboratory tests:-
    - Blood group and Rh,
    - Hematocrite

- Urine analysis
- VDRL (if no previous documentation or no ANC)
- HIV counseling and testing including repeat tests for those who were sero-negative for HIV. If serology for HIV is positive refer to section on PMTCT guide and administer ARV prophylaxis
- For those with ANC record, update Hematocrite and urine analysis

- Shower : if parturient is mobile and wishes
- Clothing : loose hospital gown

Management during 1st stage

All observations and findings should be recorded on the partograph.

Maternal wellbeing monitoring

(a) Vital signs: pulse- every ½ hourly
Temperature and BP - every 4 hourly or more frequently if indicated

(b) Maternal position - avoid supine position
- Should not be confined to bed unless contraindicated (e.g. sedated patient, for frequent monitoring, high head and ruptured membranes)
- Can assume any position comfortable to her (Left Lateral Position, Right Lateral Position, sitting unless indicated.)
- can encourage the mother to walk around rather than confine her to the delivery couch or bed
- Respect choice of position for delivery

(c) 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)

(a) 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 through delivery

(d) Pain management - provide continuous emotional support
- Inform laboring mothers about the procedures to which they will be subjected during labor and delivery
- The selected analgesia should be simple to administer, safe to the mother and fetus, no undue effect on progress of labor, and available in the unit.
- Timing, route, dosage and frequency of administration should be based on the anticipated interval of time till delivery

- No pharmacologic method of pain control(refer to Focused ANC)
- Avoid combination of antagonist opioids
- A small dose given more frequently is preferable to a large one administered less often
- Whenever one uses opioids during labor,(4-9 centimeter) one should be prepared to treat neonatal respiratory depression which includes ventilation, oxygenation, gentle stimulation and judicious use of the opioid antagonist naloxone,

1) Opioids alone or in combination with phenothiazines

- Pethidine injection: 50 mg im initially. Assess after ½ hr and if not adequate and side effects not troublesome, repeat 50 mg . Onset of action within 10 -20 min and lasts for 2-4 hours
- Pethidine injection: 25 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

2) Lumbar Epidural Analgesia if available

Fetal Well - being monitoring

(a) FHR - use Pinnard stethoscope for a women with no known problem

- Immediately after a contraction for 1 min
- every 30 min for a parturient without any risk and every 15 min for with a risk condition

Continuous electronic FHR monitoring for Known problem (external/internal)

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 pattern (NRFHRP)

(b) Status of liquor for meconium

Grades of meconium

Grade I - good volume of liquor, lightly meconium stained
Grade II - Reasonable volume with a heavy suspension of meconium
Grade III - Thick meconium which is undiluted
NB a newly appearing meconium is quite significant

Monitoring of progress of labor

1. **Uterine contraction** - frequency in 10 minutes, duration and intensity of each contraction determined by palpation and or toco-dynamometer, Monitored every 1 hr. for latent phase and every 30 min. for active phase

2. **Descent of fetal head**: should be done by abdominal palpation before vaginal examination

3. **Vaginal examination** to see:
   - Rate of cervical dilation at least 1 cm./hr.
   - Station, position, degree of moulding

The frequency of vaginal examination is every 4 hrs unless the following condition occur

- After spontaneous rupture of membranes
- When there is abnormal FHR pattern
- Before giving analgasia
- Symptoms suggesting 2nd stage (to confirm the diagnosis)

Management during 2nd stage

Definition : Second stage is the time from full dilation of the cervix to delivery of the (last) fetus.

Diagnosis of prolonged 2nd stage

Nullipara - 2 hrs without or 3hrs with epidural anesthesia
Multipara- 1 hrs without or 2hrs with epidural anesthesia

Maternal care and wellbeing evaluation in second stage of labor

- Vital signs : continued as 1st stage but more frequently
  - Bp Q 30 min (if indicated more frequently)
  - PR, temp., RR Q 1hr
- Evaluate general condition fatigue , pain, physical depletion and state of hydration
- Evaluate the presence of the urge to push and / or effort
- Avoid early push; it should start spontaneously.
- LLP till head is visible and preparation
- The woman should be encouraged to empty her Bladder before delivery

FHR Monitoring in second stage of labor

- Every 15 min for low-risk fetus
- Every 5 min for high-risk fetus or continuous electronic monitoring

Labor progress evaluation in second stage of labor

- Evaluate the degree of descent every 1 hr.

Management of Prolonged 2nd stage

- Reevaluate maternal and fetal condition
- Rule out inefficient uterine contraction and maternal expulsive effort, malposition, malpresentation and CPD
- Act accordingly

Preparation for delivery

General

- Notify nursing staff that delivery is imminent.
- Move the woman to the delivery room if its is separate.
- 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
- Position the mother to semi-sitting (back up and leg down)
- Attendant should be dressed and gloved appropriately (gloves, gowns, apron, masks, caps, eye protection)
- Sterile draping in such a way that only the immediate area about the vulva is exposed.
- Perineal care:- cleaning of the vulva and perineum with antiseptic (downward and away from the introitus). If pieces of faeces get expelled, wipe them downward.

Assistance of spontaneous delivery

Goal: - Reduction of maternal trauma
Prevention of fetal injury
Initial support of the newborn

Episiotomy: individualization is important. Routine performance of episiotomy should be avoided

Do episiotomy when there is

- Threat for a perineal tear
- perineal resistance for fetal head descent
- fetal/maternal distress to expedited delivery

Timing of episiotomy – performed when fetal head has distended the vulva 2-3cms unless early delivery is indicated.

Types-median or mediolateral

Use analgesia/anesthesia for making episiotomy and repair.

Delivery of the Head

- Prevent rapid delivery and assist extension of the head.
- Assist using modified Ritgen's maneuver if extension does not occur with ease i.e., hand protected with sterile towel placed on the perineum and the fetal chin palpated and pressed up ward gently effecting extension.
- Check for cord around the neck
  - disentangle it from around the head
- or clamp at two sites and cut in between if not reducible.After delivery of the head, wipe the mouth, oro-pharynx first (routine suctioning not recommended).

Complete delivery of the rest of the body

: After securing complete delivery, wipe the newborn's body dry with clean towels , remove the wet towel and wrap them with a dry towel.

Cord clamping:- 4-5 cm from fetal umbilicus

- Put fetus at the level the of the introitus for 3 min before claming (unless preterm, small, with Rh iso-imunization and HIV positive women or of unkown status)
- Take cord blood if indicated.

(vii) Immediate newborn care Refer to Section in Newborn care in page 51

Management of third stage of labor

Definition:

Third stage of labor:

It is the time interval between the deliveries of the fetus up to the expulsion of the placenta

Active management of third stage of labor (AMTSL):

AMTSL is the administration of uterotonic agents (preferentially oxytocin) followed by controlled cord traction and uterine massage (after the delivery of the placenta).

Who should get AMTSL?

Every woman who come 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 short
- Less maternal blood loss
- Less need for oxytocin in post partum
- Less anemia in the post partum

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 adverse events
- Misoprostol has the advantage that it is cheap and stable at room temperature. It can be distributed through community-based distribution systems.
- Uterotonics require proper storage:
    - Ergometrine: 2-8°C and protect from light and from freezing.
    - Misoprostol: room temperature, in a closed container.
    - Oxytocin: 15-30°C, protect from freezing

Active Management of the Third Stage of Labor to Prevent Post-Partum Hemorrhage

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 is preferred over other uterotonic drugs because it is effective 2-3 minutes after injection, has minimal side effects and can be used in all women.
- If oxytocin is not available, other uterotonics can be used such as: ergometrine 0.2 mg IM, syntometrine (1 ampoule) IM

  or

- misoprostol 400-600 mcg orally. Oral administration of misoprostol should be reserved for situations when safe administration and/or appropriate storage conditions for injectable oxytocin and ergot alkaloids are not possible.

Steps in 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 await a strong uterine contraction (2-3 minutes).
- With the strong uterine contraction, encourage the mother to push and very gently pull downward on the cord to deliver the placenta. Continue to apply counter-pressure to the uterus.
- If the placenta does not descend during 30-40 seconds of controlled cord traction do not continue to pull on the cord:
- Gently hold the cord and 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. Slowly pull to complete the delivery.

- If the membranes tear, gently examine the upper vagina and cervix wearing sterile/disinfected gloves and use a sponge forceps to remove any pieces of membranes that are present.
- Look carefully at the placenta to be sure none of it is missing. If a portion of the maternal surface is missing or there are torn membranes with vessels, suspect retained placenta fragments and take appropriate action.

Uterine massage

- Immediately massage the fundus of the uterus until the uterus is well contracted.
- Palpate for a contracted uterus every 15 minutes and repeat uterine massage as needed during the first 2 hours of the postpartum period.
- Ensure that the uterus does not become relaxed (soft) after you stop uterine massage.

CARE FOR THE NEWBORN BABY AT THE TIME OF BIRTH

The epidemiological profiles of newborn health as it is presented in the global situational analysis of the health of newborns denote that most neonates die mainly from three causes:

1. Neonatal infection: Sepsis, Tetanus, Diarrhea and pneumonia
2. preterm delivery/ Low birth weight
3. Birth Asphyxia

In Ethiopia, infection is considered to be the prime cause of newborn death. It is responsible for about 47% of the neonatal deaths (sepsis 37%, Diarrhea 3%, and tetanus 7%) next to infection are Asphyxia 23% and preterm/low birth weight 17%.

When do newborn die?

- Fifty and seventy five percent of the newborn mortality take place in the first 24 hours and first week after birth respectively. Hence, among the different neonatal age groups, special attention should be provided to those babies who are less than one week of life, particularly at the time of birth.
- Provision of Essential Newborn Care and Neonatal Basic Life Support to all babies immediately after birth is the corner stone of neonatal care that will certainly have a significant impact on neonatal outcomes. Therefore, Early recognition of signs of fetal hypoxia by clinical monitoring and prompt measures to deliver the necessary life support to newborns with speed and safety are of paramount importance and should be a mandatory practice in all delivery rooms of all hospitals and health centers.

In principle, to salvage the life of thousands of newborns dying every year in Ethiopia, we should mainly focus on the triads of activities that should be carried out routinely:

1. Ensure the provision of Essential newborn care to all babies
2. Early detection and management of common newborn problems particularly Birth asphyxia, and neonatal infection.
3. provision of extra care and creation of an environment of thermal comfort to all preterm and low birth weight babies

Essential Newborn Care:

90% of newly born babies make the transition from intrauterine to extra-uterine life without difficulty. They require little to no assistance to begin spontaneous and regular respirations. Approximately 10% of newborns require some assistance to begin breathing at birth and only about 1% need extensive resuscitative measures to survive.

Therefore, most babies breath and cry at birth with only the provision of essential newborn care. The care you give immediately after birth is simple but important.

Remember that the baby has just come out from the most comfortable uterine environment. It was warm and quiet in the uterus and the amniotic fluid and walls of the uterus gently touched the baby. You too should be gentle, observant and vigilant with the baby when you handle them and also keep them warm always.

Adequate preparation for resuscitation

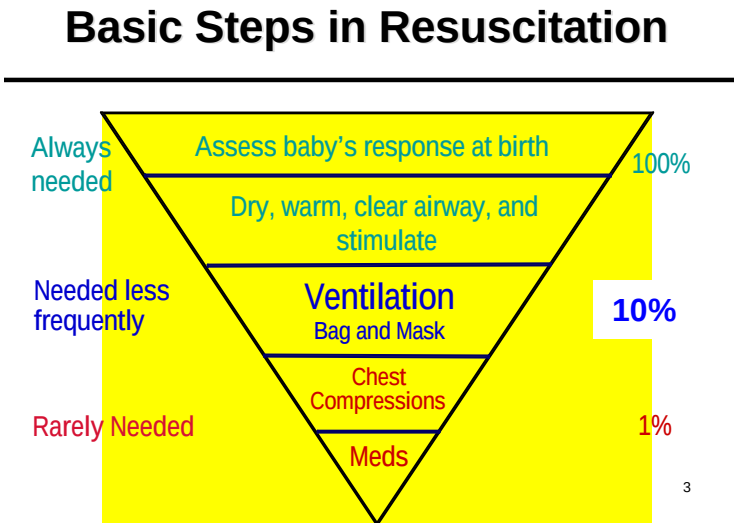
Personnel:

For normal term deliveries: Any one attending delivery should be trained on ENC and Neonatal Resuscitation. Therefore, a midwife or nurse should be capable of at least providing Bag and mask ventilation suffice for normal term delivery. For multiple births, multiple trained health workers and multiple set of equipments are necessary.

When asphyxia is anticipated: Trained health workers capable of intubating the baby (pediatrician, should attend the delivery. If pediatrician is not present, the obstetrician, Anesthetist or general practitioner who is trained to intubate a newborn baby should attend the delivery in addition to trained midwife or nurse.

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.



Essential Equipments

All equipments necessary for Essential Newborn care and effective resuscitation must be available in every delivery room and be fully operational.
The following equipments and drugs should be available and checked for proper function before delivery.

- Radiant warmer/room heater, sterile sheets
- Suction catheter number 5,8,10, Fr
- Suction machine/Delee mucus trap
- Infant resuscitation bag. If possible bag with pressure release valve and reservoir. (Self inflating bag have become popular and is preferred).
- Face mask size 00 and 01
- Oxygen with flow meter and tubing
- Laryngoscope with blade No 0 and 1
- Endotracheal tube size: 2.5, 3.0, 3.5, and 4.0 mm with connectors
- Scissors, adhesive tape, gloves and stethoscope
- Syringe: 2cc, 5cc,10cc, 20cc
- Needles No 24 and 21
- Alcohol and Iodine
- Umbilical catheters: No5 and 8 FR
- Feeding tubes: No 5 and 8 FR
- Iv cannula: 24 gauge and three way stop cocks

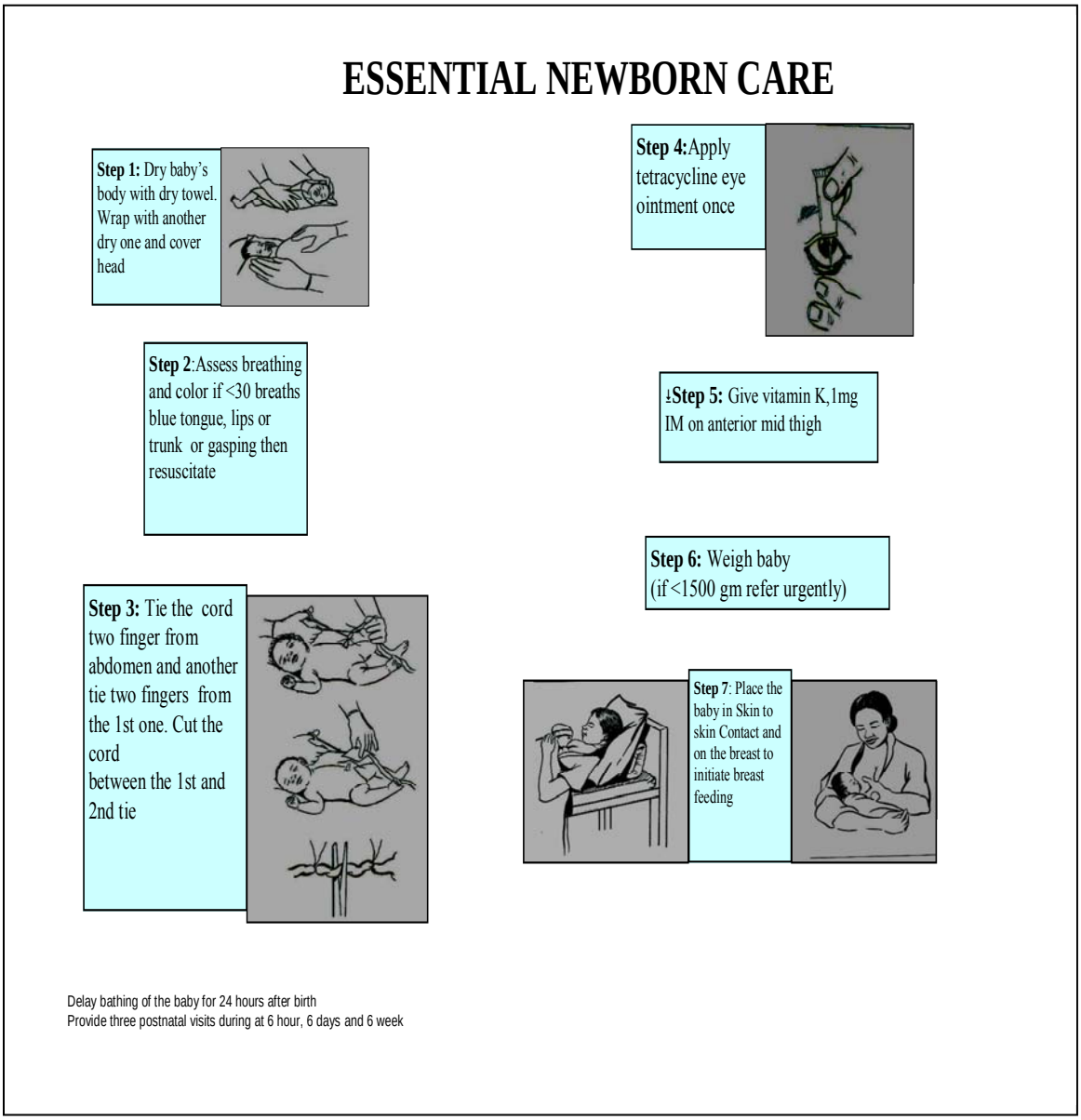
In addition, specific equipments may be required for specific situation as mentioned earlier.

Drugs to be used during resuscitation

Currently the use of drugs during neonatal resuscitation, particularly, sodium bicarbonate and epinephrine are not routinely recommended. But in desperate situation, one may consider the following drugs as a last resort.

- Epinephrine1:1000
- Sodium bicarbonate 7.5%
- Distilled water
- 10% Dextrose
- Normal saline
- Nalaxone and 10% calcium gluconate

Steps of Essential Newborn Care



Steps of Essential Newborn Care

- Deliver baby onto mothers abdomen
- Dry baby with a warm and clean towel
- Remove the wet towel and wrap the baby with dry towel and for preterm babies you wrap them with double towels
- Assess the baby's breathing while drying
  - *make sure that there is not second baby*
- Clamp and cut the umbilical cord
- Put the baby between mothers breasts for skin-to skin-care
- Cover mother and baby with warm cloth
- Place and identity label on baby
- Put a hat on the baby's head and put socks also
- Start breastfeeding within one hour of life.

Detail activities of Essential Newborn Care

- Make sure the newborn care corner is pre-warmed using a room heater before the baby is born
- Wash your hand thoroughly with soap for at least two minutes and always put gloves.
- Hold him with the dry towel and put him on the mother abdomen while the mother is lying on supine and dry quickly the whole body including the head. While drying him or her you are also providing tactile stimulation to initiate breathing. Most of the babies cry while drying them. Remove the wet towel and wrap them with another dry towel. This procedure should not take more than 20 seconds.
- Routine suction is not required in every baby; all what you need to do is to clean the mouth and the nose with clean gauze. But, if amniotic fluid is Meconium stained, proper suctioning using a suction machine or a Delee mucus trap is required. if you have to do suctioning, always first suction the mouth then the nose and do it only 2-3 times from each side.
- After drying them thoroughly, carefully observe them for breathing. If baby doesn't cry or breathing irregularly or gasping, immediately start **Basic Life Support or Resuscitation.**
- If every thing goes fine, Cut and secure the umbilical cord properly. Just two fingers away from the baby's abdomen tie the cord with two threads on the same area, make a double knot and cut it. Do not put any thing on the cord, leave it dry and clean.
- Shortly after breastfeeding and within 1 hour of age, give the newborn eye care with an anti microbial medication. Eye care protects the baby from serious eye infection which can result in blindness or even death. Put two drops of Tetracycline eye drops to the lower lids of both eyes

Steps for giving eye care:

1. Wash your hands/ put gloves
2. Tetracycline 1% eye ointment/
3. Hold one eye open and apply a rice grain size of ointment along the inside of the lower eyelid. Make sure not to let the medicine dropper or tube touch the baby's eye or anything else.
4. Repeat this step to put medication into the other eye.

- Give Vit. K1 mg IM in the anterior –lateral aspect of the thigh. Use any disinfection available with you to clean the area before and after you give the injection.
- Put the baby skin to skin contact with the mother and start **exclusive breastfeeding within the first one hour of life.**

IF RESUSCITATION IS NECESSARY:

-
- 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 him. 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 over head heat source .

Resuscitation of Asphyxiated newborn

- If the baby is not breathing, gasping or breathing < 30/minute and if drying the baby does not stimulate him to breathe, the first step of resuscitation should be started immediately.

  - CALL FOR HELP!
  - Cut cord quickly, transfer to a firm, warm surface [under an over head heater source]
  - Inform the mother that baby has difficulty breathing and you will help the baby to breathe
  - *Start newborn resuscitation*



Opening the airway

POSITIONING

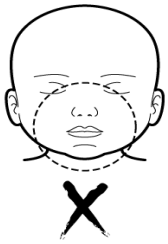
- Lay the baby on its back on a hard warm surface
- Position the baby's head so that is slightly extended
- Place a folded piece of cloth under the baby's shoulders

SUCTION

Routine suctioning may not be required. Do it when there is Meconium stained liquor

- Clear the mouth first and then the nose.
  - gently introduce the suction tube into the mouth 5 cms from the lips
  - suck while withdrawing the tube
  - Then introduce the suction tube 3 cms into each nostril
  - suck while withdrawing the tube
  - Repeat mouth and nose suction if needed , but no more than twice.
- Spend no longer than 20 seconds doing suction

Ventilating the baby



If the baby is still not breathing, VENTILATE.

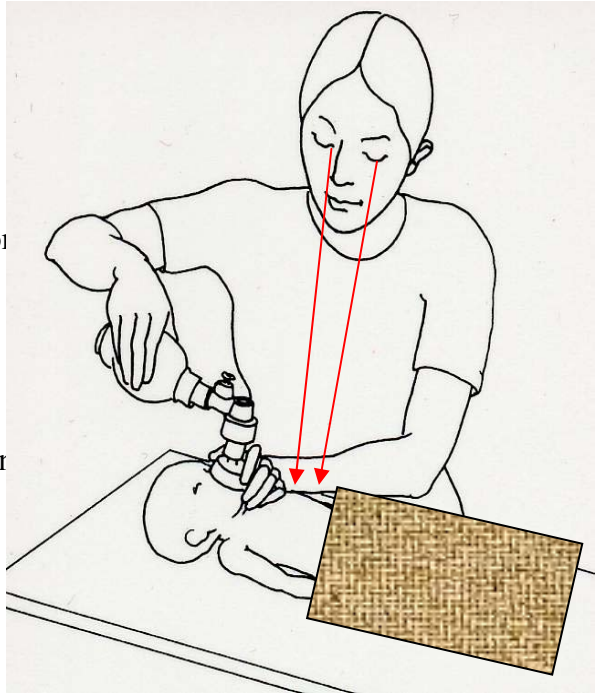
Use the CORRECT size face mask
Fitting a face mask:

- A face mask that is too LARGE
  - Covers the eyes
  - Extends over the tip of the chin



- A face mask that is too SMALL
  - Does not cover the nose
  - Does not cover the mouth effectively

- A correct sized mask covers:
  - The nose
  - The mouth
  - The tip of the chin



How to ventilate

- Squeeze bag with 2 fingers and a thumb or whole hand, 2-3 times
- Observe for rise of chest.
- IF CHEST IS NOT RISING:
  - reposition the head
  - check mask seal
- Squeeze bag harder with whole hand when stiff lung

- Once good seal and chest rising, ventilate at 40 squeezes per minute
- Observe the chest while ventilating:
  - is it moving with the ventilation?
  - Is it moving symmetrically
  - is baby breathing spontaneously?
- Observe for color change (the baby who was blue becomes pink

When to stop ventilating?

- If breathing or crying: STOP VENTILATING
  - count breaths per minute
  - look for chest in-drawing

- If breathing >30/min, and regular:
  - Stop ventilating
  - put the baby in skin-to-skin contact on mother's chest and continue care
  - monitor every 15 minutes for breathing and warmth
  - tell the mother the baby will probably be well

- Encourage the mother to start breastfeeding as soon as possible.

When to continue ventilating?

If the baby:

  - is breathing <30/min,
  - is gasping/breathing irregularly
  - has severe chest in-drawing

- ARRANGE FOR IMMEDIATE REFERRAL to a pediatrician
- Explain to the mother what happened, that her baby needs help with breathing
- Ventilate during the referral
- Record the event on a referral form and labour record.
- If the baby is NOT breathing (stop ventilating at 20 minutes).

APGAR SCORE

APGAR score is not used to initiate or make decision about resuscitative measures. However, it is useful for assessing the effectiveness of resuscitation efforts.

Table 2 Apgar Score

Sign		Scores		
		0	1	2
1.	Heart rate	Absent	Below 100 beats per minute	More than 100 beat per minute
2.	Respiratory effort	Absent	Slow (irregular)	Good, baby crying
3.	Muscle tone	Limp	Some flexion of extremities	Active motion
4.	Reflex	No response	Grimace	Cough or sneeze
5.	Color	**Total body Blue/pale**	**Pink body blue extremities**	**All pink**

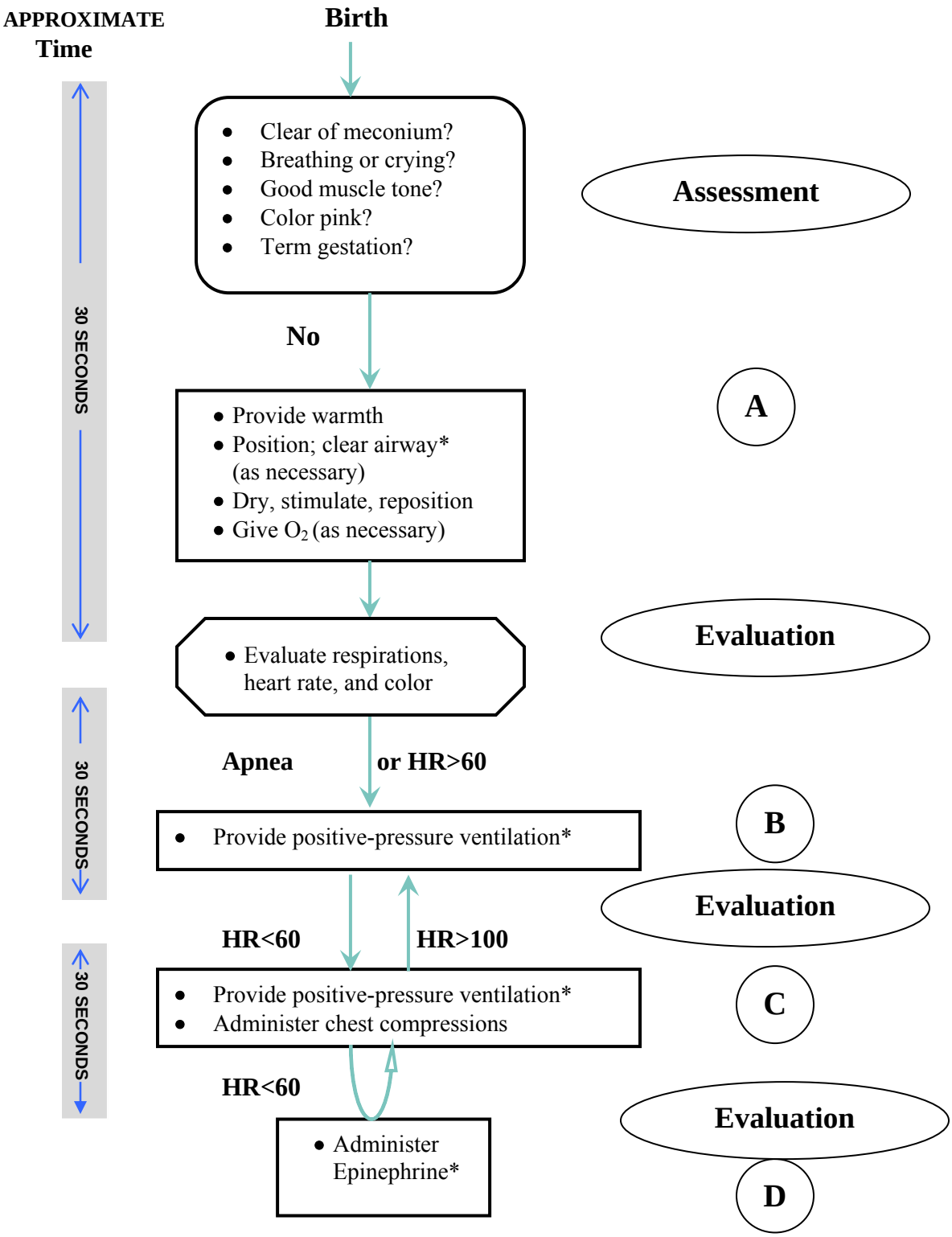
One minute Apgar score, generally correlates with umbilical cord blood PH and is an index of intra-partum asphyxia. Normal Apgar score is >7 out of ten and babies with a score of 0 to 4 have been shown to have significant acidosis and higher Pco_2 value than those with normal Apgar score.

Beyond one minute, APGAR score reflects the neonates changing condition and adequacy of the resuscitative efforts. When 5 minute Apgar score is < 7 additional scores should be obtained every 5 minutes up to 20 minutes of age unless two successive scores are ≥ 8.

Care after resuscitation

- Place baby in skin-to-skin contact with mother
- Keep the baby warm
- Monitor every 15 minutes for the first 3 hours and if baby remains ok, monitor every one hour for 24 hours.
- Start breastfeeding as soon as possible
- If breast feeding could not be started because of medical reasons for more than one hour , give glucose 10%,2ml/kg stat and accordingly if BF is to be delayed consider maintenance IVF therapy
- Discuss what has happened with the parents - be positive!
- Do not separate the mother and baby unless the baby has more difficulty breathing

Steps of evaluation of a newborn baby immediately after birth



❖ **Endocracheal intubation may be considered at several steps.**

DETAILS OF ROUTINE CARE OF THE NEWBORN BABY

The postnatal environment

- Ensure the mother and baby is in a warm room, which is not less than 25 C with no draughts.
- Keep the baby in the same room with the mother, in her bed or within easy reach.
- Provide bed nets for the mother and baby to sleep under especially if there are no screens at the doors or windows. This will protect them against mosquitos and other insects.

Breastfeeding care

- Support exclusive breastfeeding on demand day and night, at least 8-10 times a day
- Ask the mother to get help if there is a breastfeeding difficulty.
- Assess breastfeeding in EVERY baby before planning for discharge. If the mother reports a breastfeeding difficulty, assess breastfeeding and help her with attachment and positioning
- DO NOT discharge the baby if breastfeeding is not yet established.

Keep the baby warm

- Within the first hours If skin-to-skin contact NOT possible:
  - wrap the baby in a clean dry warm cloth
  - place in a cot, cover with a blanket.
  - Use a radiant warmer
- The first day and later
  - Dress baby
  - Wrap in soft dry clean cloth, cover head with hat
  - Ensure baby is dressed or wrapped and covered with a blanket
  - Assess warmth every 4 hours by touching baby's feet;
  - If feet cold skin-to-skin contact + extra blanket and reassess
  - Keep the room warm.

If room not warm cover baby with a blanket or use skin-to-skin

- At home
  - One more layer of clothes than children or adults
  - Keep room warm for baby
  - During the day, dress or wrap baby
  - At night let baby sleep with mother or close for breastfeeding

Giving cord care

Wash hands before and after cord care

- Put nothing on the stump
- Fold diaper below stump or umbilical tie
- Keep stump loosely covered with clean clothes
- If the stump is wet, wash with clean water and soap, dry with clean cloth.
- If umbilicus is red or draining pus or blood, reassess the bay and manage accordingly

Hygiene

- Wash or bathe a baby in a WARM, draught free room after 24 hours of life
- Wash the face, neck, underarms DAILY
- Wash the buttocks when soiled. Dry thoroughly
- Bath when necessary:
  - Use warm water for bathing
  - Thoroughly dry the baby, dress and cover after the bath
- Use cloth on baby's bottom to collect stool. Dispose as for woman's pads. WASH HANDS
- DO NOT bath a baby before 24 hours of age

DANGER SIGNS IN NEWBORNS

Neonates often present with non-specific symptoms and signs which indicate severe illness. These signs might be present at or after delivery, or in a newborn presenting to hospital, or develop during hospital admission. Initial management of the neonate presenting with these signs is aimed at stabilizing the child and preventing deterioration. Signs include:

- Unable to breastfeed (Unable to suck or sucking poorly)
- Convulsions
- Drowsy or unconscious
- apnea (cessation of breathing for >20 secs)
- Breathing ≤ 30 or ≥ 60 breaths per minute, grunting, severe chest in drawing, blue tongue & lips, or gasping
- Grunting
- Severe chest in drawing
- Central cyanosis
- Feels cold to touch or axillary temperature < 35°C
- Feels hot to touch or axillary temperature ≥ 37.5°C
- Red swollen eyelids and pus discharge from the eyes
- Jaundice /yellow skin — at age < 24 hours or > 2 weeks
  - — Involving soles and palms
- Pallor, bleeding from any site
- Repeated Vomiting, swollen abdomen, no stool after 24 hour

EMERGENCY MANAGEMENT of danger signs:

all babies with danger and unable to feed should be put on daily maintenance fluid therapy

- Give oxygen by nasal prongs or nasal catheter if the young infant is cyanosed or in severe respiratory distress.
- Give bag and mask ventilation , with oxygen (or room air if oxygen is not available) if respiratory rate too slow (<20).
- If drowsy, unconscious or convulsing, check blood glucose.
- If glucose <20 mg/100 ml), give glucose IV. 10% ,2ml/kg
- If glucose 20–40 mg/100 ml), feed immediately and increase Feeding frequency.
- If you cannot check blood glucose quickly, assume hypoglycemia and give glucose IV. If you cannot insert an IV drip, give expressed breast milk or glucose through a nasogastric tube.
- if convulsing Give Phenobarbital 15mg/kg
- Give vitamin K (if not given before).
- After doing all these , refer the baby to pediatrician or any available child health clinician in the hospital
-

Signs of Serious bacterial infection

Risk factors for serious bacterial infections are:

- Maternal fever (temperature >37.9 °C before delivery or during labour)
- Membranes ruptured more than 24 hours before delivery
- Foul smelling amniotic fluid
- All of the DANGER SIGNS are signs of serious bacterial infection, but there are
- others:
- Deep jaundice
- Severe abdominal distension
- Localizing signs of infection are:
- Signs of septic arthritis : Painful joints, joint swelling, reduced movement, and irritability if these parts are handled
- Umbilical redness extending to the periumbilical
- skin orumbilicus draining pus.
- Bulging fontanelle

A newborn baby with one sign of serious bacterial infection should be referred to a pediatrician or any available child health clinician in the hospital for further assessment and management

Prevention of neonatal infections

Many early neonatal infections can be prevented by:

- Ensuring clean and safe delivery always ;Good basic hygiene and cleanliness during delivery of the baby
- Make sure the delivery room is clean and delivery equipments are sterile or at least clean
- Special attention to cord care and Eye care
- Many late neonatal infections are acquired in hospitals. These can be prevented by: Exclusive breastfeeding and
- Strict procedures for hand washing for all staff and for families before and After handling babies

Fluid management

Encourage the mother to breastfeed frequently to prevent hypoglycemia. If Unable to feed, give expressed breast milk by nasogastric tube.

- Withhold oral feeding if there is bowel obstruction, necrotizing enterocolitis or the feeds are not tolerated, e.g. indicated by increasing abdominal distension or vomiting everything.
- Withhold oral feeding in the acute phase in babies who are lethargic or Unconscious, or having frequent convulsions or in babies very low weight or very preterm babies

If IV fluids are given, reduce the IV fluid rates as the volume of milk feeds increases. Babies who are suckling well but need an IV drip for antibiotics should be on minimal IV fluids to avoid fluid overload, or flush cannula with 0.5 ml NaCl 0.9% and cap.

The type of fluid and the amount in the first 24 hours of life:

- 10% dextrose for Term babies, 60ml/kg/24hrs
- 5% dextrose for Preterm babies, 60ml/kg/24hrs

Increase the daily requirement of fluid by 20ml/kg /day every day until it reaches 150ml/kg/day

ROUTINE NEWBORN FOLLOW-UP

Provide four postnatal visits, at 6-24 hours, 3 days, 7 days and 6 weeks.

6 to 24 hours visit/evaluation:

- Check for danger signs in the newborn and in the mother
- Counsel mother/family to keep the baby warm
- Counsel mother/family on optimal breastfeeding
- Check umbilicus for bleeding
- Counsel mother to keep umbilicus clean and dry and infection prevention actions
- Weigh newborn, if not weighed at birth
- Immunize newborn with OPV & BCG
- Give Vitamin K, 1mg IM if not given before
- Give one capsule of 200,000 Vitamin A to the mother
- Counsel the lactating mother to take at least 2 more varied meals than usual

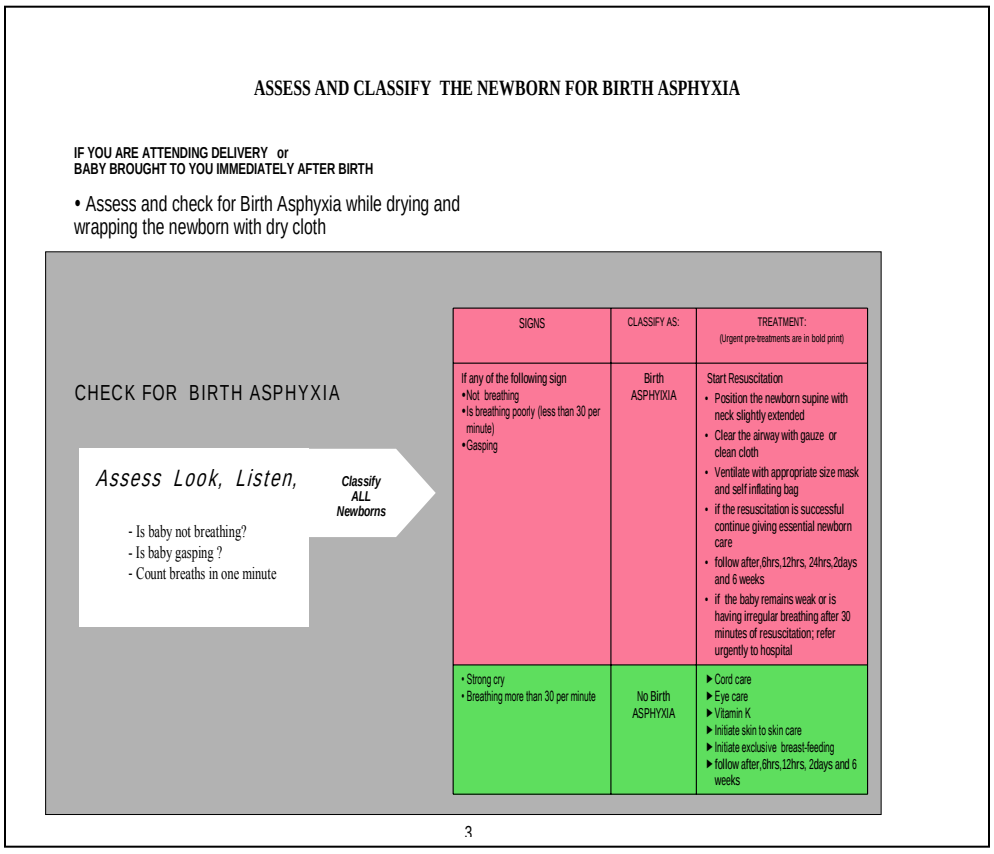
3 days visit:

- Check for danger signs in the newborn
- Counsel and support optimal breastfeeding
- Follow-up of kangaroo mother care
- Follow-up of counseling given during previous visits
- Counsel mother/family to protect baby from infection
- Give one capsule of 200,000IU Vitamin A to the mother if not given before
- Immunize baby with OPV & BCG if not given before

6 weeks visit:

- Check for danger signs in the newborn
- Counsel and support optimal breastfeeding
- Immunization, DPT1- HEP 1-Hib, OPV 1
- Counsel mother/father on the need of family planning
- Counsel mother/family to protect baby from infection
- Give one capsule of 200,000IU Vitamin A to the mother if not given before

Classification of Newborns immediately after birth



ASSESS AND CLASSIFY THE NEWBORN FOR BIRTH ASPHYXIA

IF YOU ARE ATTENDING DELIVERY or
BABY BROUGHT TO YOU IMMEDIATELY AFTER BIRTH

• Assess and check for Birth Asphyxia while drying and wrapping the newborn with dry cloth

CHECK FOR BIRTH ASPHYXIA

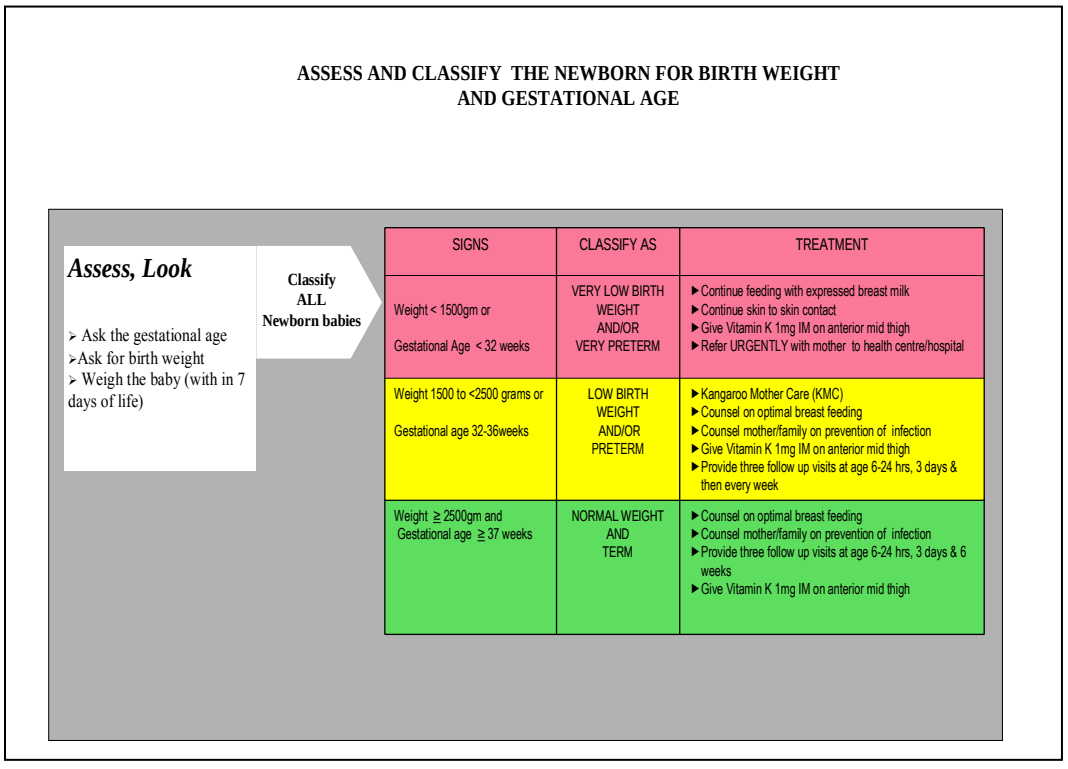
Assess Look, Listen,

- Is baby not breathing?
- Is baby gasping ?
- Count breaths in one minute

Classify ALL Newborns

SIGNS	CLASSIFY AS:	TREATMENT: (Urgent pre-treatments are in bold print)
If any of the following sign •Not breathing •Is breathing poorly (less than 30 per minute) •Gasping	Birth ASPHYXIA	Start Resuscitation • Position the newborn supine with neck slightly extended • Clear the airway with gauze or clean cloth • Ventilate with appropriate size mask and self inflating bag • if the resuscitation is successful continue giving essential newborn care • follow after,6hrs,12hrs, 24hrs,2days and 6 weeks • if the baby remains weak or is having irregular breathing after 30 minutes of resuscitation; refer urgently to hospital
• Strong cry • Breathing more than 30 per minute	No Birth ASPHYXIA	▶Cord care ▶Eye care ▶Vitamin K ▶Initiate skin to skin care ▶Initiate exclusive breast-feeding ▶follow after,6hrs,12hrs, 2days and 6 weeks

3



ASSESS AND CLASSIFY THE NEWBORN FOR BIRTH WEIGHT AND GESTATIONAL AGE

Assess, Look

- Ask the gestational age
- Ask for birth weight
- Weigh the baby (with in 7 days of life)

Classify ALL Newborn babies

SIGNS	CLASSIFY AS	TREATMENT
Weight < 1500gm or Gestational Age < 32 weeks	VERY LOW BIRTH WEIGHT AND/OR VERY PRETERM	▶Continue feeding with expressed breast milk ▶Continue skin to skin contact ▶Give Vitamin K 1mg IM on anterior mid thigh ▶Refer URGENTLY with mother to health centre/hospital
Weight 1500 to <2500 grams or Gestational age 32-36weeks	LOW BIRTH WEIGHT AND/OR PRETERM	▶Kangaroo Mother Care (KMC) ▶Counsel on optimal breast feeding ▶Counsel mother/family on prevention of infection ▶Give Vitamin K 1mg IM on anterior mid thigh ▶Provide three follow up visits at age 6-24 hrs, 3 days & then every week
Weight ≥ 2500gm and Gestational age ≥ 37 weeks	NORMAL WEIGHT AND TERM	▶Counsel on optimal breast feeding ▶Counsel mother/family on prevention of infection ▶Provide three follow up visits at age 6-24 hrs, 3 days & 6 weeks ▶Give Vitamin K 1mg IM on anterior mid thigh

Postpartum Care

Postpartum care is the attention given to the general social, mental, and physical welfare of the mother and infant during the postpartum period. The care should respond to the special and immediate needs of the mother and her baby during their hospital stay and follow up after discharge. The majority of the maternal deaths and morbidities occur during the postpartum period.

Biologically, the p*ostpartum period* is the time after birth, a time in which the mother's body, including hormonal levels and uterine size, return to pre-pregnancy conditions and extends up to the sixth week postpartum. It is also known as postnatal period or puerperium.

Components of postpartum care

1. Early detection and management of complications
2. Promoting health and preventing disease
3. Providing woman-centered education and counseling

1. Early detection and management of complications

The postpartum evaluation starts by reviewing the parturient clinical document including antepartum and intrapartum records. Complications such as cardiac disease, preeclampsia, obstructed labor, cesarean delivery that require close monitoring and treatment are identified in the patient's medical document. Besides reviewing the clinical records, the parturient should be evaluated thoroughly during the immediate postpartum period, 6th day and 6th week postpartum visits.

Generally, the postpartum evaluation of the *woman* during hospital discharge, or subsequent postpartum visits includes:

- how she feels; ask for pain, bleeding, difficulty in urination, breast feeding, any other concern she may have
- General physical
- Depression /psychosis. mood
- Malnutrition: general health, night blindness, goiter
- BP, pulse, temperature[1] - take BP and PR every:
  - 15 minutes for first 2 hours
  - 30 minutes for 1 hour
  - 3 hours then after
- Anemia: conjunctiva/tongue/palms, hemoglobin (if necessary)
- Condition of the breast and nipple; establishment of breastfeeding
- Checking for bladder distension and urine passed, incontinence/ fistula
- Fundal height and uterine consistency

[1] *The diagnosis of puerperal infection* in the first day of delivery should not be based on isolated findings of low grade fever and increased WBC, because normally, temperature may be elevated up to 38°C in the first day of delivery; and white Blood Cells (WBCs) increase during labor, marked leukocytosis (up to 20,000 to 30,000/μL) occurs in the first 24 hours postpartum; white blood cell (WBC) count returns to normal within one week.

- Inspecting the vaginal, perineum: episiotomy, lochia, bleeding, discharge, hematoma
- Thrombophlebitis: Homan's sign, inspection of legs
- The uterus involutes progressively:
  - After 5 to 7 days, it is firm and no longer tender, extending midway between the symphysis and umbilicus.
  - By the second week, it is no longer palpable abdominally.

Usually, no specific tests are required in the postpartum period if all the basic investigations are done in the ANC and intrapartum care. In case these tests were not undertaken, they have to be done before discharge. Besides, tests required in the management of any complication have to be undertaken as required. If the HIV status of the parturient is unknown, offer her testing.

After thorough evaluation and review of the parturient's antepartum and intrapartum records, parturients with complication are separated from those with normal postpartum conditions:

- Women with complications or risk factors such as hypertensive disorder of pregnancy, APH, PPH, cesarean delivery, ruptured uterus, or having newborns requiring neonatal admission are admitted to other wards where they get the basic postpartum care and treatment for their medical conditions.
- Women with normal conditions are managed in the labor ward or postpartum clinic and get the basic postpartum care.

2. Promoting health and preventing disease

- Iron/ folate: 1 tablet to be taken by mouth once a day for at least 40 days postpartum
- Vitamin A: one dose of 200,000 IU within 30 days after childbirth in vitamin A deficient regions
- Iodine supplementation: 400–600 mg by mouth or IM as soon as possible after childbirth if never given, or if given before the third trimester (only in areas where deficiencies exist)
- Six monthly presumptive treatments with broad-spectrum anti-helminthics in areas of significant prevalence
- Sleeping under a bed net in malarias areas
- Tetanus toxoid
- VDRL/ RPR
- HIV testing (opt-out)

3. Providing woman-centered education and counseling

The education and counseling should address postpartum needs such as nutrition, breastfeeding, family planning, sexual activity, early symptoms of complications and preparations for possible complications.

Postpartum counseling should take place at a private area to allow women to ask questions and express their concerns freely. If this is not feasible, counseling could be done by the women's bed provided that privacy is ensured. It is advisable to involve

husbands of postpartum women (after the permission of the woman) in this counseling and in receiving instructions before discharge.

Specific postpartum care and treatment

Nutrition:

- A regular diet should be offered as soon as the woman requests food and is conscious.
- Intake should be increased by 10% (not physically active) to 20% (moderately or very active) to cover energy cost of lactation.
- Women should be advised to eat a diet that is rich in proteins and fluids.
  - Eating more of staple food (cereal or tuber)
  - Greater consumption of non-saturated fats
  - Encourage foods rich in iron (e.g., liver, dark green leafy vegetables, etc.)
- Avoid all dietary restrictions

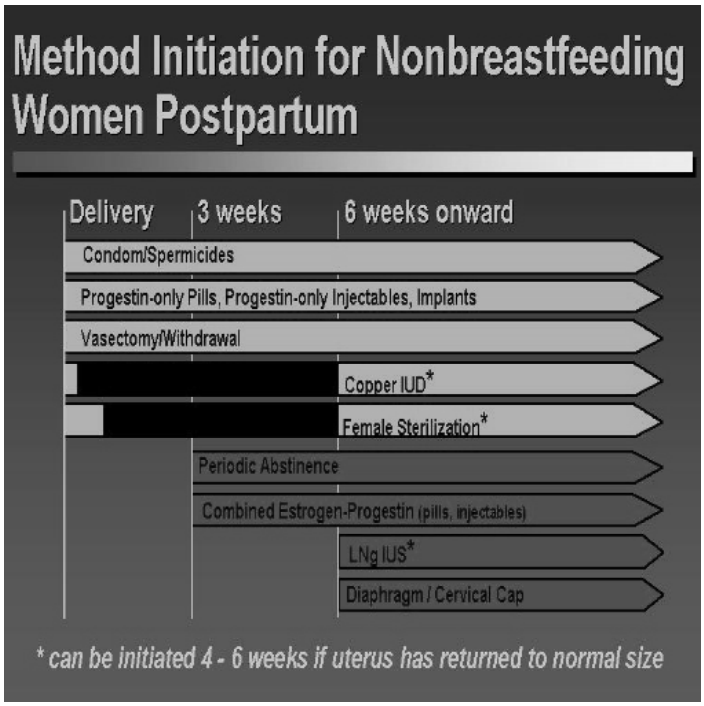
Breastfeeding

- Early skin to skin contact of mother and baby and immediate initiation of breast feeding
  - Initiate breastfeeding within 2-3 hours of CS; when the mother is conscious
  - Incase breast feeding can't be started due to either maternal or newborn illness, feeding the baby has to be initiated if possible by milk sucked from the mother herself.
- Rooming in throughout the hospital stay of mother and baby
- Women should be encouraged to maintain exclusive breast feeding for six months and should be educated about effective breastfeeding practices, as well as common breastfeeding problems, how to continue breast feeding for two years and to start complementary feeding after six months. See PMTCT section on breast feeding advice regarding HIV infected women. Postpartum education and counseling includes:
  - Correct positioning of the baby at the breast
  - Exclusive breast feeding.: No other fluids e.g. herbs, glucose, or sugar water should be given
  - Encouraging breast feeding on demand
- If there is a medical contraindication to breastfeeding, firm support of the breasts can suppress lactation. For many women, tight binding of the breasts, cold packs, and analgesics followed by firm support effectively control temporary symptoms while lactation is being suppressed

Postpartum family planning

- All postpartum women should receive family planning education and counseling before discharge.
- Ideally, counseling for postpartum contraception should start during the antenatal period, and should be an integral part of antenatal care.
- Women who had no antenatal care and those who did not receive counseling during the ante natal period, should be counseled for family planning in the immediate post partum period, after their own and their baby's condition have stabilized.

- Women should be informed about the advantages of birth spacing for at least two years before getting pregnant again and about different family planning options. Women should also be given a choice of receiving a family planning method in the labor ward before discharge from hospital or at a family planning clinic within the first 40 days postpartum.
- Facilitate free informed choice for all women: The provider should make sure that the mother is not in pain and that her other concerns have been addressed. It is preferable to offer family planning counseling some time before discharge from hospital so as to give the woman time to make a free decision and to consider different contraceptive options.
- Women who will have elective C-section could be counseled pre-operatively.
- Family planning services should be provided by the attending doctor and nurse in the ward as well as FP workers.



- In settings where family planning methods are not available on the ward, the health provider should provide family planning counseling and refer the woman either to the hospital family planning clinic (if the women is interested in immediate initiation) or to a family planning clinic near her residence.
- Reinforce that non-hormonal methods (lactational amenorrhea, barrier methods, IUD and sterilization) are best options for lactating mothers
- Initiate progestogen-only methods after 6 weeks postpartum to breastfeeding women, if woman chooses a hormonal method



- Advise against use of combined oral contraceptives in breastfeeding women in the first 6 months after childbirth or until weaning, whichever comes first
- Women who are interested in immediate initiation of contraception should be offered a family planning method before discharge.
- Women who were counseled during antenatal care and who had indicated a desire for postpartum IUD insertion or tubal ligation could have an IUD inserted at delivery (postplacental IUD insertion) or have minilap for tubal ligation. Other women could have an IUD inserted before discharge or receive any other method depending on their needs.

Exercise

- Normal activities may be resumed as soon as the woman feels ready.
- When to start an exercise routine depends on the woman; its safety depends on whether complications or disorders are present. Usually, exercises to strengthen abdominal muscles can be started once the discomfort of delivery (vaginal or cesarean) has subsided, typically within one day for women who deliver vaginally and later for those who deliver by cesarean section.
- Sit-ups or curl-ups, (rising from supine to semi-setting position), done in bed with the hips and knees flexed, tighten only abdominal muscles, usually without causing backache.
- Negel's exercise are also recommended to strengthen the pelvic floor

Personal hygiene and perineal care

- If delivery was uncomplicated, showering and bathing are allowed.
- Vaginal douching is avoided in early puerperium, till after bleeding stops completely and all wounds are healed.
- The vulva should be cleaned from front to back.
- Women are encouraged to defecate before leaving the hospital, although with early discharge, this recommendation is often impractical.
- Maintaining good bowel function can prevent or help relieve existing hemorrhoids, which can be treated with warm sitz baths.

Emotional support

- Transient depression (baby blues) is common during the first week after delivery.
  - Symptoms are typically mild and usually subside by 7 to 10 days.
  - Treatment is supportive care and reassurance.
- Persistent depression, lack of interest in the infant, suicidal or homicidal thoughts, hallucinations, delusions, or psychotic behavior may require intensive counseling and antidepressants or antipsychotic.
- Women with a preexisting mental disorder are at high risk of recurrence or exacerbation during the puerperium and should be monitored closely.

Sexual activity

Intercourse may be resumed after cessation of bleeding and discharge, and as soon as desired and comfortable to the woman. However, a delay in sexual activity should be considered for women who need to heal from lacerations or episiotomy repairs.

Sexual activity after childbirth may be affected due to decreased sexual desire (due to fatigue and disturbed sleep patterns, genital lacerations/episiotomy), hypo-estrogenization of the vagina, and power issues in marriage.

Bladder care:

- Avoid distention & encourage urination: voiding must be encouraged and monitored to prevent asymptomatic bladder overfilling.
- Do not routinely catheterize unless retention necessitates catheterization (e.g. retention of urine due to pain from peri urethral laceration at vaginal delivery)
- Rapid diuresis may occur, especially when oxytocin is stopped.

Pain management

Common causes: after-pain and episiotomy

- Episiotomy pain: immediately after delivery, ice packs may help reduce pain and edema at the site of an episiotomy or repaired laceration; later, warm sitz baths several times a day can be used. Analgesics are used if not relieved.
- Contractions of the involution uterus, if painful (after-pains), may require analgesics. Commonly used analgesics include:
  - Aspirin 600 mg,
  - Acetaminophen 650 mg
  - Ibuprofen 400 mg orally every 4 to 6 hours

Rh-negative blood group

Women with Rh-negative blood group, who have an infant with Rh-positive blood and are not sensitized, should be given Rh0(D) immune globulin 300 μg IM, as soon as possible (preferably within 72 hours of delivery) to prevent sensitization.

Hospital stay and follow up

Hospital stay:

Hospital stay after delivery varies depending on the parturients' condition. Women with complications stay longer period. Most women have normal pregnancy, labor, delivery and postpartum period; and usually they are discharged within a day of delivery. The minimum in-hospital say is 6 hours after which the risk of life endangering conditions such as PPH due to atonic uterus or genital trauma, postpartum eclampsia etc. are less likely. The use of this hospital stay should be well organized so that all parturients and their babies get the basic postpartum care. At the time of discharge, the evaluation should be thorough; the parturient and her baby should get all the basic postpartum care; and appointment be given. Providing women with a summery of their condition, especially for those with complication, is essential.

Follow-up visit:

Women should be informed that they should make a follow up visit to the hospital or to a health unit on 6^{th} day and at six weeks postpartum. The schedule should not be rigid. It should incorporate maternal (family) convenience and medical condition.

They should also be informed to come back to hospital if they feel any symptoms that worry them. The education regarding complication and preparedness includes:

Danger signals for woman

- Sudden and profuse blood loss, persistent or increased blood loss
- Fainting, dizziness, palpitations
- Fever, shivering, abdominal pain, and/or offensive vaginal discharge
- Painful or hot breast(s)
- Abdominal pain
- Calf pain, redness or swelling
- Shortness of breath or chest pain
- Excessive tiredness
- Severe headaches accompanied, visual disturbances
- Edema in hands and face

Danger signals for newborn

- Cord red or draining pus
- Suckling poorly
- Eyes swollen, sticky or draining pus
- Cold to touch in spite of re-warming
- Hot to touch in spite of undressing
- Difficulty breathing
- Lethargy
- Convulsions

Complication readiness

- Establish savings plan/ scheme
- Make plan for decision-making
- Arrange system of transport
- Establish plan for blood donation

Abnormal labor

Abnormal labor is labor that deviates from the course of normal labor and delivery (see section on labor management). Without timely intervention, abnormal labor usually leads to prolonged labor[2]. Maternal and neonatal complications are increased with increasing duration of labor.

Traditionally, p*rolonged labor* is defined *retrospectively* when all the stages of labor (from onset of true labor to delivery) last more than 24 hours. One of the main objectives of monitoring labor is to detect abnormal progress of labor before it is prolonged. Clinically, abnormal progress of labor is entertained whenever there is 'failure to progress' in labor; i.e., progress of labor not following the normal course. 'Poor or failure to progress' is a symptom of abnormal labor. It is not the cause for the abnormal labor. The indication for any interventions (e.g. CS) should be the cause of the 'failure to progress' rather the symptom.

The causes of abnormal labor are generally denoted by the "three Ps":
- Dysfunctional uterine contraction (power),
- Cephalo-pelvic disproportion (CPD) or feto-pelvic disproportion (FPD) including soft tissue dystocia (passage)
- Malpresentation or malposition (passenger).

Initial evaluation and labor follow-up
Objectives of the initial evaluation and follow up of labor at any of its stage include identifying maternal, fetal or labor progress abnormalities early before complications arise. The initial clinical evaluation may identify gross CPD or malpresentation such as transverse lie that dictate cesarean delivery. If there is no contraindication for vaginal delivery, labor is allowed and followed closely.

The diagnostic criteria of abnormal progress of labor depend on the stage and phase of labor. The clinical parameters used include cervical effacement and dilatation, descent (station) and rotation of the head, and molding.

Diagnostic and treatment approach

Prolonged latent phase of labor
Prolonged latent phase: cervical dilation below 4 cm after 8 hours of *true labor*

Assessment on admission[3]
When the cervical dilation is less than 4 cm at the initial assessment, true labor is considered if there are at least 2 regular contractions in 10 minutes. The presences of rupture of the membranes and "show' strengthen the diagnosis. In true labor, the contractions persist and progressively increase in frequency and duration leading to

[2] Precipitate labor (labor lasting less than 3 hours) is a rare type of abnormal labor.
[3] This flow chart is mainly for women who need admission during the latent phase rather than after 3 cm of dilatation. The admission includes women with complication necessitating through out labor monitoring (e.g. diabetes, previous scar) or women who have difficulty in accessing health facility (e.g. distance, transport)

progressive cervical effacement and dilatation. If 'false labor' can not be excluded with certainty, the woman is observed for 4 to 8 hours.

Assessment at the 4th hour

- If contractions cease; cervical effacement and dilatation remains the same; and fetal membranes are not ruptured, manage her as false labor.
- If there is rupture of fetal membranes with no contractions, treat as PROM (page 160).
- If cervix dilates to 4 or more cm; manage her as active phase of labor (use the partograph).
- If contractions persist, with or without progress in cervical dilatation and/ or effacement, continue labor observation for the next 4 hours (total 8 hours from initial assessment). Follow labor as any other labor and provide psychological support and pethidine if necessary.

Assessment at the 8th hour

- If cervical dilation is 4 or more cm, mange as active phase of labor using the partograph.
- If the contraction ceases; the cervical dilatation remain less than 4 cm with
  - Intact fetal membranes, mange her as false labor
  - Ruptured fetal membranes, treat as PROM
- If contraction persist for 8 hours and cervical dilatation remains less than 4 cm, the cause of the prolonged latent phase is thoroughly evaluated. Besides the provision of general labor support[4], the treatment incorporates the specific cause for the prolonged latent phase:
  - ***Dysfunctional uterine contraction*** is the most common cause of prolonged latent phase (especially among nullipara). *Excessive sedation, tocolytics and anesthesia* may affect uterine contractions. Dysfunctional uterine contractions are treated by artificial rupture of fetal membranes and augmentation of labor.
  - ***Unripe cervix*** may prolong the latent phase. On the other hand, most of these cases progress normally once the active phase is reached. A scarred cervix due to operations such as connization or qautery may lead to prolonged first stage of labor. Watching of labor for 2 to 4 hours (± argumentation) may be considered.
  - ***Cephalo-pelvic disproportion (CPD)***: Unless the CPD is gross, the diagnosed of CPD is considered after a good trial of labor. Unless there is a contraindication for ARM and/ or oxytocin use, usually labor is augmented to ascertain whether the cause of the poor progress of labor is dysfunctional of labor or borderline CPD.

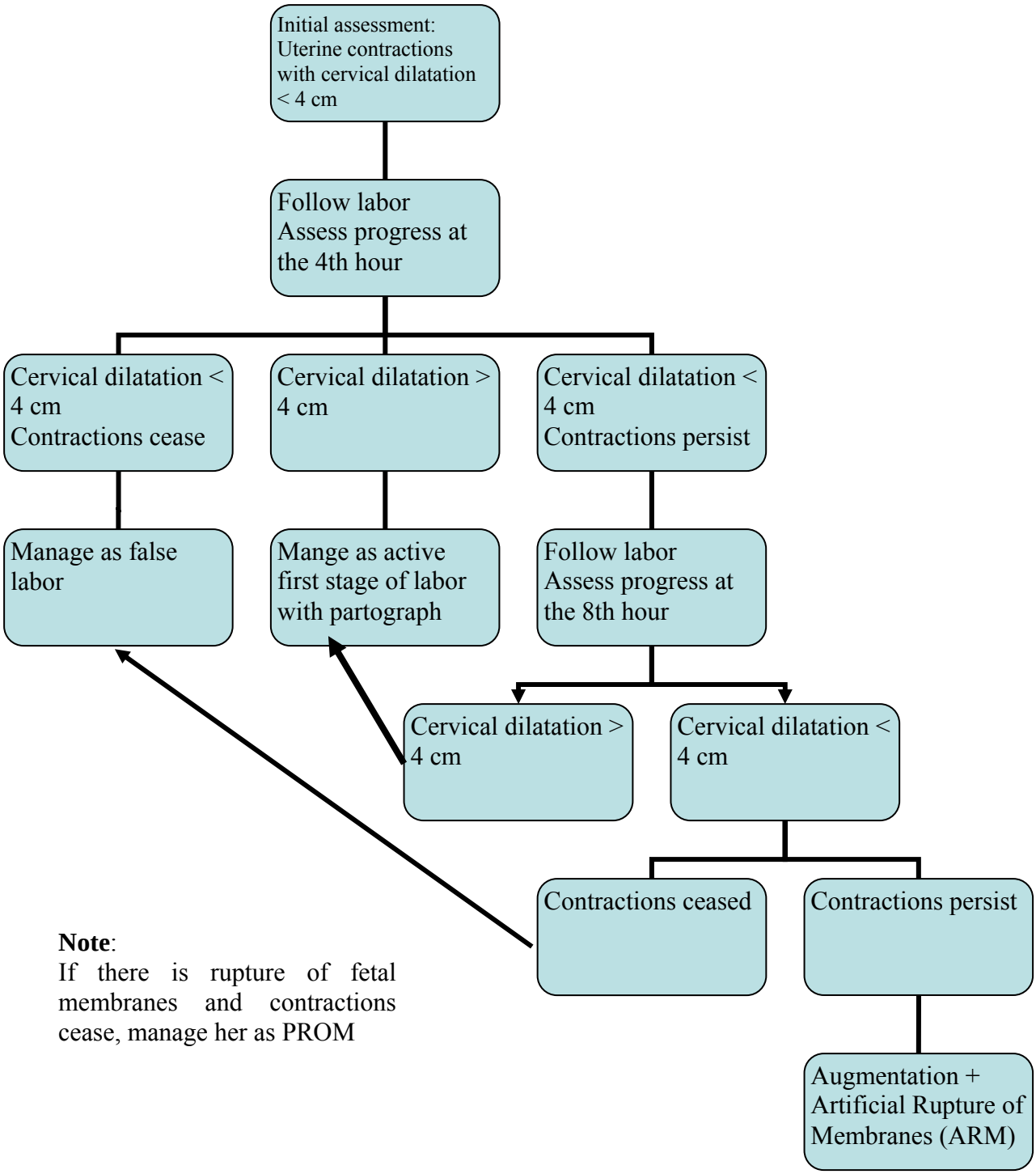
[4] *Labor support* is an essential component of labor management, especially protracted labor which leads to exhaustion, dehydration, starvation and psychological disturbances. Labor support improves contractions and accelerates progress. It incorporates: providing emotional support and encouragement; encouraging walking, sitting and change position; giving abundant fluid either by mouth (or IV if indicated); encouraging urination; catheterize only as a last effort; managing labor pain as appropriate; encouraging the woman's birth companion to give adequate support (rub the woman's back, wipe her face and brow with a wet cloth, assist her to move about); and discussing findings with her

- ***Malpresentations and malpositions*** are diagnosed by abdominal and vaginal examinations and the management depends on the specific abnormality (see section on malpresentation, malpositions and breech presentation).

False labor is unlikely when regular uterine contractions persist for more than four to eight hours. A wrong diagnosis of onset of labor (false labor) leads to a wrong diagnosis of prolonged labor and unnecessary interventions. Once false labor is ascertained explain to the woman (and accompanying relatives) about:

- False labor
- True labor and where to report
- Danger symptoms of pregnancy and labor
- Discharge the woman if she has no other problem requiring inpatient management.

Diagnosis and management of prolonged latent phase of labor



Note:
If there is rupture of fetal membranes and contractions cease, manage her as PROM

Abnormal progress in the active phase

Abnormal progress of the active phase: cervical dilatation of less than 1cm per hour of labor in the active phase (p*rotracted cervical dilatation)*

Diagnostic and treatment approach

Crossing the alert line

In the active phase of labor, plotting of the cervical dilatation usually remains on, or to the left of the alert line. When the cervicogram crosses t the alert line, it is taken as a warning that the labor may be prolonged. A thorough assessment of the mother, fetus and progress using the partogram may indicate the cause. If the assessment identifies a specific cause for the delay (CPD, malpresentation, malposition or inadequate uterine contraction), treat accordingly:

- Perform emergency CS if the assessment reveals any of the following causes for the poor progress of labor:
  - Face with mentoposterior,
  - Brow
  - Shoulder presentation
  - CPD
  - Presence of other indications for CS; e.g., fetal distress, cord presentation
- Inadequate uterine contractions are implicated if the cervicogram crosses the alert line, and there are less than 3 contractions in 10 minutes and/ or the contractions last less than 40 seconds.
  - Provide labor support: Sometimes rehydration, emptying the bladder and encouraging the woman to be more active and move around or adopt an upright position will speed up the progress of labor and normal progress will continue.
  - Consider ARM and augmentation

Specific conditions

In the absence of any indication for CS, the management of a cervicogram crossing the alert line depends on factors such as adequacy of the contractions, parity and presentation:

- Beach presentation:
  - General labor support management ,
  - Close follow up,
  - Reevaluation 2-4 hours later
    A. Adequate labor progress (cervicogram remains to the left of the action line):
       ⇒ Expect vaginal delivery
    B. Inadequate labor progress (Cervicogram crosses the action line):
       ⇒ Cesarean delivery
- Vertex (OP, OA) or face (MA) with inadequate contractions:
  - General labor support management,
  - ARM
  - Augmentation
  - Close follow up,
  - Reevaluation after at least 2 hours of adequate uterine contraction achieved

A. Adequate labor progress (cervicogram remaining to the left of action line):
⇒ Expect vaginal delivery
B. Inadequate labor progress (cervicogram remaining to the left of action line):
⇒ Cesarean delivery

- Vertex (OP, OA) or face (MA) with adequate contractions:
  - General labor support management,
  - Close follow up,
  - Reevaluation 2-4 hours later
    A. Adequate labor progress (cervicogram remains to the left of the action line):
    ⇒ Expect vaginal delivery
    B. Inadequate labor progress (Cervicogram crosses the action line):
    ⇒ Reevaluate:
    - CPD, multipara or any other indication for CS deliver by CS
    - Nullipara: decide on mode of delivery after augmentation

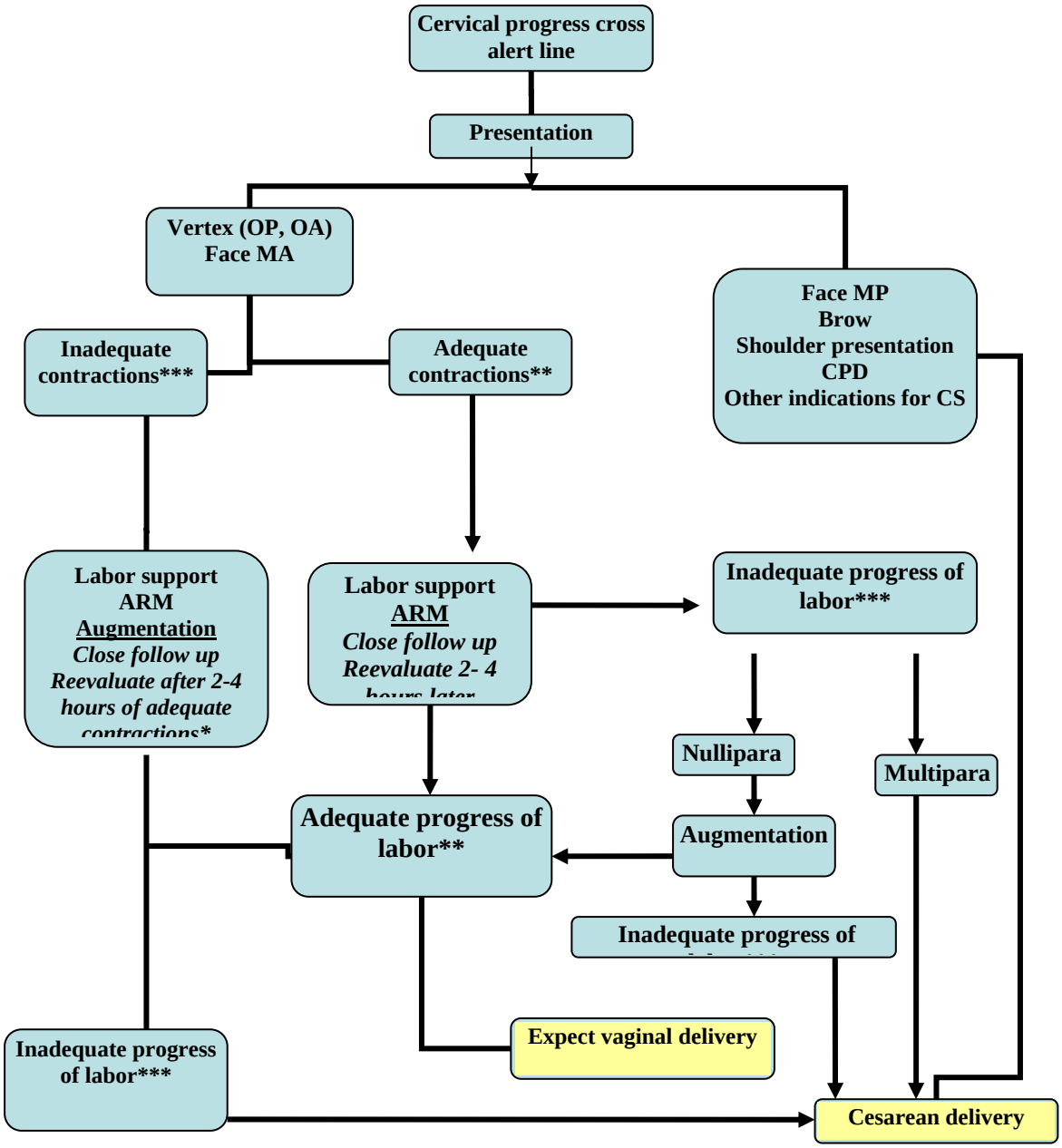
Crossing the action line:

When cervical dilatation crosses this line, action must be taken immediately. A thorough assessment of maternal and fetal conditions, fetal size, and maternal pelvic[5] with a proper analysis of the partograph indicates the cause of the abnormal progress of the active phase. Besides providing labor support, the treatment depends on the identified cause:

- Cesarean section:
  - Malpresentations and malposition are diagnosed by abdominal and vaginal examination (VE) (see section on malpresentation and malposition).
  - If there are adequate uterine contractions (3 contractions in 10 minutes, each lasting more than 40 seconds), with increasing moulding without descent of the head or at a high station, CPD is entertained. Inadequate uterine contraction with such findings indicates secondary inertia.
- Augmentation of labor:
  If contractions are inefficient (less than 3 contractions in 10 minutes, each lasting less than 40 seconds), dysfunctional uterine contraction[6] is entertained which treated by augmentation and ARM[7]. In nullipara, dysfunctional uterine contraction is entertained and labor augmented if malpresentations and CPD are excluded irrespective of the uterine contraction characteristic.

[5] If not done previously, undertake clinical pelvimetry
[6] Secondary uterine dysfunction as a result of OL should be excluded before augmentation as a primary dysfunction.
[7] Before contemplating ARM in HIV sero-positive women, the advantages and disadvantages has to evaluated thoroughly and discussed with the woman.

Management of abnormal active phase 1st stage of labor



* The reevaluation should be done after the augmentation achieves adequate contraction for 2-4 hours by excluding the initial time of augmentation taken to reach adequate contractions.

** Adequate progress after the cervicogram has crossed the alert line implies that the cervicogram remains to the left of the action line.

Inadequate progress of labor after the cervicogram has crossed the alert line implies that the cervicogram remains to the left of the action line.

Abnormal second stage

Prolonged second stage: the second stage of labor lasting more than 1 hour in multipara and 2 hours in nullipara[8]. The second stage of labor starts with full cervical dilation and no cervical "rime" remaining. Timing of the second stage before full dilatation leads to a wrong diagnosis of prolonged second stage and unnecessary intervention.

Abnormal progress in the second stage is entertained if there is not progressive descent (or head rotation to a favorable position) with each uterine contraction.

Progress in the second stage is monitored mainly by descent of the presenting part. As long as there is progressive descent and maternal and fetal conditions are satisfactory, intervention for 'prolonged second stage' should be individualized. Besides descent of the presenting part, rotation of the denominator to a favorable position indicates good progress; e.g. progressive rotation of occipito-posterior to occipito-anterior position.

The management of protracted second stage depends on the identified cause and complications. The following outlines the management of abnormal second stage when the uterus is intact and without symptoms of imminent uterine rupture:

- ***Vertex presentation:***
  - *Live fetus* with descent of:
    0/5 or 1/5 (at or bellow station 0) ⇒ vacuum or forceps delivery
    1/5 with marked moulding and fetal distress ⇒ cesarean section
    2/5 to 5/5 ⇒ cesarean delivery
  - *Dead fetus* with descent of:
    0/5 to 3/5 ⇒ craniotomy
    4/5 to 5/5 ⇒ cesarean deliveries[9]
  - Tight perineum, vaginal delivery may be achieved with vaginal procedure such as episiotomy
- ***Brow and mentoposterior:***
  - *Live fetus* ⇒ cesarean delivery
  - *Dead fetus* with descent of:
    0/5 to 3/5 ⇒ craniotomy
    4/5 to 5/5 ⇒ cesarean deliveries[10]
- ***After coming head***
  - ***Dead fetus*** ⇒ craniotomy
  - ***Hydrocephalus*** ⇒ craniocentesis
  - ***Live fetus with undilated cervix*** ⇒ Cut cervix at 8 and 4 o'clock and deliver by forceps. If the head is deflexed deliver with Mauriceau-Smellie-Veit maneuver
- ***Transverse lie***
  - ***Live fetus*** ⇒ cesarean deliver
  - ***Dead fetus*** ⇒
    - Neck of the fetus accessible for decapitation ⇒ destructive vaginal delivery
    - Neck and body are high in the birth canal ⇒ cesarean section

[8] When epidural analgesia is used, the limits are extended by one hour.
[9] rarely craniotomy may be considered by experienced obstetricians
[10] rarely craniotomy may be considered by experienced obstetricians

Cephalopelvic Disproportion (CPD)

Definition

CPD is failure of the fetus to pass safely through the birth canal because the fetal head being relatively larger than the maternal pelvic size. The relative size of the maternal pelvis and fetal head vary from one labor to another in their dimensional sizes, shape and mouldability of the fetal head[11]. If timely intervention (CS) is not undertaken, CPD leads to obstructed labor and its complications.

The causes of CPD are:

- Contracted pelvis due to genetic, nutritional or trauma. The commonest cause of contracted pelvis in developing countries is poor nutrition during childhood.
- Large fetus as in diabetes, postterm pregnancy, or hydrocephalus.
- Usually disproportion is relative rather than an absolute fetal head or pelvic size abnormality. Occipitoposterior position may lead to a relative CPD.

Initial evaluation

Except in gross pelvic contracture or macrocosmic fetuses, the diagnosis of CPD is made after trial of labor. Past obstetric performance and pelvic assessment may indicate CPD but the ultimate diagnosis is reached after trial of labor.

Past obstetric history

- CPD is unlikely in a multipara with previous vaginal deliveries of fair sized healthy babies though one pregnancy is different from another.
- A previous history of prolonged labor with perinatal death or genital trauma could be due to CPD. If previous labor is conducted in a health facility and properly documented, the medical record would give more accurate information.

Physical examination

Abdominal and pelvic assessment for CPD is done after 36 weeks of pregnancy and labor. Some of the findings that may indicate CPD are:

- Estimated fetal weight of 4,000 or more grams
- Hydrocephalus
- High head that fails to descend when pushed into the pelvic brim (head fitting test)[12]
- If the true conjugate[13] is less than 10 cm, CPD is suspected. A true conjugate or bituberous diameter of less than 8 cm indicates a grossly contracted pelvic through which a fair sized fetus (with BPD of 8.5 cm) can be delivered safely.
- Other pelvic findings suggesting CPD include prominent ischial spine, diverging pelvic walls, flat sacrum, and narrow sacrosciatic notch.

Diagnostic tests and procedures

- ***Ultrasound examination*** may reveal macrosomia or hydrocephalus.

[11] Feto-pelvic disproportion (FPD) is a general term indicating relative disproportion between the pelvis and any part of the fetus including the head (e.g., shoulder dystocia).

[12] If the heads gets into the pelvic brim (positive test), CPD at the pelvic inlet is unlikely. However, a negative test could be due to poor formation of the lower uterine segment (wrong date), pelvic tumors, placenta previa or CPD.

[13] True conjugate is calculated by subtracting 1.5 from the diagonal conjugate

- Screening for diabetes is also done if there is macrosomia or other indications.
- ***Trial of labor***: is conducted in a woman in whom CPD is suspected in order to determine whether it is safe for the woman to deliver vaginally or not. The trial continues as long as there is no fetal or maternal distress or leads to delay in labor progress.

  Borderline CPD 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, beech presentation), trial of labor is the best diagnostic approach. The trial of labor is conducted using partogram.

Diagnostic approach and risk assessment

Suspect CPD

- Previous prolonged labor with bad obstetric history or operative delivery
- Primigravida especially if age is less than 16 years
- True conjugate of 8 – 10 cm (*borderline CPD*)
- Prominent ischial spines, flat sacrum etc
- The cervicogram crossing the alert line without signs of CPD (see section on abnormal labor)

Gross CPD

- Estimated fetal weight of 4 or more kg (in an average sized Ethiopian)
- Hydrocephalus
- Gross traumatic or congenital pelvic abnormality
- True (obstetric) conjugate and/ or bituberous diameter of less than 8 cm

Diagnosis of CPD in the absence of gross CPD is confirmed after trial of labor:

- Severe moulding at a higher station ($3/5^{th}$ or more above the pelvic prim);
- Increasing moulding with no progress in descent
- Secondary arrest of cervical dilation and descent with good contraction;
- In the primigravida, failure of progress of labor after augmentation

Obstructed labor due to CPD (see section on obstructed labor).

- Large caput,
- Severe moulding (3+) at higher station,
- Cervix poorly applied to head,
- Ballooning of the lower segment,
- Formation of retracting band,
- Maternal and fetal distress and complications

Treatment plan

- CS for gross CPD with normal fetus
  - Hydrocephalus is managed by craniocentesis
  - If gross CPD with normal fetus is diagnosed, elective CS is appropriate
- Suspected CPD:
  - Plan place of delivery at a hospital (where CS service is available) or health centre with timely referral service to a hospital.
  - Conduct trial of labor using partogram

- Emergency CS is done when CPD is diagnosed after trial of labor

– Obstructed labor or ruptured uterus: see section on OL

Discharge counseling and education
A woman delivered by CS should be explained about the indication (CPD) and the need for repeat CS in future pregnancy (once CS always hospital delivery). Besides verbal explanation, a written note should be given that could also serve as referral feed back to referring health centers. Previous CS for CPD can be followed at a nearby health center and referred after the fourth focused ANC.

Guideline on consultation of obstetrician
A midwife / nurse or other health worker at a hospital who is providing either ANC or following labor should know when to counsel the in-house obstetrician[14]:

– If gross CPD is considered during the prenatal period, the need for possible hospital delivery and operative delivery is discussed with the woman and her relatives. The consultation (referral) is made at the time of the fourth focused ANC visit[15].

– Consultation for CPD in labor is made when the cervicogram crosses the alert line (see section on abnormal labor)[16].

[14] Similar guideline can also be used by provider working at health centers. Arrange possible blood donors to accompany the woman.
[15] If Gross CPD is diagnosed in labor, the woman has to be referred as early as possible.
[16] At a health centre, if the cervicogram crosses the alert line and CPD is suspected, early referral is essential. Besides the referral note, sending the partogram (or a copy of it) facilitates communications.

Malpositions and malpresentations

Definitions

Malpositions are all other positions other than occipitoanterior position (occiput posterior, mento-anterior, mentoposterior etc)
Malpresentation are all other presentations other than the vertex (face, breech, brow etc.)

Predisposing factors

- *Maternal:*
  - Contracted pelvis
  - Pendulous abdomen
  - Pelvic tumors: fibromyomas, ovarian tumors etc.
  - Uterine anomalies: bicornuate uterus, uterine septum etc.
  - High parity
- *Fetal:*
  - Prematurity
  - Fetal attitude
  - Fetal anomaly (e.g., hydrocephalus, anencephalus)
  - Polyhydramnious/ oligohydramnious
  - Multiple pregnancy
- Placental & membranes:
  - Cornual placenta
  - Placenta previa
  - PROM

Diagnostic approach

Clinical assessment is usually diagnostic especially in labor with dilated cervix through which vaginal examination provides adequate information. Ultrasound is mainly used to:

- investigate predisposing factors (e.g., placenta previa, fetal goiter)
- assess fetal condition
- assess attitude of the fetus especially in breech
- confirm clinical diagnosis etc

X-ray and other imaging methods are rarely used. In the absence of US, x-ray may be used to assess fetal attitude and presentations.

Occiput posterior

The occiput is posterior in relation to the maternal pelvis

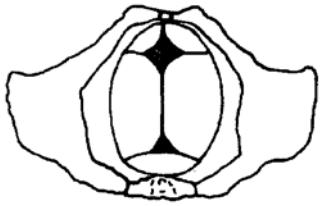
Diagnosis

Abdominal findings

- Flattened lower part of the abdomen
- Anteriorly palpable fetal limbs
- Fetal heart heard in the flank

Vaginal findings

- Posterior fontanelle towards the sacrum
- Anterior fontanelle felt anteriorly if neck is flexed



Occiput posterior



Left occiput posterior

Persistent occiput transverse

- No rotation of the occiput transverse position for 2 or more hours



Left occiput transverse

Brow presentation

Partial extension of the fetal neck making the sinciput lower than the occiput

Diagnosis

Abdominal findings

- Occiput felt above sinciput

Vaginal findings

- Anterior fontanelle and orbit are felt



Persistent brow presentation

- Brow presentation in the later part of the first stage (cervical dilatation of 7 cm or more) and second stage
- No change in attitude to a favorable presentation and position (mento- anterior or occipitoanterior) in the last 2 hours of follow up in early labor

Face presentation

Hyperextension of the neck with the face being the leading part

Diagnosis

Abdominal findings

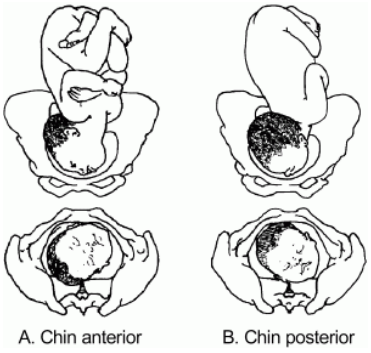
- Groove may be felt between the occiput and the back
- Face palpated and the finger may get into the



mouth

Vaginal findings

- 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

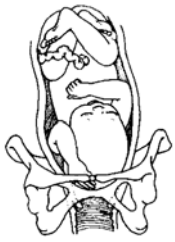


Persistent mento posterior presentation

- Mento posterior position in the later part of the first stage (cervical dilatation of 7 cm or more) and second stage or
- No change in the mento posterior position in the last 2 - 4 hours of follow up in early labor

Compound presentation

An extremity, usually the hand occurs alongside the fetal head inside the pelvis simultaneously



Breech presentation

The fetal buttock and/ or feet are the presenting part

Diagnosis

Abdominal findings

- Head is felt in the upper part of the uterus
- Breech is in the pelvic brim
- Fetal heart auscultated above the umbilicus

Vaginal findings

- Buttock or feet is felt
- Unlike face presentation, the anal orifice is inline with the trochanteric eminences



Frank breech

Frank breech: Both hips are flexed while both knees are extended. Neither of the feet is felt.



Complete breech

Complete breech: Both hips and knees are flexed. If the feet are felt, they are placed above the buttock.

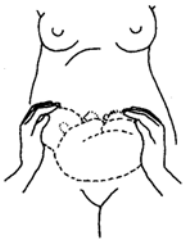
Footling breech: One or both hips are extended with one or both extended knee(s) and the foot felt below the buttocks



Footling breech

Kneeling breech: One or both knee(s) are extended with flexed knee(s) and the knee felt first bellow the breech

Transverse lie (shoulder presentation)
The long axis of the fetus is transverse and the shoulder is typically the presenting part



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

Vaginal findings
- The shoulder or the prolapsed arm is felt

Complications
- *Labor:*
  - Prolonged labor
  - Obstructed labor
- *Maternal:*
  - Operative deliveries: CS, laparotomy, operative vaginal deliveries
  - Complication of prolonged and obstructed labor (ruptured uterus, fistula etc)
  - Bleeding: genital trauma, abnormal placentation, and uterine atony
  - Infection: prolonged labor, PROM, genital trauma, frequent vaginal examinations
  - Increased maternal mortality and morbidity
- *Fetal:*
  - Asphyxia
  - Umbilical cord prolapse
  - PROM
  - Increased operative deliveries
  - Trauma: increased perinatal mortality and morbidity

Treatment plan
Malpresentation and malposition leading to prolonged and obstructed labor (see section on abnormal labor and obstructed labor). The following plan summarizes the pre-obstructed labor with live-fetus management. The management detail of breech is described in the next sections on breech presentations.

Malpresentations	Management plan
Occiput posterior	– Gross CPD or any other indication for CS ⇒ CS – No gross CPD, follow labor closely: • Anterior rotation to occiput anterior ⇒ expect vaginal delivery as occiput anterior • Posterior rotation and if: ⇒ borderline CPD suspected, perform CS ⇒ Grossly adequate pelvic, expect vaginal delivery and manage labor as occiput anterior including augmentation of labor if there are inadequate uterine contractions. The use of instrumental vaginal deliveries is also as in vertex anterior position.
Persistent occiput transverse	– CS
Brow presentation	– Cesarean delivery if: • Suspected CPD or any other indication for CS • Flexion to occiput posterior or extension to mento posterior • Persistent brow ⇒ CS – Grossly adequate pelvis with: • Flexion/ extension to occiput/ mento anterior ⇒ expect vaginal delivery
Face presentation **Mento-anterior**	– Suspected CPD or any other indication for CS ⇒ CS – Grossly adequate pelvis, manage labor as vertex anterior. Augmentation and forceps delivery can also be used when the indications arise. Vacuum delivery is contraindicated.
Mento-posterior	– Cesarean delivery if: • Suspected CPD or any other indication for CS • Persistent brow (no rotation or late admission) – Early admission with rotation to mento anterior ⇒ expect vaginal delivery
Compound presentation	– If suspected CPD or any other indication for CS ⇒ CS – Closely monitor labor or put the woman in the knee-chest position; push the arm above the pelvic brim; and hold it there till a contraction pushes the head into the pelvis: • If procedure succeeds, expect vaginal delivery • If procedure fails or complication arise (cord prolapse), deliver by CS
Transverse lie (shoulder presentation)	– Before 36 weeks of gestation and transverse lie persistents, exclude placenta previa or other possible predisposing factor by US. If placenta previa or other predisposing factor

identified, mange pregnancy accordingly. If no predisposing factor identified, follow pregnancy till after 36 weeks of gestation.

- After 36 weeks till early in labor with intact fetal membranes, consider ECV. If ECV:
  - succeeds: expect vaginal delivery
  - fails: deliver by CS
- In labor:
  - Fetus alive, late labor or ruptured fetal membranes, deliver by CS
  - Fetus dead deliver either by destructive vaginal delivery. CS (intact uterus) or laparotomy (ruptured uterus)
  - Rarely, a dead premature fetus may be delivered vaginally doubled up

Breech presentation

Definition and predisposing factors

Breech presentation is a longitudinal lie of the fetus with the caudal pole (buttock or lower extremity) occupying the lower part of the uterus and cephalic pole in the uterine fundus. The breech of the fetus is palpated at the pelvic brim.

Breech presentation may be caused by an underlying fetal or maternal abnormality, or may be an apparently chance occurrence, or related to an otherwise benign variant such as cornual placental position. The predisposing factors include:

- Polyhydramnious
- Oligohydramnious
- Uterine anomalies
- Pelvic tumors (myoma, ovarian neoplasm etc)
- CPD
- Placenta previa
- Cornual placenta
- Multiple pregnancy
- Anencephaly
- Hydrocephaly and other fetal anomalies
- IUFD
- Uterine relaxation associated with high parity

Complication

- *Fetal complications*
  - Increased perinatal mortality and morbidity
  - Cord-prolapse (more frequent in footling breech)
  - Congenital malformation
  - LBW
  - Birth traumas are increased following vaginal delivery due to difficult extraction following arrested after coming head; extended arm; extended head; incomplete dilation of the cervix; or feto pelvic disproportion. The traumas include:
    - brachial plexus laceration
    - spinal cord injury, with neck fracture
    - fracture of femur, humorous or clavicle
    - Intra cranial hemorrhage
  - Asphyxia due to cord prolapse, abruptio placenta, arrested head
- *Maternal complications:*
  - Operative deli very
  - Lacerations of the vagina & cervix
  - Post partum endometritis

Initial evaluation

The history may reveal:

- discomfort under the rib (due to the hard head)

– feeling of more fetal movement in the lower segment

On abdominal palpation (Leopold's maneuvers):
– A round hard and smooth mass (head) occupying the fundus
– A soft, broad, indefinite and non ballotable mass (the breech) occupying the lower pole of the uterus
– FHB loudest just above the umbilicus (may be lower with engagement

Vaginal examination:
– Ischial tuberocities, sacrum and its spines, genitals and the anus (are usually palpable in frank breech)
– The foot distinguished by the heel should be searched for round the breech to determine the type:
  - Complete breech: feet are felt along side the buttock
  - Footling breech: one or both feet are inferior to the buttock
– Ischial tuberosity and anus are in straight line (where as the malar eminence & mouth form a triangle in face presentation)
– Suckling in live fetus (but not by the anus in breech)[17]

The examination should also include pelvic assessment and cord presentation or prolapse.

Diagnostic procedures
– *Ultrasound* confirms the clinical diagnosis of breech and predisposing factors.
– Radiography may be used if US is not available to confirm the diagnosis and assess gross fetal malformations, multiple gestation, attitude etc. Breech is one of the rare recommendation for x-ray pelvimetry which may be considered if the technical know how is available.

Treatment Plan
– At 37 or more weeks of gestation[18] (including early labor with intact fetal membranes) assess thoroughly and plan management accordingly:
  - If there is absolute indication for CS (e.g. placenta previa, CPD) or compounding factors (e.g., multiple pregnancy, postterm, elderly primigravida, Rh-isoimmunization), plan for cesarean delivery
  - If there is not any contraindications for ECV (see ECV bellow), consider ECV. If the ECV fails, consider breech vaginal delivery (see below)

Cesarean delivery
Fetal outcome is better after CS than breech vaginal delivery. Some of the i*ndications for cesarean delivery are:*
– Presence of any indication for CS such as placenta previa, fetal distress
– Specific breech-related indications:
  - Footling breech
  - Estimated fetal weight of ≥ 3500 gm

[17] It is not advised to explore and insert the finger to ascertain whether an orifice is mouth or anus
[18] There is no need of intervening before 37 weeks (before fourth focused ANC) if breech presentation is diagnosed.

- Extended or deflexed neck

– Presence of compounding factor[19] such as
  - Previous CS
  - Elderly primigravidity
  - Infertility
  - Bad obstetrics history
  - Severe IUGR
  - Rh-isoimmunization
  - Any degree of CPD
  - Uterine dysfunction, prolonged labor or failure to progress in labor during breech vaginal delivery (augmentation is a contraindication in breech presentation) etc.

External cephalic version (ECV)

Definition

ECV is a procedure in which the baby is manipulated by pressure through the mother's abdominal wall into a cephalic (head-down) position.

Indications

– Breech presentation
– Transverse lie

Contraindication[20]

– Footling breech
– Presence of an indication for CS such as CPD, placenta previa, fetal distress
– Presence of compounding factors such as:
  - Previous CS
  - Multiple pregnancy
  - Elderly primigravidity
  - Infertility
  - Bad obstetrics history
  - Compromised fetal condition (NRFHP)
  - Polyhydramnious
  - Oligohydramnious
  - PROM
  - IUGR
  - IUFD
  - Congenital fetal abnormality
  - Rh-isoimmunization
  - Maternal cardiac disease

[19] Compounding factors are risk factors which by themselves won't be an indication for CS but the presence of two or more such factors entails an increased risk of poor outcome if vaginal delivery (or ECV) is undertaken.

[20] There is no direct evidence on the question of whether ECV might increase the risk of mother-to-child transmission of viral infections such as HIV. Conclusions on review of relevant biological evidence indicate that unlike fetal-maternal transfusion, maternal-fetal transfusion is extremely rare, and unlikely to be precipitated by ECV (Holmes 2004). It is also reassuring that in a randomised trial of fundal pressure to expel the baby during caesarean section, no evidence of maternal-fetal transfusion was found. (Owens 2003).

- Uterine malformation
- Obesity
- Consent declined
- Hypertension
- Cord completely encircling the fetal neck

Prerequisites

– Gestational age > 36 weeks including early labor
– Intact fetal membranes and adequate amniotic fluid
– Reassuring fetal condition
– No contraindication for vaginal delivery

Preparation

– Explain the procedure and reason and obtain consent
– Undertake ECV in a unit with immediate CS access (labor ward in hospital)
– Let the woman empty her bladder
– Let the woman lie on her back on a firm examination coach with uncovered abdomen
– Put a pillow under the head and flex the hips and knees to relax the abdominal wall
– Give tocolytics to relax the uterus: terbutalin sulphate 250 mg subcutaneously, 20 minutes prior to the procedure; keep PR < 120
– Listen to and note the FHR prior to ECV
– Sprinkle powder on the abdomen to avoid slippage due to moist hands or abdomen

Technique

– Perform abdominal palpation to confirm presentation, feel where the head, back and hips of the baby are located
– Lift the lowest part of the fetus from the pelvic inlet by grasping above the pelvic bone (mobilization of the breech)
– Bring the head and buttock of the fetus closer to each other
– Perform the rotation of the fetus slowly by guiding the head in a foreword roll as the buttocks are lifted (use one hand to push the breech & the other hand to guide the vertex, slowly in circular motion, near to the pelvic inlet)
– If the foreword roll is unsuccessful for first time, make a second attempt. If the second foreword fails, try the back flip technique (follow opposite direction of rotation to foreword roll) for the third and last attempt.
– Listen to and note the fetal heart rate every 2 minutes
– Limit pressure to the uterus to every 5 minutes
– If the procedure is successful, check FHR. After version, there may be transient FHR abnormality. Follow the fetal condition till stabilized.
– Give ant-D immunoglobulin to Rh-negative non-sensitized woman
– Failed ECV: Version attempts should be discontinued, if there is
  - Excessive maternal discomfort
  - Persistent abnormal FHR
  - After a maximum of three attempts

Complications

– Abnormal FHR usually transient
– Feto-maternal haemorrhage

- Caesarean section during labor is increased following successful ECV than in spontaneous cephalic presentation.
- Vaginal bleeding and placental abruption
- Fracture of the baby's femur

Follow up and education
Counsel the woman to report immediately at any time if there is:
- Vaginal bleeding
- Abdominal pain
- Decreased fetal movement

Vaginal breech delivery
Indications:
- No indication for CS or compounding factor
- Complete or frank breech presentation
- Adequate maternal pelvis
- Estimated fetal weight < 3500 gm
- Flexed neck
- Presence of a skilled care provider

For vaginal delivery, spontaneous onset of labor is expected. Induction of labor is avoided even though there is no convincing evidence against its use when the indications for induction and vaginal breech delivery are met.

Uterine dysfunction, prolonged labor or failure to progress in labor is considered as a sign of disproportion. In such circumstances, augmentation is contraindicated. Hence, the woman is delivered by emergency CS.

Conduct of breech labor and delivery
- All breech deliveries should be attended in a unit equipped with facility for emergency CS
- The most experienced provider in breech delivery should attend the delivery & a person experienced in neonatal resuscitation should be around
- Admit to a maternity unit in early labor or immediately after rupture of membranes
- *First stage of labor* is monitored using partogram with close fetal monitoring as in cephalic presentation.
  - If the cervicogram crosses the alert line, consider hydration; avoid augmentation of labor. Cesarean delivery is undertaken if the action line is approached
  - Immediate vaginal examination at rupture of membranes to rule out cord prolapse
  - Avoid ARM
  - Meconium is common with breech labors. It 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
Vaginal delivery of breech may occur in any of the following ways:
- *Spontaneous breech delivery*: The baby is expelled entirely spontaneously with out any manipulation other than support

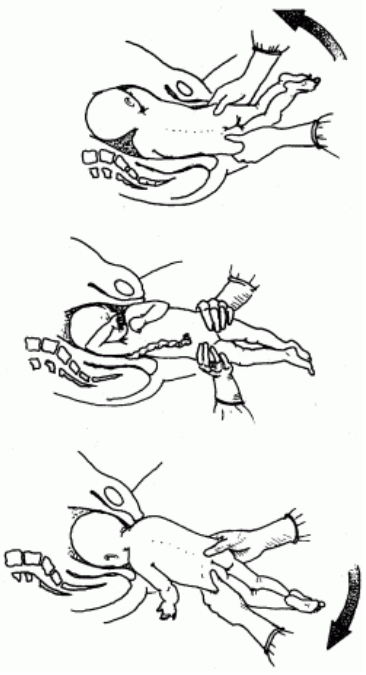
- *Assisted vaginal breech delivery (partial breech extraction)*: Delivery assisted, after the fetus has been delivered spontaneous up to the fetal umbilicus
- *Total breech extraction*: The Obstetrician extracts the entire body of the fetus from the uterus. It is rarely indicated to expedite the delivery of the second twin in emergency condition.

Assisted vaginal delivery

- Do vaginal examination to ascertain full cervical dilatation and rule out cord prolapse or entanglement
- Delivery of the buttocks & legs
- Keep the patient in lithotomy position and empty her bladder
- Provide emotional support and encouragement
- Use pudendal block and local infiltration to alleviate pain: Do episiotomy when the fetal anus is visible and perineum is distended, unless there is considerable relaxation



- Once the buttocks have entered the vagina and the cervix is fully dilated, instruct the mother to bear with every contraction
- As the buttocks get delivered, gently guide the sacrum anteriorly (no other manipulation at this stage)
- Allow the buttocks delivered spontaneously until the lower back and then the shoulder blades are seen (gently hold the buttocks in one hand, but do not pull till the body is born up to the level of umbilicus)[21]
- 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*
  - Pushing behind the knee so that it bends; then grasp the ankle and deliver the foot and leg.



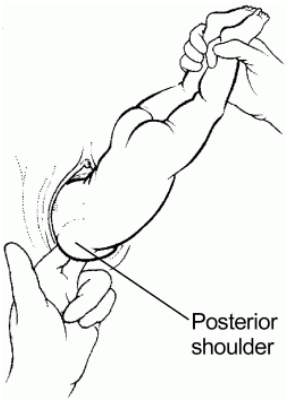
- Repeat for the other leg
- Hold the baby by the hips (grasp the fetal bony pelvis, using a cloth towel moistened with warm water) with fingers lying over anterior superior iliac spine & the sacrum. Do not hold the baby by the flanks or abdomen as this may cause kidney or liver damage

Delivery of the arms and shoulders

- Apply gentle and steady down traction, preferably with good maternal pushing, until the lower half of the scapula are delivered

[21] Traction deflexes the fetal head and may cause nuchal arm.

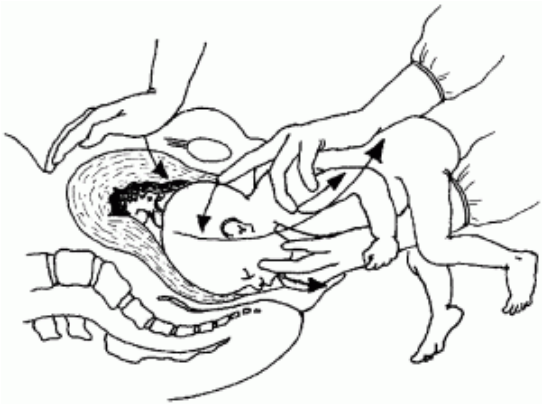
- Attempt should be made to deliver the shoulders and arms until one axila become visible
- If arms are felt on the chest:
  - Allow the arms to disengage spontaneously one by one; only assist if necessary
  - After spontaneous delivery of the first arm, lift the buttock to ward the mother's abdomen to enable the second arm to deliver spontaneously
  - If the arm does not spontaneously delivered, place one or two fingers in the elbow and bend the arm, bringing the hand over the baby's face
- If arms are stretched above the head or folded around the neck, use the *Lovset's maneuver*:
  - Hold the baby by the hips and turn half circle, keeping the back upper most and applying down ward traction at the same time, so that the arm that was posterior becomes anterior & can be delivered under the pubic arch.
  - Assist delivery of the arm by placing one or two fingers on the upper part of the arm. Draw the arm down over the chest as the elbow is flexed, with the hand sweeping over the face.
  - To deliver the second arm, turn the baby back half a circle (on reverse direction), keeping the back upper most and applying down ward traction, and deliver the second arm in the same way under the pubic arch
    - If the baby's body can not be turned to deliver the arm that is anterior, first deliver the shoulder that is posterior:
    - Hold and lift the baby up by the ankles (elevation of the trunk)
    - Move the baby's chest to wards the woman's inner leg.
    - The shoulder that is posterior should deliver. Deliver the arm and hand
    - Lay the baby back down by the ankles (depressing the body)
    - The shoulder that is anterior should now deliver. Deliver (the arm and hand usually follows spontaneously & fetal back rotates anteriorly)



Delivery of the head can be achieved in either one of the following maneuvers:

Mauriceau Smellie Veit Maneuver (MSV):

- Lay the baby face down with the length of its body over your hand and arm
- Place the mid- and forefingers of the hand (usually the right) on the baby's cheekbones and pull the jaw down to flex the head
- Use the other hand to grasp the baby's shoulders with two fingers of the hand (hooking round the neck), gently flex the babies face to wards the chest, while applying down ward pressure on the



shoulder. The midfinger is also placed at the suboccipuit to push gently and facilitate flexion of the head.

- Pull gently downward until the hairline is visible
- Ask an assistant to gentle push on the suprapubic area of the mother to assist in delivery of the head. This helps the baby's head flexed and facilitates its expulsion.
- Once the head gets into the pelvic, following the pelvic curve, raise the baby, still astride on the arm, until the mouth and nose are delivered

Forceps application

- Can be used to deliver the head electively or after failure of MSV maneuver
- Be sure that the arms are delivered, the cervix is fully dilated and the head engaged (if not apply gentle traction with supra pubic pressure)
- Wrap the baby's body in a cloth or towel and get an assistant hold the baby up & keep arms out of the way.
- Use piper forceps (if available) or a long forceps
- Place the left blade of the forceps followed by the right blade and lock handles
- Use the forceps to flex the baby's head & deliver the head.
- Application of pressure on the suprapubic area of the mother assists to flex the baby's head and push it through the pelvis.

Breech extraction

It is delivery of the baby with no assistance from the mother. It serves as an alternative to CS in desperate conditions.

Indications

- Fetal distress in 2nd stage of labor
- Cord prolapse or entanglement around the leg
- Need for expedite delivery of the 2nd twin
- Footling breech- with advanced labor with fully dilated cervix (better managed by *CIS* in other conditions).

Preconditions

- Fully dilated cervix
- No mechanical obstruction or fetopelvic disproportion
- No uterine scar
- No grand multiparity

Techniques of breech extraction

- Wearing high-level disinfected gloves, insert a hand in to uterus and grasp the baby's feet & pull it out through the vagina
- Gently pull the baby down wards by the ankles.
- Deliver the baby until the buttocks are seen.
- Proceed with delivery of the arms & head as in assisted breech delivery
- Give a single dose of prophylactic anti biotic after breech extraction: Ampicillin 2 gm IV and Metronidazol 500 mg IV (or PO if IV is not available).

Post delivery care

- Provide active third stage management and immediate neonatal care

- Examine the newborn for any possible birth trauma
- Examine the woman carefully and repair any tears to the cervix or vagina or repair episiotomy.

Obstructed Labor and Ruptured Uterus

Definition

- Obstructed labor (OL) is failure of descent of the fetus in the birth canal for mechanical reasons in spite of good uterine contractions[22].
- Spontaneous rupture of the uterus is rupture of the unscarred uterus following obstructed labor usually in the multigravida or oxytocin use.
- In complete uterine rupture, all the three layers of the uterus are involved and there is a direct communication between the uterine and abdominal cavities. In incomplete uterine rupture the peritoneum covering the uterus remains intact. A rare variety of uterine rupture is one that involves the serosa and the external myometrium, but the laceration does not extend into the uterine cavity[23].
- Trial of labor is a planned and closely monitored labor to achieve safe vaginal delivery in cases of suspected CPD. The trial is not allowed till complications of OL take place.

Causes

- Cephalopelvic disproportion (CPD)
  - Small or abnormal pelvis
  - Fetal causes
    - Large fetus
    - Congenital abnormalities e.g., hydrocephalus, ascites or tumor
    - Fetal monsters
    - Locked twins
    - Shoulder dystocia
- Malpresentations and malpositions
  - Breech presentation
    - Impacted large breech
    - Extended arm
    - Arrest of after coming head due to hydrocephaly, undilated cervix, deflexed head, or CPD
  - Persistent brow
  - Shoulder presentation (transverse lie)
  - Persistent mentoposterior
  - Occipitoposterior
- Abnormalities of the reproductive tract
  - Uterine abnormalities (fibroid, congenital malformations) or ovarian tumors
  - Stenosis of cervix
  - Vaginal abnormalities
    - Scarring after female genital cutting, previous OL or caustic medications
    - Congenital malformation: transverse or longitudinal septa

[22] OL is a neglected labor and should not occur in a labor ward.

[23] Tear of the serosa and external myometrium leads into intraperitoneal bleeding with shock, acute abdomen and absence of uterine defect on manual exploration of the uterus after delivery.

- Tight perineum particularly in the primigravida

Risk assessment

- Malnutrition, rickets or osteomalacia
- Strikingly short[24] is often associated with malnutrition.
- Previous uterine scare following CS, uterine perforation or operation on the uterus
- Previous stillbirth with prolonged labor
- Young age of mother (under 17 years of age)
- Female genital cutting
- Long distance to obtain skilled help
- Lack of transport and communication
- Traditional beliefs and practices regarding prolonged/ obstructed labor
- Custom of early marriage
- Community distrust of health care personnel
- Compromised training of staff in recognizing obstructed labor and its management
- Failure to act on risk factors (previous scare to deliver in hospital)
- Delay in referral to higher level of care (e.g. for caesarean section)
- Limited resource allocation for reproductive health services and programs

Complications

Maternal and neonatal mortalities and morbidities are greatly increased in OL due to complications arising from prolonged labor, mechanical effects of the obstruction or/ and operative interventions:

- Sepsis and septic shock leading to various organ failure (temporary or permanent)
- Hemorrhage (APH, PPH), shock and anemia
- Urinary or/ and rectal fistula: more common in nullipara mainly due to pressure necrosis of the vaginal wall entrapped between the fetal head and bony pelvis. Some are due to operative complications used to relieve the obstruction (e.g., bladder injury during CS or craniotomy).
- Ruptured uterus: more common in multipara
- Nerve injury: e.g., drop foot
- Infertility following postpartum PID or hysterectomy
- Psychological trauma due to the painful labor experience, loss of the baby, fistula and social isolation

Diagnostic approach

OL is an emergency condition and requires a concerted team approach. A rapid assessment of any patient on first contact is essential to identify critical patients and immediately instituting life saving measures. Besides the prolonged labor, a woman with OL may have life-endangering signs such as loss of consciousness, breathing difficulty, bleeding, fever, or shock. *The general condition and vital signs* (respiratory rate (RR), blood pressure (P), pulse rate (PR) and temperature) may indicate the critical condition of the patients.

[24] Height <150 cm doe not have adequate sensitivity and specificity to be used for screening (referral)

The initial assessment of the life-threatening conditions and early initiation of resuscitation, the management should incorporate close monitoring, thorough clinical evaluation and essential investigations.

History

- Age, height, gait, and any disability affecting the pelvis or lower limbs
- Gravidity, parity,
- Gestation age
- History of current labor:

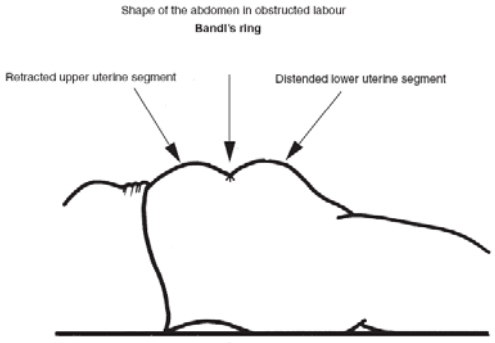
  Duration of labor is prolonged
  - Change of labor pain characteristics to continue generalized abdominal pain (peritoneal irritation due to hemoperitoneum, infection and meconium) which may be preceded by a sudden sever pain at the time of uterine rupture (described some times as "something gives away"). The woman may also give a feeling that the "fetus is moving upwards".
- Past obstetric history:
  - Any complications during previous pregnancy
  - Reasons for any previous operative deliveries (instrumental deliveries , CS etc)
  - Previous stillbirth or early neonatal death and cause, if known, and whether associated with prolonged labor
- Medical history, in particular rickets, osteomalacia, or pelvic injury
- If partograph has been used in following the labor; it may show:
  - A prolonged first or second stage of labor with cervicogram crossing the alert line and then action line despite adequate uterine contractions.
  - It may also reveal that little or no descent of the presenting part has taken place.
  - Increasing moulding especially at high station or with little descent
  - Increasing uterine contractions in frequency and duration, that become atonic later (mainly in a primigravida)
  - Prolonged rupture of the membranes
  - Drying of the amniotic fluid and gradual development of meconium-stained and foul-smelling discharge

Physical Examination

The physical findings depend on the duration, complications, cause of the obstruction and gravidity. For example, a primigravida with prolonged labor due to CPD is prone to atonic uterus with fistula formation while a multipara will have continued stronger contractions till the uterus ruptures. The findings include:

- Maternal exhaustion, anxiety, confusion, or unconsciousness
- Shock with rapid and weak pulse which may be due to both bleeding, sepsis and pain
- Fever
- Rapid respiratory rate
- Dehydration (sunken eyes, thirsty, dry mouth, dry skin)
- Anemia

– Decreased urinary output
– *Abdominal examination:*
  - Fetal head above the pelvic brim; a big head (hydrocephalus); transverse (depending on cause of OL);
  - Abnormal fetal heart rate (tachycardia, bradycardia or deceleration) or no fetal heart ton if the fetus dies from anoxia
  - Distended abdomen with tenderness and rebound tenderness. The abdominal distension could be due to gas in the intestines and uterus and hypokalemia (paralytic ilues)
  - Atonic uterus: common in primigravida and may lead to atonic PPH after delivery
  - The uterus may also be in tonic contractions and tightly molded around the fetus
  - Bandl's ring is a late sign of obstructed labor. It is the retraction ring which becomes visible and/ or palpable during labor. It can be seen as a depression across the abdomen at about the level of the umbilicus.
  - The 'three tumor abdomen" is a warning sign of an impending uterine rupture. The three tumors are due to:
    - Grossly thickened and retracted upper uterine segment above Bandl's ring;
    - Thinly distended lower uterine segment bellow the ring;
    - Fully distended or/ and edematous bladder further distending the lower abdomen.



  - In ruptured uterus (common in multiparous women), the findings include:
    - Shock
    - Abdominal distension/ free fluid
    - Abnormal uterine contour
    - Tender abdomen
    - Easily palpable fetal parts
    - Absent fetal movements and fetal heart sounds[25]
  - Diagnosis could be more difficult if rupture is incomplete or the tear is small. In this case, the fetus will remain at least partially in the uterus and signs of shock are delayed until after delivery because the pressure of the fetus prevents bleeding to some extent. Symptoms in this case could be initially very slight, and labor may even continue. Suspect rupture if the fetus suddenly becomes distressed and the mother's pulse starts rising.
  - Rupture of a uterus with a previous scar (e.g., previous CS) may be silent.
– *Vaginal examination*
  - Foul-smelling meconium and dry vagina

[25] Immediately after rupture, NRFHP may be picked up before loss of the FHR.

- Vaginal bleeding after rupture of the uterus; There may be no vaginally bleeding if there is an impacted head in the birth canal (tamponad effect)
- Catheterization can be difficult due to the impaction of the presenting part; it may produce concentrated urine which may contain meconium or blood which may indicate rupture involving the bladder
- Edema of the vulva and cervix following prolonged pushing down and labor
- Depending on the cause of the obstruction, there may be:
  - Large caput succedaneum in CPD
  - Shoulder with or without prolapsed arm
  - Brow
  - Face presentation in mentoposterior.

Investigations

OL and ruptured uterus are diagnosed based on history and physical examination. Occasional paracentesis may be required to check for hemoperitoneum. Laboratory test are required for preoperative assessment and evaluation:

– Hemoglobin/ Hct
– Blood group (ABO, Rh)
– Urine analysis
– Renal function tests (especially with decreased urine output)
– Blood culture and sensitivity
– Others test depending on individual clinical findings

Treatment Plan

The initial management of OL and ruptured uterus involves two concurrently on going activities:

- Resuscitation and monitoring of the life endangering conditions such as shock, sepsis
- Identifying the cause of OL and other complications and treating accordingly

Resuscitation and monitoring

- *Shock*: If the patient is in shock (hemorrhagic or septic), treat shock aggressively (see specific sections for details). With the ongoing resuscitation, preparation for operative interventions (e.g., availing cross matched bloods, organizing the OR), has to be undertaken so that measures to stop bleeding or removal of septic focus (e.g., hysterectomy for ruptured uterus) are done as soon as possible. Whenever there is ongoing bleeding (as in ruptured uterus), laparotomy should not be delayed till patient is resuscitated out of shock.

– *Dehydration*: If the woman is not in shock but she is dehydrated and ketotic, give 1 liter of ringers lactate rapidly and repeat till dehydration and ketosis are corrected. Then reduce to 1 liter in 4–6 hours.

– *Monitor closely*: Keep an accurate record of all intravenous fluids infused, drugs given, vital signs and urinary output.

– *Sepsis*: Give antibiotics if there are signs of infection, or the membranes have been ruptured for 12 hours or more. In sever cases with OL for days, the following antibiotic regimen can be used:
  - Ampicillin 2 g every 6 hours or ceftriaxon and
  - Gentamicin 5 mg/ body weight IV every 24 hours (adjusted with renal status) and
  - Metronidazole 500 mg IV every 8 hours, Clindamycin or Chloramphenicol

  If the woman is delivered by caesarean section or had laparotomy, continue antibiotics until the woman is fever-free for 48 – 72 hours. In less severe cases, ampicillin and gentamicin may be adequate.

– *Supportive care*: The woman's birth companion 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.

– *Analgesics* can be given while resuscitating and preparing her for operative delivery. There is not any reason to withhold anti-pain treatment in a woman with peritonitis.

Mode of Delivery in OL:

A. Intact uterus with no imminent rupture
  – If the cervix is not fully dilated, CS should be performed.
  – If cervix is fully dilated, the method of delivery depends on factors such as fetal status, and descent. See section on abnormal labor (abnormal second stage) and instrumental deliveries for details of delivery methods.

B. Imminent uterine rupture
  – *Alive fetus* ⇒ cesarean section
  – *Dead fetus*: ⇒ Laparotomy under direct vision to undertake one of the following applicable procedure:
    - *Destructive vaginal delivery:* If the uterus is intact without excessive thinning and bruising and unlikely to rupture, vaginal destructive operation is undertaken and the abdomen closed without opening the uterus. If the destructive vaginal delivery is observed to cause rupture of the uterus, destructive vaginal delivery is abandoned; and cesarean delivery is undertaken.
    - If the lower segment of the uterus is dangerously thinned out, cesarean section is safer (though hazardous by itself in neglected labor).

C. Ruptured uterus

Destructive vaginal operation is a contraindication in ruptured uterus. Laparotomy is undertaken even when there is suspicion of rupture (see imminent uterine rupture above). Through a subumbilical vertical skin incision, one of the following operative procedures is undertaken for rupture of the uterus:
  – Repair of uterine tear (with or without tubal ligation)

- Tear is not too large
- Recent rupture
- Edge clean and easy to see
- Little or no infection
- Preservation of fertility or menstruation needed
- Patient's critical is condition
- Preservation of menstrual cycle
- Easy procedure

– Total hysterectomy
  - Extensive tear
  - Necrotic edges
  - Tears difficult to stitch such as posterior tears and extension into the vagina
  - Grossly infected uterus
  - Rupture after prolonged labor
  - Future cervical cancer concern

– Subtotal hysterectomy
  - Similar conditions as total hysterectomy that are related to infection and tear
  - Relative ease of procedure than total hysterectomy
  - High subtotal hysterectomy preserves menstruation
  - May also preserve sexual pleasure

Postoperative care and follow up

– Intensive resuscitation and monitoring should be continued till condition improves
– Blood transfusion
– Antibiotics IV till fever free for 2-3 days and continue coarse PO
– Investigation including blood and urine culture and sensitivity as indicated
– Analgesics including pethidine
– Breast care for those with stillbirths or neonatal deaths
– Close monitoring to identify complications early (e.g., abscess)
– Explain condition and counsel on future pregnancy
  - Repaired uterine rupture without tubal ligation or CS: always hospital delivery
  - Total or sub-hysterectomy or tubal ligation: infertility
  - Hysterectomy: amenorrhea and infertility
  - Severe postpartum infection: possibility of ectopic pregnancy in future pregnancy and need for early check up if pregnant; infertility (one child syndrome)
– Fistula care and follow-up: 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 2-3 months after delivery.

- *Follow up schedule* of women with OL after discharge depends on the type of complications, operative procedure and residence of the patient. It is advisable to keep patients till 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 focuses on the specific complication sustained after OL.

Shoulder dystopia

Definition

Shoulder dystocia is inability to deliver the shoulders after the fetal head has been delivered despite the performance of routine obstetric maneuvers. It is an acute obstetric emergency requiring prompt, skilful management to avoid significant fetal damage and death.

Risk assessment

Shoulder dystocia cannot be predicted. Be prepared for shoulder dystocia at all deliveries, especially if a large baby is anticipated. Predisposing factors include:

- Macrosomia
- Diabetes mellitus
- Women with previous history of macrosomic babies
- Obesity

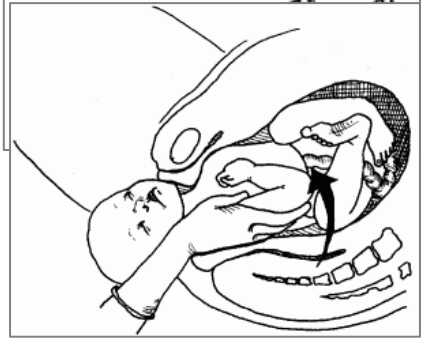
Complications

- Birth asphyxia and metabolic acidosis, shock, renal failure, seizure
- Neurological damage, mental retardation, cerebral palsy etc
- Traumatic birth injuries: fracture of the humerus and clavicle;
- Injury to the brachial plexus (Erb's palsy)
- Maternal complication of the cervix, vagina and perineum that may lead to excessive bleeding

Diagnosis

- The fetal head is delivered but remains tightly applied to the vulva
- The chin retracts and depresses the perineum.
- Traction on the head fails to deliver the shoulder, which is caught behind the symphysis pubis.





Management

- Make an adequate episiotomy to reduce soft tissue obstruction and for manipulation.
- In the lithotomy position, ask the woman to flex both thighs, bringing her knees as far up as possible towards her chest. Ask two assistants to push her flexed knees firmly up onto her chest (McRoberts maneuver).
- After wearing high-level disinfected gloves undertake the following maneuvers to deliver the shoulder:
- Apply firm, continuous traction downwards

on the fetal head to move the shoulder that is anterior under the symphysis pubis[26]. Avoid excessive traction on the head as this may result in brachial plexus injury. Have an assistant simultaneously apply suprapubic pressure downwards to assist delivery of the shoulder

- If the shoulder still is not delivered, insert a hand into the vagina and apply pressure to the shoulder that is anterior in the direction of the baby's sternum to rotate the shoulder and decrease the shoulder diameter. If needed, apply pressure to the shoulder that is posterior in the direction of the sternum.
- If the shoulder still is not delivered despite the above measures, insert a hand into the vagina; grasp the humerus of the arm that is posterior; and, keeping the arm flexed at the elbow, sweep the arm across the chest. This will provide room for the shoulder that is anterior to move under the symphysis pubis.
- If all of the above measures fail to deliver the shoulder, the last options is to fracture the clavicle to decrease the width of the shoulders and free the shoulder that is anterior; apply traction with a hook in the axilla to extract the arm that is posterior.

Prevention

Even though shoulder dystocia can not be predicted, the complication of shoulder can minimized by:

- Fetal weight estimation at term and, if the estimated weight of the fetus is 4 or more Kg, elective cesarean delivery is effected. Fetal weight estimation is especially required among women with:
  - diabetes mellitus,
  - previous history of macrosomic babies,
  - obesity
  - big abdomen
- Avoid mid-pelvic manipulation in the second stage
- Adequate training of providers

[26] Failure to deliver with this gentle traction also proves the diagnosis.

Operative deliveries and procedures

Induction of Labor

Definitions

Induction of labor is the artificial stimulation of uterine contractions before the spontaneous onset of true labor at 28 or more weeks of gestation *to achieve vaginal delivery*[27].

Induction methods

- *Surgical methods*: ARM, ballooned catheter, laminaria
- *Medical, pharmacological induction:* Oxytocin, prostaglandins such as misopristone

Some of these methods are also used to ripen the cervix. Depending on the indication, the induction is conducted in an elective (planned) or emergency basis. When the indication incurs immediate and serious complication, emergency induction is undertaken; e.g. eclampsia, severe abruptio placentae. On the other hand, when the indication entails an early phase of a relatively gradual progressing complication (e.g. postterm pregnancy, PROM, IUFD), elective induction is preferred.

Indications

There are various indications. The criteria for termination of pregnancy and using induction (rather than CS) for each indication have to be referred to the specific condition dictating the induction.

The following list of indication is not exhaustive:

- Preeclampsia, eclampsia, chronic hypertension
- Diabetes mellitus
- PROM
- Chorioamnionitis
- Abruptio placentae
- Postterm pregnancy
- Congenital abnormality
- IUFD
- Previous stillbirth
- Rh isoimmunization
- IUGR

Contraindications

- *Contraindications for labor or vaginal delivery* such as placenta previa, transverse and oblique lie fetal lie, breech with contraindication for vaginal deliver (e.g., footling, extended neck). CPD, brow presentation, face with mento posterior, twin pregnancy, extensive genital wart, cervical cancer
- *Contraindications to oxytocin use* such as uterine scar (after CS, myomectomy, perforation, ruptured uterus etc), meconium stained amniotic fluid, NRFHP or fetal

[27] Contraction stress test using oxytocin challenge test differs from induction in the goal of the artificial initiation of contractions. But failed induction is better used to failure to initiate *adequate contraction* rather than failure to achieve vaginal delivery. Failure to achieve vaginal delivery could be due to varies reasons such as FD, unforeseen CPD.

distress

- *Relative contraindications to oxytocin use* such as breech presentation (e.g., frank, complete), bad obstetric history, grand multi parity
- *Contraindication for ARM* such as cord presentations, placenta previa, vasa previa, active genital herpes with intact fetal membranes or less than 4 hours of rupture, presenting part above the pelvic inlet (relative)

Prerequisites

- *Valid indication*: The indication for termination of the pregnancy entails that continuation with the pregnancy endangers the mother, fetus or both; and the benefits of pregnancy termination outweighs the benefits of continuing with pregnancy.
- *No contraindication*: There is not any foreseeable *contraindication* to achieve vaginal delivery (no indication for cesarean delivery at the time induction is initiated)
- *Elective induction:* In case of an elective induction, lung maturity and Bishop Score are considered to minimize premature delivery and failed induction, respectively.
  - Assess fetal lung maturity: If the pregnancy is preterm or fetus does not have matured lung, consider using corticosteroid (GA<34 weeks) or allow pregnancy continue for some days if possible.
  - If lung maturity is ascertained, plan induction based on the Bishop score. The Bishop Score predicts *the likelihood of vaginal delivery* after induction with Oxytocin.

Bishop Scoring

Score	Dilation	Effacement (%)	Station*	Consistency	Position
0	Closed	0-30	-3	Firm	Posterior
1	1-2	40-50	-2	Medium	Mid position
2	3-4	60-70	-1,0	Soft	Anterior
3	≥5	≥ 80	+1, +2		

*Station is graded from -3 to +3

Interpretation of the Bishop's score:

Score≤4: Unfavorable 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.
Score 5-8: Intermediate
Score ≥ 9: Favorable cervical condition and induction is likely to succeed. There is no need for cervical ripening. Induction using Oxytocin can be planned for next day.

Preparation

- *Cervical ripening in elective induction*
  - *Cervical ripening* is the use of pharmacological (misopristone) or surgical means to soften the cervix (laminaria). The cervical ripening agent may also initiate labor. Cervical ripening is a process that culminates in physical softening and elasticity of the cervix. There are various methods of cervical ripening; use the method as described in the next page.
  - Admit the woman the day before the oxytocin induction is scheduled to a ward[28] where she can sleep so that she becomes fresh for the next day of induction. Note that she has to be monitored every 2-4 hours once she is started with the cervical ripening agent to detect labor early and avoid unforeseen complications.
  - Provide light sedation the night before procedure
  - Allow fluid diet in the evening before the day of induction and keep her NPO in the morning.
  - Plan initiation of oxytocin in all elective induction at 08:00 am of a working day. The procedure should be initiated by the outgoing duty medical team and be followed by in the incoming working hour medical team.
  - Discontinue use of PG and begin oxytocin infusion if membranes ruptures; cervical ripening has been achieved; contractions are achieved; or 6 hours have passed from last planned dose.
- If a woman scheduled for an elective induction is not an inpatient, explain her to arrive to the labor ward as early as 07:00 am and clearly inform the labor ward medical team (duty hour and working hour teams) of the elective induction. The communication with the medical team is preferably be made in writing. The woman's record book should be in the labor ward at leas a day before the induction day. You may also provide light sedation for the night before the induction.
- Avail recent hemoglobin, urine analysis and other investigation as indicated.
- Encourage the mother to empty her rectum

[28] Usually, the labor ward is hectic for a quite sleep though monitoring might be better than other wards.

Methods of cervical ripening

Prostaglandin (PGE)

- *Intra-vaginal gel* of 2.5mg PGE_2 (Prostin) is applied on the upper vaginal canal (or posterior fornix) every 6 hours for a maximum of 4 doses.
- *Intra-cervical gel* of 0.5 mg of PGE_2 is placed in the endo-cervical canal and repeated after 6 hours for a maximum of 3 doses.
- *Vaginal insert* of 3 mg PGE_2 (Prostin), or 10 mg of dinaprostone is placed into the posterior fornix and repeated after 6 hours for a maximum of 4 doses.
- *Vaginal misoprostol* of 25 mcg is placed into the upper vagina and repeated after 6 hours. If there is no response after 2 dozes of 25 mcg, the dose is increased to 50 microgram every 6 hours for a total of 200 mcg.
- *General guideline for PG use in cervical ripening*
  - The insertion should be in a hospital and the patient is kept recumbent for at least 30 minutes after insertion.
  - FHB and uterine activity are monitored for 30 minutes to 2 hours after insertion. When contractions occur, they usually apparent in the first hour and peak in the first 4 hours of insertion.
  - Repeat doses of PGE are given after an interval of 6-12 hours of the last dose only if the cervical change is insufficient (Bishop Score $\geq$ 3) and with minimal uterine activity.
  - Discontinue use of PG and begin oxytocin infusion if membranes ruptures; cervical ripening has been achieved; contractions are achieved; or 6 hours have passed from last planned dose.
  - Effects of PGE_2 may be exaggerated with oxytocin, so oxytocin induction should be delayed for 6 hours after the last dose.

Stripping of membrane:

Striping of fetal membranes by gentle digital stripping (separating) of the intact sac of the fetal membranes from the internal os of the cervix and some part of the lower uterine segment

Folly catheter

Folly catheter (size16 or 18) is introduced aseptically through the cervix above the internal os (about 5-8 cm). The balloon is then inflated with 30 -50 ml of sterile saline and pulled gently to the level of the internal os. It is left for 12 hours or labor starts and expelled spontaneously.

Osmotic cervical dilators

Osmotic cervical dilators: laminaria japonicum or synthetic laminaria are kept in the cervix for overnight.

Induction procedures

A. Artificial rupture of the membranes (ARM):

ARM is a recommended practice in both induction and augmentation. In some cases this is all that is needed. In most cases, failure of induction or augmentation is certain if use of both ARM and oxytocin fail to initiate contractions or correct the poor contractions. However, ARM should be delayed as long as reasonably possible to reduce vertical transmission of HIV.

Prerequisites

- Appropriate indication
- Engaged fetal head (relative)
- No contraindications such as cord presentation, vasa previa
- No fetal distress (unless immediate vaginal delivery is possible)

Preparation and procedure

- Explain the procedure to the woman,
- Ask her empty her bladder,
- Check FHB
- Put her in lithotomy position,
- Check for pulsation that may indicate cord presentation (or very rarely vasa previa)
- Perform ARM using amniotic-hook or Kocher forceps, and following aseptic technique (use fundal pressure if head is high to avoid prolapse)
- Keep your fingers inside the vagina and allow the amniotic fluid to drain slowly around the forefingers.
- Note the amount and color of the amniotic fluid (clear, greenish, bloody)
- Check for cord prolapse after ARM: Remove your fingers from the vagina once the fluid is drained well and are certain there is no cord prolapse
- Listen to the FHB after ARM and after next contraction to be sure there is no deceleration or bradycardia

B. Oxytocin infusion

- Open IV line using No 18 canula
- Perform artificial rupture of membranes[29].
- Start oxytocin infusion, and monitor the dose and rate of infusion strictly as follows
  - Add 2 IU of oxytocin into 1000 ml of N/S or R/L solution and adjust the number of drops every 30 minutes.
  - Starting with a low dose of oxytocin and increase every 30 minutes till adequate uterine contraction is achieved or maximum dose is reached.

[29]Depending on the condition under consideration, oxytocin infusion may be initiated with ARM or one hour after ARM. Both ARM and oxytocin are used in emergency induction as in eclampsia. In IUFD, oxytocin infusion is initiated and may be followed by ARM after good contractions are ascertained.

Table 3 schedule for escalating Oxytocin dosage

Dose and oxytocin concentration	**Time**	**Drops / minute** 1 ml ≈ 20 drops	**Approximate oxytocin in mIU/ minute**
First dose:	0:00 hours	20	2
2 IU of oxytocin in 1000 ml fluid	0:30 hours	40	4
	1:00 hours	60	6
	1:30 hours	80	8
Second dose:	2:00 hours	50	12
Add another 2 IU of oxytocin to	2:30 hours	60	15
the remaining first dose fluid	3:00 hours	80	20
Third dose:	3:30 hours	50	24
Add another 2 IU of oxytocin on	4:00 hours	60	30
the remaining second dose fluid	4:30 hours	80	40
	5:00 hours	As above	As above
	5:30 hours	As above	As above

- Label the bottle and keep timely record[30] of the drops used. Aim to maintain the lowest possible dosage consistent with adequate uterine contraction[31].
- Monitor mother, fetus and labor according to labor protocol. Record maternal and fetal conditions and progress of labor. Uses the partograph once adequate uterine contractions are achieved[32].
- Continue the oxytocin infusion for at least one hour postpartum.

Complications

- Failure to initiate labor or achieve good contractions leading to failed induction leading to increased risk of cesarean section
- Atonic PPH
- Iatrogenic prematurity
- Uterine hyper stimulation/ tetanic contractions (oxytocin, PG)
  - Uterine rupture
  - Fetal distress
- Chorioamnionitis (prolonged rupture of membranes after ARM and repeated VE)
- Fetal sepsis and vertical HIV transmission (ARM)[33]
- Cord prolapse (ARM)
- Placental abruption (ARM)

[30] Use 'Induction Chart' that includes date, time (every 30 minute observation), oxytocin (miu in a liter, miu/ minute, drops/ minute), contractions (frequency, duration), fetal and maternal conditions, and cervical status. In augmentation and established labor, the partograph can be used.

[31] Adequate uterine contraction is 3 to 5 contraction every ten minutes lasting more than 40 seconds

[32] As much as possible, it is good practice that one provider follows the induction procedure and labor.

[33] The risk of HIV and herpes genitalis to the newborn is increased if rupture of the membranes is more than 4 hours.

- Water intoxication (oxytocin)
- Amniotic fluid embolism

Failed induction
Definition: Failed induction is failure to initiate good uterine contraction. It is diagnosed if adequate uterine contractions are not achieved after 6 to 8 hours of oxytocin administration and use of the maximum dose for at least one hours.

Management
- 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 and ripening of the cervix considered.
- 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.
- Failed induction as an indication for cesarean section should be differentiated from other indications detected after achieving good uterine contraction. Protraction of labor after achieving adequate uterine contraction is managed as abnormal labor. Differentiating CPD from failed induction as an indication for cesarean section is detrimental in planning the mode of delivery for subsequent pregnancies.

Tetanic contractions
Definition: Six or more contractions in 10 min and/ or durations of 90 or more seconds

Management
- Stop oxytocin infusion
- Use tocolytics if available
- Assess fetal and maternal conditions carefully for possible fetal distress or ruptured uterus. If there is fetal distress (e.g. NRFHP, meconium stained amniotic fluid) or uterine rupture, manage accordingly.
- If both mother and fetus are in good condition, restart at half dose of the last dose causing tetanic contractions.

Augmentation of Labor

Definition:
Augmentation of labor is stimulation of the uterus to increase its frequency, duration and/ or strength of spontaneously initiated labor. Hence, the main indication of augmentation is weak and ineffective uterine contractions leading to abnormal progress of labor.

Contraindications
- The contraindications are similar to the contraindications of oxytocin (± ARM) use as detailed in the section of induction above.
- Breech, scared uterus, multiple pregnancy etc. are contraindication for oxytocin use
- Oxytocin should not be used for secondary hypotonic contractions due to obstructed labor.

Methods and procedure are generally similar to induction (see the section above)
- The methods for augmentation are ARM and oxytocin.
- Labor support (including hydration) should be provided for all laboring women

- Perform ARM if membranes are intact.
- Start oxytocin infusion as for induction. If there is not any urgency to expedite delivery, oxytocin infusion is initiated one hour after ARM and after checking that the ARM fails to correct the weak contractions.
- Follow labor, mother and fetus closely using partogram

Cesarean Section (CS)

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. An 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. When the CS is done in labor or due to any complication (excessive bleeding following placenta previa) that necessitates immediate cesarean delivery, the CS type is emergency cesarean section.

CS Types

- Lower transverse uterine incision
  - The Misgav Ladach technique and its modification is considered now as over traditional techniques of cesarean section
- Lower vertical uterine(De Lee) incision
- Upper vertical uterine incision(Classical cesarean section)

Indications

Cesarean section is performed when safe vaginal delivery either is not feasible (absolute) or would impose undue risks to the mother or/ and fetus (relative). The common indications include fetopelvic disproportion (FPD) including CPD, failure to progress in labor, placenta previa, fetal malposition and malpresentations, suspected fetal distress, cord prolapse, previous uterine incision, maternal infections (e.g. HIV, active Herpes simplex).

Prerequisites

- Appropriate indication
- Trained providers
- Appropriate facilities and equipments

Preoperative preparation

- Revise the clinical history including anesthetic risk assessment, drug history
- Plan CS procedure ahead of time based on the individual clinical situation:
  - Type of anesthesia
  - Position[34]
  - Skin incision type
  - Uterine incision type[35]
  - Addition procedures (e.g., tubal ligation, cesarean-hysterectomy)
  - Use double gloving
- Explain to the woman (and relatives) and obtain informed consent

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[34] In obstructed labor with an impacted head of the fetus, lithotomy position facilitates the push of the fetal head from inside the vagina by an assistant and delivery through the uterine incision.

[35] Choice of uterine incision *for transverse lie Cesarean section:*

- Lower transverse CS is done if there is with adequate amniotic fluid (intact or recently ruptured fetal membranes) and fetus's back is superior (dorso-superior)
- Vertical (low/ de Lee or high/ classical vertical) CS is preferred if there is prolapsed arm and fetus's back down (dorso-inferior)

- Timing:
  - Elective CS
    - Plan on days when the facility is fully functioning (working hours)
    - Do in the morning (preferably start at eight- nine am.)
  - Emergency CS cannot be planed.
    - To minimize the increased risk of emergency CS, elective induction of labor should be limited to working hours; initiated before 08:30 am[36]; and preparation for possible CS be made.
- Investigations:
  - Hemoglobin / Hct
  - Blood group (ABO) and Rh
  - Urine analysis
  - Investigate specific clinical complications required as in DIC
  - Basic investigations done during pregnancy (e.g., VDRL, HIV) if they are not done previously
- At least 2 units of crossed matched blood should be prepared for conditions that have high possibility of transfusion need such as:
  - Active bleeding
  - Preeclampsia
  - Anemia
  - Coagulopathy
  - Previous uterine scar
  - Over distended uterus and other predisposing factors for atonic PPH
- Feeding:
  - Elective CS: NPO after mid-night and start IV fluid in the morning
  - Limit feeding to fluid diet in laboring women with increased risk of emergency CS (e.g., VBAC, induction in non-reassuring biophysical score).
- If necessary, clip the hair on the operation site but DON'T shave
- Administer antacid solution PO (or through NG tube)
  - Magnesium trisilicate 300 mg
  - 0.30% sodium silicate 30 ml
- Transfer the woman to the operation theater with stretcher in lateral position
- Catheterize
- Open IV line with a cannula of 16 or more gauge
- Position on operation table:
  - Tilted the table to left or place a bellow under the woman's right lower back
- Make sure that the anesthesia team, the necessary drugs and equipments, neonatal resuscitation set and personnel are in place
- Check fetal heart beat before proceeding to the CS
- Apply antiseptic solution (iodine, chlorhexidine) on the incision and surrounding area
- Record maternal vital signs before anesthesia and during the CS

[36] The increased risk of emergency CS after failed elective induction of labor can be mitigated by planning the possibility of such CS during the working hours when the facility is working at full capacity than emergency hours.

Anesthesia[37]

- Regional (spinal, epidural)**:** administered while the surgeon and scrub nurse are preparing for surgery
- General: Administered after the surgeon and scrub nurse are ready, and the abdomen (operation site) is cleaned and draped.

Procedure

Abdominal incision:

- Incise the skin and subcutaneous tissue. Skin incision types include
  - Lower transverse incision ('Joel-Cohen based' methods)
  - Pfannensteil incision
  - Subumbilical midline incision
- Make a small incision over the fascia with a scalpel and extend it to the whole length of the fascia with scissors
- Dissect the rectus and pyramidalis muscles by sharp instrument and then with blunt dissection
- Elevate the peritoneum at the upper edge of the incision by holding it with two artery forceps about 2 cm apart. Palpate the tent of peritoneum to check if omentum or bowel is not grasped. If grasped release the artery forces and grasp again. Incise between the two artery forceps with scalpel to open the peritoneal cavity. Check if there is adhesion of the peritoneum or dense infiltration by inserting a finger and palpating up and down the peritoneal opening. Extend the peritoneal opening with scissors up wards up to the upper border of the incision and downward up to the reflection of the bladder checking for any adhesion.
- Correct the uterus if dextro-rotated
- Insert moistened packs on each side of the uterus
- Insert a bladder retractor

Lower segment transverse cesarean section:

- Grasp the peritoneal flap at the site of the reflection with forceps and incise with scissors. Dissect the peritoneal flap at the reflection site be inserting the scissors between the serosa and myometrium. Open up your instrument to dissect the peritoneum and then cut moving to the left and right side of the uterus (The assistant moves the bladder retractor to the side you are moving your scissors). Push the peritoneum downwards with gauze on a holder or using your fingers.
- Incise transversely over the exposed uterine lower segment for about 2 cm with a scalpel. The incision should be just enough to cut through the myometrium and not reach the fetal part neither too shallow to peel the myometrium. Extend the incision bluntly with your index fingers of the two hands laterally and upwards.
- Rupture the amniotic membrane if encountered.
- Remove the bladder retractor. Then insert your right hand between the symphysis pubis and the presenting part and elevate the vertex gently through the incision assisted by gentle abdominal pressure.

[37] Though the current evidence shows no conclusive preference in the use of regional analgesia (spinal and epidural) to general anesthesia, the regional anesthesia has largely replaced general anesthesia in many services. When other methods are not available or safe, local analgesic infiltration may be used.

- Wipe the nares and mouth once the head is delivered. Deliver the rest of the body.
- The anesthetist administers uterotonics[38]
- Clamp the cord at two sites and cut in between. Hand over the neonate to the midwife for immediate newborn care.
- Give prophylactic antibiotics[39]: One dose of a broad spectrum antibiotic (ampicilline or a first-generation cephalosporin) IV is given immediately after the cord is clamped:
  - Ampicilline 2 gm or
  - Cefazoline 1 gm
- Deliver the placenta by CCT. Clean the uterine cavity with pack to ensure completeness of the placenta and membranes.
- Clamp the edges of the uterine incision and any briskly bleeding sites with green armitage or ring forceps. Lift the uterus out of the abdominal cavity and cover the fundus with moist pack
- Close the uterine incision with two layers of continuous inverting stitches starting from the edge the first bite just behind the edge with Chromic 1- or 0-catgut or polyglycolic (Vicryl). Replace back the uterus into the abdominal cavity. Make sure hemostasis is secured and uterus is well contracted[40].
- Dry the abdominal cavity with gauze pack if there is grossly contaminated amniotic fluid or meconium.
- Close the Fascia with continuous Vicryl no 2
- Approximate the subcutaneous layer with chromic 2-0 catgut
- Close the skin with continuous subcuticular stitch or interrupted silk as needed.
- Check uterine contraction and clean any clot in the vagina.

Major complications

Immediate complications

- Intraoperative damage to organs such as the bladder or ureters
- Anesthetic complications including aspiration pneumonia
- Haemorrhage
- Infection
- Thromboembolism
- Maternal mortality is greater after caesarean than vaginal delivery
- Transient tachypnoea of the newborn is more common after caesarean section.

Long-term risks include an increased risk of

- Uterine rupture in subsequent pregnancies
- Limitation of number of children
- Placenta previa
- Placental abruption
- Placenta accrete

[38] Deliver similarly if there are multiple fetuses and then give oxytocin after the last fetus is delivered.

[39] Continue antibiotics if already started to treat established pelvic infection (e.g., chorioamnionitis, obstructed labor)

[40] There is no need to close the bladder and abdominal peritoneum.

Postoperative follow-up
Immediate:
- Check and record vital signs on arrival to the ward and every 30 min once she is fully awake and stabilized
- Check urine output
- Check for vaginal bleeding and uterine consistency

Late:
- Check and record vital signs and urine output every 4-6 hours.
- Start sips of fluid after ascertaining that she conscious and bowel sounds are active
- Discontinue IV fluids once started fluid diet unless there is other IV medication
- Provide analgesics as required
- Ambulate early
- Look for evidences of PPH, pulmonary infection, UTI, and wound infection
- Initiate breast-feeding and skin-to skin contact with the baby as soon as the mother is awake
- Open the wound site and remove stitches on the sixth day (can be done at the OPD if the woman is discharged earlier)
- Discharge when vital signs are with in normal range, mother has started regular feeding, breast-feeding is initiated and there is no evidence of wound infection

Forceps Delivery

Obstetric forceps is a pair of instruments used to effect delivery of the fetus. The main function of the forceps is traction[41]. The two acceptable forceps operations with minimum trauma to the mother and fetus are[42]:

- Low forceps: application when the leading part of the fetal scalp is at station +2 or below but not on the pelvic floor.
- Outlet forceps: application when the head is at perineum and visible at introitus between contractions. The fetal scalp has reached the pelvic floor.

Indications

- Prolonged second stage
- To shorten the second stage in cases with
  - Maternal distress
  - Preeclampsia, eclampsia
  - Cardiac or pulmonary diseases
  - Glaucoma,
  - Cerebrovascular diseases: aneurysm, CVA etc
- Fetal distress and cord prolapse
- After-coming head in breach presentation

Prerequisites

- Presentation & position
  - Vertex presentation with occipitoanterior or occiput posterior
  - Face presentation with mentoanterior
  - After-coming head in breech (Piper's forceps)
- Engaged head with a station of +2 or below
- Fully dilated cervix
- Ruptured membranes
- No contraindication to vaginal delivery such as CPD

Preparations

- Lithotomy position with the buttock of the parturient at the edge of the delivery table
- Empty bladder (catheterization)
- Apply anesthesia if local or general is used is used. Regional anesthesia has to be given earlier.

Procedure

Application in OA

Orientation: Hold a completely locked forceps in front of the perineum to orient and identify the right and left blades. The right is the one on the right side of the mother and the left on the left.

- Disassemble the forceps and place it on a tray
- In occipitoanterior position both perfect cephalic and pelvic applications are possible:

[41] Other uses include rotation (Keilland forceps), protection (in premature baby) and as vectis (with single blade in C delivery of fetal head)

[42] Mid forceps is not described in this protocol

- Cephalic application:
  - The blades are over the parietal bones in an occipito-mental application
  - The front of the forceps (concave edges) point to the denominator (occiput)
- Pelvic application:
  - The left blade is next to the left sidewall of the pelvis and the right blade near the right sidewall.
  - The concavity edges points to the pubis.
  - The convex edges pints to the sacrum.
  - The diameter of the forceps is in the transverse diameter of the pelvis

– First apply the left blade: Lubricate the blade. Hold the handle of the left blade with your left hand freely and apply it to the left side of the mother guided by the two fingers of the right hand.
– Apply the right blade: Hold the handle by your right hand and place it to the right side of the mother guided by the two fingers of the left hand. The right is always below the left when locked.
– Locking is easy when applied correctly. If it is difficult, disarticulate and apply again after re-ascertaining the position and station. Never apply undue force to lock.
– Check application is correct and no maternal tissue is entrapped. In correct application:
  - Locking is easy;
  - The application is biparietal - bimalar.
  - The posterior fontanelle should be about one finger's breadth in front of the plane of the shanks and equidistant from the blades; the sagittal suture should be perpendicular to the middle of the plane of the shank.

Delivery of the head

– Traction is synchronized with uterine contractions and should follow the line of Carus (Pelvic Curve).
– With each pull, the head should descend.
– Two or three pulls are usually needed to effect delivery of the head
– In-between tractions, check fetal heart beat and application is correct
– Perform an episiotomy with crowning of the head
– Once the head reaches the pelvic outlet, lift it out using the forceps
– Removal the right first followed by the left forceps

Further care

– After delivery inspect the vagina and cervix; and repair if there is any tear
– Examine the newborn as describe for vacuum delivery

Complications

Fetal complications:

– Facial nerve injury which is usually self-limiting
– Newborn's face or scalp laceration; cephalhematoma
– Fracture of the face or scalp: Usually need observation as they heal by themselves

Maternal complications:

– Tear or laceration to the cervix, vagina, or vulva

– Rupture of the uterus
– Postpartum hemorrhage (traumatic PPH)

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

The possible causes are:

– Undiagnosed CPD
– Incomplete cervical dilatation
– Wrong diagnosis of position
– Incorrect application
– Cervical entrapment

When application of forceps or traction does not yield, reassess for possible cause. After a failed forceps, Cesarean delivery is undertaken if the fetus is alive.

Vacuum Delivery

Vacuum delivery is effected using the ventouse (vacuum extractor). The main action of the ventouse is traction with an additional effect of rotation. Its main components are the suction cup, vacuum pump and traction devices.

Indications

1. Prolonged second stage of labor
2. To shorten second stage in:
- Maternal distress
- Preeclampsia/ eclampsia
- Cardiac or pulmonary diseases
- Glaucoma,
- Cerebrovascular disease: CNS aneurisms etc.

3. Fetal distress and cord prolapse

Contraindications:

- CPD,
- Fetal coagulopathy
- Non-vertex presentation such face , breech (after-coming head)

Prerequisites

- Vertex presentation with fetal position identified
- Fully dilated cervix[43]
- Engaged head: station at 0 or not more than 2/5 above symphysis pupis[44]
- Ruptured membranes
- Live fetus
- Term fetus

Preparation

- Empty bladder
- Local anesthesia infiltration for episiotomy
- Assembled and tested vacuum extractor

Procedure

Application:

- Apply the largest cup that can fit near to the occiput with knob of the cup pointing to the occiput. The center of the cup being at about 1 cm anterior to the posterior fontanel and on the sagittal suture.
    - The ideal application of vacuum extraction is achieved when the centre of the cub is superimposed on the flexion point. The flexion point is 3 cm in front of the posterior fontanelle at the sagittal suture.

[43] In certain emergency conditions where immediate CS is not feasible, vacuum can be applied at cervical dilatation of at least 8 cm.

[44] Delivery of the second twine when the head is high may be considered when the need arises as an emergency measure.

- A wrong application of the cub center anterior to the flexion point leads to defluxion attitude while by more than a cm lateral of the sagittal suture exacerbates asynclitism.

– Check for correct application and entrapment of maternal tissue. If there is maternal tissue entrapment, release it before creating vacuum.

Vacuum creation

– Create a vacuum of 0.2 kg/cm^2 negative pressure and check that maternal tissue (cervix or vagina) is not entrapped
– Gradually increase the vacuum to 0.8 kg/cm^2 in 10-12 minutes and recheck the application and 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; do not rotate the cup to effect rotation; traction alone is expected to bring rotation;
– Between contractions, check for fetal heart and cup application;
– With progress and absence of fetal distress, continue traction with contraction for 30 minutes or till three successive pulls fail to advance the head;
– As soon as the head is delivered, release the vacuum and proceed with the delivery of the fetus;

Further care

– After delivery inspect the vagina and cervix; and repair if there is any tear
– Proceed with the immediate neonatal examination and care
  - Assure that vitamin k is provided within one hour of delivery.
  - Check for scalp abrasions and lacerations;
  - Measure the head circumference, and watch the chignon (localized scalp edema after the vacuum cup). The chignon gradually disappears in few hours. Cephal-hematoma may develop gradually.

Complications

Fetal complications

– Laceration of scalp: provide local wound care as appropriate;
– Cephal-hematoma requires observation: usually clears within 3-4 weeks
– Sub-aponuerotic hemorrhage
– Intracranial hemorrhage: very rare but requires immediate intensive care

Maternal complications

– Tears of the vagina or cervix are repaired as appropriate

Failed Vacuum

Diagnosis is based on any one of the following conditions

– The head does not advance with each pull;
– The fetus is not delivered with 3 pulls;
– The fetus is not delivered within 30 minutes;
– The cup that is applied appropriately and pulled in the proper direction with maximum negative pressures slips off the head twice

After failed vacuum, the fetus is delivered by Cesarean section. Every vacuum application should be considered as a trial of vacuum delivery.

Destructive Vaginal Operations

Destructive vaginal operations (deliveries) are procedures undertaken to reduce the bulk of a dead fetus in obstructed labor to facilitate delivery[1]. The main advantages of these operations are prevention of cesarean delivery and dissemination of infection associated with obstructed and neglected labor. They also prevent maternal trauma if vaginal delivery is undertaken without destructive operation on the dead fetus.

Various types of destructive vaginal operations are used depending on the cause of the obstructed labor:

- Craniotomy
- Craniocentesis
- Decapitation
- Evisceration
- Cleidotomy

Craniotomy

In craniotomy, the head of the dead fetus is perforated to evacuate the brain tissue; and decrease its size to effect extraction of the fetus.

Indication

Obstructed labor with a dead fetus due to

- Cephalic presentation: CPD, brow, face
- Entrapped after-coming head

Contraindication

- Severely contracted pelvis with true conjugate less than 7.5 cm won't allow the delivery of the uncompressible bimastoid which has 7.5 cm diameter.
- Ruptured uterus
- Dead fetus without obstruction
- Doubtful fetal demise

Prerequisites

- Dead fetus
- Fully dilated cervix
- Descent of 2/5 or less in cephalic presentation or entrapped after coming of head
- Ruptured membranes
- Intact uterus

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
- Avail consent of the patient/ parent
- Use aseptic & antiseptic care

[1] The delivery is usually effected through the birth canal and some times through the uterine incision during CS

- Give pain medication: pethidine (with or without diazepam), 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

- Site of entry:
  Vertex presentation:
  - Make a cross-shaped incision through the skin of the head right down to the 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

  Face presentation:
  - Enter the cranium through the orbit/ or hard palate

  Brow presentation:
  - Enter the cranium through the frontal bones

  After coming head
  - Make an incision at the base of the neck; inter the cranium by inserting the perforator or scissors through the incision and tunneling subcutaneously to reach the occiput. Perforate the occiput to drain the brain tissue as above.
- Introduce the perforator, with closed blade, under palmer aspect of fingers protecting anterior vaginal wall and bladder at predetermined site. Avoid sudden sliding of your instrument over the scull and getting into maternal tissue.
- Open the perforator or the scissors and rotate it to disrupt the brain tissue; the brain should now be coming out from the hole
- Put 3-4 strong volsellum forceps, kochers or heavy-toothed forceps on the skin and the bones and pull on the forceps to achieve vaginal delivery. In case of breech, pull on the delivered part of the fetus.
- Protect the vagina by avoiding sharp scalp bone edges tearing the vaginal wall by your finger or by removing the offending bones.

Craniocentesis

Skull puncture is performed in case of hydrocephalus to drain the CSF fluid to achieve vaginal delivery (or to deliver the hydrocephalic head through the uterine incision at time of cesarean section).

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

With closed cervix

- Palpate for the location of fetal head

- Apply antiseptic solution to the suprapubic skin
- Pass a large-bore spinal needle through the abdomen and uterine wall and through the hydrocephalus head
- Drain / aspirate the CSF until the skull has collapsed and allow normal delivery to proceed

After-coming head

- After the rest of the body has been delivered, insert a large-bore spinal needle through the dilated cervix and foramen magnum. Alternatively, the CSF can be drained by opening the spinal canal (spondylectomy). If the fetus has spina-bifede, 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 allow normal delivery to proceed.

Decapitation:

Decapitation is severing the fetal head of a dead fetus after obstructed labor followed by delivery of the trunk and the decapitated head separately through the birth canal.

Indication[2]

Obstructed labor with a dead fetus in neglected shoulder presentation

Prerequisites and preparations

- Besides the prerequisites and preparations described for craniotomy, in transverse lie, the neck of the fetus has to be accessible for decapitation[3].
- Under anesthesia (or sedation under diazepam and pethidine), assess the situation:
  - If the neck and body are both still high in the birth canal, do a cesarean section;
  - If the neck can be reached easily, attempt decapitation;
  - If the neck is difficult to reach but the body is well down, attempt evisceration (see bellow)

Procedure

- If hand is not prolapsed –bring down a hand
- Ask an assistant to pull the hand and make the neck accessible & fixed
- By protecting maternal tissue, put the decapitation hook round the fetal neck[4]
- Make upward and down ward movements till the vertebral column is cut (sudden loss of resistance felt)
- Put a forceps on the head for holding the head after it is separated from the body
- Cut remaining soft tissue by the same hook or use scissors
- Remove the hook
- Deliver trunk first by pulling on the prolapsed arm
- Then retrieve the decapitated head with the forceps attached to it and deliver it as in the delivery of the after coming head in breech presentation.

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[2] The rare chin to chin interlocking in twins is the second indication for decapitation. The decapitation is done on the dead first twin after its body is delivered. The procedure in chin to chin interlocking is not difficult as in transverse lie described here. A couple of strong sutures are placed in the head of the firs twin followed by decapitation bellow the level of the suture. After delivering the body of the severed twin and the second twin, the sutures on the first twin are used to extract the decapitated head of the first twin.

[3] If the neck is high, cesarean section and evisceration with further decapitation is considered.

[4] In place of the decapitation hook, the Blond –Heidler thimble and wires saw can be used. A strong pairs of scissors can also be used when the neck is low and easily accessible.

- Explore the uterus and vagina to exclude rupture of the uterus & trauma to birth canal

Evisceration

Evisceration is removal of thoracic and or abdominal contents through an opening at most accessible site on the abdomen or thorax.

Indications

- Neglected shoulder presentation with dead fetus & neck not accessible for decapitation
- Fetal malformation (fetal ascitis, monsters, distended bladder & hydronephrosis)

Preparation and prerequisites

The preparation and prerequisites are similar as craniotomy and decapitation.

Procedure:

In transverse lie, after collapsing the trunk with evisceration, the neck becomes accessible for decapitation; or delivered as breech or footling by pulling the breech or a foot.

- Let an assistant pull on the prolapsed arm.
- With a knife or a pair of strong scissors make a large opening in the abdomen and/ or chest.
- Using an ovum forceps or your fingers remove the intestine, liver, lung and heart. Some times you may need to perforate the diaphragm using scissors.
- Now reassess the situation:
  - When the breech can be brought down by hooking a few fingers behind the fetal pelvis or a foot or leg can be felt easily; then delivered as breech.
  - If the breech cannot be delivered easily, the neck can be brought down for decapitation by pulling on the arm.
  - In the unlikely event that all this fails, perform cesarean section.

Cliedotomy

Cliedotomy is used to reduce the bulk of the shoulder girdle of the dead fetus by cutting one or both clavicle(s). It is indicated in shoulder dystocia. The preparations are as in craniotomy.

Post-destructive operation care

- Explore the uterus, cervix and vagina and treat accordingly. Repair episiotomy.
- Keep a self retaining catheter for 7-14 days if there is prolonged pressure of the presenting part on the bladder (obstructed labor) or trauma to the wall of the vagina;
- Manage the third stage actively and start 1000 ml D/S, Ringer's or saline fluid with oxytocin 20-40 IU intravenous drip;
- Treat infection: Broad spectrum antibiotics. Debridement of the dead tissue under general anesthesia may be needed to control infection from devitalized vaginal tissue.
- Continue with IV fluid and record vital signs and input/ output. Correct anemia and shock as indicated.
- Suppress possible breast engorgement
- Help the woman morn loss of her fetus and counsel her on future pregnanacy

Complications of destructive operations:-

- Trauma to the birth canal including vaginal fistula
- Recto-vaginal fistula
- Post partum hemorrhage due to atonic uterus or genital trauma
- Shock due to hemorrhage or sepsis

Hemorrhagic Shock in Pregnancy

Shock is a state in which the circulatory system fails to maintain adequate perfusion to sustain the physiologic needs of organ tissues leading to malfunction of total cellular metabolism[49]. It is an immediate life-threatening condition that needs prompt recognition and intensive treatment. Hemorrhage is one of the five major common causes of maternal deaths in Ethiopia. It accounts for about 25% of the deaths.

Diagnosis of shock

- Fast (PR ≥ 110 per minute), weak pulse
- Low blood pressure (systolic BP less than 90 mm Hg)

Other symptoms and signs of shock include:

- Sweating or cold clammy skin
- Rapid breathing (rate (RR) more than 30 per minute or more)
- Anxiousness, confusion or unconsciousness
- Pallor of conjunctiva, palms or mouth
- Scanty urine output(less than 30 ml per hour)

Estimation of loss in hemorrhagic shock

- In hemorrhagic shock, the amount of blood is estimated and accordingly classified using clinical parameters that suggest the amount of replacement-fluid needed. Treatment should be aggressive and directed more by response to therapy than by initial classification. The aim is to replace two to three times the estimated fluid loss. At the same time, monitor the need for further fluid on response of ongoing infusion so as over transfusion is avoided. The classification is based on the percentage of blood volume loss (Table 3).

Table 4 classification of severity of hemorrhagic shock

Classification of Hemorrhagic Shock	**Compensated**	**Mild**	**Moderate**	**Severe**
Blood Loss (mL)	≤ 1,000	1,000-1,500	1,500-2,000	> 2,000
Heart Rate (bpm)	< 100	> 100	> 120	> 140
Blood Pressure (mmHg)	Normal	80-100 Orthostatic change	70-80	50-70
Capillary refill	Normal	May be delayed	Usually delayed	Always delayed
Respiration	Normal	Mild increase	Moderate tachypnea	Marked tachypnea Respiratory collapse
Urine output (mL/h)	> 30	20-30	5-20	Anuria
Mental status	Normal or agitated	Agitated	Confused, Restless	Lethargic, Obtunded
Others	Palpitation, Dizziness	Weakness, Sweating	Pallor	Collapsed, Air hunger

-

[49] The common causes of shock include hypovolemia, sepsis, congestive heart failure, and neurogenic shock.

- ***Treatment Plan***
- The management of shock involves two concurrently on going activities:
- Combating shock and monitoring for adequate response (resuscitation & monitoring).
- Identifying the cause of shock and other complications and treat accordingly.
- This section describes resuscitation and monitoring of hemorrhagic shock while subsequent sections deal with identification of the cause of hemorrhage and its specific treatment.

Resuscitation steps

The overall goal of resuscitation is to improve the oxygen delivery function of the circulatory system. During the earlier stage of hemorrhagic shock, this is achieved by restoring the blood volume and hemoglobin (RBC mass) lost[50].

– Shout for help: Shock is a team work. All available personnel (including porters, paramedics) have to be around.
– Give oxygen at 6-8 L/minute by a face mask or nasal catheter
- If the woman is *not breathing*: ventilate with bag and mask until she starts breathing spontaneously. Intubation may also be considered.
- If the woman is *unconscious* turn her onto her side to minimize the risk of aspiration if she vomits and to ensure that the airway is open
- Start two IV line using a large-bore (16-guage or the largest available) cannula or needle. If necessary do vein cut down.
- Initiate infusion of fluid as fast as possible:

Diagnosis and treatment plan in imminent shock

Imminent shock: Suspect or anticipate shock if a woman is bleeding, especially if the loss is estimated to be 500 – 1,000 mL, either during pregnancy or puerperium or has sepsis even if her BP is within normal range.

– *Give oxygen by (*6-8 L/minute by a face mask or nasal catheter)
– Ventilate with bag and mask if she is not breathing
– Turn her onto her side if she is unconscious
– Commence slow crystalloids infusion (1000 mL over 6 to 8 hours)
– Take blood (10 mL) for X-matching (2 units), Hemoglobin (Hg)/ hematocrit (Hct) and others as indicated
– Vital signs (BP, PR, RR) at least every hour till the patient's condition is stabilized
– Urine output hourly

[50] In a septic patient, the failure of oxygen delivery may also involve respiratory failure besides circulatory collapse. Hence, depending on the cause of the shock, additional treatment may be needed or IV infusion of fluid or blood may be cautioned (e.g. shock due to heart failure).

- Aim to replace two to three times the estimated fluid loss. Normal saline or ringer's lactate initially at a rate of 1000 ml in 15-20 minutes (if possible give warm fluid). Give at least 2 L of these fluids in the first hour[51].. This is over and above fluid replacement for ongoing loss
- Blood transfusion in shock is indicated mainly on the clinical condition of the patient and the immediate response of fluid infusion. Some of the indications in shock are:
  - An estimated blood loss of 15% or more of the patient blood volume.
  - After 3 - 4 L of crystalloid is given and the patient is still in shock
  - Generally, moderate anemias with ongoing bleeding or sepsis require transfusion.
  - Transfusion should be considered seriously if the hemoglobin level is less than 7 g/dL and the patient has ongoing bleeding or sepsis or she is likely to bleed (e.g. placenta previa).

Issues in blood transfusion

– Incase the urgency for transfusion is extreme and there is no time for blood typing and cross matching; or if X-matched blood is not available once 3.5 L of crystalloid infused, give a unit of O-negative blood. During this first transfusion, it is better to have the blood grouping and cross matching to avoid hemolysis following repeated O negative transfusion.

– The transfusion of large volume of blood over a short time (e.g. more than 5 units of blood transfused in less than 4 hours) may be associated with haemostatic failure, citrate toxicity, disturbance in electrolyte and acid-base balance and hypothermia.

– Warm all infused fluids and blood before transfusion.

– If bleeding is unrelenting and coagulation failure is clinically suspected but coagulation laboratory results are not available, 1 L of Fresh Frozen Plasma (FFP) and 10 units of cryoprecipitate can be given empirically.

- Do not give fluid by mouth to a woman in shock.

- *Vasoactive drug therapy:* After adequate volume replacement has been achieved, vasoactive agents, which include inotropes and vasopressors (dopamine, dobutamine, phenylephrine, norepinephrine, epinephrine), may be considered but are not often required in hemorrhagic shock. When required, inotropic agents are administered first followed by vasopressors in refractory cases. There is a risk that these agents may cause a further limitation of perfusion and oxygenation of distal organs. Ideally, these drugs should be administered in a critical care setting.

[51] A more rapid rate of infusion may be required in the management of some cases with hemorrhagic and septic shock.

Table 5 Inotropic drugs and dosage

Pharmacological Support of the Cardiovascular System

Agent	Usual dote range	Effect
Inotropic agents		
Dopamine	1 - 3 μg/kg/min	Increased renal output Vasodilation
	2 - 10 μg/kg/min	Increased heart rate Increased cardiac output
	>10 μg/kg/min	Peripheral vasoconstriction Increased heart rate and contractility
Dobutamine	2 - 10 μg/kg/min	Increased heart rate and contractility decreased afterload
Vasopressor agents		
phenylephrine	1 - 5 μg/kg/min	Peripheral vasoconstriction
Noreplinephrine	1 - 4 μg/min	Peripheral vasoconstriction
Epinephrine	1 - 8 μg/min	Peripheral vasoconstriction

- Elevate her legs to increase return of blood to the heart. Avoid elevating the foot end of the bed as it may aggravate the respiratory embarrassment of the patient especially in late pregnancy. In late pregnancy, avoid supine to prevent supine hypotension syndrome. Use lateral position.
- Keep the woman warm

Goal of resuscitation
- SBP of 90 mm Hg or above (or MAP of $\geq$ 65 mm Hg)
- PR to 90 or less beats per minute (if no other cause for tachycardia, e.g. sepsis, anemia)
- Urine output to 30 mL or above per hour (o.5 mL/ Kg body weight/ hour)
- Improvement in mental status
- Hemoglobin level above 7 g/dL and, as much as possible, near to 10 g/dL (hematocrit 0f 30%).
- Oxygen level of 93% arterial

Monitoring and investigation

Pulmonary edema as a result of over transfusion should be prevented by close monitoring and detection of the complication as early as possible. Signs of over transfusion include crepitation on the posterior lung fields, raised JVP and tender and enlarged liver. Pulmonary edema is diagnosed by a CVP of 9-12 mm Hg and PCWP of $\geq$ 18 mm Hg.

Once the patient is stabilized, adjust the IV fluid to her current condition. For various reasons, shocked patients are exposed to infection and, hence, antibiotics are given

Frequent monitoring and recording of vital signs, relevant clinical-findings and treatment given is initiated as soon as shock is diagnosed. Patients in shock need intensive monitoring. The monitoring in shock includes:
- PR, BP, RR at least every 20-30 minutes

- Temperature (Tº)
- Cardio-respiratory and other clinical findings
- Urine output every hour using bladder catheterize
- Level of consciousness
- Fluid and blood given
- Drugs given

Laboratory investigations:
Ten mL of blood for hemoglobin (Hg)/ Hct, WBC, ABO and Rh-blood grouping, cross-matching and others has to be drawn immediately after accessing an IV line. In sepsis and septic shock, besides these investigations, specimens for culture and sensitivity and blood film (to exclude malaria and relapsing fever) are needed. The results of "very urgent"-laboratory orders should be available within 1 hour, preferably within half an hour of request.

Based on availability and suspected complications, other investigations that may be needed include arterial pH (7.35-7.45), $PaCO_2$ (35-45 mm/ mL), serum electrolytes, clotting parameters, RFT, LFT. When coagulopathy is suspected, bedside clotting tests, bleeding time, PT, PTT, fibrinogen level, platelet count, and other test have to be considered

Averting the shock inciting cause
If possible, a major surgical intervention is planned after stabilizing the patient's conditions but preparations for the intervention are initiated with resuscitation efforts. But, in condition such as PPH, ruptured ectopic pregnancy and ruptured uterus, where ongoing bleeding evades resuscitation efforts, surgical intervention to arrest bleeding is undertaken as soon as possible with on going resuscitation measures. For details see specific sections.

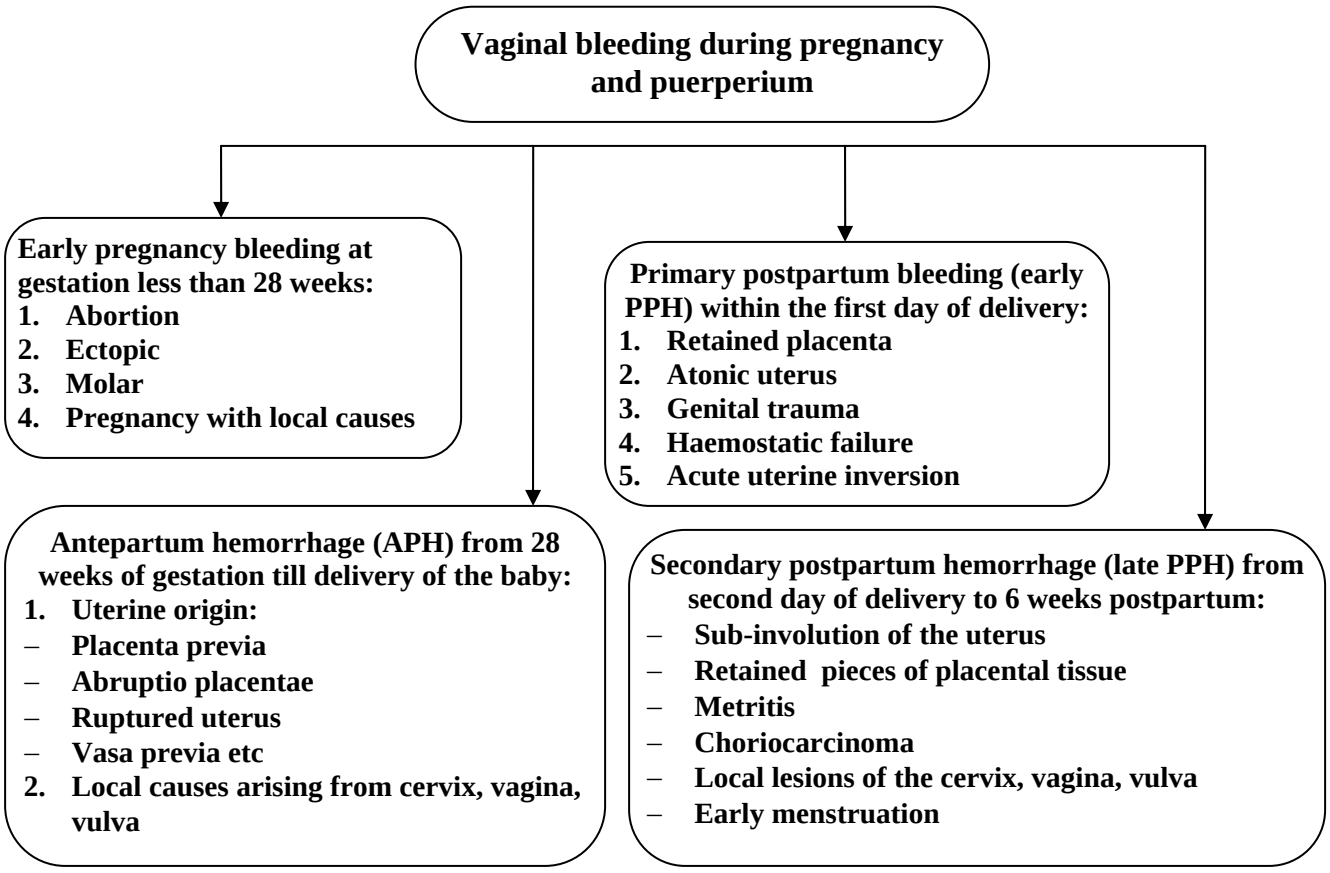
Health Education Message and Counseling: "Bleeding during pregnancy kills"
Women and the community should be made aware through various means that any bleeding during pregnancy is potentially life endangering. Families and the community need to be prepared (including financial, transport, blood donors) for such emergencies.

Hemorrhage in Pregnancy

General diagnostic approach

Vaginal bleeding during pregnancy and puerperium is pathological with few exceptions such as implantation bleeding in the first trimester; bloody show at the beginning of labor; during the third of stage of labor and early puerperium; and rarely, early initiation of menstruation in late puerperium.

The gestational age of pregnancy, stage of labor and postpartum period suggest the possible causes of hemorrhage; and, hence used in the clinical approach to the management of hemorrhage in pregnancy.



Early Pregnancy Bleeding

Early pregnancy bleeding is bleeding from the genital tract during pregnancy of less than 28 weeks of gestation[1]. The main c*auses are:*

- Abortion: threatened, inevitable, incomplete, complete abortion
- Ectopic pregnancy
- Molar pregnancy
- Coincidental local genital lesions of the cervix, vagina or vulva (e.g. cervical cancer)

Diagnostic approach

The table below summarizes the causes and signs and symptoms of early pregnancy bleeding:

Table 6 differential diagnosis of early pregnancy bleeding

Presenting Symptom and Other Symptoms and Signs Typically Present	Symptoms and Signs Sometimes Present	Probable Diagnosis
• Light bleeding • Closed Cervix • Uterus corresponds to dates	• Cramping/lower abdominal pain • Uterus softer than normal	Threatened abortion
• Light bleeding • Abdominal pain • Closed cervix • Uterus slightly larger that normal • Uterus softer than normal	• Fainting • Tender adnexal mass • Amenorrhea • Cervical motion tenderness	Ectopic pregnancy
• Light bleeding • Closed cervix • Uterus smaller than dates • Uterus softer than normal	• Light cramping/lower abdominal pain • History of expulsion of products of conception	Complete abortion
• Heavy bleeding • Dilated cervix • Uterus corresponds to dates	• Cramping/lower abdominal pain • Tender uterus • No expulsion of products of conception	Inevitable abortion
• Heavy bleeding • Dilated cervix • Uterus smaller than dates	• Cramping /lower abdominal pain • Partial expulsion of products of conception	Incomplete abortion
• Heavy bleeding • Dilated cervix • Uterus larger than dates • Uterus softer than normal • partial expulsion of products of conception which resemble grapes	• nausea /vomiting • Spontaneous abortion • Cramping /lower abdominal pain • Ovarian cysts (easily ruptured) • Early onset pre-eclampsia • No evidence of a fetus	Molar pregnancy
• Bleeding usually spotting except variceal bleeding and may precede pregnancy • Uterus corresponds to date • Closed cervix	• Pregnancy sign and symptoms • Speculum and VE reveal the specific cervical, vaginal or vulvar lesion	Pregnancy with cervical, vaginal or vulvar lesion; e.g., cervix/ vaginal cancer

[1] Since placenta previa rarely bleeds spontaneously before 28 weeks it is usually considered in late pregnancy bleeding

Ectopic pregnancy

The most common site for ectopic pregnancy is the fallopian tube. Symptoms and signs are variable depending on the ongoing pathological process that includes rupture of the tube or not; tubal abortion and the rate and amount of bleeding.

Diagnostic approach
The *classic triad* of symptoms ascribed to ectopic pregnancy is:
- amenorrhea (symptoms of early pregnancy) followed by
- vaginal bleeding
- abdominal/ pelvic pain

High risk factors include previous history of ectopic pregnancy, pelvic surgery, and infertility.

Table 7 clinical features of unruptured and ruptured ectopic pregnancy

Unruptured Ectopic Pregnancy	*Ruptured Ectopic Pregnancy*
• Symptoms of early pregnancy (irregular spotting or bleeding, nausea, swelling of breasts, bluish discoloration of vagina and cervix, softening of cervix, slight uterine enlargement, increased urinary frequency) • Abdominal and pelvic pan	• Collapse, weakness, syncope • Fast, weak pulse (110 per minute of more) • Hypotension • Hypovolaemia • Acute abdominal and pelvic pain • Abdominal distension (±shifting dullness) • Rebound tenderness • Anemia

The common differential diagnoses of ectopic pregnancy include:
- Abortion (threatened abortion is a common differential considered)
- Acute or chronic PID
- Ovarian cyst (torsion or ruptured)
- Acute appendicitis

Diagnostic Tests and Procedures
General:
- CBC, blood typing

Ruptured ectopic:
- The clinical presentation is usually diagnostic or implicates laparotomy/ laparoscopy.
- *Culdocentesis* is used to ascertain hemo-peritoneum:
  - *Procedure*: Let the woman sit at 30^{o} to 45^{o} for few minutes just before the procedure; use a 16-guage needle with 5 or 10 cc syringe; and pull the posterior lip of the cervix with a tenaculum
  - Positive culdocentesis is easy aspiration of at least 5cc non-clotting blood. Besides ruptured and other causes of hemo-peritoneum, 50-60% of unruptured ectopic pregnancies may have positive results.

- Negative culdocentesis is an aspiration of at least 5 cc clear-serous fluid. It indicates the absence hemo-peritoneum.

– Equivocal culdocentesis is a difficult aspiration of less than 5 cc blood-tinged fluid. It may represent the incomplete aspiration of a hemo-peritoneum or the aspiration of blood from a vessel in the uterus, ovary or vaginal wall. The culdocentesis must either be repeated or a diagnosis made on other criteria (e.g. laparoscopy, US, laparotomy).
– US and pregnancy test may be used in suspicious condition (see below)

Unruptured ectopic

– Ultrasound and pregnancy test are used in differentiating intrauterine and unruptured ectopic:
  - Positive pregnancy test and intrauterine pregnancy finding by US almost always excludes ectopic pregnancy
  - Serum β-hCG level in the 'discriminatory zone' with no intrauterine pregnancy by US is highly suggestive of ectopic pregnancy.
  - Serum β-hCG level bellow the 'discriminatory zone' with no intrauterine pregnancy by US is not conclusive and needs serial (doubling time) β-hCG level determination.
  - The 'discriminatory zone' of β-hCG level for abdominal US is 6,000 to 6,500 mIU/mL while for vaginal probe, it is 1,500 to 2,000 mIU/mL.

– Serum progesterone level $\geq$ 25 indicates intrauterine (IUP) pregnancy while a level < 5 indicates either a dying in IUP or an ectopic pregnancy. When the level is < 5, uterine evacuation (MVA / D&C) is indicated for histological examination. Arias Stella or absence of chorionic villi indicates ectopic pregnancy while presence of chorionic villi excludes ectopic pregnancy and indicate a failing IUP.

Treatment Plan

In ruptured ectopic pregnancy, resuscitation is immediately instituted (see section on shock) and laparotomy is performed as soon as possible. At laparotomy:

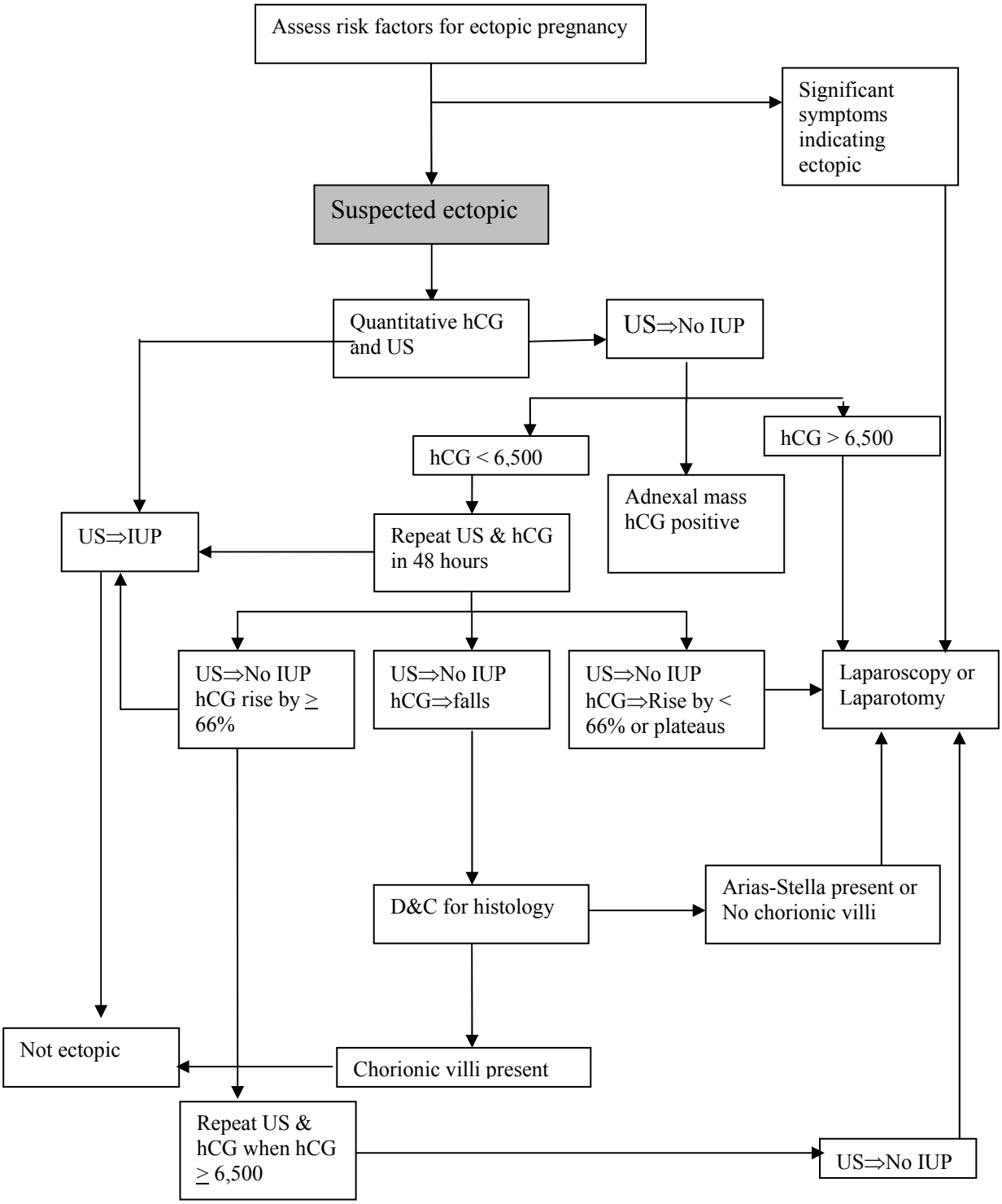
– If there is extensive damage to the tubes, perform salpingectomy. This is the preferred method in most cases.
– Rarely, if there is little tubal damage, perform salpingostomy to remove the products of conception and close the incision to conserve the tube. This is considered only when preserving fertility is very important to the patient as the risk of subsequent ectopic is high.

In unruptured ectopic pregnancy, conservative surgery (salpingostomy or segmental resection and re-anastomosis) or medical management (e.g. methotrexate) is considered if fertility conservation is essential.

Rh-immunoglobulin therapy (50 μg for less than 12 weeks) should be administered to all Rh negative, unsensitized women within 72 hours of surgery for ectopic pregnancy. Anemia is also corrected by ferrous sulfate or ferrous fumerate 60 mg PO daily for six months.

Prior to discharge, the woman should be counseled on the prognosis of fertility and risk of future

Figure 4 Algorithm for the diagnosis of ectopic pregnancy



Molar pregnancy

Molar pregnancy is characterized by an abnormal proliferation of chorionic villi. The diagnosis is certain if vesicles were passed. With such a presentation, evacuate the uterus immediately[2]:

- Get prepared for possible hemorrhagic shock (hemoglobin, blood group, blood cross-matching). If there is hemorrhagic shock, treat accordingly (page 133).
- Open an IV line
- If the cervix is closed and needs dilatation use cervical block or other analgesics
- Use vacuum aspiration. If manual vacuum aspiration is used, prepare at least three syringes
- 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.
- Submit the evacuated specimen from the uterine wall for histological examination if pathological examination is available.
- Advice for use of combined oral contraceptive pill for one year or tubal ligation if the woman has completed her family
- Follow patient with thorough history and physical examination, chest x-ray, urine pregnancy test every 8 weeks.
- Refer patient to a tertiary care if:
    - the pregnancy test remains positive after 8 weeks of evacuation or
    - becomes positive after becoming negative within the first year after evacuation

[2] The management described here is for a hospital with limited diagnostic option and the woman can not afford to go to an oncology unit.

Antepartum Hemorrhage

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

Causes:
- Placental causes
  - Abruptio placentae
  - Placenta previa
  - Rare causes: vasa previa and other placental abnormalities
- Uterine rupture
- Local legions of the cervix, vagina and vulva
- Indeterminate: causes of bleeding not identified even after delivery and examining the placenta

Abruptio placentae
Abruptio placenta is a premature separation of the whole or part of a placenta implanted in the upper segment of the uterus. Normally, the placenta separates after the delivery of the fetus, in the third stage of labor.

Factors associated with abruptio placenta are multiparity, maternal age greater than 35 years, hypertension, low socio-economic status, smoking, trauma (e.g. ECV), polyhydramnious, short cord, amniocentesis and previous history of abruptio placentae.

The complications of abruptio placenta include hemorrhagic shock (acute renal failure, congestive heart failure), DIC, and utero-placental insufficiency (UPI) that may lead to IUGR, fetal distress or IUFD.

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). In abruptio placenta, part or most of the bleeding from the detached placental site may get its way through the cervix to the vagina or all the bleeding becomes concealed:

- *Vaginal bleeding*: menstrual-like (dark), totally concealed or the amount is less than the degree of the shock
- *Abdominal pain/ (uterine) tenderness*: In case of a large placental detachment, there will be severe pain /tenderness, shock and fetal death. The clinical picture is that of 'acute abdomen' in late pregnancy.
- In case of a sudden major separation, the fetus may die immediately while gradual separation may lead to progressive UPI with fetal growth retardation and abnormal fetal heart pattern in labor.
- Depending on the degree of coagulation defect, there may be frank bleeding (epistaxis, echymosis, petichii) disorder or a mild derangement that may be picked by coagulation profile only.

US diagnosis of abruptio placentae may be made by occasional detection of retroplacental clot and by exclusion of placenta previa and local causes. The diagnosis can be confirmed after delivery by examining the placenta.

Table 8 Grading the severity of abruptio placenta

Classification of Abruptio Placenta			
Clinical presentation	**Mild (Grade 1)**	**Moderate (Grade 2)**	**Sever (Grade 3)**
Degree of separation	<1/6th	<2/3 rd	.2/3rd
Amount of blood	<400 mL	<1000 mL	≥ 1000 mL
Uterine irritability (pain/ tenderness)	Normal / slightly ↑	↑	Tetanic, reactive, board like, tender on palpation
Fetal condition	No abnormal fetal heart abnormality	Abnormal / rarely death	Fetal distress or death common
Shock	Absent	Mild, postural hypotension	Severe and always present

Treatment plan

Timing of delivery: Abruptio is usually an ongoing process; and, hence, delivery is the definitive management. But, initiating delivery may be delayed (conservative management) to prevent prematurity.

Mode of delivery: The preferred mode of delivery in abruptio placenta is vaginal. Cesarean section is indicated for severe bleeding endangering maternal life and where vaginal delivery seems unlikely within a reasonable time. Besides, Cesarean section is done for other obstetrics indication (e.g. fetal distress).

In abruptio placentae, coagulation defects have to be looked seriously. The treatment includes amniotomy to release intrauterine pressure; termination of pregnancy; and management of shock

Placenta previa

Placenta previa is partial or complete localization of the placenta in the lower segment of the uterus. Factors associated include large placenta (e.g. twin pregnancy), scared uterus, high parity and maternal age.

Placenta previa is classified based on nearness of the placental edge to internal-os of the cervix:

- *Lateral (low lying) or primary*: The placenta is in the lower segment of the uterus but away from the internal-os
- *Marginal or secondary*: The edge of the placenta reaches the internal-os
- *Major placenta previa*:
    - *Partial (incomplete) or tertiary placenta previa*: the edge of the placenta gets beyond the internal-os but does not complete covers the dilated cervical os
    - *Complete (total) or fourth degree placenta previa*: the placenta covers the whole of the internal-os and the fully dilated cervix

Diagnosis

The bleeding of placenta previa is described as bright red, painless, cause-less and recurrent. The first bleeding usually occurs late in pregnancy.

The diagnosis of placenta previa can be confirmed by US and/ or double set up examinations. A low lying placenta previa detected by US early in pregnancy may migrate to the upper segment of the uterus. Hence, repeat US late in pregnancy is needed before deciding on the mode of delivery.

Treatment Plan
Timing of delivery: Delivery is the definitive management of placenta previa. The timing of delivery may postponed (conservative management) to prevent preterm delivery.

Mode of delivery: The preferred mode of delivery in placenta previa is Cesarean delivery, but vaginal delivery may be considered in anterior and low lying placenta.

Local causes
All local causes of APH have minimal spotting or bleeding. An exception to such a presentation is the occasional profuse bleeding of ruptured vaginal varicose vein. Once placenta previa is excluded, digital and speculum examination may confirms the specific local legion.

Diagnostic Tests and Procedures in APH
Unless placenta previa is excluded by a double setup examination (DSE) or ultrasound (US) examination, **vaginal or rectal examination should not be done**. Tentative diagnoses of abruptio placenta or placenta previa *may be reached* on certain clinical findings. But, the definitive diagnosis of placenta previa and further management decisions are made on ultrasound *done by an experienced sonographer* and/ or DSE. An uncertain-US report should be seen within the context of the other clinical findings and exclusion of placenta previa by DSE.

Table 9 Clinical Findings in Placenta Previa and Abruptio Placenta

Clinical Findings	Placenta Previa	Abruptio Placentae
Vaginal bleeding	Painless Causeless Recurring Bright red	Painful Presence hypertension, trauma, etc Non-recurring Menstrual like
Shock	Proportion to vaginal blood loss	Degree of shock out of proportion to amount of vaginal bleeding
Uterus	Quite or relaxed between labor contractions	Irritable, not relaxing between labor contractions (tetanic contraction),
Fetal presentation	Mal-presentation (transverse, breech), unengaged head	Difficult to palpate fetus Engaged head
Fetal condition	Usually normal fetal condition	Fetal distress, Fetal death, IUGR

By using the severity of abruptio placenta as reference, the main differential diagnoses in APH can classified into:

Mild abruption:

– placenta previa,
– local causes,
– heavy show
– vasa previa

Severe abruption with acute abdomen presentation:

– ruptured uterus,
– appendicitis,
– volvulus
– Chorioamnionitis
– Other rare causes: red degeneration, retroperitoneal bleeding, rectus muscle bleeding

Uterine rupture, heavy show and vasa previa are usually diagnosed by their clinical presentation:

- Ruptured uterus: prolonged labor with sign and symptoms of obstructed labor; previous scar and abdominal pain
- Heavy show: bloody mucus at onset of labor
- Vasa previa: minimal bleeding with rupture of fetal membranes followed by fetal distress or death. Early diagnosis of vasa previa before rupture of the membranes can be considered on palpating a band crossing the fore-water membranes and US diagnosis of placenta previa. Pulsation on the band makes the possibility certain.

The specific local cause of bleeding is identified by speculum examination. Since speculum examination can incite profuse bleeding from placenta previa, its use is considered:

- after excluding placenta previa by US;
- at the time of DSE

Double set up examination (DSE) is performing VE in the OR with all the preparations for an emergency CS are made DSE is performed:

– on the day of termination of pregnancy
– before allowing labor to proceed if the woman is already in labor

Procedure in DSE:

– Take patient to the OR and make all the preparation for immediate CS which includes draping of the patient, laid trolley, scrapped up nurse and assistant, x-matched two units of blood, and all preparation for immediate intubation. If placenta previa is more likely or the anesthetist is not well experienced, general anesthesia can be initiated before the VE.
– Using two Sims speculum, explore the vagina and cervix to exclude any local lesion and confirm that bleeding is coming through the cervix if there is active bleeding
– Ask an assistant push the presenting part (head), into the pelvic brim
– First explore the vaginal fornices with your fingers:

- Abnormal thickness in the lower segment of the uterus or a feeling of intervening tissue between your finger and the head indicated presence of placenta previa.
- If the thickness all round the vaginal fornices, major placenta previa is entertained while thickening of part of the fornices indicate lesser degree of placenta previa.
- In case the thickness you feel is not suggestive of a major placenta previa or if there is no such thickness, put your index finger into very gently through the cervical os, and explore all round. Sweep it in gently widening circle until you have examined all around as far as you can reach with your finger. Check for vaginal bleeding while exploring. Stop when you feel any placenta or bleeding is incited or increased during the examination.
- If you feel placenta, manage her as placenta previa
- If there is profuse bleeding following the VE, proceed with CS
- If you feel no placenta, the bleeding may be due to abruptio or minor degree (low lying) of placenta. Perform ARM and transfer the woman to the labor ward for close monitoring and induction with oxytocin.

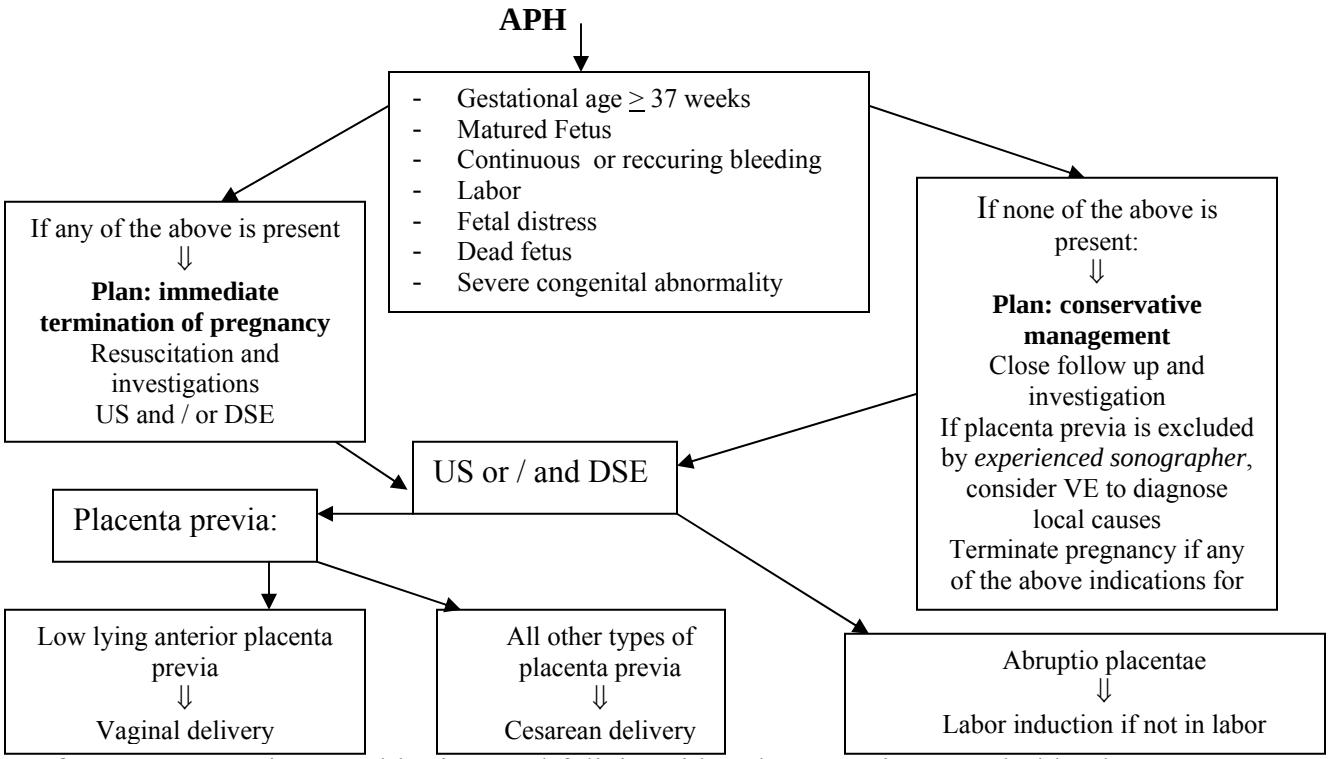
Treatment Plan in APH

Besides the specific cause-related interventions of the bleeding, the management of APH includes decision on time of termination (immediate or conservative). Immediate termination of the pregnancy is considered if:

- Gestational age is 37 weeks or above or when fetal maturity is ascertained
- Bleeding is continuous with shock and maternal condition deteriorates. Treat shock (page 144) and arrest bleeding by terminating the pregnancy
- Patient is in labor
- There is fetal distress
- The fetus is dead
- The fetus has severe congenital abnormality incompatible with life (e.g. anencephaly)

When the gestational age is less than 37 weeks and none of the above conditions prevail, the patient is admitted and closely followed until 37 weeks (or fetal maturity ascertained by fetal lung maturity test) or any of the indications for immediate termination supervene during follow up. Such a conservative treatment includes:

- Identifying cause of bleeding
- Exclusion of local causes: if so treat accordingly and follow as an outpatient
- Preparation of 2-4 units cross-matched blood
- Treatment of anemia or iron supplementation
- Daily fetal and maternal monitoring
- Rest and avoidance of deep vaginal douching and coitus
- Provision of steroid treatment when gestational age is 28 to 34 weeks to accelerate lung maturity



Iron deficiency anemia is treated by iron and folinic acid oral-preparation. Rarely blood transfusion is indicated.

Primary post partum hemorrhage

Primary post partum hemorrhage is *excessive* genital bleeding within 24 hours of delivery of a 28 or more-weeks baby.

The amount of bleeding considered to be *excess* is a perceived blood loss of 500 mL or more after a vaginal delivery or 1000 mL or more after a cesarean delivery. In certain conditions (such as pre-eclampsia, anemia) lesser amount of blood loss leads to shock. For practical reasons, when an attendant considers that the bleeding is unusually excessive or trickling for a long time, s/he has to presume PPH and intervene to avoid delay of management. Providers usually underestimate blood loss.

Causes

- atonic uterus
- genital trauma
- retained placenta
- coagulation failure
- acute inversion of the uterus

Atonic Uterus

Atonic uterus is the most common cause of primary PPH. The contraction of the uterus after delivery of the baby is the most effective mechanism that arrests bleeding from the placental bed and causes detachment and expulsion of the placenta. A hypotonic uterus leads retention of the placenta and excessive bleeding. Active management of the third stage of labor (AMTSL) is recommended for all deliveries (see section on AMSTL).

Clinical presentation of atonic uterus mainly rests on palpating an atonic (hypotonic, floppy) uterus and expulsion of clots when the uterus is compressed. When the uterus is extremely hypotonic, one may not feel the uterus. Bleeding due to hypotonic uterus has the tendency to recur and, hence, needs close monitoring and frequent rubbing of the uterus for two or more hours after delivery.

Retained placenta

The placenta is detached after the delivery of the fetus due to the contraction and retraction of the uterus and subsequent decrease in uterine implantation surface area. The common cause of placental retention is poor uterine contraction. Constricting ring formation by the lower segment of the uterus or cervix and pathological adherence of the placenta are rare causes of placental retention. In retention of the placenta without bleeding, pathological adherence should be considered and manual removal of the placenta has to be done in the OR with all the preparation for laparotomy.

Traumatic causes

Feto-pelvic disproportion, instrumental deliveries and scarred uterus are some of the predisposing factors for tears of the birth canal (vaginal, cervical, uterus) and bleeding. Bright red (arterial) bleeding with a contracted uterus suggests traumatic cause of PPH.

Coagulation defects

Disseminated intravascular coagulation may develop as a consequence of abruptio placenta, amniotic fluid embolism, severe infections or massive bleeding. Certain

congenital abnormalities of coagulation and platelet may also occur in certain pregnant women.

Clinically, failure of coagulation may be identified from the woman's previous medical and family history or suspected from her current obstetrics complication (abruption placenta, intrauterine fetal death, infection etc). On physical examination, gross haemostatic failure is revealed by ecchymosis (especially at injection sites), petichii, and epistaxis. After delivery, the vaginal bleeding may not form clot or, if there is clot formation, the clot liquefies after some time.

Failure of clot formation can also be demonstrated by a simple bed side clotting tests. Failure of blood kept in a test tube at body temperature to form clot within seven minutes or easy break down of initially formed soft clot, demonstrate failure of the coagulation mechanism. Laboratory results may demonstrate low fibrinogen (<280 mg/dL), prolonged prothrombin and partial thromboplastin time, increased fibrin split products and low platelet number.

Acute inversion of the uterus

In acute inversion of the uterus, the uterus turns inside-out during delivery. It occurs very rarely. The immediate causes of shock are bleeding and neurogenic reflex due to pain. If not treated with antibiotics, sepsis and septic shock may develop later in the first ten days postpartum. The inversion may occur with the placenta attached to the uterus, in which case further pulling may complete the inversion. With the placenta detached the inverted uterus is described as cherry red mass.

The extent of the inversion is classified into four degrees:

- *First degree*: Fundus is within the uterus not extending beyond the cervix; on abdominal palpation, a dimple can be felt with the bleeding, pain and shock
- *Second degree*: the inversion extends out of the cervix and is limited to within the vagina. A soft and easily bleeding mass can be felt inside the vagina if the placenta is already detached
- *Third degree* is a complete inversion to the perineum
- *Fourth degree* is a total inversion of the uterus with the vagina

Diagnostic and Treatment Plan in PPH

When one is faced with excessive postpartum vaginal bleeding with or without shock, s/he has to call the team, immediately initiate resuscitation, and perform diagnostic and treatment activities promptly. When the cause of the PPH is known, specific treatment is directed towards the identified cause; e.g. ruptured uterus or retained placenta. When the cause of the bleeding is not straightforward, the following management approach is taken to diagnose and treat PPH:

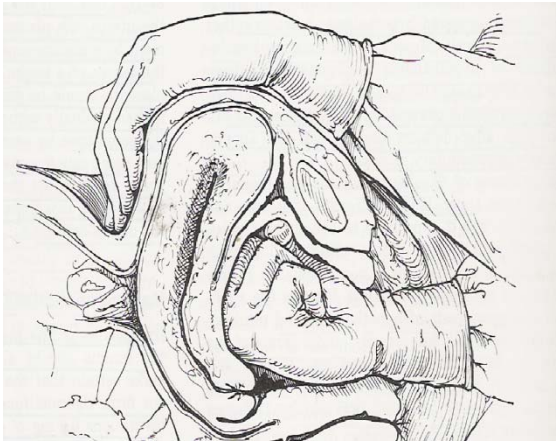
1. **Call for help:**
   - PPH is a team work
2. **Initiate resuscitation and monitoring (see section on hemorrhagic shock)**
   - Establish two IV lines
   - Take blood (10 mL) for X-matching (2 units), hemoglobin (Hg)/ hematocrit (Hct) etc

- Commence crystalloids infusion
- Initiate monitoring vital signs: BP, PR, RR etc
- Catheterize and measure urine output

3. **Retained placenta: PPH with undelivered placenta:**
   - Give oxytocin 10 units IM, rub the uterus and attempt CCT (see section on AMSTL):
   - If placenta is delivered and uterus well contracted, closely monitor and continue with frequent rubbing of the uterus (see step 8: follow up after PPH).
     - In case the placenta is delivered but the uterus remains hypotonic and bleeding continues, manage as atonic uterus (see step 4: atonic uterus).
     - If placenta delivery fails, perform manual removal of the placenta.
     - *If placenta is not delivered by CCT and manual removal of the placenta*, consider:
       - Constriction ring or technical difficulty in passing the hand through the cervix and/ or lower segment: Extract the placenta using the fingers, ovum forceps or wide curette
       - Pathological adherence of the placenta: Hysterectomy may be needed

4. **Atonic uterus: PPH with delivered placenta and atonic uterus**

   If the uterus is not well contracted after the placenta is delivered, management is directed to atonic uterus.



   - Stimulate contraction by rubbing the uterus and giving oxytocic- (or repeating oxytocic-) drugs.
     - If there is no response, perform bimanual compression of the uterus and alert the OR team: Once bimanual compression is required, it is necessary to alert the OR team for possible operative intervention. The bimanual compression may arrest bleeding or provides 30-40 minutes for organizing the OR team, arrange blood and treat shock. Compression of the abdominal Aorta may also be used in place of the bimanual compression especially during laparotomy.
       - If bleeding is not arrested by manual compression, subsequent management of atonic uterus involves uterine or utero-ovarian artery ligation, or hysterectomy (total or subtotal).
       - *Note: If the uterus is not felt at all or a 'crater' is felt, perform digital examination to role out acute inversion of the uterus.*

Abdominal aorta compression



5. **Genital trauma: PPH with delivered placenta and well contracted uterus**

- Bleeding from episiotomy site and perineum can be identified by inspection early
- Digitally explore the uterus to identifying uterine rupture. If so, perform laparotomy.
- Following exploration of the uterus, examining the vagina and cervix using two Sims speculums. For proper inspection of the cervix, a segment of the cervix held by two sponge forceps is inspected at a time. After any normal delivery, the cervix and vagina may have small cuts that do not bleed. Such tears do not need repair. Do not waste valuable time by stitching non-bleeding tears. If there is no tear that accounts for the PPH in the vagina and cervix, check for uterine rupture. Cervical tears that extend into the uterus or their apex can not be visualized need laparotomy.

6. Clotting abnormality

– Make sure that the uterus is well contracted. Uterine contraction is the most effective haemostatic mechanism in controlling bleeding after delivery
– Generally, correction of anemia and shock are adequate measures.
– Occasionally, transfusion of FWB (after HIV Screening), FFP (15 mL /Kg body weight), platelet concentrates, fibrinogen or cryoprecipitate are needed:
  - Give platelet when there is continues bleeding and platelet count is less than 20,000/ mm^3. A unit of platelet may increase the platelet count by 5,000 – 10,000/ mm^3 in a patient not consuming platelet. If the patient is likely to undergo an operative procedure and her platelet count is bellow 50,000, platelet transfusion is needed
  - Cryoprecipitate is given when a patient has hypofibrinogenemia. To supply 4 g of fibrinogen, 15–20 U must be given, which will raise the fibrinogen level in plasma by approximately 100mg/dL.
  - The standard ratio of packed erythrocytes to FFP is 4 to 1.

7. PPH after acute inversion of the uterus

The management of acute inversion of the uterus includes immediate recognition, treatment of pain and shock and quick and safe replacement of the uterus:

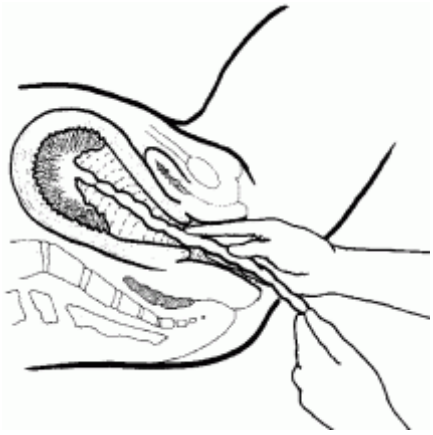
- If the woman is in severe pain, give pethidine 1 mg/kg body weight (maximum of 100 mg) IM or IV slowly or give morphine 0.5 mg/ kg body weight. General anesthesia may be required in certain patients.
- Immediately after diagnosis, it is often possible to replace the uterus by applying gentle transvaginal pressure. The Johnson technique calls for lifting the uterus and the cervix into the abdominal cavity with the fingers in the fornix and the inverted uterine fundus on the palm. The fundus is then gently pushed back through the cervix. The operator's hand should be kept in the uterus until the fundus begins to climb up. If the placenta is still attached, it should not be removed until after the uterus is replaced through the cervix.
- If the uterus cannot be easily replaced, a tocolytic (terbutaline 250 µg or nitroglycerine 125 µg IV) to relax the uterus may be used. But, these tocolytics are contraindicated in hypotensive patients. Magnesium sulfate (2-4 g IV slowly) can be used in hypertensive patients.

- If vaginal replacement is unsuccessful (as may occur in delayed recognition and treatment), laparotomy with abdominal replacement is indicated. Gentle upward traction can be used with Allis clamps placed sequentially on the round ligament. If that fails, then a midline vertical incision in the uterus (a 'classical' uterine incision) can be made to aid in lifting the fundus. Rarely vaginal hysterectomy may be required for necrosis of the inverted uterus.
- Do not give Oxytocin until the inversion is corrected. After the uterus has been replaced, oxytocic agents can be used.
- If there are signs of infection (fevers, foul-smelling vaginal discharge), treat as metritis. Other wise give a single dose of prophylactic antibiotics after correcting the inversion:
  - Ampicillin 2 g IV and metronidazole 500 mg IV
  - Cefazolin 1 g IV and meronidazole 500 mg IV

Follow up after arresting PPH

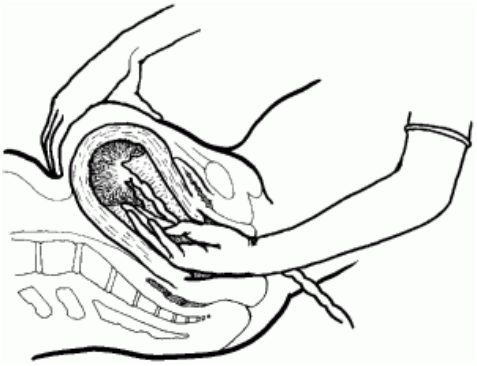
- Keep woman in labor ward or ICU where she can be monitored closely for at least 2 hours
- Check and rub the uterus every 15 minute for the next two hours
- Monitor bleeding and vitals signs (PB, PR,RR) for next 6 hours every 30 minutes
- Continue with IV fluid and oxytocin drip for next 4-6 hours
- Continue with blood transfusion if already initiated or start transfusion if indicated
- If patient is stabilized, assist her to initiate breast feeding if appropriate
- **Manual Removal of the Placenta**

– Review indication
– Use infection prevention measures
– Start an IV line
– Give pethidine and diazepam IV slowly (do not mix in the same syringe) or ketamine
– Catheterize bladder or ensure that it is empty
– Give single dose of prophylactic antibiotics:
– Ampicilline 2 g IV PLUS metronidazole 500 mg IV *OR*
– Cefazolin 1 g IV PLUS metronidazole 500 mg IV
– If metronidazole is not available, give chloramphenicol 1 g IV or clindamycin
– Hold the umbilical cord with a clamp. Pull the cord gently until it is parallel to the floor
– Wear high-level disinfected or sterile glove (use long gloves if available), insert the other hand into the vagina and up into the uterus
– Let go of the cord and move the hand up over the abdomen in order to support the fundus of the uterus and to provide counter-traction during removal to prevent inversion of the uterus
– Move the fingers of the hand in the uterus laterally until the edge of the placenta is located.
– If the **cord has been detached previously**, insert a hand into the uterine cavity. Explore the entire

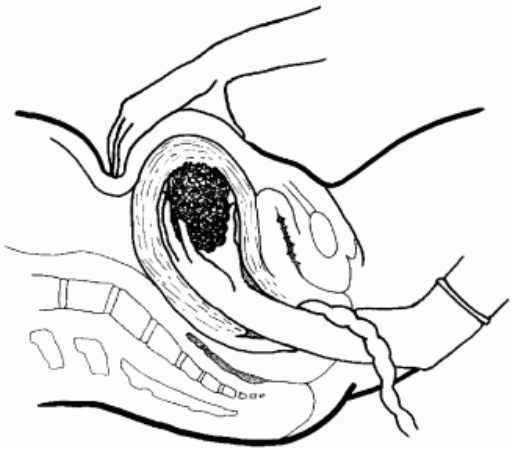


cavity until a line of cleavage is identified between the placenta and the uterine wall.

– Detach the placenta from the implantation site by keeping the fingers tightly together and using the edge of the hand to gradually make a space between the placenta and the uterine wall.
– Precede slowly all around the placental bed until the whole placenta is detached from the uterine wall.
– If the **placenta does not separate from the uterine surface** by gentle lateral movement of the fingertips at the line of cleavage, remove placental fragments. If the **tissue is very adherent**, suspect placenta accreta and proceed to laparotomy and possible subtotal hysterectomy.



– Hold the placenta and slowly withdraw the hand from the uterus, brining the placenta with it.
– With the other hand, continue to provide counter-traction to the fundus by pushing it in the opposite direction of the hand that is being withdrawn.
– Palpate the inside of the uterine cavity to ensure that all placental tissue has been removed.
– Give oxytocin 20 units in 1000 mL IV fluids (normal saline or Ringer's lactate) at 60 drops per minute.
– Ask an assistant to massage the fundus of the uterus to encourage a tonic uterine contraction.
– If there is continued heavy bleeding, give ergometerine 0.2 mg IM or prostaglandins and manage as PPH with placenta out.
– Examine the uterine surface of the placenta to ensure that it is complete. If any Placental lobe or tissue is missing, explore the uterine cavity to remove it.



– Examine the woman carefully and repair any tears to the cervix or vagina, or repair episiotomy.
–

Secondary Postpartum Hemorrhage

Definition

Secondary PPH (2^0 PPH) is abnormal bleeding occurring from the second day to the sixth week postpartum.

Causes

– Bleeding in the first 3 weeks after the first day of delivery is mainly due to:
  - Sub-involution of the uterus
  - Infection
  - Retained pieces of placental tissue or clot
  - Breakdown of the uterine wound after Cesarean delivery or ruptured uterus
  - After obstructed labor, bleeding may occur due to sloughing of dead vaginal tissue (cervix, vagina, bladder, and rectum).

- Bleeding from the third week to sixth week is mainly due to:
  - Choriocarcinoma (rare)
  - Local causes (vaginal or cervical) such as severe infection, malignancies, trauma
  - Early onset menstruation

Treatment Plan:

1. Usually sub-involution of the uterus, intrauterine infection and retained pieces of placental tissue are considered as a triad of causes for bleeding in the first two weeks especially from the 5^{th} to 10^{th} day postpartum. When reliable US is available, the decision to evacuate the uterus or not can be made based on US finding. Otherwise, all the three conditions are treated together:
   – Oxitocics in drip or ergometerine (PO 1 tablet twice a day for 2-3 day)
   – Semi-sitting position to enhance drainage from the uterus
   – Antibiotics against common organisms of the vagina
   – Evacuate the uterus using 'finger curettage', vacuum aspiration or large blunt curette
   – Treat anemia and shock as appropriate (see section on hemorrhagic shock
   – Very rarely, bleeding persists and hysterectomy or other surgical procedures might be needed
2. Incase of breakdown of the uterine wound after Cesarean delivery or ruptured uterus, laparotomy is done to re-suture the wound or hysterectomy.
3. Sloughing of dead tissue of the vaginal wall is treated by removing dead tissue under light anesthesia; and packing the bleeding areas tightly for 24-48 hours
4. When bleeding occurs late in the postpartum period, (3^{rd} - 6^{th} week), pregnancy test has to be performed to role out choriocarcinoma. Specimen of uterine evacuation must be submitted for histological examination. In non-breast feeding woman, it may be the first menstrual bleeding postpartum. Local legion of the vagina or cervix are excluded by speculum examination.

Post Term Pregnancy

Definition: It is a pregnancy that advances beyond 42 completed weeks or 294 days of gestation from the last normal menstrual period(LNMP). The reported incidence rate ranges from 3 to12 %.

Evaluation: Many women are unable to accurately recall either the date of their last menstrual period or the regularity of their cycles. Therefore a through revision of history, physical examination and earlier ultrasound evaluation are helpful in ascertaining the duration of gestation and also diagnosis and management.

History:

- Define the LNMP & determine the regularity of menses. The expected date of delivery (EDD) should be adjusted by number of days that the cycle varied from the usual 28 days.
- The presence of abnormal uterine bleeding & the date on which hormonal contraceptive method was discontinued should be noted.
- Date of quickening (add 18 weeks in primigravida or 16 weeks in multipara from the date of quickening to know the gestational age)
- Date of conception(e.g ovulation induction and assisted reproductive treatment)

Physical Examination

- First trimester pelvic examination to determine uterine size
- Symphysis fundal height in centimeter compares favorably with gestation age at approximately 20-34 weeks of gestation.
- At 20 weeks of gestation, fundal height is at level of the umbilicus.
- Detection of fetal heart tones
    - Fetoscope at 18-20 wks.
    - Doppler at 10-12wks.

Diagnostic tests

Positive pregnancy test (in urine by 6 weeks from LNMP)

Ultrasound is most useful when performed before the 20th week of gestation.

- First trimester (accuracy ± 1wk). Gestational sac, crown rump lengh.

- Second trimester (accuracy ± 10-14 days). Femur length, Biparietal diameter.
- Third trimester (accuracy ± 2-3 wks), Biparietal diameter, femur length.

Management of Post Term Pregnancy

General

- Confirm the gestational age
- Review the prenatal case document
- Do physical examination to
    - Estimate fetal size; ascertain viability and fetal well being.
    - Assess the adequacy of the pelvis, and favorability of the cervix using Bishop score

Specific

Induce at

- 42 completed weeks in all cases with favorable cervix.
- 42 completed weeks by ripening the cervix if unfavorable.
- 43 weeks of gestation irrespective of cervical status.

Cesarean section if contraindication for induction or vaginal delivery exists

Cervical Ripening

Most parturient with documented post-term pregnancy have a low Bishop score. Cervical ripening techniques may help to attain a safe vaginal delivery. Method used includes membrane stripping, Prostaglandin E2 administration and Foley catheter traction. Once the cervical priming is complete, amniotomy or oxytocin administration may be used to stimulate labor.

Antenatal Surveillance Testing Methods

Ante partum surveillance generally begins at 41 weeks, or 287 days from the first day of the last menstrual period, because the perinatal morbidity and mortality begin to rise before 42 weeks of amenorrhea.

- Kick count: if less than 10 kicks per 12 hrs or less than 3 kicks per hour (Morning, afternoon, evening), further testing required.
- Biophysical Profile (BPP): if the total score is less than 8, consider induction of labor.

- Non stress test: done twice weekly: If non reactive, do Oxytocin challenge test (OCT/CST).
- Oxytocin challenge test weekly. Terminate pregnancy if test is positive.

Note that parallel testing for fetal well-being should be preferred than branched testing to avoid loss of mature fetus. Therefore a single abnormal test is satisfactory to consider termination of the pregnancy.

Management of Labor & delivery in postterm pregnancy.

Refer the induction and labor management protocol.

Patients are scheduled for induction from outpatient unless otherwise induction on emergency ground or admission for other obstetrical risk factors is indicated.

First stage of labor: close follow up of the fetal well being by CTG monitoring or intermittent auscultation every 15 minutes in relations to contraction.
Second stage of labor: anticipate the following maternal and fetal complications.

Maternal: Shoulder dystocia, PPH, Genital (birth canal) trauma,

Fetal: Fetal distress, Meconium aspiration syndrome.

Third stage should be managed actively.

Complications of post term pregnancy

- Macrosomia
- Fetal Asphyxia
- Meconium Aspiration
- Post maturity Syndrome

Premature/Pre-Labor Rupture of Membrane

Definitions

Premature/ pre-labor rupture of membrane PROM (premature/pre labor rupture of membranes) is rupture of membranes (ROM) before the onset of labor (regular uterine contractions)

- Latency period: - is the interval between the rupture of membranes(ROM) & the onset of labor
- Prolonged PROM is rupture of membranes for> 12 hrs
- Term PROM is rupture of membranes after 37 completed weeks of gestation
- Pre term PROM: - is rupture of membranes before 37 completed weeks of gestation

Diagnosis

An accurate diagnosis is crucial to the management of suspected ROM Most cases can be diagnosed on the basis of the history & physical examination.

Digital examination should be avoided as it increases the risk of ascending infection

History

- Most commonly the patient presents with history of a **large gush of f1uid from the vagina followed by persistent uncontrolled leakage .**
- Some patients have only small, intermittent leakage
- May soak clothing or bedding
- Fluid may be seen on clothing or on sanitary pads
- Fluid can usually be seen at the introits
- Typical odor of amniotic fluid confirm the diagnosis

Physical examination

- **General examination to rule the presences of maternal and fetal infection**
- **Speculum examination** - using high level disinfected or sterile instruments may help to confirm the diagnosis, & may reveal
  - Glistening, washed out vagina
  - Fluid pooling in posterior fornix

- Free flow of fluid from cervix! presence of meconium/vernix
- Ask the women to cough' this may cause a gush of fluid

In addition during speculum examination note the following

- Rule out the presence of a cord prolapse
- Asses the state of the cervix (effacement and dilatation)

Additional test to confirm diagnosis

Pad test can be helpful when there is no pooling & no leakage from cervix .

- Place a vaginal pad over the vulva & examine it an hour later visually & by odor
- Wetting with no urine and no vaginal discharge (vaginitis) may suggest PROM
- If the diagnosis remains in question, do two tests, if available

Nitrazine paper test

- Depends upon the fact that vaginal secretions & urine are acid while amniotic fluid is alkaline
- Hold a piece of nitrazine paper in a hemostat & touch it against the fluid pooled on the speculum blade. A change from yellow to blue indicates alkalinity (a PH > 6-6.5) (amniotic fluid 7.0-7.5, vaginal secretion 4.5-6)
- The test is accurate in 90-98% of cases
- Urine PH should be obtained simultaneously
- **False positive** results of nitrazine testing, may occur in the presence of
  - Blood or semen contamination
  - Alkaline antiseptics, or
  - Bacterial vaginosis
- **False negative** results occur with prolonged leakage & minimal residual fluid.

The fern test

- Obtain fluid by swabbing the posterior fornix, avoiding cervical mucus
- Spread some fluid on a slide & let it dry. Examine it with a microscope
- Amniotic fluid crystallizes & may leave a fern-leaf pattern (arborization), which suggests membrane rupture
- The test accurately confirms PROM in 85-98% of cases
- False negatives are frequent
- False positive test can result from the collection of cervical mucus

- The test is unaffected by, meconium, changes in vaginal PH & blood:

Amniotic fluid ratio of≤ 1: 10 (may not fern in heavy contamination of blood

Ultrasound examination,

- **Ultrasound examination** may be useful, when the Clinical history or physical examination is unclear, to document **oligohydramnios**. PROM is less likely if fluid volume is normal.

Dye test

- Ultrasound guided trans-abdominal installation of indigo carmine dye (l ml in 9 ml sterile *N/S)* followed by observation for passage of blue fluid from the vagina with in 30 min.
- The test is seldom indicated. Methylene blue should not be used

Management of PROM

Natural history of PROM

The duration of PROM (latent period) is inversely related to the gestational age at the time of rupture of membranes.

- <26wks GA: - 30-40% gain at least 1 week and 20% gain at least> 4weeks
- 28-34wks: - 70 -80% deliver within 1^{5t} week and >1/2 of these with in 1^{st} 4 days
- At term: - 80% go into labor within 24hrs of rupture of membrane

ii) General Management

- Confirm the diagnosis, & once the diagnosis is confirmed admit the woman to a hospital.
- Assess -maternal & fetal well being & check for signs of labor
- Determine gestation age form the last normal menstrual period, milestones of pregnancy or ultrasound
- Determine Fundal height which will mostly be less than gestational age
- Ascertain Fetal presentation
- Determine cervical status- by sterile speculum examination (avoid digital examination)
- Do cervical swab may be taken this time (if not for immediate delivery) &

determine CBC

- Check for signs of intra-amniotic infection (chorioamnionitis) including
    - Maternal fever
    - Fetal tachycardia ((FHB > 160 beats per minutes)
    - Tender uterus
    - Purulent cervical discharge
    - Leukocytosis &/or positive bacterial culture (if later in the course)

NB some suggests 2 peaks for infection after PROM

• 1-12 hours & 72 hrs after the ROM

If there are signs of uterine infection at any time during the pregnancy, Manage as chorioamnionitis:

1) Start treatment with broad-spectrum, high dose. IV antibiotics
    - (in adequate doses to cover gram-positive, gram negative & anaerobes)
    - Penicillion, Gentamycin & Metronidazole is a good combination)

Doses - Ampicillin 2gm IV Q 6 hrs for 7-10 days

- Gentamycin 80mg IV Q 8hrs for 7-10 days
- Metronidazole 500mg P.O Q 8hrs (IV is best, if available)

Alternatives for Metronidazole could be

- Clindamycin 900mg IV Q 8hrs (best, if available)
- Chlorapmhenicol 1gm IV Q 6hrs

Single agent treatment with Ceftriazone 19m IV Bid/10 days

2) Induce labor & expedite delivery, without any delay despite the GA; consider cesarean section if abnormal labor occur.
3) Continue antibiotics post partum, at least for 24hrs after the mother becomes non Febrile

Further management of PROM, without evidence for infection, depends upon the gestational

age.

iii) Management of Term PROM (>37wks GA)

At term, PROM complicates approximately 8% of pregnancies & is generally followed by onset of labor & delivery. Half of all term PROM will delivery after 5 hrs and 95% will deliver within 28hrs of ROM.

The information now available, from the "Term PROM Trial", showed no difference in any major outcome measure whether the chosen management was immediate induction, using oxytocin or vaginal prostaglandin, or expectant Management.

Therefore, our management approaches, in term PROM should be:

Expedite delivery with out delay; in presence of suspected or evident intrauterine infection, abruption placenta, or evidence of fetal compromise.

Route of delivery depends on other obstetric conditions

If the cervix is favorable (on speculum examination)

- Consider induction, especially if duration of ROM is > 12-16hrs (Without onset of labor}
- Institute prophylactic anti-biotic when the duration of ROM> 12hrs

If the cervix is unfavorable (in absence of other needs for immediate delivery)

- Start on expectant management (described below) & consider prostaglandin for cervical ripening (if possible)

iv) Management of near term PROM (34-37 wks GA)

- In this gestational age range, induction or expectant management are acceptable management options depending on local resources (similar to the Management of term PROM)
- Consider antenatal steroids & prostaglandin for cervical ripening, if possible, before induction (or while on expectant Management)

v) Management of Pre term PROM(under 34 wks)

• At this gestational age , expectant management is preferred (in absence of chorioamnionitis), because of the significant risks associated with pre- maturity; & attempts should be made to prolong the latent period.

NB: - It is important to re-emphasize here again that, there is almost a universal agreement that delivery should be expeditiously undertaken regardless of the GA, when clinical Chorioamnionitis is diagnosed.

Expectant management

Expectant management, when chosen at any gestational age, consists of the following Principles.

- Avoid digital cervical (pelvic) examination
- **Advise bed-rest**, to potentially enhance amniotic fluid re- accumulation & possible delay onset of labor.
- **Complete pelvic rest**- to avoid infection

- **Use of steroids**, as in pre term labor, to accelerate fetal lung maturity are indicated unless there is evidence of chorioamnionitis (except for term PROM). One can use either
    - Betamethasone 12mg IM q 24hrs, for 2 doses (or every 12 hrs)

    or

    - Dexamethasone 6mg IV q 12hrs for 4 doses (or every 6hrs)

NB: - Even an incomplete course of steroids may still be beneficial

- **Provide prophylactic antibiotics**
    - Advantages possibly include
        - Increased latency period
        - Decreased incidence of maternal & neonatal morbidity & mortality
    - Antibiotics & dose for prophylaxis
    - Give Amoxacillin 500 mg & Erythromycin 500 mg P.O. every 8hrs for 7 days, if delivery doesn't occur (may be started as Ampicillin 2gm *IV* QID & Erythromycin 500 mg IV QID for 48 hrs).

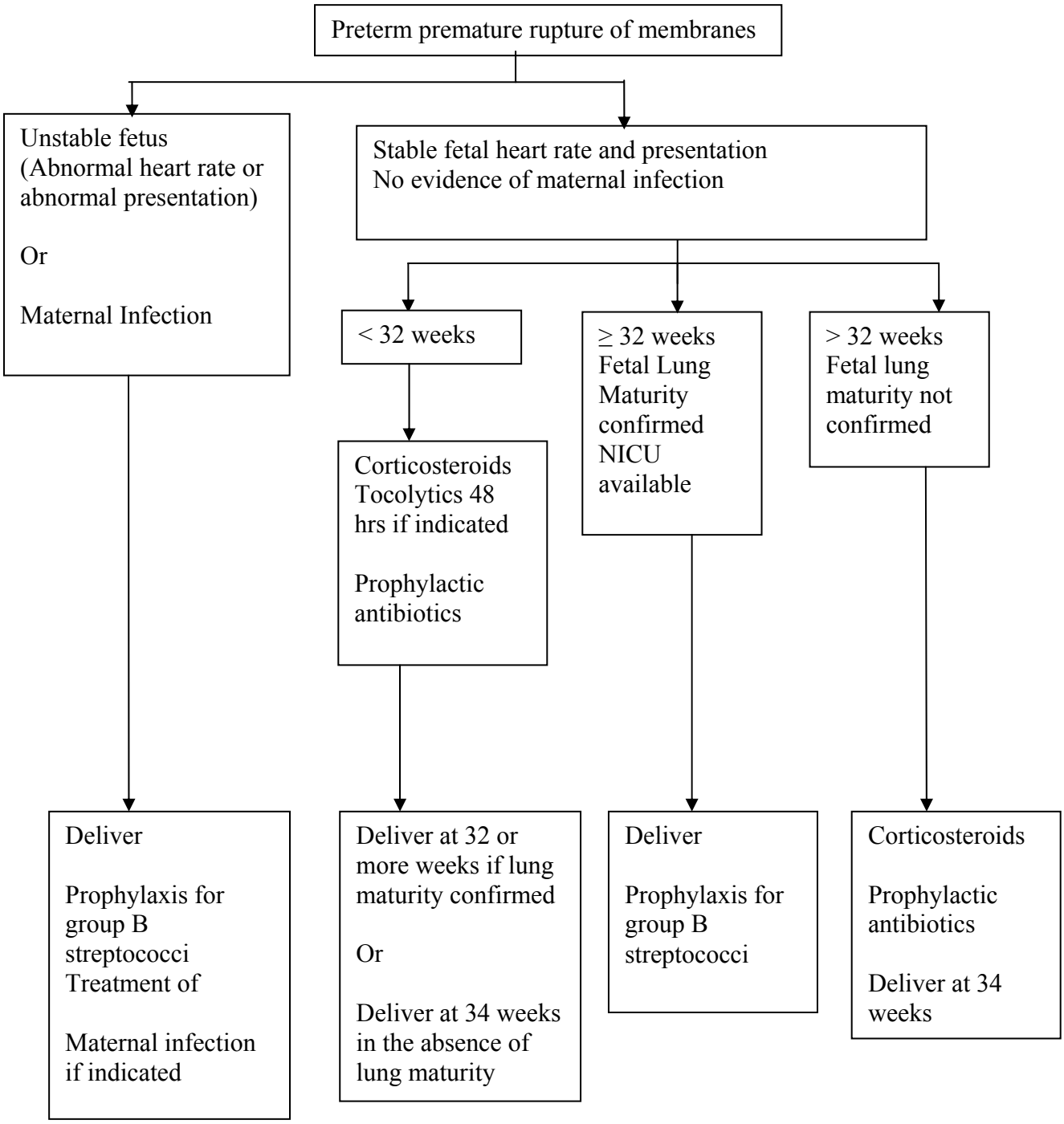
If there is no sign of uterine infection, discontinue antibiotics after delivery

- Consider transfer to a higher care center with newborn intensive care, if possible
- Implement- surveillance for infection when duration of PROM exceeds 12 hrs, which may include monitoring the following:
    - Maternal pulse & temperature- every 4-6hrs
    - FHR every 4-6hrs (&if possible CTG 2x daily)
    - Uterine tenderness or irritability (or pain)
    - WBC count & differential- changes, daily
    - Amniotic fluid appearance & odor (if pussy & foal smelling)
    - If possible liquor is sent every 12-24 hrs for gram stain & -culture (if possible additionally examine for phosphatidyl glycerol daily)

Indications for delivery (i.e. termination of expectant Management) include:

1. Onset of labor
2. Gestation age ≥ 37wks or the presence of phosphatidyl glycerol daily (indicates fetal lung maturity)
3. Evidence for fetal distress
4. Evidence for intra uterine infection.

All infants who are symptomatic require antibiotic therapy & appropriate septic work ups.


Preterm premature rupture of membranes
Unstable fetus (Abnormal heart rate or abnormal presentation)
Or
Maternal Infection
Stable fetal heart rate and presentation
No evidence of maternal infection
< 32 weeks
≥ 32 weeks Fetal Lung Maturity confirmed NICU available
> 32 weeks Fetal lung maturity not confirmed
Corticosteroids Tocolytics 48 hrs if indicated
Prophylactic antibiotics
Deliver
Prophylaxis for group B streptococci Treatment of
Maternal infection if indicated
Deliver at 32 or more weeks if lung maturity confirmed
Or
Deliver at 34 weeks in the absence of lung maturity
Deliver
Prophylaxis for group B streptococci
Corticosteroids
Prophylactic antibiotics
Deliver at 34 weeks

Management of Abnormal pregnancy

Twin Pregnancy

Definition: Development of two fetuses in a pregnant uterus.

It is a high risk pregnancy associated with significantly higher rates of maternal and perinatal morbidity and mortality.

Type of twin pregnancy

Dizygotic twins (fraternal twins): results from fertilization of two separate ova by two spermatozoa. They are always diamniotic-dichorionic. The sex of the fetuse may be same or different. The blood group is usually different

Monozygotic twin (identical twin): results from the division of a single zygote. Placentation depending on time of division can be diamniotic dichorionic, diamniotic mono chorionic or mono amniotic mono chorionic. The fetuses have always the same sex and The blood group is always the same.

Diagnosis of a twin gestation

Diagnosis require a high index of suspicion if a routine ultrasound is not performed for all pregnant women. In all other situations, the following history, physical findings and diagnostic tests provide useful clues.

History

- Family history of twins particularly on the maternal side.
- History of ovulation inducing therapy.
- Excess maternal weight gain
- Breathlessness, palpitation during later months of pregnancy

- Excessive vomiting, edema.

Physical finding

- A parus woman may present as a big abdomen
- Anemia, PIH(Edema all over, hypertension, proteinuria)
- Fundal height is large for date
- Palpation of more than one head or breech
- Two fetal heart beats heard at the same time by two observers & differing in rate by at least 10 beats per minute.

Diagnostic Tests & Procedures

- Ultrasonography
- X-ray of abdomen after gestational age of 18 weeks

Differential diagnosis big for date uterus

- Wrong date,
- Fetal macrosomia,
- Polyhydraminos,
- Molar gestation,
- Tumor with the pregnancy (myoma and ovarian tumors being the commonest),
- Full bladder
- Placenta previa

Management

Ante partum

Nutritional: Consumption of energy source should be increased by 300 kcal/day above that of singleton pregnancy..

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

Frequent prenatal visit screen for high risk conditions like pregnancy induced hypertension (PIH) , preterm labor, premature rupture of membranes.

Education: Birth preparedness and on the need for Hospital delivery with Cesarean Section facility and in the presence of a health worker skilled in intrauterine manipulation and neonatal resuscitation.

Rest: Limited physical activities, Early work leave.

Ultrasound for evaluation of: Placentation (Amninionicity & chorionicity), Number of fetuses, fetal amniotic fluid, placental abnormalities, Growth of each fetus & presence of congenital anomalies.

Antepartum surveillance starting from 32 weeks of gestation weekly is indicated in complicated multifetal gestation.

Techniques-Modified biophysical profile,

Fetal movement counting (Cardiff's count to ten method)

Timing of delivery

All twin gestations should be delivered by 40 weeks of gestation.

Fetal lung maturity should be assessed if elective delivery is considered before 38 wks of gestation.

Note that Induction & augmentation of labor are contraindicated in twins.

Route of Delivery

The route of delivery of a twin gestation depends on the presentation of the fetuses which could be as follows

Table 10 Route of delivery for twin pregnancy

Twin A	**Twin B**	**Recommended route of delivery**
Vertex	Vertex	Vaginal
Vertex	Non - Vertex	Vaginal for twin A followed by ECV or assisted breech for the Twin B. occasionally cesarean section for twin B
Non-Vertex	Vertex	Cesarean section
Non-Vertex	Non-Vertex	Cesarean section

Twin A-Vertex / Twin B-Vertex

If labor start spontaneously, deliver vaginally. Cesarean section should only be performed for the same indications as in singleton pregnancy.

Twin A-Vertex/Twin B-non vertex

If labor start spontaneously, Twin A can be delivered through the vaginal route.

Twin B could be in a breech presentation or transverse lie. If twin B is a breech and the estimated weight greater than 1500gm but less than 3500 gram vaginal delivery could be allowed.

Alternative management for twin B transverse or Breech is to perform External cephalic.

Twin A-Non-vertex

In all cases of twin gestation where the first tin is non-vertex, delivery should be effected by cesarean section. This mode of delivery has to be done irrespective of the presentation of the second twin.

Intra-partum care when vaginal delivery conducted

All preparations should be made for resuscitation & special care for babies of low birth weight.

Follow labor using partograph

First stage of labor

- Admit in early labor
- Open IV line with crystalloid
- Ascertain fetal number, presentations, estimated fetal weight &placental location..
- Blood transfusion products should be readily available.
- Close monitoring of FHR in all fetuses.
- Augmentation is contraindicated before the delivery of the first twin.
- Use minimal analgesia for labor

Second stage of labor

- Following the delivery of 1st twin, Cut the cord as far out side the vagina as possible and clamp.
- Determine the lie & presentation of the second twin. look for possible occult cord prolapse or cord entanglement.
- If the vertex/breech is in or over the inlet and the uterus is contracting artificial rupture of membranes (ARM) should be done on the second sac.
- If uterine inertia has set in, start Oxytocin drip following amniotomy.
- When either twin shows signs of persistent compromise & vaginal delivery is not imminent, proceed promptly to cesarean delivery.
- Interval between deliveries should not be unduly delayed.

Third stage of labor

Third stage of labor should be managed actively after the delivery the last fetus.

Examine the placenta for completeness, vascular anomalies and communications, and zygosity (mono or Dizygotic twin)

- Monozygotic twins -commonly have a transparent(thin) septum made up of 2 amniotic membranes only (No chorion & no decidua)
- Dizygotic twins Always have an opaque(thick)septum made up of 2 chorions,2 amnions,& an intervening deciduas.

Complications

1. Delayed delivery of the second twin

In the absence of infection late second-trimester or early third-trimester rupture of the membranes and delivery of one fetus need not always be followed by efforts to deliver the second fetus.

2. Discordant Twins: A difference in EFW of greater than 20% between twin A & Twin B expressed as percentage of the larger twins weight.

3. Twin to Twin transfusion syndrome(TTTS)

In the presence of placental vascular connection, if the twins have a Hgb difference greater than 5g/dl and birth weight difference greater than 20%, TTTS can be diagnosed. There will be Hydraminos in the larger twin (recipient), oligohydraminos in a growth restricted fetus(donor).

4. Conjoined twins

This is one of the rarest complication of a twin pregnancy, which if not recognized can lead to obstructed labor. Conjoint twin diagnosis should be considered under the following situations

- Finding of single fetal heart in multiple pregnancy
- Lack of engagement when the lie longitudinal
- A persistent parallel lie in (Vrtex-vertex,breech-breech)
- An abnormal fetal attitude.

Method of diagnosis

- Ultrasonography
- Plain film of the abdomen may show that the head of both twins are at the same level.

Management

- Refer to a higher level if the diagnosis is made earlier.
- Cesarean section (Lower segment vertical incision/Classical)
- Destructive operations: When infant dead & part of the fetus has been born.

6. Interlocking of twins

One may impede the descent & delivery of the other.

Management

a- Collision, Impaction, Compaction

- Avoid strong traction & fundal pressure.
- Push the second twin out of the pelvis under deep anesthesia.
- Then deliver the first & the second twin in the usual way.

- If the method fails & babies are alive C/S.

b- Chin to chin interlocking

- Avoid traction of the first twin.
- Unlock the chin under anesthesia & the second twin is pushed out of the way.
- If the first baby dies, break the locking by decapitating the first twin, delivery of the head of the first baby by traction in most cases cesarean section may be preferable.

Pregnancy Induced Hypertension

Definition & Classification

Hypertension:

Pregnancy related hypertension is defined as a systolic blood pressure ≥140 mm Hg or diastolic blood pressure ≥ 90 mm Hg in two occasions at least 6 hours apart, but not more than 7 days; or a single BLOOD PRESSURE recording of 160/110 mm Hg in a woman who was normotensive prior to 20 weeks of gestation.

Proteinuria:

- 0.3 g protein in a 24-hour urine specimen or
- 1+ on dipstick (specific gravity < 1030) or
- 2+ on dipstick or
- two random urine protein concentrations of 100 mg/dl collected 4 hours or more apart

The seizures should not be attributable to another cause.

The possible causes of hypertension in pregnancy are classified as:

Preeclampsia: refers to the new onset of hypertension and proteinuria after 20 weeks of gestation in a previously normotensive woman.

Gestational hypertension: refers to hypertension (usually mild) without proteinuria (or other signs of preeclampsia) developing after the 20th week of pregnancy in a previously normotensive pregnant woman.

Chronic hypertension: is defined as hypertension that antedates pregnancy; is present before the 20th week of pregnancy; or persists after 12 weeks postpartum.

Superimposed preeclampsia: is diagnosed when a woman with chronic hypertension develops new onset proteinuria after 20 weeks of gestation. Women with chronic hypertension and preexisting proteinuria (before 20 weeks) are considered preeclamptic if there is an exacerbation of blood pressure to the severe range (systolic 160 mmHg or diastolic 110 mm Hg) in the last half of pregnancy, especially if accompanied by symptoms or a sudden increase in proteinuria.

Eclampsia: describes the development of grand mal seizures 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

Initial Evaluation

If a **woman is unconscious or convulsing, SHOUT FOR HELP.** Urgently mobilize all available personnel.

• Make a rapid evaluation of the general condition of the woman including vital signs (pulse, blood pressure, respiration) while simultaneously finding out the history of her present and past illnesses either from her or from her relatives.

• If she is **not breathing** or **her breathing is shallow**:- Check airway and intubate if required;- If she is **not breathing**, assist ventilation using Ambu bag and mask or give oxygen at 4–6 L per minute via endotracheal tube;

- If she **is breathing**, give oxygen at 4–6 L per minute by mask or nasal cannula.

• If she is **unconscious**:

- Check airway and temperature;
- Position her on her left side;
- Check for neck rigidity.

• If she is **convulsing**:

- Position her on her left side to reduce the risk of aspiration of secretions, vomit and blood;
- Protect her from injuries (fall), but do not attempt to restrain her;
- Provide constant supervision;
- If **eclampsia is diagnosed**, give magnesium sulfate;
- If the **cause of convulsions has not been determined**, manage as eclampsia and continue to investigate other causes.

Diagnostic tests & Procedures

Laboratory evaluation that helps to characterize end organ involvement and determine disease severity includes:

- Hematocrit (hemoconcentration supports the diagnosis of preeclampsia)
- Quantification of protein excretion
- Serum creatinine concentration
- Serum uric acid concentration
- Serum alanine and aspartate aminotransferase concentrations (ALAT,ASAT), bilirubin level
- Platelet count
- Lactic acid dehydrogenase concentration (LDH): this test and review of the red blood cell smear may indicate the presence of microangiopathic hemolysis
- PT, aPTT
- Nonstress test or biophysical profile

- Ultrasound for fetal growth and amniotic fluid volume

DIAGNOSIS AND MANAGEMENT OF DIFFERENT STAGES OF PIH

Women with PIH may progress from mild disease to a more serious condition.

The stages of PIH are:-

- Hypertension with proteinuria or edema
- Mild pre-eclampsia
- Severe preeclampsia,
- Eclampsia

- In PIH there may be no symptoms & the only sign may be hypertension .
- Proteinuria is a late sign of increasingly severe PIH.

i) PIH with out proteinuria or edema

Clinical features

• Two blood pressure readings greater than 90mm Hg and 4 hours apart (± 140 mm Hg systolic)
There will be no symptoms & hypertension is the only sign at this stage.

Management

• Manage on outpatient basis (especially if at <36wks GA)

- Follow up for increasing BLOOD PRESSURE, urine (for proteinuria) & fetal condition weekly
- If blood pressure worsens, manage as mild pre-eclampsia
- If there are signs severe IUGR admit to hospital for assessment & possible induction of labor (or *CIS* as indicated).
- Counsel the woman & her family about danger signals indicating sever pre-eclampsia or eclampsia.
- If all observations remain stable, allow to proceed with normal labor & childbirth (but better not to post term)

ii) Mild pre- eclampsia

Clinical Features

- The diastolic blood pressure remains on two occasions 90 mm hg but less than 110 mmhg
- Proteinuria of 2+ (or 1 ~ with specifications given in the definition).
- no other symptoms, signs or laboratory findings of severe pre-eclampsia

Management may vary depending on the gestational age

1) Gestational age less than 37 weeks

Outpatient twice weekly follow up is preferable as long as signs remain unchanged or normalize if it is convenient for the patient).

- Monitor blood pressure, urine protein, reflexes (DTR) & fetal condition, twice weekly.
- Counsel about the danger signals (symptoms and signs of severe pre-eclampsia listed below)
- Encourage additional periods of bed rest
- Encourage the woman to eat a normal diet (salt restriction should be discouraged)
- Orient on fetal movement counting (kick chart) daily, to be reported at ANC visits
- No medications (do not give anticonvulsants, anti hypertensives, sedatives or tranquillizers).

If follow up as an outpatient is not possible or if close observation is preferred, or pre-eclampsia progress rapidly, admit to hospital

- Provide a normal diet (no salt restriction)
- Monitor blood pressure (twice daily) & urine protein & weight (daily)
- Auscultation of FHB & kick chart daily
- Do not give medications (as above)
- Do not give diuretics (diuretics are harmful & only indicated for use in pre-eclampsia with pulmonary edema or congestive hear failure)

NB Weight gain should be : 0.45kg/wk (lesser with placental dysfunction & excess with fluid retention)

If the Diastolic blood pressure decreases to normal levels or her condition remains stable send the woman home with the following instruction

- Advise her to rest & to watch out for signs of severity
- Continue follow up twice a week (as above)
- If diastolic blood pressure rises again, readmit her

If the signs remain unchanged, keep the woman in the hospital

- 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 until term (& consider termination if cervix is favorable)

If signs worsen (urinary protein level increased etc) manage as severe pre-eclampia

2) Gestation ≥ 37 complete weeks

- If the woman's condition remains stable & there is no signs of IUGR, Continue monitoring as above & plan delivery when the cervix is favorable (but before going post term, better not beyond 40wks)

- If there are signs of fetal compromise, assess the cervix & expedite delivery.

- If the cervix favorable (soft, thin, partly dilated); rapture the membranes
- with an amniotic hook or kocher clamp & induce labor using oxytocin (refer to inducation protocol).

- If the cervix is unfavorable (thick, closed), ripen the cervix using prostaglandin or a folly catheter (see protocol for induction), or deliver by caesarian section.

iii) Severe pre-eclampsia

a.) Clinical Features - includes any one or more of the following in variable combination

- Diastolic blood pressure 2X 110mmhg after 20wks gestation & proteinuria of≥ 3^{+} (≥ 5gm in 24hrs)
- Any of these manifestations of multi organ involvement
- Headache: -increasing frequency, unrelieved by regular analgesics (frontal/occipital)
- Hyper-reflexia (exaggerated deep tender reflexes)
- Clouding of vision (blurred vision/photophobia)
- Oliguria (<400 ml urine in 24hrs) (followed by rapid weight gain)
- Upper abdominal pain (epigastric or right upper quadrant pain)
- Pulmonary edema (rapid shallow breathing, cyanosis, rales).
- Fetal growth restriction
- Abruptio placenta

- Disseminated intravascular coagulation (DIC) (bleeding, petechial)
- HELLP syndrome (hemolysis, elevated liver enzymes & low platelets)
- Eye changes: arteriolar spasm, edema, retinal detachment (by fundoscopy).
- Severe nausea & vomiting
- Lab changes include
    - Increased hematocrete (hemoconcentration
    - Blood smear (----> hemolysis)
    - Platelets < 1 00,000
    - PT, PTT, Fibrinogen, FDP
    - Serum uric acid (↑ ed)
    - Serum creatinine (↑ ed)
    - Significantly altered liver function tests
        - Hyperbilirubinemia
        - Elevated liver enzymes (AL T, AST, LDH)

b) Management of severe Pre-eclampsia

The appearance of any of the above manifestations of multi-organ involvement constitutes an obstetrical emergency (act accordingly).

If there are symptoms or signs of imminent eclampsia (such as headache, blurred vision, vomiting, right upper quadrant pain, oliguria, exaggerated DTR) manage as in eclampsia.

The steps of management include:

- General measures - supporting the specific treatments
- Prevent convulsion with magnesium sulfate or valium
- Control hypertension
- Delivery as soon as possible

1) General Measures

- Admit the patient urgently, if not done before
- Manage in left lateral position (relieves pressure on inferior vena cava)
- Set up IV line (using canulla) & infuse fluids to replace estimated loss (from bleeding, vomiting diarrhea, sweating) (500ml in 1st 1/2 hr). then ongoing loss + urine out put + insensible loss (700 ml124 hrs (PO & IV).
- Place an indwelling catheter to monitor urine out put & proteinuria
    - Urine output should be at least 30 ml/hr. If it is less, run fluids more rapidly (if no still improved, consider renal failure) ..

- Maintain a strict fluid balance chart, to avoid fluid overload
- Prepare equipment for convulsion management, at bedside (mouthpiece, airway, suction equipment, mask & bag, oxygen)
- Never leave the patient alone (if convulsion occurs, aspiration may cause death)
- Observe vital signs, FHB & reflexes hourly
- Oscultate the lung bases for crepitation indicating pulmonary edema. If they occur, with hold fluids & administer a diuretic (furosemide 40 mg Iv stat)
- The immediate treatment should include managing symptoms
- Anti emetic - for nausea & vomiting to minimize maternal discomfort
- Anti pain - for RUQ pain, headache etc

2) Stress Reduction

- A component of maternal hypertension is adrenergic & may be modified by stress reduction
- Maternal discomfort must be minimized (as above & others)
- Components of stress reduction includes

    - Quiet, dimly lit, isolated room.
    - Well planned management protocol
    - Clear explanation of the management plan to patient and family
    - Minimization of negative stimuli
    - Consistent, confident team approach

3) Anticonvulsant therapy (seizure prophylaxis)

Seizure prophylaxis should be instituted

- In all pre-eclamptics during labor & continued for 12-24 hrs after delivery
- In all severe pre-eclamptics during admission & continued during period of evaluation & observation.
- This is achieved by proper sedation & cutting off all peripheral stimuli
- A key factor in anticonvulsive therapy is aggressiveness, as the most frequent cause of convulsion in hospitalized patients is under - treatment.
- Magnesium sulfate is the drug of choice for preventing & treating convulsions in severe pre-eclampsia & eclan1psia. (not available here currently)
    - Diazepam

- May be used as alternative, if mgs04 is not available, although there is a greater risk for neonatal respiratory depression because diazepam passes the placenta freely.
- For administration schedule refer to management of eclampsia (below)

NB It is difficult to predict who will seize. It is not directly related to degree of hypertension or level of proteinuria (Blood pressure is not a reliable predictor of the risk of seizures, some may seize with blood pressure of 140/90)

4) Anti -hypertensive therapy

• Goals

- Minimize risk of maternal CVA (but does not necessarily reduce the risk of seizure or prevent IUGR)
- Maximize maternal condition for safe delivery
- Gain time for further assessment
- Facilitate vaginal delivery if possible
- Prolong gestation where appropriate / feasible

- Anti - hypertensive drugs should be used if the DBLOOD PRESSURE remains at ≥ 110 mmhg after an hour of bed-rest & anti-convulsive treatment (also for DBLOOD PRESSURE I 00-1 09 mm hg with other adverse manifestation)
- The goal is to keep the diastolic blood pressure 90-100 mm hg) (LllO mm hg in labor).

Hydralazine

- Is the drug of choice for acute therapy (arteriolar dilator with rapid onset iv)
- Give 5-10 mg iv slowly every 5 minutes until BLOOD PRESSURE is lowered (to diastolic blood pressure <110mmhg) Repeat hourly as needed or give 12.5mg 1M every 2hrs as needed.(If IV rout is not possible)
- Cautions -hypotension with fetal compromise may occur in slow acetylaters & hypovolemic patients (start with 5 mg *iv* test dose)-
- Side effects may cause flushing, headache or tachycarida.

Nifedipine

- Nifedipine is a calcium channel blocker, oral agent, with rapid onset of action, if regular capsule used (relaxes vascular smooth muscle)
- It can be used as alternative for acute therapy (though less satisfactory) 5-10 mg sublingually (under the tongue) as initial dose, followed by 5-10mg if response is inadequate (in 30 minutes). Then continue as 10-20 mg PO every 6 hours.
- For maintenance therapy 10-40mg PO bid
- Side effects: edema, flushing, headache, palpitation, mgso4 toxicity, tocolytic (may

stop labor) ,

Methyldopa

- Methyldopa is a centrally acting α:-receptor agonist, it is an oral agent. Methyldopa is the drug of choice for maintenance therapy. It has a minimal side effect & safe. Methyldopa has a long history of safe use in pregnancy, well tolerated .

- There is some concern regarding ability to control blood pressure (additional drug may be needed)

- Dosage - 500 - 3000mg PO in 2-4 divided doses per 24 hrs

- Other alternative (or supplementary) drugs for maintenance therapy. Include - nifedipine (PO), hydralazine (PO) or atenolol (50 - 100 mg PO once daily)

ii) ECLAMPSIA..

Management of Eclampsia

Treatment of eclampsia is symptomatic & consists of six aspects:

1. General measures
2. Control of convulsions (to stop ongoing convulsion & prevent repeated convulsion)
3. Correction of hypoxia & acidosis
   -by clearing airway & giving O_2 by mask at 6L/min
4. Blood pressure control & stabilization of the condition of the mother & fetus
5. Fluid balance & diuresis
6. Delivery & intra partum/post partum care

i.) General Measures in the Mx of Eclampsia

1. Set up IV line & maintain intravascular volume & replace ongoing losses; avoid overload (if not done already)
2. Position the patient on her side (left lateral) & in Trendelenburg (head down) position to reduce risk of aspiration of secretions, vomits or blood
3. Aspirate (suction) the mouth & throat as necessary & ensure open airway
4. Give oxygen by mask at 6 liters per minute
5. Avoid tongue bite by placing an airway or padded tongue blade between the teeth & protect the Woman from injury but do not actively restrain
6. Place an indwelling catheter to monitor urine output & urine test for protein (if not done already)
7. Observe vital signs, FHB & reflexes frequently & ascultate the lung bases

hourly for crepitation indicating pulmonary edema

8. If the pulmonary edema occurs, withhold fluids & administer a diuretic such as furosemide 40mg IV stat

The patient has to be kept in the "eclampsia room" (a specially designed quiet room (darkened room is no more used), with intensive care on a railed cot). An attendant must be always beside the patient.

Administration of prophylactic IV antibiotics is beneficial

i) <u>Anticonvulsant Therapy</u>

- Administer anticonvulsant drugs to stop the ongoing convulsion & prevent repeated attacks
- Be aggressive & avoid under treatment, to be successful
- Magnesium sulphate is the drug of choice in eclampsia

Magnesium sulfate schedules for severe pre-eclampsia and eclampsia

Loading dose

- Magnesium sulfate 20% solution, 4 g IV over 5 minutes.
- Follow promptly with 10 g of 50% magnesium sulfate solution, 5 g in each buttock as deep IM injection with 1 mL of 2% lignocaine in the same syringe. Ensure that aseptic technique is practiced when giving magnesium sulfate deepIM injection. Warn the woman that a feeling of warmth will be felt when magnesium sulfate is given.
- If **convulsions recur after 15 minutes**, give 2 g magnesium sulfate (50% solution) IV over 5 minutes.

Maintenance dose

- 5 g magnesium sulfate (50% solution) + 1 mL lignocaine 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.

Before repeat administration, ensure that:

- Respiratory rate is at least 16 per minute.
- Patellar reflexes are present.
- Urinary output is at least 100 ml over 4 hours.

Withhold or delay drug if:

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

Keep antidote ready

- In case of respiratory arrest:

Assist ventilation (mask and bag, anaesthesia apparatus, intubation).

Give calcium gluconate 1 g (10 mL of 10% solution) IV slowly until respiration begins to antagonize the effects of magnesium sulfate.

Diazepam

Diazepam is an effective alternative, but it increases the risk of respiratory depression & newborn asphyxia, in babies who, may already be suffering from the effects of utero-placental ischaemia & pre term birth

- The effect may last several days

Diazepam schedule for severe Pre-eclampsia: & eclampsia

I) Intravenous administration

i) Loading dose

- .Diazepam 10 rng IV slowly over 2 minutes
- If convulsion recur, repeat loading dose

ii) Maintenance dose

- Diazepam 40 mg in 500 ml IV fluids (N/S or Ringer's lactate L) no of drops titrated to keep the woman sedated but arousable.

NB Maternal respiratory depression may occur when dose exceeds 30 mg /hr

- Diazepam may be given rectally when IV access is not possible.
- Peak levels are reached with in 10-20 minutes
- This is invaluable during transportation and at primary health care level.

Use loading dose of 20 mg followed by maintenance dose of≥ 10 mg/hr depending on the size of the woman and her clinical response.

- A urinary catheter or a 10 ml syringe can be used to install the drug in to rectum.
- Draw the drug in to a syringe remove needle, lubricate the barrel and insert the syringe in to the rectum to 1/2 of its length, discharge the content and leave the syringe in place holding the buttocks together for 10 minutes to prevent the expulsion of the drug.

ii. Anti Hypertensive Therapy

the therapeutic goal is to keep the diastolic blood pressure < 110 mm Hg & prevent cerebal hemorrhage

For drugs used as hypertensive medication refer back to management of severe pre-eclmapsia (use some drugs & doses).

iii. Fluid balance & diuresis

- Keeping strict input & output record is essential and determine serum electrolyte, if possible
- For unconscious patient, 5% DW (1000ml) & ringer's Lactate (500ml) are infused for maintenance of nutrition & fluid balance during 24hrs. (or alternatively urine output plus insensible loss of 700ml)
- 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 fluid is started.
- Lasix 20mg IM is given for diueresis(especially after delivery)

iv) Delivery

- Delivery should take place as soon as the woman's condition has stabilized, regardless of
  the gestational age (delay will risk the lives of both the fetus & the mother)
- Eclamptics usually proceed to labor spontaneously while having convulsions

NB Delivery should occur within 24hrs of the onset of symptoms in severe pre-eclmapsia, & within 12 hrs of the onset of convulsions, in eclampsia. If vaginal delivery is not anticipated within this time limit, delivery should be by cesarean section.

Termination of pregnancy in the management of (pregnancy induced hypertension) PIH

- Delivery remains the only definitive treatment for PIH
- Timely delivery minimizes maternal & neonatal morbidity & mortality
- Expectant management is potentially harmful in the presence of severe PIH, fetal maturity or suspected fetal compromise
- Optimize maternal status before intervention to delivery (through resuscitation & stabilization)

Indications for delivery

1. Pregnancy at ≥ 37wks GA. with PIH (even if mild)
   - Note that PIH is a progressive disease & sometimes IS unpredictable
   - If cervix is favorable do ARM & induce with Pitocin

   However, if the cervix is unfavorable, & has only mild blood pressure elevation without either maternal end-organ involvement or fetal compromise delivery may be appropriately delayed up to 40wks (not beyond in most)

2. Gestation ≥34 wks GA, with severe pre-eclampsia

3. Severe pre-eclampsia remote from term «28 or 30 wks GA)

4. Gestation age from 32 to 34 wks GA, with severe PIH not responding to initial observation & treatment (e.g. Diastolic blood pressure ≥ 110 mm hg despite anti hypertensive medications)

   Corticosteroids (dexamethasone *I* betamethasone) may be used (for 48hrs) to facilitate fetal lung maturity, but only if conditions permit delay

5. Gestation ≤34wks with any of the following: (Urgent delivery within 12-24 hrs in most cases IS indicated, despite the GA)
   - Severe hypertension not responding to RX
   - Symptoms unresponsive to appropriate therapy
     - Severe headache or visual disturbance
     - Nausea, vomiting or RUQ / epigastric pain
   - Suspected fetal compromise
   - Eclamptic-convulsions
   - Lab. Evidence of end organ involvement despite good blood pressure control
     - Decreasing platelets or increasing liver function enzymes
     - Severe proteinuria

Route of delivery

- Depends on gestation age , fetal condition & presentation, cervical condition & maternal condition

- Vaginal delivery is preferable to cesarean section for women with PE (even if with sever disease). It is desirable, if possible, to avoid the added stress of surgery & anesthesia, because of multiple physiologic abnormalities

- Aim for vaginal delivery by induction using artificial rupture of membranes (ARM) & Oxytocin where needed under the following condition :

  If the cervix is ripe (soft, thin, dilated)
  If the fetus is dead or extremely premature for survival
  With rapid progress in labor
  After cervical ripening with prostaglandin E2 gel, under appropriate circumstances
  As trial of induction - warranted because even though the cervix may feel unfavorable, labor can be induced & progress fairly *(CIS* can be performed if labor has not begin within 6-12hrs or if the progress of labor is poor).

  NB Eclampsia is not a contraindication to such trial of induction. In fact it is usually successful with short induction delivery interval.

- Cesarean delivery is indicated

  - 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 8hrs of induction of labor
  - If there is evidence of fetal distress, or there obstetric indications,&

Use of Anesthesia

- Do not use local anesthesia or ketamine in women with pre-eclampsia or eclampsia.
- General anesthesia with thiopental, succinyl cholines & nitrous oxide is preferable
- Spinal anesthesia can be used, with adequate IV fluid loading(500- 1000ml), to reduce the risk of hypotension (except in patients with thrombocytopenea (platelets <100,000) or bleeding disorders).

Management of PIH during labour

- In mild PIH at 39-40wks a proportion comes to spontaneous labor; others require termination by 40 completed weeks (fetal risk rises if allowed to run over date)

- An ante partum eclamptic usually comes to labor spontaneously while convulsing; if not terminate, after control of convulsions by sedatives; usually-within 4hr

- If attempting vaginal delivery is chosen the Intra-partum management, of either spontaneous or induced labor should emphasize or involve the following:

    - Absolute bed rest in LLP, is essential

    - Proper sedation is important as hypertension & risk of convulsion tends to increase in labor

    - Anti hypertensive drugs (usually hydralazine or nifedipine) should be employed, as necessary, to regulate diastolic blood pressure between 90 & 110 mm hg

    - Glucose therapy is useful

    - Careful monitoring of FHB, maternal conditions & progress of labor is essential with augmentation as required

    - The second stage should be shortened by episiotomy & low forceps (or craniotomy with dead baby), in severe cases (avoid difficult vaginal delivery).

    - Pudendal block or perineal infiltration analgesia along with injection of diazepam is often employed .
    - Prevent PPH-(Manage third stage actively using Oxytocin)

    - Watch closely for at least 2hrs after delivery, for complications such as shock, **PPH** & eclampsia

    - Neonatal care is needed for premature & those with IUGR for respiratory distress

Post partum Care

- 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 DBLOOD PRESSURE is≥ 110mmhg

- Continue to monitor urine output & check for coagulation failure, LFT,RFT if possible

- During puerperium, lying-in period should be increased till BLOOD PRESSURE settles down & proteinuria clears up

- Postnatal follow-up of these cases is very important for the treatment of hypertension & possible complications (e.g. Pelvic or urinary tract infections/pneumonia)

- Treatment of complication (may require referral to higher centers before or after delivery)
  i) DIC - minimize trauma; transfuse with fresh whole blood or fresh frozen plasma
  ii) Acute renal failure (persistent oliguria for> 48hrs after delivery, despite adequate fluid & diuretics). Restrict fluid intake to 500ml plus ongoing loss, consider referral if no improvement
  iii) Pulmonary edema - keep in propped up position, give O_2 (100%), restrict fluid intake (2.5 l/day) give Furesemide 40-100mg IV & Aminophylline 480mg IV slowly).

Diabetes Mellitus in pregnancy

Diabetes Mellitus (DM) is the most common medical problem complicating pregnancy. Approximately 1% of all pregnant are diabetes and majority is gestational diabetes mellitus (GDM).

Definition

Gestational Diabetes Mellitus (GDM) is any degree of glucose intolerance with onset or first recognition during pregnancy.

Pre-pregnancy diabetes is diagnosed prior to onset of pregnancy. This can be type 1 or type 2.

Diagnosis

Diagnostic criteria for Diabetes mellitus prior to pregnancy

- Symptoms of Diabtes Mellitus plus:
- Random plasma glucose concentration ≥ 200mg/dl .Random is defined as any time of day without regard to time since last meal.
- Fasting plasma glucose ≥ 126 mg/dl. Fasting is defined as no caloric intake for at least 8 hours.
- Two –hour post load glucose level equal to or greater than 200 mg/dl during an oral glucose tolerance test (OGTT).

The test should be performed as described by the World Health Organization using a glucose load containing the equivalent of 75-g anhydrous glucose dissolved in water.

1. Impaired fasting glucose (IFG): fasting glucose of more than 110 but less than 126 mg/dl.
2. Impaired glucose tolerance (IGT): 2-hour value of the glucose tolerance test (GTT) of more than 140 but less than 200 mg/dl.

Diagnostic criteria for gestational Diabetes mellitus

Table 11 Diagnostic criteria for gestational Diabetes mellitus

Time	*Blood Glucose (mg/dl)*	*Blood Glucose (mmol/I)*
Fasting	95	5.3
1 hr	180	10.0
2 hr	155	8.6
3 hr	140	7.8

Diagnosis is made when any two values are met or exceeded but still others suggest only one abnormal value is enough. Whole blood glucose values are lower than plasma levels due to glucose uptake by hemoglobin.

Universal screening at first ANC visit with OGTT for

In those who meet the following criteria

- Maternal age > 35 yrs.
- Previous macrosomic infant (≥ 4000gm)
- Previous unexplained fetal death
- History of pregnancy with GDM
- Strong immediate family history of diabetes.
- Obesity (> 90kg)
- Previous congenital abnormal fetus
- Glucosuria.

The recommended time of screening 1-hour challenge test is administered between 24 and 26 weeks of gestation. Classically, screening has consisted of a blood glucose determination 1 hour after the ingestion of a 50-g glucose load. If the blood glucose concentration exceeds 140 mg/dl, a 3-hour oral GTT has been recommended.

Treatment of GDM

Main stay of management

- Exercise
- Diet
- Initiate insulin if fasting glucose level is above 95mf/dl or 2hrs postprandial is more than 120mg/dl.

Treatment of Diabetes in pregnancy

The recommended initial therapeutic approach should be dietary manipulation and prescribed exercise in an effort to maintain euglycemia and to prevent excessive fetal growth and initiate insulin if this is not achieved.

Components to the treatment of diabetes in pregnant women.

- Careful monitoring of blood glucose
- 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 and after achieving good control it can be reduced to 3 days per week done randomly.
- In resource poor settings FBS & 2hrs postprandial should be checked at least twice weekly.

Target glucose levels

- Pre-meal glucose 70-95mg/dl
- PP glucose <130mg/dl at 1hr. or <120mg/dl at 2hrs.
- No significant hypoglycemia(Glucose <60mg/dl)during the hours of sleep.

Exercise:(in GDM & type 2 diabetes)

- Regular exercise is an essential component of the management of diabetes. Blood glucose concentration is lowered by exercise resulting in lowering the need for insulin.
- Patients should exercise at least 3 days each week, but preferably every day for ½ to 1 hour.
- Exercises should be undertaken with the advice of the physician

Diet : The optimal diet takes into account caloric intake, carbohydrate content & distribution of meals throughout the day. Desirable perinatal outcomes are affected to an important degree by nutrient intakes sufficient to meet pregnancy requirements. It is well established that energy is the most important nutrient determinant of weight gain during pregnancy. Extra energy is required during pregnancy, and it has been recommended that between 200 to 300 kcal per day be added to non-pregnant requirements.

The appropriate caloric intake depends upon the pre-pregnancy weight with the following recommendation

30 Kcal/kg/day if the women 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

36-40 Kcal/ Kg /Day if more than 10% below ideal body weight

Recommended distribution of calories

40-50 % carbohydrates

20% protein

30-40 fat

Most programmes recommend three meals & three snacks/day.

Acceptable caloric distribution -10% of caloric at breakfast, 30% at both lunch & dinner each and 30% as snacks.

A daily supplement of ferrous sulfate (300mg) & folic acid (1mg) is also recommended.

Insulin

Principles

There is no universal formula, and treatment must be individualized. The desired dosage schedule should be one that resembles insulin production in the normal patient as closely as is technically possible. The preferred regimen is multiple injections consisting of rapid-acting insulin before each meal and at bedtime, with the latter mixed with intermediate-acting insulin.

In GDM ,initiate insulin therapy when:

FBS > 95mg/dl

One hour post prandial blood glucose concentration > 120 mg/dl on two or more occasions within a two wk. interval despite attempted dietary control.

In the 1st trimester, reduce insulin dose by 10-25% to avoid hypoglycemia.

A typical insulin dose is 0.7 units/kg in the 1st trimester, but this must be increased progressively with gestational age. New cases need Hospitalization for the skill and education on insulin therapy. A combination of short & intermediate acting insulin is necessary to maintain glucose levels in an acceptable range.

1. Short and intermediate acting insulin pre breakfast and pre dinner.

   From the total dose two-thirds before breakfast (NPH or Lente and regular insulin in a 2:1 mixture)one-third before dinner (NPH or Lente 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.

2. Shot acting insulin before each meal plus intermediate insulin at bed time.

The total daily dose (TDD) is given as rapid-acting insulin as follows: 40% before breakfast, 30% before lunch, 20% before dinner, and 10% at bedtime. In addition, 5–10 units of NPH or Lente is given at bedtime.

Pre-meal doses (30min. before) of regular are sufficient to keep 1 hr. post prandial blood sugar <130mg/dl may result in hypoglycemia 4 hrs. later.(E.g-Regular insulin before breakfast often causes hypoglycemia at 11A.M).Snacks are essential in late morning, the late afternoon & prior to bed time if regular insulin is used to avoid post prandial hypoglycemia.

Obstetrics Management of Diabetes in pregnancy

First Trimester

- Obtain menustrial history for pregnancy dating.
- Obtain 24 hr creatinine clearance & total protein once as baseline & treat only if symptoms suggest diabetes nephropathy or possible pre-eclampsia.
- Opthalmologic, cardiac and renal evaluation in type 1 and 2 DM.
- Ultrasound exam for documentation of fetal viability & for confirmation of dating.
- Glycosylated hemoglobin levels to council diabetic women regarding the risk of congenital abnormalities.
- Visiting frequency should be guided by the adequecy of glycemic control & patients compliance.
- During each visit ,the pt.should have routine evaluation of BP,wt.gain & glucsuria/ketouria,blood glucose determination.

Second Trimester

- Evaluate BP with special attention to whether the expected 2nd trimester drop has occurred.
- Careful management of fundal height to assess fetal growth.
- Maternal Serum Alpha Feto –protein screening test at 16-18wks gestation.
- Ultrasound for assessment of fetal anatomy & for detecting malformation & should include fetal echocardiography.

Third Trimester

- Assess BP values frequently, because of the likelihood of pre-eclampsia is increased.
- Serial ultrasound assessment for fetal growth, to identify LGA & SGA fetuses every 4 to 6wks.Togather with weight estimate ,the ratio of head circumference to the abdominal circumference may help in predicting shoulder dystocia.
- Initiate fetal surveillance weekly starting from GA of 32 WKs and biweekly after 36 WKs of gestation (Fetal movement, NST, BPP, CST).

Timing & Route of Delivery

- An optimal time for delivery of most diabetic pregnancies is between 38 & 40 WKS.
- Induction of labor at 38 WKs of gestation is recommended in patients with poor glucose control and macrocosmia and all insulin requiring diabetes should be induced at GA of 40 WKs if spontaneous labor has not occurred.
- If A patient has maintained excellent glycemic control and all parameters of fetal surveillance have remained normal, with no obstetric problems dictating early delivery await the spontaneous onset of labor.
- If early delivery is indicated before GA 38 WKs, lung maturity should be assessed by amniocentesis.

Route of delivery

Cesarean section is indicated only upon obstetric indications.

Intrapartum glycemic management

1-Insulin infusion method

Withhold the morning insulin injection.
Begin & continue glucose infusion (5%DW) at 100ml/hr throughout labor.
Begin infusion of regular insulin at 0.5 unit/hr (5IU insulin in 1000ml of 5%%DW)
Begin Oxytocin as needed
Monitor maternal glucose levels hourly.
Adjust insulin infusion as follows.

Table 12 dosage of insulin vs. random blood sugar

Glucose/dl	Infusion rate(Units/hr)
< 80	Infusion off
80-100	0.5
101-140	1.0
141-180	1.5
181-220	2.0
> 220	2.5

2-Intermittent sub-cutaneous Injection method

Give ½ the usual insulin dose in AM.

Begin & continue glucose infusion(5%DW)at 100ml/hr.

Begin oxytocin if needed

Monitor maternal glucose hourly.

Administer regular insulin in small(2 units) doses to maintain glucose 80-20mg/dl.

Post partum management

- GDM - No therapy required. If the need arises, use of oral hypoglycemic agents can normalize the blood glucose concentration. Medical follow-up of these patients must be more intense as they are more likely to remain or progress to overt diabetes.
- **Type 1** - One third to one half of ante-partum daily dose, decrease the insulin dose by one half and instruct the patient to continue to decrease or increase the dose as during pregnancy.
- **Type 2** - Pre pregnancy insulin regimen, or diet controlled, or oral hypoglycemics can be restarted. To ensure adequate follow-up, these patients need to be referred to an endocrinology program with extensive experience in intensive management of diabetic patients.

Recommendations on Contraception

- Barrier methods are safe & without metabolic side effects.
- Women with preexisting diabetes, who do not have serious vascular disease, may be prescribed either the lowest dose combination or progestin only contraceptive under medical supervisions.

- Neither DMPA nor norplant is recommended as 1st line methods of contraception in woman with diabetes.
- Permanent methods of contraception are ideal if family size is complete.

HIV in Women of Reproductive Age

Women show the greatest increase in HIV/AIDS incidence in recent years. In Sub-Saharan Africa, nearly 60% of infected persons are women. In Ethiopia, HIV prevalence in women is 4% (accounting to 55%) compared to 3% in men. HIV primarily affects women in the reproductive age group, 15-49 years.

Reasons for high rate of HIV infection in women include:

- Biological – STDs are manifested late, sexual trauma more in females
- Economic status
  - Paid sex
  - Sugar daddies
- Gender inequity, prostitution, sexual violence and coercion, drug use, HTPs, early marriage, forced marriage and lack of access to comprehensive information.
- Conflict situations – refugees, internally displaced people, IDPs
  - Sexual violence, rape
  - Sex for survival

Clinical course of HIV/AIDS in women is more or less similar to men. The exceptions are considerations that should be given for:

- Obstetric problems including MTCT
- Gynecologic diseases and
- FP related issues

Effect of Pregnancy on HIV infection

Pregnancy does not have significant influence on the progression of HIV infection. However, if pregnancy occurs in late stage AIDS the rate of maternal mortality, particularly in developing countries is increased.

Effect of HIV on pregnancy

In HIV infected women there is an increase in IUGR, LBW, preterm delivery and abortion. In the developing countries there is also an increase in stillbirth rate, perinatal mortality and infant mortality. HIV does not have direct influence on rate of congenital malformation.

Four Pronged Approach

To reduce MTCT WHO designed four pronged strategy that is feasible to implement in developing country settings. The four prongs are:

- Primary prevention of HIV infection in women 15-49years
- Secondary prevention of unplanned pregnancy in HIV infected women
- ARV prophylaxis or treatment
- Care and support during and after pregnancy and childbirth.

DEFINITION

MTCT is the transmission of HIV virus from the mother to the fetus and child during pregnancy, childbirth and breastfeeding.
ART is the use of three or more antiretroviral drugs to treat HIV infection. ART is a treatment for life long and helps to reduce MTCT.
ARV prophylaxis is short term use of antiretroviral drugs in the mother and/or infant to reduce MTCT. Prophylaxis is divided into two:

- short term: beginning at or after 36 weeks of gestation
- long term: beginning anytime before 36 weeks of gestation

PREGNANCY IN HIV POSITIVE WOMEN
Globally, about 2.3 million HIV positive women get pregnant annually and 700,000 children are born infected from their parents. In Ethiopia, there are over 100,000 pregnancies in HIV positive women and over 12,000 HIV positive births. MTCT is the predominant mode of transmission in children under 15 years of age.

HIV is transmitted to the offspring during

- Pregnancy in 5–10%
- Labor in 10–20%
- Postpartum in 10–20%.

The rate of MTCT is estimated to be 15-25% in developed countries compared with 25-35% in developing countries; the estimate for Ethiopia is 29-47%. The reasons for higher transmission in developing countries include:

- Poor health care facilities
- More pregnant women with advanced disease
- Almost universal breastfeeding
- Higher frequency of chorioamnionitis
- More untreated other STDs

With the available interventions MTCT can be reduced to less than 2%. These interventions are:

- Testing and counseling
- HAART
- Elective cesarean delivery
- Treatment of related diseases, STDs, OIs

Factors influencing MTCT
Several factors influence the transmission of HIV from the mother to the offspring. The factors are categorized in to viral factors, maternal factors, obstetric factors and fetal factors.
Viral factors

- Viral load – the higher the viral load the higher the transmission of the virus to the child. If the woman is infected with HIV during pregnancy or breast feeding the viral load is high.

Maternal factors

- Stage of disease, CD4 count – Transmission is higher in women with late stages of AIDS, and in women with low CD4 count
- Nutrition – Multivitamin supplement decreases the rate of low birth weight babies and preterm labor.
- Behavior – sexual relations with multiple partners during pregnancy, use of social drugs-tobacco and other hard drugs increase transmission.
- STIs – The presence of STIs, especially ulcerative STIs, increases the rate of MTCT

Obstetric factors

- Placental infections – viral, bacterial including bacterial vaginosis, syphilis protozoal including malaria and trichomoniasis
- Diagnostic and therapeutic interventions – frequent vaginal examination, amniocenthesis, external cephalic version, chorionic venous sampling
- Duration of membrane rupture – for every hour after rupture of fetal membranes there is a 2% increase in MTCT.
- Mode of delivery – elective cesarean section decrease MTCT by a factor of five; instrumental delivery increases transmission. If instrumental delivery is required it is better to use forceps.

Fetal factors

- Preterm delivery and immature immune system
- First born twin is more affected than the second.

Infant feeding practices

- Breast feeding increases transmission of HIV by 10-20%. If the mother chooses to breastfeed exclusive breastfeeding for six months should be recommended.
- The transmission is higher if breast feeding is mixed with other feeds, if there is inflammation of the GIT including the mouth, and if there is cracked nipple, fissure, mastitis or breast abscess.

PRECONCEPTION CARE IN THE FACE OF HIV

Inform HIV positive women about options for preventing unplanned pregnancy, the use of FP methods and its relation with HIV/AIDS and ARV drugs.

- Prevent, screen and treat STDs prior to conception
- Nutrition: advice adequate high calorie intake to support nutritional needs, give additional iron and folate at least three months prior to pregnancy. Encourage the consumption of foods rich in iron (e.g. green leafy vegetables, meat and liver).
- Prevention of malaria: Encourage use of insecticide treated nets (ITN) for all women and early treatment for symptoms of malaria for women living in malaria endemic areas.
- Prophylaxis and treatment of opportunistic infections.
- ART is commenced for standard indications (see national guideline for treatment of HIV).

Give information on risk of MTCT

- Probability of vertical transmission (25-35%) and the available technologies to prevent MTCT
- Effect of HIV on pregnancy outcome and the effect of pregnancy on HIV
- Stress the relevance of involving the partner in VCT and subsequent care
- Follow-up schedule before, during and after pregnancy and child birth

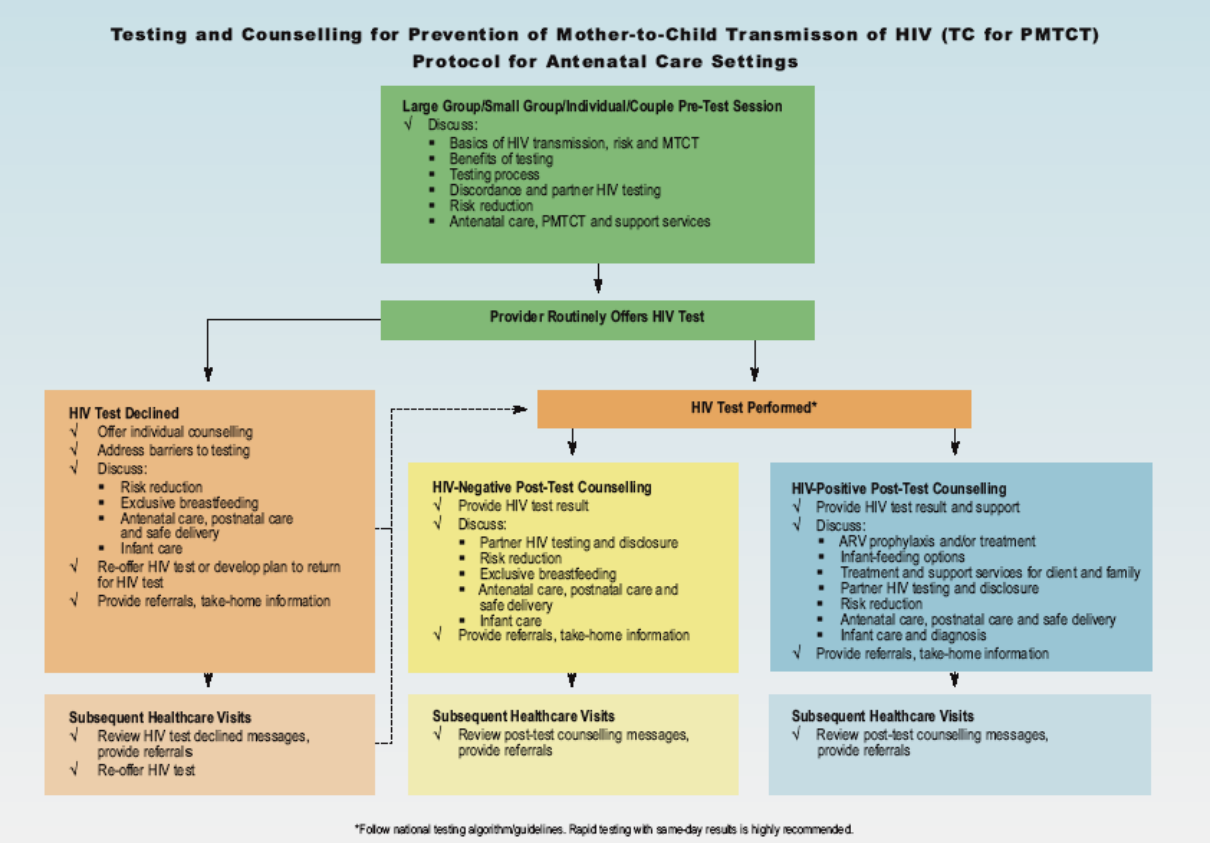
INITIAL EVALUATION

HIV Counseling and Testing during Antenatal Care

Testing and counseling is the first step for PMTCT. Routine provider-initiated counseling and testing of all pregnant women for HIV results in greater acceptability, increased opportunity to prevent MTCT, and minimized stigma. Testing and counseling is voluntary and this should be communicated to all pregnant women. The woman's right to say no and opt out from HIV testing shall be respected.

The pregnant woman should be given the results of rapid HIV tests within one hour whenever possible. Information about HIV testing and counseling must maintain privacy and confidentiality. Knowledge of HIV status is crucial in providing appropriate recommendations and treatment for HIV positive women if indicated.

the recommendation for HIV testing and counseling in Pregnancy should follow the steps shown in the diagram below (see Guidelines for Prevention of Mother-to-Child Transmission of HIV in Ethiopia, Federal Ministry of Health)



Address the following specific issues during counseling HIV positive women:

- Effect of pregnancy on HIV and vice versa
- Risk of transmission of HIV in pregnancy, delivery and postpartum
- Treatment options and their unwanted effects and potential risks
- Interventions available to prevent MTCT
- Infant feeding options
- Need for follow-up, and
- Future pregnancy intentions

Antenatal Care Needs of HIV positive Women

The aim of ANC in HIV positive women is to maintain optimal maternal and perinatal outcome including prevention of MTCT. Whenever possible, refer all HIV positive pregnant women to a center where CD4 testing is available. If CD4 testing is not available, stage the HIV infection in the pregnant woman clinically for AIDS and determine baseline total lymphocyte count. At each ANC appointment, reassess the HIV positive mother clinically for ART eligibility.

Elicit the following specific history and physical examination in HIV positive pregnant women:

- Duration since the woman knew that she is HIV positive

- Past history of HIV-related illness: admission, TB, PCP, toxoplasmosis, herpes-zoster, chronic diarrhea
- ART use: combination being used, duration, adherence, side effects
- Assess for symptoms of AIDS and HIV of children and partner based on WHO Clinical Staging System for HIV Status
- Partner disclosure and referral
- Any medications for HIV related illness taken since beginning of pregnancy (e.g. TB or malaria medications, ARVs, antibiotics for opportunistic infections)

DIAGNOSTIC TESTS AND PROCEDURES

Table 13 Laboratory tests to be done for HIV positive pregnant women during antenatal care.

First Visit	24 -28 weeks	36 weeks
▪VDRL ▪Hgb/Hct ▪Blood group and Rh factor ▪Urine analysis and culture ▪WBC ▪Stool exam	▪Hgb/Hct ▪WBC – frequent testing if indicated	▪Hgb/Hct ▪WBC – frequent testing if indicated
▪Vaginal discharge smear ▪Pap smear ▪HBV panel	▪Vaginal discharge smear ▪Urine analysis and culture	▪Vaginal discharge smear ▪Urine analysis and culture ▪LFT, RFT if eligible for ART prophylaxis
▪Ultrasound ▪CD_4 count/percentage ▪HIV RNA PCR (viral load)	▪CD_4 count/percentage ▪HIV RNA PCR (viral load)	▪CD_4 count/percentage ▪HIV RNA PCR (viral load)

NB: All HIV positive pregnant women should have baseline total lymphocyte count at the minimum.

TREATMENT PLAN

Antenatal management

- Prevent, screen and treat STDs according to the national guideline.
- Diagnose (vaginal smear, pH, sniff test) and treat bacterial vaginosis with metronidazole 500mg orally twice per day for 7 days.
- Nutritional advice: same as in preconception care above.
- **Prevention and treatment of anemia**: Provide iron and folic acid supplement to all pregnant HIV positive mothers. Clinically detected anemia should be treated using ferrous sulphate or fumerate 100mg, providing 60mg of elemental iron three

times a day. Parentral iron treatment and blood transfusion should be based on severity of the anemia, the gestational age and presence of other conditions associated with ongoing blood loss.

- **Malaria**: All pregnant women should be advised to use insecticide treated bed nets to prevent malaria. All HIV positive pregnant women living in malaria endemic area should receive prophylaxis and treatment for malaria according to the national guideline.
- **Tuberculosis:** Screen any pregnant woman who presents with cough that persist more than two weeks for Tuberculosis (TB) according to the national guideline.
- **Prevention and treatment of opportunistic infections**: Provide prophylaxis and treatment for opportunistic infections as per the National Guideline on the management of opportunistic infections. In general Prophylaxis against TB, PCP, Toxoplasma, HSV, during pregnancy is the same as non pregnant women. Prophylaxis against candida and CMV is not indicated. Recurrent genital herpes (HSV type II) should be managed by prophylactic acyclovir at 36 weeks of gestation.
- **Vaccination** recommendation
    - HBV, influenza, pneumococcal, meningococcal – same as HIV negative pregnant women
    - Avoid live vaccines.

Antenatal procedures

- Avoid invasive obstetric procedures e.g., amniocenthesis, external cephalic version.
- Treatment of condylomata accuminata is only surgical.

Intrapartum management

- Care of laboring mothers with HIV should follow standard obstetric practice. IP/UP shall be practiced in all laboring mothers.
- Avoid invasive procedures. Avoid artificial rupture of membranes, ARM, unless strictly necessary or delivery is imminent. Avoid other procedures including frequent vaginal examination, fetal scalp sampling, internal monitoring.
- Avoid conditions that cause bleeding including episiotomy and vaginal and perineal tears.
- Minimize instrumental delivery. If there is a need use forceps.
- Discuss the benefit and potential complications related to CS. Do elective CS based on resources of the health facility, availability of skilled provider, and the pregnant woman's preference. Give single dose prophylactic antibiotics if CS is to be done. Balance the postoperative complications, e.g., wound infection, endomyometritis, UTI and pneumonia, against the benefit, i.e., PMTCT.
- Do elective CS if there is active genital herpes infection.
- ARVs should be given according to the national guideline.

Postpartum Management and Care

- Postpartum complications are commoner in HIV positive women. These complications include endomyometritis, wound infection, UTI and respiratory infections.
- Inform the importance of proper disposal of lochia.
- Counsel on contraception and condom use
- Inform that care for family members interfere with self care
- Ensure the woman gets medical and social support system

ART in Women of Childbearing Age and Use of ARV for PMTCT

Consider pregnancy before initiation of ART in all women aged 15–49 years. The use of ART in pregnant women is divided in two:

- ARV Prophylaxis
- ART

Treatment recommendations change frequently. Hence, health providers should update themselves as their situation allows.

Principles of ART in pregnancy

- ART during pregnancy is for standard indications or for prevention of MTCT.
- Give information on:
  - effectiveness of ART in PMTCT
  - the known and potential effects of ART on the fetus and newborn, and
  - the importance of adherence to any ARV regimen
- Women on HAART should continue the regimen during labor and postpartum
- Infants born to mothers receiving ARVs should receive AZT 4mg/kg/dose bid for 7 days
- The woman's informed decision is very important to start or alter ART during pregnancy.
- Toxic effects of the drugs are the same in pregnant and non pregnant women.

Initiation and alteration of ARV drugs in pregnancy is based on the benefit of ART to the mother and its risk to the fetus.

- Delay initiation of ART till 12 weeks of pregnancy. Counsel the woman about the benefit and potential teratogenic effects of ARV drugs.
- If the mother has advanced HIV infection or a low CD4 count ($<200/mm^3$) commence ART even if the pregnancy is less than 12 weeks. Determine CD4 count and viral load at every trimester whenever available.
- Start ART after the first trimester with AZT containing combination.
- If the woman is on ART regimen that does not include AZT substitute one of the nucleoside analogues by AZT at 16wks.
- AZT is recommended because of its proven effectiveness in MTCT and safety of its use during pregnancy.

Criteria for initiating ART for pregnant women:

- All women in stage IV irrespective of CD4 count
- Women in clinical stage III, with CD4 count <350cell/mm3, if CD4 count is not available all women in stage III
- Women in clinical stage I and II with CD4 count of <200cell/mm3.

If the woman is taking an efavirenz containing ART regimen while planning pregnancy or during first trimester of pregnancy replace efavirenz by nevirapine because of its teratogenic effect.

ARV Prophylaxis for PMTCT

The national guidelines on PMTCT recommend the following ARV prophylaxis regimen.

1. Women Presenting in Pregnancy

In facilities where ART service is functional and available

Mother

- Antepartum: AZT (300mg bid) starting at 28 weeks of gestation from LNMP or as soon as feasible thereafter
- Intrapartum: Single dose NVP (200mg), and AZT (600mg at onset of labor) with 3TC (150mg at onset of labor) and every 12 hours until delivery
- Postpartum: AZT (300mg bid) and 3TC (150mg bid) for 7 days.

Infant

- Single dose NVP (2mg/kg) with AZT (4mg/kg/dose bid) for 7 days.

In facilities where there is no ART service or when referral to the nearest ART clinic is not possible or difficult for the client

Mother

- Single dose NVP (200mg) at onset of labor

Infant

- Two doses of NVP (2mg/kg) to be given 24 hours apart within 72 hours.

2. Women Presenting in Labor

In facilities where ART service is functional and available

Mother

- Intrapartum: Single dose NVP (200mg), and AZT 600mg with 3TC 150mg (both every 12 hours until delivery)
- Postpartum: AZT (300mg bid) and 3TC (150mg bid) for 7 days.

Infant

- Single dose NVP (2mg/kg) with AZT (4mg/kg/dose bid) for four weeks.

In facilities where there is no ART service and referral to the nearest ART clinic is not possible or difficult for the client

Mother

- Single dose NVP (200mg) at presentation

Infant

- Single dose NVP (2mg/kg) within the first 72 hours of life

3. Infant born to ARV naïve HIV positive women postpartum

In facilities where ART service is functional and available

- Single dose NVP (2mg/kg) with AZT (4mg/kg/dose bid) for four weeks.

In facilities where there is no ART service and referral to the nearest ART clinic is not possible or difficult for the client

- Single dose NVP (2mg/kg) within the first 72 hours of life

Scenarios in labor and postpartum

- Woman with no ANC – provide VCT, rapid test and manage as described above
- Woman given nevirapine but false labor – repeat nevirapine dose at onset of true labor
- Elective C/S – give prophylaxis three hours before operation
- Emergency C/S – prophylaxis should have been administered earlier during labor
- Planned home birth – provide both maternal and newborn doses of nevirapine at 28-32weeks of pregnancy.

Precautions in use of ARV drugs in pregnancy

- Avoid effavirenz because of its association with congenital malformation.
- Avoid combination of stavudine and didanosine because of academia that can threaten the life of the mother.
- Avoid combination of ZDV and stavudine because of antagonism.
- PIs influence carbohydrate metabolism. So, blood glucose follow up is important with use of PIs.
- Indinavir use is associated with hyperbilirubinemia and nephrolithiasis.
- Herbs should be avoided because there is no safety data on their use.
- Long term effects of ARVs not well established

Breastfeeding for the HIV Positive Woman

In many situations where there is a high prevalence of HIV, lack of breastfeeding is also associated with a three- to five-fold increase in infant mortality. Consequently, providers must weigh the client's circumstances when counseling for breastfeeding. To do this, the client must have access to confidential HIV testing. Once a woman knows her status, an informed decision can be made regarding infant feeding.

The recommendation is:

- IF a mother knows she is infected, and
- IF breast milk substitutes are affordable and can be fed safely with clean water and
- IF adequate health care is available and affordable,
- THEN the infant's chances of survival are greater if fed with breast milk substitutes.

HOWEVER,

- IF infant mortality is high due to infectious diseases such as diarrhea and pneumonia, or
- IF hygiene, sanitation, and access to clean water are poor, or
- IF the cost of breast milk substitutes is unaffordable, or
- IF access to adequate health care is limited,
- THEN breastfeeding may be the safest feeding option, even when the mother is HIV positive.

***NB**: The safest way to breastfeed during the first six months is exclusive breastfeeding. The addition of liquids and food items into the baby's diet may cause irritation or inflammation in the gut that, in turn, could increase MTCT.*

HIV and Infant Feeding Counseling Guidelines in Low Resource Communities

Situation	Health Personnel Guidelines
Mother's HIV Status Unknown	• Promote the availability and use of confidential HIV testing. • Promote breastfeeding as safer than artificial feeding. • Teach mother how to avoid exposure to HIV.
HIV Negative Mother	• Promote breastfeeding as safest infant feeding method (exclusive breastfeeding for first 6 months, introduction of appropriate complementary foods at about 6 months, and continued breastfeeding to 24 months and beyond). • Teach mother how to avoid exposure to HIV.
HIV Positive Mother Who is Considering Her Feeding Options	• Treat with anti-retroviral drugs, if feasible. • Counsel mother on the safety, availability, and affordability of feasible infant feeding options. • Help mother choose and provide safest available infant feeding method • Teach mother how to avoid sexual transmission of HIV.
HIV Positive Mother Who Chooses to Breastfeed	• Promote safer breastfeeding (exclusive breastfeeding up to 6 months, prevent and treat breast problems of mothers and thrush in infants, and shortened duration of breastfeeding when replacements are safe, feasible, and available.
HIV Positive Mother Who Chooses to Feed Artificially	• Help mother choose the safest alternative infant feeding for her situations. • Support her in her choice (provide education on hygienic preparation, health care, family planning services, child health services).

STI and HIV Prevention

In order to support effective behavior change, preventive health messages need to be specific without being offensive. Take the lead by discussing your client's sexual practices together. Use the following outline in presenting STI and HIV prevention counseling:

Risk

Tell the client that penetrating sexual intercourse without condoms carries a high risk of infection.

Discuss the sexual practices of the client and of the client's partner that might put the client at risk.

Safer Sex

Tell the client that practicing safer sex can prevent most future STIs. Safer sex practices include:

- Having sex only with an uninfected partner who has sex only with you.
- If that is not possible or if you do not know if your partner is infected:
  - *Use condoms each and every time you have penetrating sexual intercourse.*
- Ensure that the client knows that sores or warts in the genital area that cannot be covered by condoms can cause transmission of infection.

Communicating with Partners about Sex

Ask the client the following:

- Have you ever discussed sex or safer sex with your partner? If so, what happened?
- If not, how might you bring it up with your partner?
- What would you say and how do you think your partner would react?
- Can you think of any ways to increase pleasure with condom use?

Role-play with the client how to begin the conversation and what to say to a partner.

Reducing Risk

If the client is unable to practice safe sex, help the client develop strategies to reduce the risk of infection; *e.g.*, reducing the number of partners, making condoms available to partners for use with relationships outside the primary one. *Have STI symptoms evaluated and treated immediately.*

HIV and Selected Gynecologic Conditions/Diseases

Gynecologic infections in HIV positive women are found in up to 63% of routine clinic visits. Nearly one in 10 HIV positive women are hospitalized for gynecologic symptoms and diagnosis. More than 25% of HIV positive women have gynecologic manifestations. Abnormal pap smear result is found in 40% of HIV positive women. All HIV positive women need complete gynecologic evaluation, including Pap smear and pelvic examination. Abnormal Pap smear is associated with presence of HPV infection.

Menstrual disorders

Menstrual disorders are common in HIV positive women. The disorder can be:

- Metrorrhagia
- Menorrhagia
- Oligomenorrhea
- Ammenorrhea: is related with the degree of immunosupression.

HIV alone does not cause menstrual dysfunction. Ask for related conditions assumed to be responsible:

- Severe weight loss
- Stress
- Symptoms suggestive of chronic illnesses (e.g., TB, chronic liver and renal failure)
- Phychiatric illnesses and use of phychotropic drugs (e.g., chlorpromazine)
- Thrombocytopnia: bleeding from other sites.

Effect of antiretroviral drugs is not well studied, but hypermenorrea is reported with ritonavir.

Lower Genital Tract Neoplasia

HIV is associated with increased prevalence of squamous intraepithelial lesion, SIL,: abnormal cytology and histology is independently associated with the degree of immunosuppression. SIL progresses faster, is less responsive to standard treatment, and is more likely to recur after treatment. The risk of CIN is five times higher in HIV infected women. Refer if there are risk factors for progression and regression which are:

- HPV-seropositive
- High HIV-RNA level
- Low CD4-count

Do Pap smear 2 times/year 6 months apart in first year of diagnosis of HIV infection, then every year if first test result is normal. More frequent Pap smear is required:

- With previous abnormal Pap smear.
- With HPV infection
- After treatment for cervical dysplasia.
- In women with symptomatic HIV infection (CD4 counts <200/mm^3.

Management

Recommended management for abnormal pap smears:

Severe inflammation: evaluate for infection; repeat pap smear if inadequate.

Refer if there is:

- Cytologic abnormality
- History of untreated abnormal pap-smear
- Evidence of HPV infection
- CD4 count <200/mm^3 need for screening colposcopy with.

Invasive Cervical Cancer

- AIDS defining disease (CDC 1993)
- Immunosuppression and anogenital cancers are related.
- Degree of immunosupression has not been associated with cervical cancer.
- Cervical cancer in HIV positive women is diagnosed at later stages (approximately 50% of HIV+ women have stage 3 and 4 disease at diagnosis).
    - More likely to recur
    - More aggressive, metastasize to unusual sites
    - Prognosis is poor.

Refer: if there is suspicion or diagnosis of cervical cancer.

Vulval and Vaginal Intra-Epithelial Neoplasia

- Are more prevalent.
- Tend to occur in younger women.
- May have more rapid and aggressive course.

Refer: if there is suspicion or diagnosis of cervical cancer.

Sexually Transmitted Infections

Human papilloma virus infections

- HPV is common in HIV positive women.
- HPV DNA in the non-immunosupressed female population is lower.
- HIV per se is an independent risk factor for ano-genital HPV infections.
- Both **latent** and **clinically expressed** HPV infections are found to be significantly more common in HIV positive women
- HPV infections in HIV positive women are:
    - More frequent
    - More persistent
    - More difficult to treat.
- High risk DNA types and infection with multiple HPV types are found at significantly increased rates.
- Persistence rate in 3-12 months period is six times higher (20% for HIV positive Vs 3% for HIV negatives).

Genital Herpes Simplex Infection

- More frequent, prolonged, and/or severe episodes common with progressive immunosuppression; lesions may be atypical in appearance or location.
- Viral shedding increases with declining CD4
- Most viral shedding are asymptomatic.

- HSV is associated with increased risk of HIV transmission and acquisition.
- Chronic HSV ulceration (1 month duration) is an AIDS defining condition.
- Manage acute HSV infection using Acyclovir. Resistance is common. Factors associated with resistance are low CD4 count and long term exposure to acyclovir.

Refer cases resistant to acyclovir.

Vulvovaginal candidiasis

- Prevalence in HIV positive women is 3-15%. It increases with a decrease in CD4 count.
- A quarter vaginal isolates are strains other than candida albicans (e.g Torulopsis glabrata.)
- Is usually the first presenting symptom in HIV positive women.
- Topical therapies are more effective when given for at least 7 days.
- Consider prophylactic use of topical anti-fungals when antibiotics are given.
- Fluconazole 200mg orally weekly for prophylaxis of candidiasis in women with CD4<300/mm^3 is effective in preventing vaginal and oro-pharyngeal candidiasis.

Gonorrhea and Chlamydia

Prevalence, clinical presentation, diagnosis and treatment in HIV positive women is the same as in HIV negative women (see national guideline for syndromic approach for treatment of STIs).

Syphilis

- HIV infected patients may have abnormal serologic tests; usually high titers, false negatives, delayed sero-reactivity.
- Clinical presentation is variable at all stages and atypical manifestations may be seen in HIV infection.

PID

PID in HIV positive women:

- May present differently
- Symptomatic HIV infections increase the frequency and severity of PID because local immunity is impaired.
- Colonization by anaerobic bacteria is higher.
- Treatment requires hospitalization. Give high dose IV antibiotics.
    - Ampicillin 1gram IV four times a day or crystalline penicillin 4 million IU IV every 4 hours.
    - Gentamycin 80 mg IV three times a day, and
    - Chloramphenicol 1gram first loading dose then 500 mg IV four times a day or Metronidazole 500 mg three times a day.

      And
    - Continue with doxycyclin 100mg BID for 14 days.

If available use third generation cephalosporines in the place of Ampicillin, and clindamycin in the place of chloramphenicol/metronidazole.

Microbiology and response to standard antibiotic regimens are similar to HIV negative women but there is increased incidence of tubo-ovarian abscess and a greater need for surgical intervention.
Refer if there is tubo-ovarian abscess or there is no response to high dose antibiotic regimen within 48 hours of initiation of antibiotic treatment.

HIV and Contraception
Contraceptive of choice should:

- Effectively prevent pregnancy
- Effectively prevent transmission of HIV and other STDS
- Have least potential for drug interactions due to HIV related therapy
- Not have a negative impact on the course of HIV.

Depending on the woman's informed decision after counseling best choice or practice is condom with hormonal methods or tubal ligation. Male condoms are less efficacious for pregnancy prevention with a first year failure rate of 12% and perfect use failure rate of 3%.

Hormonal contraceptives (COC, POP, injectables and implants) belong in WHO's medical eligibility criteria, MEC I, unrestricted use.

- Nelfinavir and lopinavir/ritonavir possibly reduce effectiveness of COCs. So, use alternative or additional FP method or dual protection to avoid contraceptive failure.
- Do not co-administer fosamprenavir and amprenavir with COCs to avoid side effects from COCs and risk of ART failure.

IUCD for women found to be HIV infected is categorized in MEC category II. In women with AIDS: continuing IUCD use belongs in MEC category II and initiating IUCD use is in MEC category III, its use needs special follow-up.

Health education messages

- Penetrating sexual intercourse without condoms carries a high risk of infection.
- ***Safer Sex:*** practicing safer sex can prevent most future STIs. Safer sex practices include:
  - Having sex only with an uninfected partner who has sex only with you.
  - If that is not possible or if you do not know if your partner is infected:
    - *Use condoms each and every time you have penetrating sexual intercourse.*
  - Sores or warts in the genital area that cannot be covered by condoms can cause transmission of infection.
- MTCT can be prevented by available interventions. These interventions are:
  - Testing and counseling
  - Taking ART drugs
  - Elective CS

- Inform about:
    - effectiveness of ART in PMTCT
    - the known and potential effects of ART on the fetus and newborn, and
    - the importance of adherence to any ART regimen
- Testing and counseling for HIV infection is an important measure to prevent MTCT. Stress the relevance of involving the partner in testing and counseling, and subsequent care
- Follow-up before, during and after pregnancy and child birth is crucial to prevent MTCT.
- But, breastfeeding is important for the health and growth of the baby. But, breastfeeding increases transmission of HIV by 10-20%. Counseling for the baby's feeding option is available. The decision to breastfeed or use alternative feeding is made by you.
- Balanced diet (nutrition) and multivitamin supplement improves the birth weight of the baby and reduce delivery before term.
- Healthy behavior reduces the chance of transmission of HIV to the baby
    - It is good to avoid sexual relations with multiple partners during pregnancy.
    - It is good to refrain from use of tobacco and other hard drugs.
- Seek medical advice and treatment for STIs. The presence of STIs, especially ulcerative STIs, increases the rate of MTCT.
- Always remember and take iron tablets to prevent anemia.
- Use insecticide treated bed nets to prevent malaria.
- Burn sanitary pads before disposal. Contaminated cloths should be washed by self or using heavy utility gloves. If possible immerse the contaminated cloths in berekina solution for 10 minutes before washing the cloth to kill HIV virus.

Management of Victim of sexual assault

Definition

Sexual Violence is any act, attempted or threatened, that is sexual in nature and is done with force – physical, mental/emotional, or social – and without the consent of the affected person/survivor. This includes acts of forcing another individual, through violence, threats, deception, cultural expectations, weapons, or economic circumstances, to engage in behavior against his or her will*, by any person regardless of relationship to the victim, in any setting including but not limited to home and work.*

Rape

Rape is an act of non-consensual sexual intercourse (penis-vagina or penis-anus). Any penetration is considered rape, and includes:

- Rape of an adult female
- Rape of a minor (male or female), including incest. Even if the minor was agreeing to the act, she/he cannot legally consent due to his/her age.
- Gang rape, if there is more than one assailant
- Male rape, sometimes known as sodomy

Under the Ethiopian penal law articles 620-631 have included sexual misconduct that is clearly punishable

1. The use of force or threat or rendering a woman unconscious or in a position unable to defend herself (620) to have sex
2. Sexual act on a person who is mentally incompetent (623)
3. Hospitalized persons, incarcerated or imprisoned persons (624)
4. Taking advantage of material or psychological problems or moral superiority (625)
5. Children under 18 (626-7)

Under Ethiopian law the following are aggravating conditions (628)

1. If pregnancy follows
2. If the victim sustained sexually transmissible infections
3. If the victim commits suicide out of physical or psychological distress

Evaluation of the victim of Sexual Assault

Component of the complete medical evaluation of the victim of sexual assault include:

- Detailed medical history
- Complete physical examination
- All necessary laboratory investigations and collection of forensic evidence
- Provision of a detailed medical affidavit as requested by the justice and legal departments

Medical history

The medical history obtained from the sexual assault victim should be as detailed as any history obtained from other clients. Important points to be included in the history include:
General medical history: as detailed as possible

Gynecological history:

- Reproductive history (Gravidity, Parity, Abortion)
- Last menstrual period (LMP)- if the woman is pregnant also assess the coincidence of the dates to date of abuse
- Previous history of STIs and treatment
- Use of family planning

Sexual history:

- Ask whether the victim is sexually active or not
- Date and time of last consensual intercourse and number of partners in the last seven days especially important when collecting semen for forensic evidence

Details of incidence of sexual assault:

- Date, time and frequency of abuse, and date of last incident in cases of repeated abuse
- Location
- Number of assailants
- Details of perpetrator, is he/she still posing a threat?
- Details of physical/sexual assault was a weapon or object used

- Occurrence of ejaculation
- Use of condoms by the assailant during the assault
- Drugs or alcohol taken or given to the victim and circumstances
- Psychological reactions such as depression, withdrawal, change of appetite or sleep patterns, shame and a feeling of guilt. Psychological reactions are particularly important in cases of child victims of sexual assault.

As much as possible documentations should be using the words of the victim rather than paraphrasing. This should be practiced while clerking all victims but is especially important in child victims of sexual abuse who may not have a notion of what a sexual act is.

Physical examination of the sexual assault victim:

General physical examination:

- Should focus in obtaining evidence of extra genital injury and the details such as location; type; size; color; swelling; age (recent or healed) etc.
- Note whether lesion is consistent with injury caused by a blunt/sharp object/burns… etc
- Use a diagram to illustrate injuries
- Clothing: mainly relevant in acute cases, i.e. describe whether torn, type of dirt, blood etc.

General appearance:

- Height/weight for children and if appropriate for adult as well
- General nutritional status and appearance including mood
- Signs of neglect or physical abuse
- Obvious functional impairments

Assess the mental state:

- Assess ability to consent: i.e. drunk, mentally retarded etc
- When you feel that patient is ‘slow’, ‘can’t quite hold a normal conversation’, it is advisable to seek expert opinion from a psychiatrist/clinical psychologist

- In children, describe whether child is anxious, fearful, tearful, happy, withdrawn… etc. These observations may complement the story and/or physical findings.

Sexual maturity rating:

Use the tanner staging of sexual maturity 1-5 or assess as 'pre-pubertal', 'pubertal' and 'mature'. This is significant in a child victim to assess the age and maturity as well.

Genital examination:

Positioning for examination:

- For the adult female victim, the dorsal lithotomy position is suitable for examination. The frog leg position with the hips and knees flexed and the soles of the feet touching each other is suitable for examining the child victim. The examination of the child can be performed while the child is on the mother's lap.
- The left lateral position is best for examining male assault victims for anal injury.
- Sedation or examination under anesthesia might be an option for the very agitated and uncooperative child.
- Describe any change noticed on each of the external and internal genital examination in a stepwise fashion:
    - Labia majora
    - Labia minora
    - Vestibule
    - Urethra
    - Fossa navicularis
    - Posterior fourchette
    - Perineum
    - Hymen

Hymeneal examination:

- Examine the hymen with a gentle traction at posterior edge of labia majora outwards and downwards. You may ask the victim to "push against" your fingers; this will generally open up the hymeneal orifice if not already visible on gentle traction.
- A cotton swab inserted through the hymeneal orifice may also be used to look at the hymeneal rim. It can then be used as a specimen for laboratory examination.
- Describe the following features regarding the hymen:
    - Shape
    - Estrogenization
    - Irregularity, distortion … etc as compared to the normally smooth margin
    - Narrowing of hymeneal rim (attenuation)

Vaginal examination:

- Vaginal examination is rarely indicated. If performed, note the following:
- Discharge: color, odor, consistency, origin- cervix or vagina
- Hemorrhage: traumatic, menstrual, origin- cervix, vagina, external genitalia …etc
- Uterine size by palpation/date

Anal examination:

- Left lateral position with flexed knees
- Gentle parting/separation of buttocks
- Describe the following during the anal examination:
    - Acute changes – details of evidence of trauma
    - Fresh tears at 'x' o'clock
    - Anal margin- look for irregularities, deficits, distortions, etc
    - Fissures- at 'x' o'clock
    - Acute fissures can occur in young children who have not been abused, they tend to occur in the midline, either posterior or anterior

Forensic evidence and laboratory investigation

Vaginal swab for spermatozoa

Take a swab for semen before doing the internal/speculum examination in the adult; avoid KY jelly, antiseptic solutions as it interferes with the forensic analysis.

Time limits to detect the following:

Table 14 duration of spermatozoa recovery

Source of specimen	Spermatozoa detectable until
Vagina	6 days
Anus	3 days
Mouth	12-14 hrs

HIV counseling and testing

Refer to a person trained in HIV counseling and testing for pre test counseling, testing and post test counseling for HIV. Testing for HIV should be done at initial encounter, at three months and six months for a victim who is negative to HIV test at initial encounter

Screen for sexually transmissible infections

The following tests should be done to screen for STIs other than HIV

- Grams stain for intra cellular diplococci (ICDC)
- Saline mount for Trichomonas Vaginalis
- Hepatitis B surface antigen
- VDRL/RPR

Baseline pregnancy test to confirm or exclude pregnancy

If menses is overdue in a woman who has had a regular cycle or a period has been missed do urine for HCG to confirm pregnancy and if need be do ultra-sonography to confirm pregnancy and also ascertain gestational age.

Treatment Plan

Purpose of management

- To prevent acute life threatening conditions like suicide
- To identify and treat acute genital injury
- To give prophylactic management for sexual transmitted infections and prevention of pregnancy
- To provide evidences of sexual assault
- To provide psychological care or refer as appropriate

1. Appropriate medical or surgical treatment for acute injuries.

- Clean any tears, cuts and abrasions and remove dirt, faeces, and dead or damaged tissue. Decide if any wounds need suturing.
- Suture clean wounds within 24 hours. After this time they will have to heal by second intention or delayed primary suture.
- Do not suture very dirty wounds.
- If there are major contaminated wounds, consider giving appropriate antibiotics and pain relief.

2. Pregnancy prevention

a. Emergency contraception

a. Progestin only Pills
Levonorgesrel 0.75mg one tab 12 hours apart highly effective before 72 hours but can be given until 120 hours hours of incident eg. *Postinor*
Levonorgesrel 0.0375 mg containing oral contraceptives
20 tabs per dose 12 hours apart eg. Ovrette

b. Combined oral contraceptive pills with High dose of estrogen (50µg) E.g. Ovral: 2-tabs 12 hours apart (total 4 tabs) highly effective before 72 hours but can be given until 120 hours hours of incident

c. Combined oral contraceptive pills with low dose of estrogen (30µg) E.g. Nordette 4 tabs 12 hours apart (total 8 tabs) highly effective before 72 hours but can be given until 120 hours of incident

d. IUCD(copper containing intrauterine devices) insertion up to 120 hours post incident. The IUD can be removed at the time of the woman's next menstrual

period or left in place for future contraception. Women should be offered counseling on this service so as to reach an informed decision.

N.B If vomiting occurs as side effect within 2 hours of ingestion of the pills the dose should be repeated with advice of antiemetic before the replacement and the second dose

3. Prophylaxis for STIs: Adults

All new cases of abuse should be given empirical anti-microbial therapy for chlamydia, gonococcus and trichomonal infection

- Ceftriaxone 250 mg IM in single dose, plus
- Metronidazole 2 gm orally in single dose, plus
- Doxycycline 100mg orally two times a day for 7 days.

Children or pre-pubertal cases

Erythromycin 30-50mg/kg/day in divided doses every 6 hours. Use Erythromycin in patients who are allergic to tetracycline.

N.B: other appropriate antibiotics can be used according to local sensitivity pattern

4. Hepatitis B Prophylaxis (vaccine if indicated)

Post exposure hepatitis B vaccination adequately protect against HBV Hepatitis B vaccine should be administered to victims of sexual assault at the time of initial examination and should be repeated one month and 6 month after the first dose

5. Tetanus (passive and active immunization)

TT schedule

Dose 1: At the first contact to the clinic

Dose 2: 4 weeks after the first dose

Dose 3: 6-12 months after the second dose

Booster: all 10 years

Dose: TIG 250 -500 units IM

TAT 3000-6000 units IM after skin test

6. Post Exposure Prophylaxis (PEP)

There is no conclusive evidence in the effectiveness that PEP could prevent HIV transmission after rape. Based on experience from occupational exposure and mother to child transmission of HIV it is believed starting PEP as early as possible, within 72 hours is beneficial. If a victim arrives to the facility after 72 hours do only VCCT

Risk of HIV exposure increases if there is

- More than one assailant
- Annal assault
- Damaged or torn skin
- HIV infected assailant

If the HIV status of the assailant is not known, assume that the assailant is infected.

7. Provide appropriate counseling and psychological support and referral

In case patient is agitated or have any indication of possible consequences due to her mental state give diazepam 5-10 mg per os (PO) daily at bed time for maximum of 3 days and refer for psychosocial care.

Social and psychological support including counseling should be offered to victims of assault

Provide basic but non-intrusive practical care. Listen to the victim but never force the victim to talk about the event

Ask the survivor whether she has got a safe place top got to and if some one she trusts would accompany her

8. Pregnancy

Female survivors of rape require emotional support and clear information so that they understand the options they have if they become pregnant: the following options should be clearly explained

Ante Natal Care: The need for antenatal care if the woman decides to keep the pregnancy. A clear schedule for ante natal care and the places where such services are available has to be explained . A birth plan has to be prepared

Adoption and foster centers: providers need to do community mapping to identify adoption and foster centers in their community to help the survivor who require help

Abortion services: if the women decide not to keep a pregnancy out of rape, she is entitled to have safe abortion services. Providers should clearly explain where the services are available or offer it is available in their facility

Recommended Follow up plan

Follow up evaluation

At Two weeks

- Screen for pregnancy and manage accordingly
- Check whether the full course of antibiotics has been taken
- Screen for STI and treat
- Asses emotional and mental status, treat or refer as appropriate
- If PEP provided
  - Evaluate for adherence and side effects
  - Make sure the survivor has enough medication for four weeks
  - Reevaluate at six weeks

12 weeks later

- Screen for pregnancy and manage accordingly
- Screen for STI and treat
- Asses emotional status
- Repeat serum test for RPR/TPHA
- Repeat serum test for HIV at 3 and 6 months
- Asses emotional and mental status, treat or refer as appropriate
- Assess community resources

Legal obligations of sexual assault

- Record events accurately
- Document injury with diagrams
- Collect sample to be sent for forensic examination whenever possible
- Provide medico legal certificate using reporting format