



health

Department:
Health
REPUBLIC OF SOUTH AFRICA

GUIDELINES FOR MATERNITY CARE IN SOUTH AFRICA

**A manual
for clinics,
community
health
centres
and district
hospitals**



Fourth Edition

2015

**National Department of Health,
Republic of South Africa**

ACKNOWLEDGEMENTS

The National Maternity Guidelines Committee at the Department of Health, Pretoria, has prepared this document. This fourth edition of the guidelines is extensively updated, but follows the general format of the successful previous editions. The contents are the result of broad and intensive discussions, feedback and debate.

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GUIDELINES FOR MATERNITY CARE IN SOUTH AFRICA

Foreword by the Minister of Health

The National Department of Health has identified maternal health care as a priority area requiring urgent action in South Africa. This is in line with the target to achieve the Millennium Development Goals (MDGs) as well as the targets set in our National Development Plan (NDP). Towards this end, we have supported the implementation of recommendations arising from the triennial Saving Mothers Reports that have been produced by the Ministerially appointed National Committee on Confidential Enquiries into Maternal Deaths (NCCEMD).

The NCCEMD has recommended regular updating and strengthening of guidelines on the clinical management of the common causes of maternal deaths in South Africa. Guidelines have to be updated on a regular basis because of advances in medicine, development of new pharmaceutical agents and the publication of results of recent evidence-based clinical trials.

The Maternity Care Guidelines for Clinics and District hospitals (Edition 2007) has been revised and new chapters such as the use of blood and blood transfusion products, early warning observation charts and professionalism in health care have been added to give additional emphasis to patient safety. The team that reviewed and upgraded the guidelines are experts from all 9 provinces, so this edition should be regarded as National Guidelines, but should be developed into clinical protocols at provincial and institutional level, where necessary. I would like the provincial obstetrician/gynaecologists as well as the District Clinical Specialist Teams to ensure that these guidelines and the necessary clinical protocols are available and implemented in each facility at which deliveries are conducted.

The National Department of Health will support wide distribution, training in the guidelines as well as monitor their use. In addition, it is imperative that medical and nursing schools in the country use the maternity care guidelines in their training programmes. The guidelines contain the basic minimum that needs to be known by all professional nurses and doctors. Their use will lower high maternal and perinatal morbidity and mortality rates and improve the quality of care for women, their babies and their families.

Finally, I wish to thank all the experts for their time and effort put into making this revision essential reading for those caring for pregnant women during the antenatal period, childbirth and the puerperium.



Dr A Motsoaledi, MP

Minister of Health

Date: 10/7/2015

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ACRONYMS AND ABBREVIATIONS USED IN THE TEXT

AC	Abdominal Circumference
AIDS	Acquired Immunodeficiency Syndrome
APH	Antepartum Haemorrhage
ARDS	Adult Respiratory Distress Syndrome
AVPU	Alert, Verbal questions, Pain, Unresponsive
AZT	Zidovudine
BMI	Body Mass Index
BP	Blood Pressure
BPD	Bi-Parietal Diameter
BRB	Blood on Returnable Basis
Ca	Cancer
CD4	T-helper cells- a Unit Measure of the Immune System
CEO	Chief Executive Officer
CEO	Chief Executive Officer
CHC	Community Health Centre
CPAP	Continuous Positive Airway Pressure
CPD	Cephalo-Pelvic Disproportion
CPD	Continuous Professional Development
CPR	Cardio Pulmonary Resuscitation
CRL	Crown Rump Length
CT SCAN	Computerised Tomography
CTG	Cardiotocograph
CVP	Central Venous Pressure
CXR	Chest X-Ray
D&C	Dilatation and Curettage
DCST	District Clinical Specialist Teams
DIC	Disseminated Intravascular Coagulation
DVT	Deep Vein Thrombosis
ECG	Electro Cardiogram
ECV	External Cephalic Version
EDD	Expected Date of Delivery
EFW	Estimated Fetal Weight
EMS	Emergency Medical Services

EOST	Emergency Obstetric Simulation Training
EPI	Expanded Programme on Immunisation
ESMOE	Essential Steps in the Management of Obstetric Emergencies
FBC	Full Blood Count
GTT	Glucose Tolerance Test
HAART	Highly Active Antiretroviral Treatment
HB	Haemoglobin
HC	Head Circumference
HCG	Human Chorionic Gonadotrophin
HELLP	Syndrome of Haemolysis, Elevated Liver enzymes and Low Platelets
HOD	Head of Department
HPCSA	Health Professions Council of South Africa
ICU	Intensive Care Unit
ID	Infectious Diseases
IM	Intra Muscular
INR	International Normalized Ratio
IPT	Isoniazid Preventative Therapy
IRIS	Immune Reconstitution Inflammatory Syndrome
IUCD	Intrauterine Contraceptive Device
IUD	Intrauterine Death
IUGR	Intrauterine Growth Restriction
IV	Intravenous
IVI	Intravenous Infusion
LMIC	Low and Middle Income Countries
LP	Lumbar Puncture
MC&S	Microscopy, Culture and Sensitivity
MCR	Maternity Case Record
MCV	Mean Cell Volume
MCWH	Maternal, Child and Women's Health
MDNF	Maternal Death Notification Form
MOU	Maternal Obstetric Unit
MRI	Magnetic Resonance Imaging
MSL	Meconium Staining of the Liquor
MUAC	Mid Upper-Arm Circumference
MVA	Manual Vacuum Aspiration

NCCEMD	National Committee for the Confidential Enquiries into Maternal Deaths
Neb	Nebulisation
NGO	Non-Governmental Organisation
NIBP	Non-Invasive Blood Pressure
NPO	Nil Per Os
NSAIDs	Non-Steroidal Anti-Inflammatory Drugs
OI	Opportunistic Infections
PCV	Packed Cell Volume
PET	Pre-Eclampsia
PID	Pelvic Inflammatory Disease
PMTCT	Prevention of Mother to Child Transmission
PNRM	Perinatal Review Meeting
PO	By Mouth
PP	Parietal-Parietal
PPIP	Perinatal Problem Identification Programme
PTT	Partial Thromboplastin Time
Rh	Rhesus Factor
RPR	Rapid Plasma Reagin
RTHB	Road To Health Booklet
SBAR	Situation-Background-Assessment-Recommendation
SC	Sub Cutaneous
SFH	Symphysis-Fundal Height
STIs	Sexually Transmitted Infections
TACO	Transfusion Associated Circulatory Overload
TB	Tuberculosis
TRALI	Transfusion Related Acute Lung Injury
TST	Tuberculin Skin Test
TT	Tetanus Toxoid
TTO	To Take Out (Drugs)
UTI	Urinary Tract Infection
VBAC	Vaginal Birth after Caesarean Section
VL	Viral Load

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MATERNITY CARE IN SOUTH AFRICA

Purpose of this Chapter

This chapter provides an overview of the current situation and data on maternal care in South Africa.

CHAPTER 1: MATERNITY CARE IN SOUTH AFRICA

There is a continuing global commitment to reduce the unacceptably high maternal death rates in low to middle-income countries (LMIC). Progress towards this goal in South Africa demands national co-ordination and co-operation with the major role players in provision of health services, addressing causes of maternal and perinatal deaths and in making available clinical management protocols to ensure that high quality health services are rendered.

Maternity care is an integral component of primary health care and a free health service for pregnant women. Within South Africa, the Maternal and Child Health programme is located in general development policies, which are focused on meeting the basic needs of rural and urban communities, maximising human resources potential, enlarging the economy and spreading its benefits to all South Africans. To comply with these principles, the then Minister of Health announced free health care services for pregnant women and children under the age of 6 years in July 1994.

MATERNAL MORTALITY

Maternal mortality is defined as the death of a woman while pregnant or within 42 days after delivery or after termination of the pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. Maternal deaths may be divided into:

- **Direct obstetric deaths** - resulting from obstetric complications of pregnancy, labour or the puerperium, from interventions, omissions, incorrect treatment or from a chain of events resulting from any of these.
- **Indirect obstetric deaths** - resulting from a previously existing disease that was aggravated by the physiological effects of pregnancy.

The definition implies and includes the following :-

- Irrespective of anatomical site (intrauterine, advanced extra-uterine pregnancy, ectopic pregnancy - tubal, cornual, fimbrial, cornual and cervical sites)
- Any gestational age (early pregnancy - miscarriage, sepsis, surgical complications, bleeding)
- Labour (prolonged labour from spontaneous and induced labour; elective and emergency CS)
- Up to 42 days following delivery (any clinical condition including trophoblastic infections, sepsis, suicide, MVA etc)
- Irrespective of clinical diagnosis or medical discipline/area where the patient was admitted and includes infections such as TB, bacterial pneumonias, meningitis and medical and surgical conditions such as cardiac, liver diseases and all malignancies including trophoblastic disorders (molar pregnancies and choriocarcinoma) trauma and suicides.

Data from the 2010 to 2013 South African Confidential Enquiries into Maternal Deaths Report suggest that the main causes of maternal deaths are related to challenges of the health care system, failure to use health care facilities, inadequacy of services and substandard care related to knowledge and skill of the health care providers.

According to the national department of health (NDoH) annual performance plan 2013/2014 report, the maternal mortality ratio is 310 per 100,000 live births. However, the institutional maternal mortality ratio was 146.71 per 100,000 live births in the year 2012 according to the 10th Interim Report of the National Committee on Confidential Enquiries into Maternal Deaths (NCCEMD) in South Africa.

SUMMARY OF KEY RECOMMENDATIONS FROM THE SAVING MOTHERS REPORT 2008 -2010

RECOMMENDATIONS

The 2010-2013 report has clearly identified three conditions that contribute to the majority of preventable maternal deaths, namely non-pregnancy related infections, obstetric haemorrhage and complications of hypertension in pregnancy. These conditions comprise 66.7% of the possibly and probably preventable maternal deaths. The three conditions have many common preventable factors that are mostly related to the knowledge and skills of the health care providers and the challenges within the health care system. The committee has summarised its recommendations into five key points namely:

The 5 H's

- HIV
- Haemorrhage
- Hypertension
- Health worker training and
- Health system strengthening

HIV and AIDS

Promote the “know your status” and “plan your pregnancy” messages in communities and in the health sector; and ensure non-judgemental approaches.

Ensure every maternity health facility is able to screen for HIV infection and perform early initiation of HAART therapy; and to recognise and treat co-infections, especially respiratory infections.

Haemorrhage

Promote preventive interventions: community education, prevent prolonged labour, prevent anaemia; use of safe methods for induction of labour and practice active management of the third stage of labour

Severe obstetric haemorrhage must have the status of a ‘major alert’ requiring a team approach; with immediate attention to diagnosis of the cause of haemorrhage, resuscitation and stepwise approach to arresting the haemorrhage.

Hypertension

All maternity facilities must provide calcium supplementation to all women throughout their antenatal care and ensure the detection, early referral and timely delivery of women with hypertension in pregnancy.

Severe hypertension, imminent eclampsia, eclampsia and HELLP syndrome must be recognised as life threatening conditions (Major Alerts) requiring urgent attention. All maternity facilities must be able to administer magnesium sulphate to prevent convulsions, administer rapid acting agents to lower severely raised blood pressure , provide close monitoring prior to and following delivery and manage fluid balance safely.

Promotion of Family Planning Services in the population at large (women, their partners, families and communities).

Health worker training

Train all health care workers involved in maternity care in the ESMOE-EOST programme and obstetric anaesthetic module.

Train all health care workers who deal with pregnant women in HIV advice, counselling, testing and support initiation of HAART, monitoring of HAART and the recognition, assessment, diagnosis and treatment of severe respiratory infections.

Health systems strengthening
Ensure 24-hour access to functioning emergency obstetric care (both basic and comprehensive).
Ensure accessible and appropriate contraceptive services for all women which are integrated into all levels of health care and which must be available on site for post-miscarriage and postpartum women.

SAFE MOTHERHOOD IN SOUTH AFRICA

The following are considered to be the 'pillars' of safe motherhood (based on the World Health Organisation's Safe Motherhood Initiative):

1	Choice on contraception - to ensure that individuals and couples have the information and services to plan the timing, number and spacing of pregnancies.
2	Basic antenatal care - the identification of risk factors and early diagnosis of pregnancy complications and appropriate management, and health education.
3	Clean and safe delivery - to ensure that all health workers have the knowledge, skills and equipment to perform clean and safe delivery and provide postpartum care to mother and baby.
4	Basic and Comprehensive emergency obstetric care (Essential Obstetric Care) - to ensure that essential care for high risk pregnancies and complications is made available to all women who need it.
5	Choice on termination of pregnancy - to provide women who have unwanted pregnancies with a legal, safe and acceptable choice.

A NATIONAL STRATEGY FOR MATERNITY CARE

COMMUNITY PARTICIPATION

Women, families and communities must be empowered to contribute actively to improving maternal, perinatal and family health. Conditions that adversely affect the outcome of pregnancy, such as sexually transmitted disease, unwanted pregnancies and lack of transportation should be addressed within the communities involved. Ward-based outreach teams as part of primary health care re-engineering will play an important role at community level.

A SUPPORTIVE LEGAL FRAMEWORK

Legislation and policies must be in place to support the national strategy in terms of free care, termination of pregnancy services and protection of women. Politicians should publicly commit themselves to support improvements in health care for pregnant women.

ADAPTATION TO LOCAL REALITIES

Some of the underlying causes of maternal and perinatal mortality, such as poverty, illiteracy and other national priorities, must be taken into account in the consideration of inadequacies in the health service or the utilisation thereof by pregnant women.

QUALITY OF CARE

Health workers administering care to pregnant women must demonstrate respect and a genuine interest in their clients, and avoid an arrogant, rude or judgmental attitude. This applies even in the context of a poor working environment or perceived unsafe practices of certain pregnant women.

IMPROVEMENT IN THE STATUS OF WOMEN

Active efforts must be made to improve the status of women in society, especially in education, reproductive choice, employment and the prevention of abuse.

PROVISION OF SKILLED MIDWIFERY AND OBSTETRIC SERVICES

The three levels of the district health care pyramid (family and community, health centre, and district hospital) must function in an efficient and cost-effective manner. Midwives and doctors are the best equipped to provide technologically appropriate care to women during their reproductive lives. To prevent maternal deaths, all hospitals must offer caesarean section and blood transfusion facilities. The practice of home deliveries, whether by professional or lay midwives, is not encouraged.

CLINICAL GUIDELINES

The development of management guidelines for normal and high-risk pregnancies will provide a framework for a high standard of maternity care.

REGIONALISED CARE AND REFERRAL SYSTEMS

The district is the basic unit of a health care region, served by a district hospital and a number of health centres. A well-coordinated referral system, with access to transport and facilities, is essential for the provision of optimal care to all pregnant women in the district.

MANAGEMENT CAPACITY

Poor management has been identified as a major weakness of health services in LMIC. Proper financial planning and optimal management of staff and resources are keystones to a fully functional district or provincial health system.

CONTINUING AUDIT OF SERVICES

It is essential to review and audit services and practices in districts and provinces, to improve current services and to develop new services where necessary. Medical and nursing audit meetings should be held at all levels of the health care system.

RESEARCH

Important areas for research include evaluation of the impact of community involvement as a strategy for improving maternal and neonatal health, operation and evaluation of reorganised antenatal care, and cost effectiveness studies of various interventions.

OBJECTIVE OF THE NATIONAL GUIDELINES

These guidelines have been prepared by the Sub directorate: Maternal Health for the guidance of health workers (doctors and midwives) providing obstetric, surgical and anaesthetic services for pregnant women in district clinics, health centres and district hospitals.

In the absence of a functioning system of primary health care and without guidance for clinical management and referral, pregnancy related deaths and ill health could be expected to continue at unacceptably high rates.

USING THESE GUIDELINES

FORMAT AND CONTENT

These guidelines are intended for use in clinics, community health centres and district hospitals where specialist services are not normally available. The guidelines deal mainly with the diagnosis and especially the management of common and serious pregnancy problems. The assumption is made that the reader has a basic knowledge and understanding about the care of pregnant women. With a few exceptions (e.g. pre-eclampsia), there is no mention of aetiology and pathogenesis of the conditions described.

The emphasis is on the **practical identification and correct management of problems**, including referral to higher levels of care. The approach is unashamedly dry, and reduced to point format, so that a management plan can be quickly assimilated and enacted. For certain clinical problems, algorithms (flow diagrams) have been prepared.

The guidelines are based on the best available evidence from published research, modified where necessary to suit local conditions. References are not given, but are available from the authors on request. Specifics of management and drug dosing are not cast in stone, and can be modified according to the experience and new evidence.

Each patient is an individual and may not necessarily be served best by the suggested guidelines. The guidelines would be used most effectively if individual hospitals and community health centres drew up their own protocols based on the contents, adjusted to their own particular circumstances.

EXCLUSIONS

Detailed guidelines on the following have been excluded from these guidelines:

- **The role of community based resources.** This includes community health workers, doulas (birth supporters), traditional birth attendants and support groups.
- **Technical descriptions of procedures.** Surgical techniques, ultrasound, amniocentesis, etc. cannot be learned from a book. Emergency procedures such as breech delivery are however described.
- **Neonatal care.** Only immediate care of the new-born is described.

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2

LEVELS OF CARE

Purpose of this Chapter

This chapter describes the different levels of care in the South African health system and explains the reasons behind the need for various levels.

CHAPTER 2: LEVELS OF CARE

The definitions of levels of care have been modified, with minor adjustments, from the Department of Health's Maternal, Child and Women's Health policy proposal, published in regulation 655 (2012).

The classification of hospitals is based on the level of functioning and includes the type of health professional that can be employed at a facility, bed occupancy and the medical disciplines catered for at each level of care. The levels of care are not location driven.

DEFINING LEVELS OF CARE

Different levels of health care are required for the efficient functioning of the health service. Most medical conditions do not need the facilities of large hospitals. For cost effective health management, clinics and hospitals should share the load of patient care, whereby clinics manage common and low risk problems and hospitals the more difficult clinical entities. It is essential to have a referral system in place with clear protocols of management, referral patterns, transport and responsibilities of the various categories of health professionals.

Approximately 60-70% of all women who use the government facilities will require the services of a hospital at some stage during their pregnancies. About 15% of women will require the services of a specialist obstetrician at a regional or tertiary hospital.

The terms clinic, community health centre and district, regional, tertiary and central hospitals, will be used in these guidelines and follow the definitions given below. Neonatal care staffing and facilities are not included.

Comprehensive lists of equipment, drugs and supplies appears at the end of this chapter. These lists may assist managers of maternity care services to ensure that their facilities are adequately equipped.

CLINIC

This health facility normally functions only on weekdays during working hours. Antenatal care is one of a number of activities in the clinic, the others being chronic diseases, child health, family planning, etc.

Functions

- Antenatal care for low and intermediate risk women, including point of care blood and urine testing.
- Postnatal follow-up visits, including the provision of contraceptive services.
- Referral of patients identified with risk factors for pregnancy complications to appropriate health facilities (according to referral patterns).
- The immediate management of obstetric and neonatal emergencies.

Staffing

Professional nurses, enrolled nurses, nursing assistants, community health workers and a visiting medical officer.

Facilities

- All the necessities to run an antenatal clinic.
- Equipment and drugs for obstetric emergencies (oxygen, ringer's lactate solution, magnesium sulphate, salbutamol).
- Sterile delivery packs for unscheduled deliveries.
- Reliable transport service for emergency transfer to an appropriate facility.
- An effective communication system (radio or telephone).
- Contraceptive Services including insertion of IUCD's and Implants.

COMMUNITY HEALTH CENTRE

This is a 24-hour comprehensive health service with an obstetric unit run by midwives. Where it stands alone as a maternity service, it might be called a midwife obstetric unit (MOU). More often, the maternity section will run alongside other services such as emergency care, minor ailments, chronic diseases, and promotive services.

Functions

- Low- to intermediate-risk antenatal care.
- Basic emergency obstetric care signal functions: magnesium sulphate, intravenous antibiotics, oxytocics, vacuum delivery, removal of retained placenta, manual vacuum aspiration, neonatal resuscitation.
- 24-hour labour and delivery service for low risk women.
- Comprehensive contraceptive care.
- Referral of problems to hospital.
- Management of emergencies.

Staffing

Advanced midwives, midwives, enrolled nurses, nursing assistants, community health workers, visiting or resident dietician and a visiting or resident medical officer.

Facilities

- All the necessities to run an antenatal clinic.
- All equipment to run a low risk labour ward.
- Hand-held Doppler instrument for fetal heart auscultation.
- An effective communication system (radio or telephone).
- Reliable 24-hour transport service for emergency transfer to hospital.

DISTRICT HOSPITAL

The package of services provided at district hospitals includes trauma and emergency care, in -patient and outpatient visits; paediatric and obstetric care. These hospitals may employ specialist family physicians, obstetrician/gynaecologists and paediatricians.

Functions

- Antenatal care for high-risk women.
- Antenatal ultrasound service.
- Treatment of pregnancy problems, including admission to hospital.
- Comprehensive emergency obstetric care signal functions: magnesium sulphate, intravenous antibiotics, oxytocics, vacuum delivery, removal of retained placenta, manual vacuum aspiration, neonatal resuscitation, caesarean section and blood transfusion.
- 24-hour labour and delivery service including caesarean sections.
- Regional and general anaesthesia.
- Essential special investigations.
- Postnatal care and postoperative care.
- Contraceptive services including postpartum and elective tubal ligation.
- Referral centre for clinics and community health centres in the district.

- Supervision of clinics and community health centres in the district.
- Referral of complicated problems to regional or tertiary hospitals.
- Counselling and support services.
- Genetic screening and counselling services.

Staffing

Advanced midwives, midwives, enrolled nurses, nursing assistants, social workers, dietician, full time medical officers and visiting specialist obstetricians.

Facilities

- All the necessities to run an antenatal clinic including an ultrasound scanner.
- All equipment to run a high-risk labour ward including a vacuum extractor, cardiotocograph (CTG) machines, pulse oximeters and intravenous fluid infusion pumps.
- A 24 hour laboratory service.
- Anthropometric equipment
- Emergency blood.
- Equipment and drugs for obstetric emergencies including a fully equipped resuscitation trolley and defibrillator.
- Fully equipped operating theatre.
- X-ray facilities.
- Reliable transport service for emergency transfer to regional or tertiary hospitals.
- A mothers' waiting area in rural areas with poor transport infrastructure.

REGIONAL HOSPITAL

Hospitals at this level render services at a general specialist level, receive referrals from district hospitals, and they serve as a platform for training and research. They may also provide some district services within the local sub-district. Experienced specialists lead the teams and the medical disciplines include general surgery, orthopaedics, general medicine, paediatrics, obstetrics and gynaecology, family medicine, radiology and anaesthetics.

A regional hospital is the base hospital for a health region that includes a number of districts. Regional hospitals frequently offer the functions of district hospitals and are the base specialist health facility for clinics and community health centres in their defined geographical area.

Functions

- All district hospital functions including a blood bank.
- Management of severely ill pregnant women.
- Specialist supervision of the care of pregnant women.
- Prenatal diagnosis, e.g. genetic amniocentesis.
- Multidisciplinary care - other specialities, dietetics, physiotherapy etc.
- Referral centre for district hospitals and, if appropriate, clinics in the region.
- Supervision and support for district hospitals and clinics.

Staffing

Advanced midwives, midwives, enrolled nurses, nursing assistants, dietician, full time medical officers and full time specialist obstetricians.

Facilities

- All the facilities required in a district hospital.
- High-care area providing short-term assisted ventilation.

TERTIARY HOSPITAL

These hospitals render specialist and sub-specialist care to a number of regional hospitals and serve as a platform for training of health care workers and research. They may also render some regional services. They may be called a central (or tertiary) hospital.

Functions

- All regional hospital functions.
- Specialist combined clinics, e.g. cardiac and diabetic pregnancy clinics.
- Advanced prenatal diagnosis such as chorion villus sampling and cordocentesis.
- Management of extremely ill or difficult obstetric patients.
- Supervision and support for district and regional hospitals.
- Responsibility for policy and protocols in the regions served.

Staffing

Advanced midwives, midwives, enrolled nurses, nursing assistants, full time medical officers and full time specialist obstetricians, including sub-specialty skills.

Facilities

- All the facilities required in level 1 district and level 2 regional hospitals.
- Specialised equipment for the management of very ill or difficult obstetric patients.

EMERGENCY TRANSPORT

Appropriately staffed and equipped dedicated obstetric ambulances are to be available 24 hours a day in all health districts, to move women with emergencies from one health facility to another, or from their homes to a health facility. Appropriate communications, whether radio or telephone, must be in place so that ambulances can be called to transport such women as rapidly as possible.

Requirements for a dedicated obstetric ambulance

- A midwife or qualified paramedic to accompany the patient in the vehicle.
- All standard equipment for an ambulance, with essential materials for the care of a mother and new-born baby, including a delivery kit.

CENTRAL HOSPITAL

These hospitals render a very highly specialised tertiary and quaternary services on a national basis and provide a platform of training of health care workers for high cost and low volume services.

3

Clinical In-Patient Record Keeping: Obstetrics

Purpose of this Chapter

This chapter outlines the standards for the clinical structure and content of patient records.

CHAPTER 3: CLINICAL IN-PATIENT RECORD KEEPING: OBSTETRICS

The rising demands on healthcare systems to deliver quality patient care as well as the constant increase in medico-legal cases in maternity demand good quality of note keeping. This document describes standards for the structure and content of a doctor's obstetric patient records, covering the SBAR (situation-background-assessment-recommendation) referral letter, antenatal clinic notes, inpatient notes (acute admission), inpatient notes (follow up notes), handover communications and discharge summaries.

An important component of quality assurance is audits of clinical notes in patient records, as based on these standards. Audit tools can be used to assess notes and partograms.

The standards consist of a list of clinical record headings and a description of the information that should be recorded under each heading.

PURPOSE OF RECORD KEEPING STANDARDS

- To instil good practice in record keeping.
- To present a historical record of clinical events to account for all care given to individual women.
- To ensure that all clinical records are complete and accurate with regards to the information they contain.
- To ensure that legal requirements are met in record keeping practices.
- To ensure that all staff are made aware of their record keeping responsibilities.
- To ensure that notes of doctors-in-training (undergraduate and interns) conform to the minimum standards and are supervised by an appropriate clinician (medical officer or above).

STANDARDS FOR INPATIENT RECORD KEEPING

- Record keeping in all clinical areas will be subject to monitoring.
- All writing in clinical records must be legible.
- All entries must be made in black (ball pen or black ink).
- All entries must be dated and timed (using the 24 hour clock).
- All entries must be signed; when the practitioner is writing in the patient's record for the first time in any episode of care they will also print their name and designation under their signature. Alternately, a name stamp can be used.
- Mistakes must be crossed through with a single line, signed, dated and timed. Correction fluid may not be used. Any sheets containing errors must not be removed from the clinical record.
- The record will only include standard and accepted clinical abbreviations (see list of abbreviations in figure , page).
- All notes should be identified with a patient identity label or name and folder number.
- The physical place where the patient was examined (e.g. labour ward, casualty unit, outpatient department, etc.) should be indicated.

Additional requirements

- These standards are for all medical personnel (medical students, interns, community service medical officers, medical officers, registrars, professional nurses and specialists) involved in maternity care.
- Where clinical notes are made by students it should be countersigned by an HPCSA registered doctor; when notes are made by an intern it should either be counter-signed by an HPCSA registered doctor or the name of the HPCSA registered doctor responsible for that intern's supervision at that time must be written in the notes.

- Try to make all entries as soon as the clinical event has taken place. When this is not possible, the record should be dated and timed at the time of writing, with the date and time of the events being recorded stated in the notes.
- The content of telephone communications (relevant to clinical care) should be recorded in the notes.
- The clinical notes should contain clinically relevant information only and should not include clinically irrelevant information such as complaints, judgments of a personal nature, perceived undesirable attitudes of the patient or alleged negligence or malpractice accusations.
- Results of special investigations must be noted as soon as it becomes available.
- Any known allergies must be noted (or the absence of any allergies).
- The initial (admission) notes for any admission episode should be complete; thereafter follow up notes are sufficient.

ORGANISATION OF THE STANDARDS

The standards are organised in a series of sections with the full set of record headings identifying where they are used.

1	Antenatal care: outpatient notes made at each consecutive antenatal clinic visit after the initial booking.
2	Acute admission: the clinical information recorded in the hospital admission record on admission to hospital for antenatal/postnatal problems or when in labour.
3	Follow-up notes: made after admission for acute antenatal or postnatal problem.
4	Handover notes: handover of patient care from one professional or team to another, including doctor-to-doctor or team-to-team handover in hospital at night and over weekends.
5	Intrapartum notes: clinical notes made to complement the labour progress on the partogram.
6	Surgery notes: notes from surgery or instrumental delivery notes.
7	Discharge notes: the clinical information recorded in the discharge record and included in the discharge summary.
8	Referral notes: communication from referring hospital to more specialised levels of care (SBAR).

NOTES MADE AT THE ANTENATAL CLINIC

- Ensure with every visit that the antenatal card (page 2 of the Maternity Case Record) was completed correctly.
- **Do not duplicate information already on the card in the notes, except when a full evaluation is made during an acute admission/evaluation.**
- Only make notes for additional, essential information that is not already entered on the antenatal card.

ACUTE EVALUATION (NOT FOR ADMISSION)

- Any pregnant patient consulted by a doctor (but not admitted as in-patient) with an acute problem should be clerked with full Admission Notes with the relevant discharge plan authorised by an appropriate clinician.

ADMISSION NOTES (ACUTE ADMISSION)

Nursing Care Plan - Upon admission, each patient must have an appropriate nursing care plan.

For patients received from EMS, any observations and problems experienced during transport must be included in the clinical notes.

Admission notes should include:

- Age, gravidity and parity, gestational age (and how it was calculated), or number of post-partum days (if applicable).
- An immediate problem statement.
- Patient history, previous medical history, previous obstetric history, known allergies, social context, delivery history if post-partum.
- HIV status
 - If negative, date of last retest
 - If positive, most recent CD4 count, most recent viral load, current medication, date of inception of medication
- Rhesus status
- Syphilis status
- Details of any current medication and allergy status.
- Observations (minimum requirement: blood pressure, heart rate, temperature, respiratory rate, urinary dipsticks).
- Details of general examination.
- Details of abdominal examination (minimum requirement when antenatal: height of fundus, number of fetuses, lie, side of the baby's back, presentation, head-above-brim, clinical weight estimation). Height of fundus if post-partum.
- Details of speculum examination (when indicated).
- Details of vaginal examination (if indicated).
- If membranes ruptured, the time of rupture as well as the status of the draining amniotic fluid.
- If fetal monitoring is indicated; the status of the latest CTG.
- Clinical risk assessment for specific risk assessments required/undertaken, including thromboembolic risk assessment.
- A list of all the problems identified.
- A working diagnosis and care /treatment plan signed and dated. Clear nursing instructions, dated and signed, must be made on the prescription chart in all cases and include as minimum:
 - Intended ward for admission.
 - General observations required and frequency thereof (according to standard nursing care plan, or more frequently if clinically indicated).
 - The action to take if any observation(s) are abnormal.
 - Diet/fluid requirements as well as IV fluid requirements if indicated; NPO if indicated.
 - Whether CTG is indicated or not; the frequency thereof and whether it must be signed off by a clinician when performed after hours.
 - All medication (current and new) and all single dose/ stat drugs including prophylactic antibiotics, pre-op medication and steroids where appropriate.

FOLLOW- UP NOTES

Follow-up notes (following on the admission notes) should include:

- Date and time of assessment, signed.
- The gestational age/number of post-partum days on that day.
- The current clinical problem.
- The reason for continued admission.
- The management plan for the next 24 hours.
- The proposed discharge/delivery plan.

HANDOVER NOTES: TRANSFER OF ACCOUNTABILITY

When the care of an acute obstetric in-patient is handed over to a next shift, a Transfer of Accountability Summary must be made. This must include:

- Date of the decision made to handover care.
- The name and designation of the doctor who is now accepting responsibility for the patient's further inpatient care.
- If there is a particular requirement to call a specific person from another discipline or special intervention team it must be clearly noted.
- Identify the patient at high risk of clinical deterioration that will need an immediate response if called.
- A short summary of the current problem.
- The proposed management plan.
- The new management plan (if adapted/changed at handover).
- When the next clinical review is due.

INTRAPARTUM AND LABOUR WARD NOTES

- All patients in a labour ward must be assessed by an experienced health professional at minimum four hourly and appropriate notes made according to the clinical situation.
- All patients in latent labour should be assessed by an experienced health professional at minimum four hourly and the partogram and a relevant progress report completed.
- All patients in active labour should be assessed by an experienced health professional at minimum two hourly and the partogram and a relevant progress report completed.
- All high-risk women should be seen by a doctor at least every 4 hours. In situations in which a professional nurse seeks advice on a patient requiring emergency attention, that patient should be seen as soon as possible. If that person is involved in another emergency, the second on call or the local protocol must be followed.
- All intrapartum notes must be dated and signed.
- All CTGs should be signed and dated/timed on the CTG when assessed, with a relevant classification made in the notes; as well as the appropriate action taken or proposed.

REFERRAL NOTES USING THE SBAR (SITUATION-BACKGROUND-ASSESSMENT-RECOMMENDATIONS) FORM

In the case of a telephonic consultation with a more senior colleague/referral hospital:

- Use the national SBAR approach as a guide when consulting telephonically with a senior colleague (see example at the end of the chapter).

DELIVERY NOTES

- If a clinician was actively involved in any part of the delivery itself, appropriate notes should be made directly after the procedure.
- This note must make a pertinent mention of the fetal condition throughout the second stage.
- All instrumental deliveries must be documented using the standard pro-forma in the Maternity Case record.

SURGERY AND INVASIVE PROCEDURES NOTES

- For patients undergoing surgery and/or invasive procedures, clinical records should include evidence that informed consent has been obtained.
- Records should contain documented evidence of the discussion of the benefits, risks and complications of the procedure, and alternative treatments.
- For a caesarean section and/or tubal ligation procedure, the relevant pro-forma in the Maternity Case record should be completed.
- For all other surgery or invasive procedures a record of the operation should be made immediately after surgery and must include:
 - Date and time of the surgery.
 - Name of the operating surgeon(s) including the assistant even if they were medical students, health professionals or clinical associates.
 - Name of the anaesthetist.
 - The diagnosis made and the procedure performed.
 - Site and side of any operative procedure documented without abbreviation.
 - Description of the findings.
 - Details of the tissue removed, added or altered.
 - Details of sutures used.
 - An accurate description of any difficulties or complications encountered and how it was dealt with.
 - Immediate post-operative instructions including site of post-operative care
 - The surgeon's full signature, date and time.

DISCHARGE NOTES

- For an antenatal discharge, there should be a clear summary of the management as inpatient and the proposed further plan including a proposed delivery plan.
- For post-delivery discharge there should be a fully completed discharge summary available, including family planning needs, referrals for breastfeeding/feeding support and plan(s) for future pregnancies. An example is the pro-forma in the maternity care guideline for uncomplicated deliveries.
- Discharge summaries should already be filled in at the patient's pinnacle of care (i.e. by the most senior personnel) before she is stepped-down for further care.
- Once a patient is discharged (before delivery) and admitted at a later stage, a full assessment with a new Admission Note should be made again.

ABBREVIATIONS IN NOTES

- Medication names cannot be abbreviated. Spell out drug names completely.
- Abbreviations cannot be used on consent forms.

Figure 3.1 SBAR Clinical Report


		<h2 style="margin: 0;">SBAR Clinical report on Maternity situation</h2>		
S	SITUATION I am calling about (name of woman) _____ Ward: _____ Hosp. No _____ The problem I am calling about is _____ I just made an assessment of the patient: Vital signs:- BP ____/____ Pulse ____ resp rate ____ Oxygen saturation ____% Oxygen at ____l/min Temperature ____ C I am concerned about: Blood pressure because: Systolic pressure greater than 160 mm Hg Diastolic pressure more than 100 mm Hg Systolic pressure less than 90 Pulse because: Pulse rate more than 120 Pulse rate less than 40 Pulse rate greater than systolic BP Respiration rate because: Rate less than 10/min Rate more than 24/min Urine output: Output less than 100 ml over last 4 hours Significant proteinuria (++)/+++ Haemorrhage Antepartum Postpartum Fetal well being CTG pathology Early obstetric warning scores 			
	B	BACKGROUND (tick relevant sections) <input type="checkbox"/> The woman is:- Parity [primiparous / multiparous/ grand multiparous] with gestation _____ weeks and a [singleton/ multiple] pregnancy She had _____ previous caesarean sections or episodes of uterine surgery <input type="checkbox"/> The present fetal assessment is : Fundal height _____ cm Presentation _____ with _____ fifths head above brim: Fetal heart rate _____ bpm CTG : Not done / normal/ suspicious/ pathological <input type="checkbox"/> Antenatal risks Risks identified on antenatal card _____ <input type="checkbox"/> Labour Not in labour / spontaneous onset of labour/ induced labour IUGR / Pre-eclampsia/ reduced fetal movements/ Diabetes/ Antepartum haemorrhage On oxytocin infusion (____IU/ ____ml fluid given at ____ml/hour) Most recent vaginal examination done at _____ h Dilated _____ cm with _____ above brim and position _____ Membranes : Intact/ ruptured at _____ h with currently clear / meconium stained liquor/ Blood stained liquor Delivered _____ at _____ h with 3 rd stage complete/ retained placenta <input type="checkbox"/> Post Natal Delivery date _____ at _____ h Type of delivery _____ With/ without perineal trauma Blood loss _____ ml Oxytocin infusion ____IU/ ____ml at ____ml/hour Fundal height: High / Atonic/ Tender/ Abdominal-/ perineal wound oozing <input type="checkbox"/> Treatment given/ in progress Rx _____		
		A	ASSESSMENT I think the problem is _____ The problem may be related to: Cardiac/infection/ respiratory/haemorrhage/PET/HELLP/Embolism/ Pulm edema/Fetal distress I am not sure what the problem is, but the woman is deteriorating and we need to do something	
			R	RECOMMENDATION Request <input type="checkbox"/> Please come and see the woman immediately <input type="checkbox"/> I think delivery need to be expedited <input type="checkbox"/> I think the patient need to be transferred <input type="checkbox"/> I would like advice on management of the patient Response _____ _____
		Person completing form: (name) _____ Rank _____ Date _____ Time _____ PERSON REPORTED TO (Name) _____ Rank) _____ Inst _____ NB! After completing and consultation, place this form in the patient file as proof of communication and response		

Figure 3.2: List of agreed abbreviations that can be used in clinical notes

Common Medical and Obstetrical Conditions	
AIDS	Acquired Immunodeficiency Syndrome
APH	Antepartum Haemorrhage
AROM	Artificial rupture of membranes
Ca	Cancer
CCF	Congestive Cardiac Failure
COAD	Chronic Obstructive Airways Disease
DVT	Deep Vein Thrombosis
IUGR	Intra-uterine Growth Restriction
MI	Myocardial Infarction
MRSA	Methicillin Resistant Staphylococcus Aureus
PE	Pulmonary Embolus
PET	Pre-eclampsia
PPROM	Preterm premature rupture of membranes
PTL	Preterm labour
ROM	Rupture of membranes
TB	Tuberculosis
UTI	Urinary Tract Infection
Patient Investigation (Radiology)	
AXR	Abdominal X-Ray
CT SCAN	Computerised Tomography
CXR	Chest X-Ray
MRI	Magnetic Resonance Imaging
U/S	Ultrasound
Common Tests/Procedures	
CPR	Cardio Pulmonary Resuscitation
CPAP	Continuous positive airway pressure
CTG	Cardiotocograph
D&C	Dilatation and Curettage
IOL	Induction of labour
TPN	Total Parenteral Nutrition
Medication/Drugs	
IM	Intra Muscular
IV	Intravenous
Neb	Nebulisation
PO	By Mouth
PR	Per Rectum
PV	Per Vagina
S/C	Sub Cutaneous
S/L	Sub Lingual
IVI	Intravenous Infusion
TTO	To Take Out (Drugs)

Equipment	
ET Tube	Endotracheal Tube
IUCD	Intra Uterine Contraceptive Device
NGT	Naso Gastric Tube
TED	Thrombo Embolic Deterrents
Patient Investigation (Blood)	
FBC	Full Blood Count
FFP	Fresh Frozen Plasma
HB	Haemoglobin
K	Potassium
Na	Sodium
PCV	Packed Cell Volume
PT	Prothrombin Time
Rh	Rhesus Factor
U+E	Urea and Electrolytes
WCC	White Cell Count
Patient Assessment/ Examination	
BMI	Body Mass Index
BP	Blood Pressure
CNS	Central Nervous System
CVP	Central Venous Pressure
EFW	Estimated fetal weight
NAD	No Abnormality Detected
PMH	Past Medical History
SOB	Shortness Of Breath
Patient Investigation (General)	
C&S	Culture And Sensitivity
CSF	Cerebro-Spinal Fluid
ECG	Electro Cardiogram
LP	Lumbar Puncture
MC&S	Microscopy Culture And Sensitivity
MSU	Mid-Stream Urine

Purpose of this Chapter

This chapter discusses the basic aspects of antenatal care, as a supplement to the national BANC protocols. The BANC tick sheets and protocols should be used for all cases and must be available in all facilities conducting antenatal care.

CHAPTER 4: ANTENATAL CARE

PRINCIPLES OF ANTENATAL CARE

OBJECTIVES

Antenatal care attempts to ensure, by antenatal preparation, the best possible pregnancy outcome for women and their babies. This may be achieved by:

- Screening for pregnancy problems
- Assessment of pregnancy risk
- Treatment of problems that may arise during the antenatal period
- Giving medications that may improve pregnancy outcome
- Provision of information to pregnant women
- Physical and psychological preparation for childbirth and parenthood

PRECONCEPTION CARE

This is the optimization of a woman's health or knowledge before she plans or conceives a pregnancy. All health workers (not only midwives and obstetric doctors) who care for women in the reproductive age group need to consider the possible effect of pregnancy on women they care for. Such women may be asked if there is a possibility of a pregnancy in the near future. If pregnancy is not desired, appropriate counselling and advice on contraception may be offered.

If a woman is considering pregnancy, the following considerations will assist in preparing her in terms of her own health and that of the baby that will be conceived:

- The presence of any medical conditions, controlled or uncontrolled.
- Medication or radiation needed as treatment for such conditions.
- The past obstetric history.
- Nutritional issues, e.g. under nutrition or obesity.
- Immunity to rubella by previous exposure or vaccination.
- Family history and genetic risks.
- Use of tobacco, alcohol and other recreational drugs.
- Possible occupational and environmental exposures.
- Social, economic and family issues.
- Mental health issues.

While designated preconception clinics are not the norm in South Africa, all health workers who look after women in the reproductive age have a responsibility to encourage women to make reproductive choices and assist those who are considering pregnancy to optimize their health and knowledge appropriately.

RISK FOR GENETIC DISEASE

The following information should be provided to all women of childbearing age before conception:

- The risks of having a baby with chromosomal abnormalities with increasing maternal age, especially after 37 years.
- The risks to the fetus of alcohol and recreational drug use by the mother.
- The increased risk of abnormality when the parents are closely related.
- The risks associated with a family history of genetic disorders.
- The risks to the fetus of poorly controlled medical conditions in pregnancy.
- The value of peri-conceptual folate in prevention of neural tube defects (5 mg daily 3 months prior to conception continuing into the pregnancy).
- The risks to the fetus of maternal infections, e.g. rubella and syphilis, during pregnancy.
- The risks to the fetus when the mother takes teratogenic medications during pregnancy.

Women at risk for having a child with a birth defect or genetic disorder

- Refer as early as possible in the pregnancy for counselling regarding management and the performance of prenatal tests.

THE MATERNITY CASE RECORD

All pregnant women that present to a health care facility, public or private, should have, or should receive, a Maternity Case Record (MCR). This standardised national document is the principal record of the pregnancy and it must be completed at each antenatal clinic visit and retained by the mother until delivery, after which it will be kept at the place of confinement or final referral. It is not necessary for antenatal clinics to keep a duplicate record of the card. Only a record of attendance, with results of special investigations, needs to be kept at the antenatal clinic for audit and backup purposes. The MCR serves as official communication tool between the different levels of care and health facilities that the client may visit during her pregnancy and should always be kept up-to-date.

RELATIONSHIP WITH PRIVATE CAREGIVERS

Private midwives, general practitioners and obstetricians are responsible for the pregnancy care of many South African women. Dialogue and mutual respect should be encouraged between private caregivers and the government service. Women that are referred from private providers to public service care should carry letters or cards that summarise all relevant antenatal care up to that point. Ultrasound reports are particularly valuable, as they assist in accurate dating of pregnancies.

THE FIRST ANTENATAL VISIT

CONFIRMATION OF PREGNANCY AND TIMING OF THE FIRST VISIT

A woman should visit her health care provider as soon as she suspects pregnancy, even as early as the first missed menstrual period. Urine pregnancy tests must be available at all health care facilities. Women who present to primary care clinics and are found to be pregnant must be issued with an antenatal card and receive first visit antenatal care. Those who request termination of pregnancy should be appropriately counselled and referred.

THE IMPORTANCE OF THE FIRST ANTENATAL VISIT

Complete assessment of gestational age and risk factors can be made at the first ante-natal visit. It is not necessary to wait until the second visit before such assessments are finalised. After one visit, a pregnant woman can be regarded as 'booked'.

At the first visit, find out what health care the woman has received so far in the pregnancy, especially from private practitioners. If she has had previous antenatal care obtain information (records) from the provider, if possible and regard that as the first visit.

HISTORY TAKING

Take a full and relevant history including:

- Current pregnancy
- Previous pregnancies, any complications and outcomes
- Medical conditions, including psychiatric problems, and previous operations
- Familial and genetic disorders
- Allergies
- Use of medications
- Use of alcohol, tobacco and other substances
- Family and social circumstances

PHYSICAL EXAMINATION

- Do a general examination including weight, height, heart rate, colour of mucous membranes, blood pressure, a check for oedema, and palpation for lymph nodes
- Do a systemic examination including teeth and gums, breasts, thyroid, and heart and lung examination. When no staff member in the antenatal clinic has been trained to perform heart and lung examination, this may be omitted provided the pregnant woman has no history or symptoms of heart or lung disease. Refer women with dental problems to a dentist or dental therapist.
- Examine the pregnancy including inspection and palpation of the pregnant uterus; with measurement of the symphysis-fundal height (SFH) in cm.

MID-UPPER ARM CIRCUMFERENCE

THE MEASUREMENT OF MID-UPPER ARM CIRCUMFERENCE (MUAC)

The MUAC gives useful information on nutritional status and pregnancy risk and is easily done during the antenatal period or during labour. MUAC is advantageous over body-mass index because height does not need to be measured, accurate scales are not required, the woman does not have to stand up straight, no calculations need be done, and MUAC, unlike weight, does not normally increase significantly during pregnancy.

A MUAC \geq 33 cm:

- Suggests obesity
- Is associated with an increased risk of pre-eclampsia and maternal diabetes.
- Is associated with an increased risk of delivery of a larger than normal infant.
- Indicates that blood pressure measurement with a normal-sized adult cuff may be an overestimation.

A MUAC <23 cm:

- Suggests under nutrition or a chronic wasting illness.
- Is associated with delivery of a smaller than normal infant.

How to measure the MUAC:

- Measure the MUAC just before or just after checking the blood pressure.
- Use a soft tape-measure, as for symphysis-fundal height.
- The arm should hang freely (elbow extended).
- Measure the MUAC at any gestation, or during or after labour.

- Measure the arm circumference in either the right or left arm, midway between the tip of the shoulder (acromion) and the tip of the elbow (olecranon).
- Record the measurement to the nearest 1 mm.
- Record the MUAC in the MCR on the antenatal card (page 2).

What should be done if an abnormal MUAC is found?

A MUAC <23 cm should:

- Raise vigilance for under nutrition or chronic illness, e.g. infection or neoplasia.
- Raise vigilance for fetal growth restriction, and careful SFH measurement and uterine palpation at all antenatal visits.
- Ensure good nutritional status; refer for nutritional supplementation if needed.

A MUAC \geq 33 cm should:

- Raise concerns about risks of hypertension and gestational diabetes.
- Raise concern about the risk of fetal macrosomia - disproportion, shoulder dystocia.
- Necessitate the use of a large sphygmomanometer cuff.

ESTIMATION OF GESTATIONAL AGE

Indicate on the antenatal card (page 2 of the MCR) how the gestational age was estimated. The first estimation of gestational age, with the expected date of delivery, should be used for the remainder of the pregnancy and must not be changed unless important new information becomes available.

Last menstrual period

This is valid if the woman is sure of her dates, and where palpation of the uterus and SFH measurement are compatible with the given dates (Figure 4.1, page 37). Gestation age must be calculated from the first day of the last menstrual period.

Symphysis-fundal height (SFH) measurement

This is used for estimation of gestational age after 24 weeks if the dates from the last menstrual period are unknown or wrong, in the presence of a normal singleton pregnancy. The measured SFH is plotted onto the 50th centile line on the SFH graph, allowing the corresponding gestational age to be read from the graph (Figure 4.2, page 38).

Palpation

The SFH measurement is of little value for estimation of gestational age at <20 cm and \geq 35 cm (corresponding to <20 weeks and term respectively). In early pregnancy, bimanual and abdominal palpation can be used, and at term, palpation of the fetal head is of some value. Gestational age assessment by palpation requires care, skill and experience.

Ultrasound

An ultrasound scan for gestational age estimation should be requested for women who are unsure of dates with SFH measurement less than 24 cm. Fetal measurements by ultrasound give reasonably accurate gestational age estimates before 24 weeks of gestation. Ultrasound after 24 weeks is less reliable, but in obese patients, it can still be used up to 28 weeks.

ESSENTIAL SCREENING INVESTIGATIONS

- Syphilis serology. Rapid tests are preferable, as results are immediately available. Take care to follow the instructions from the manufacturer carefully to avoid false negative results.
- Rhesus (D) blood group, using a rapid test.
- Haemoglobin (Hb) level, using a portable haemoglobinometer or copper sulphate screening method.
- Human immunodeficiency virus (HIV) serology, using rapid test kit. This must follow the National guidelines on routine counselling and voluntary testing (see chapter 13).
- Urine dipstick testing for protein and glucose.

All of the above tests can be performed by midwives or appropriately trained auxiliary staff at the clinic 'on site', with the results available to the pregnant women before they complete the first visit.

SCREENING TESTS THAT ARE NOT OFFERED ROUTINELY

Inform pregnant women that the following screening tests are not offered routinely, but that it is indicated in special circumstances:

- ABO blood group.
- Screening for Down's syndrome (see chapter 14).
- Rubella serology.
- Blood glucose screening (see section on diabetes).
- Cervical (Papanicolaou) smear (follow the national screening guidelines).
- Urine culture.
- Ultrasound scan (see chapter 15).

MEDICATIONS AND VACCINES

The following are given to all pregnant women (tick the appropriate block on the antenatal card when dispensed):

- Ferrous sulphate tablets 200 mg daily, to prevent anaemia.
- Calcium tablets 1000 mg daily, to prevent complications of pre-eclampsia (e.g. calcium carbonate (168 mg) 2 tablets orally, 3 times daily with food. This is best taken 4 hours before or after iron supplements.
- Folic acid tablets 5 mg daily.
- Tetanus toxoid (TT) immunization, to prevent neonatal tetanus:
 - First pregnancy: TT1 at first antenatal visit, TT2 4 weeks later and TT3 6 months later.
 - Later pregnancies: Two TT boosters, one in each pregnancy at the first visit, for the next two subsequent pregnancies, at least one year apart.
 - A total of five properly spaced doses of TT provide life-long protection against tetanus.
- If in a subsequent pregnancy, there is no record of previous immunization, treat as for a first pregnancy.

FINAL ASSESSMENT

The final assessment should include:

- Check-list for risk factors (use the 'BANC Clinic Checklist - Classifying (first) visit' tick sheet- see figure 4.3 for example) and a plan for further antenatal care and delivery at the appropriate level of care. A list of risk factors is provided in figure 4.4.
- A best estimate of gestational age, based on the evidence obtained from the date of the last menstrual period, fetal palpation, measurement of SFH and ultrasound if available.
- A plan for management or appropriate referral for any problems.

INFORMATION FOR PREGNANT WOMEN

Certain essential information must be provided to all pregnant women, verbally and (where possible) in the form of written or illustrated cards or pamphlets. This includes:

1. Five danger signs and symptoms of pregnancy

- Severe headache.
- Abdominal pain (not discomfort).
- Drainage of liquor from the vagina.
- Vaginal bleeding.
- Reduced fetal movements.

A woman that experiences any of these symptoms should report immediately to her clinic or hospital with her MCR.

2. Self-care in pregnancy

- Diet and exercise.
- Personal hygiene and breast care.
- Use of medications.
- Abuse of alcohol, tobacco and recreational drugs.

3. A delivery plan

At the end of the first visit, all pregnant women should be given a provisional delivery plan:

- The expected date of delivery, based on the best estimate of gestational age.
- The expected place of delivery, whether community health centres or hospital.
- The expected mode of delivery, whether vaginal or caesarean section.
- Who will deliver the baby, whether midwife or doctor.
- Pain relief options including non-pharmacological methods.
- A transport plan for emergency or delivery, including important contact numbers.
- The practice of home delivery should be discouraged; all women should try and deliver in a facility with a skilled attendant.

4. New-born and infant care

- Plans for infant feeding and techniques, whether breast or formula.
- Details of follow up care: immunisation and where this can be obtained.
- Future pregnancies and contraception.
- Information on genetic disorders and birth defects.
- Contraception that will be used after the pregnancy.

SUBSEQUENT ANTENATAL VISITS

SCHEDULE FOR RETURN VISITS

- A 'basic antenatal care' schedule of four follow-up visits is provided for women without any risk factors.
- Following the early booking visit (preferably <12 weeks), return visits should be scheduled for 20, 26-28, 32-34, and 38 weeks, and 41 weeks if still pregnant by then (see figure 4.5).
- This is not applicable for women with risk factors, whose return visits schedules will depend on their specific problems.

CONTENT OF SUBSEQUENT ANTENATAL VISITS

- Ask about general well-being, fetal movements, danger symptoms and any problems.
- Check the blood pressure, heart rate and colour of the mucous membranes.
- Measure the symphysis-fundal height (SFH) in cm. Plot the SFH on the graph against the gestational age and compare with the 10th, 50th and 90th centiles for gestational age and with previous measurements.
- Palpate the presenting part from 34 weeks; palpate carefully for possible breech presentation at 34-36 weeks.
- Test the urine for protein and glucose at each visit.
- Repeat syphilis and HIV tests at 32 weeks for all women who tested negative at initial testing.
- Repeat blood tests: Hb at 32 and 38 weeks.
- Repeat information for danger signs pregnancy, and review delivery and transport plans, as well as feeding and contraception choices.
- At 38 weeks, remind the woman to bring her MCR with her when she presents to the clinic or hospital in labour.

Figure 4.1: Antenatal card of a woman with certain (correct) dates

At booking (25 February 2014) she was 22 weeks pregnant by dates. The SF measurement of 20cm is in keeping with her dates. SF growth is normal, just above the 10th centile.

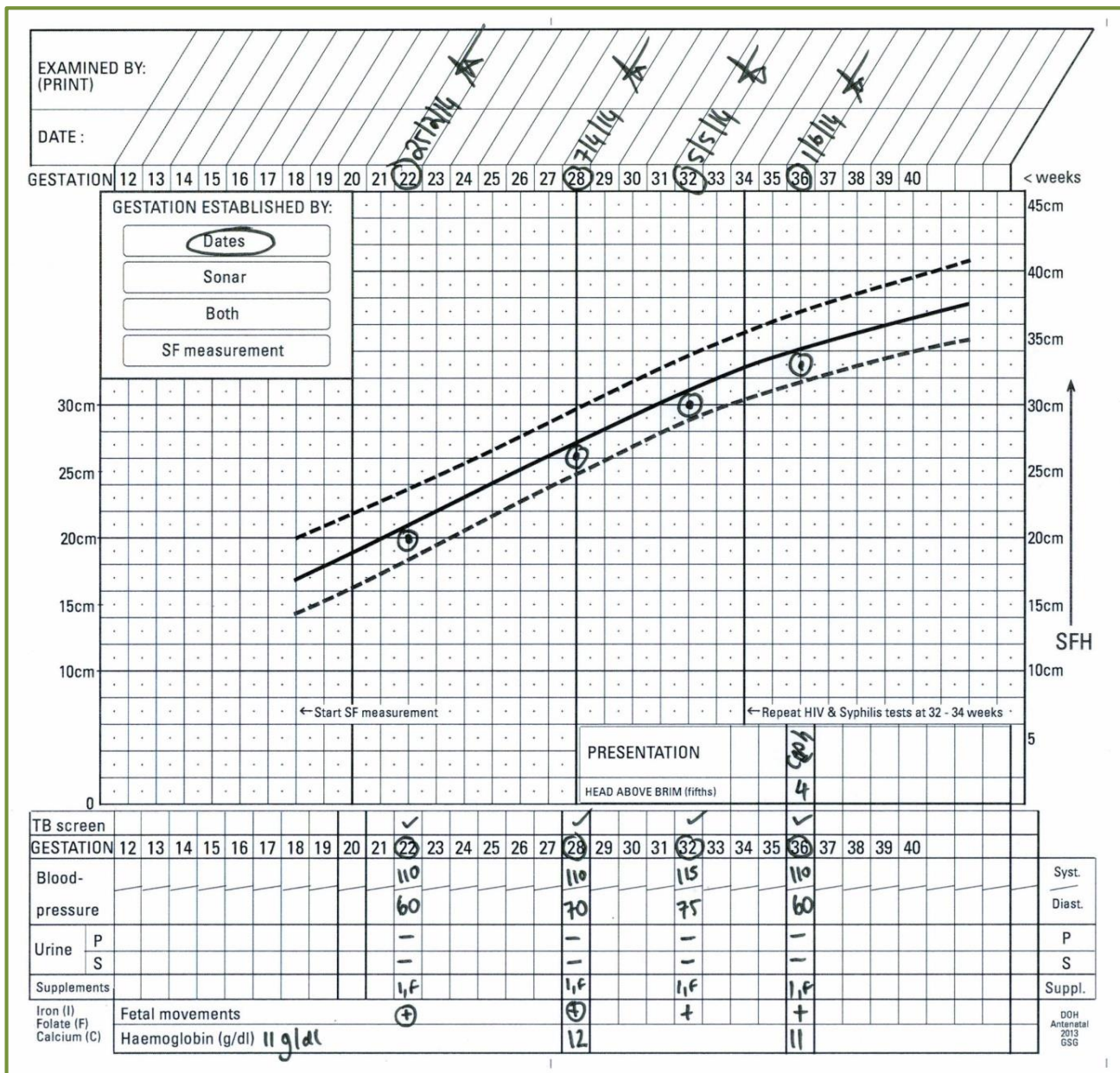


Figure 4.2: Antenatal card of a woman with uncertain dates

At booking (11 March 2014) the SF height of 26cm was plotted on the 50th centile, giving a gestational age of 27 weeks. SF growth is close to the 50th centile and appears normal.

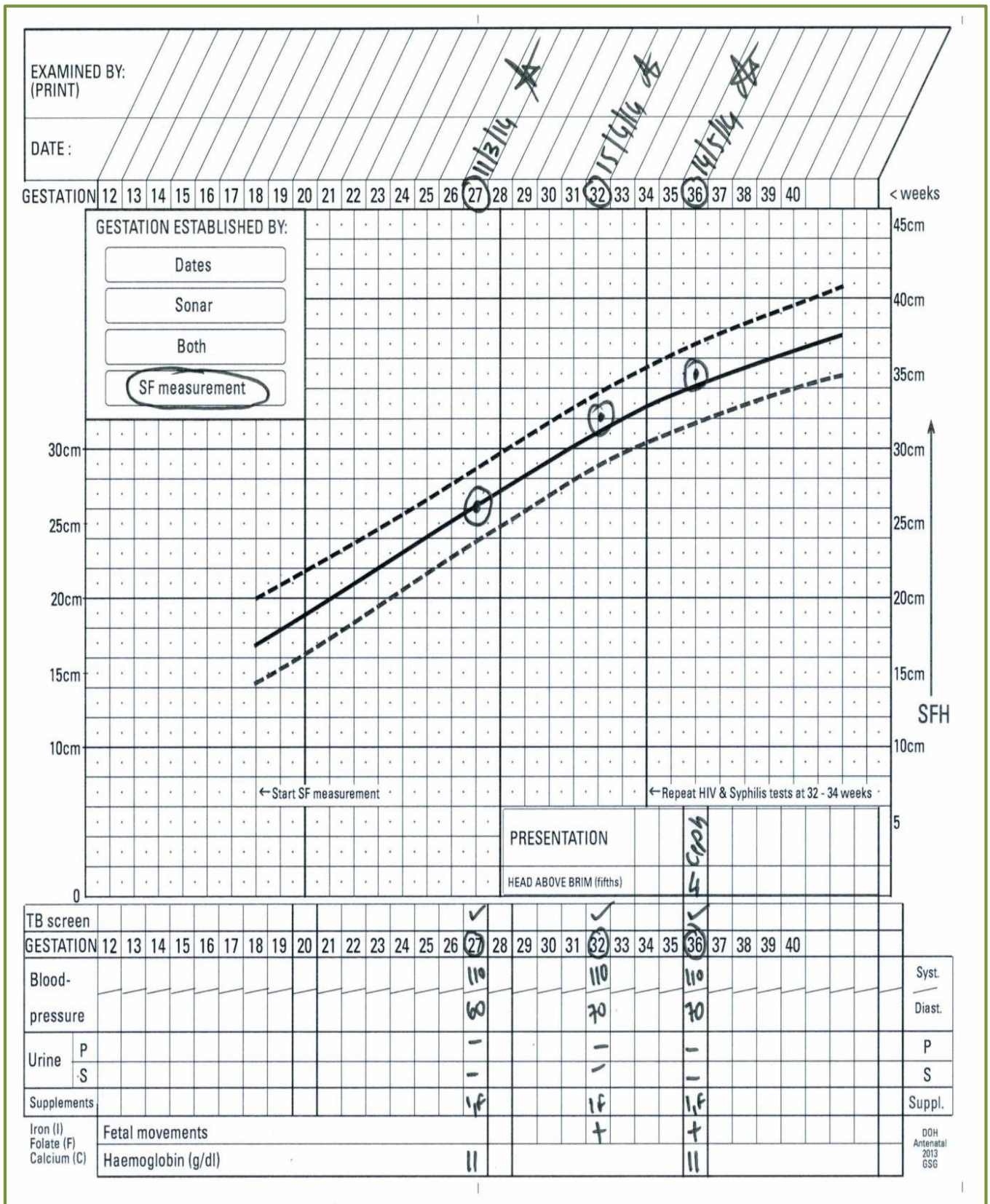


Figure 4.3: Clinic checklist – classifying (first) visit

Clinic Checklist - Classifying (first) visit									
Name of patient _____						Clinic record number			
Address _____						Telephone _____			
_____						Cell _____			
INSTRUCTIONS: Answer all the following questions by placing a cross mark in the corresponding box									
Obstetric History						No	Yes		
1. Previous stillbirth or neonatal loss?						<input type="checkbox"/>	<input type="checkbox"/>		
2. History of 3 or more consecutive spontaneous abortions						<input type="checkbox"/>	<input type="checkbox"/>		
3. History of a congenital abnormality in previous pregnancy						<input type="checkbox"/>	<input type="checkbox"/>		
4. Birth weight of last baby < 2500g?						<input type="checkbox"/>	<input type="checkbox"/>		
5. Birth weight of last baby > 4000g?						<input type="checkbox"/>	<input type="checkbox"/>		
6. Last pregnancy: hospital admission for hypertension or pre-eclampsia/eclampsia?						<input type="checkbox"/>	<input type="checkbox"/>		
7. Previous surgery on reproductive tract (Caesarean section, myomectomy, cone biopsy, cervical cerclage)						<input type="checkbox"/>	<input type="checkbox"/>		
Current pregnancy									
7. Diagnosed or suspected multiple pregnancy						<input type="checkbox"/>	<input type="checkbox"/>		
8. Age < 16 years						<input type="checkbox"/>	<input type="checkbox"/>		
9. Age 37 years or older (at conception)						<input type="checkbox"/>	<input type="checkbox"/>		
10. Isoimmunisation Rh (-) <u>with antibodies</u> in current or previous pregnancy						<input type="checkbox"/>	<input type="checkbox"/>		
11. Vaginal bleeding						<input type="checkbox"/>	<input type="checkbox"/>		
12. Pelvic mass						<input type="checkbox"/>	<input type="checkbox"/>		
13. Diastolic blood pressure 90mmHg or more at booking						<input type="checkbox"/>	<input type="checkbox"/>		
General medical									
14. Diabetes mellitus on insulin or oral hypoglycaemic treatment						<input type="checkbox"/>	<input type="checkbox"/>		
15. Cardiac disease						<input type="checkbox"/>	<input type="checkbox"/>		
16. Renal disease						<input type="checkbox"/>	<input type="checkbox"/>		
17. Epilepsy						<input type="checkbox"/>	<input type="checkbox"/>		
18. Asthmatic on medication						<input type="checkbox"/>	<input type="checkbox"/>		
19. Tuberculosis						<input type="checkbox"/>	<input type="checkbox"/>		
20. Known 'substance' abuse (including heavy alcohol drinking)						<input type="checkbox"/>	<input type="checkbox"/>		
21. Any other severe medical disease or condition						<input type="checkbox"/>	<input type="checkbox"/>		
Please specify _____									
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 antenatal care)									
Is the woman eligible (circle)						No	Yes		
If NO, she is referred to _____									
Date _____		Name _____		Signature _____					
(staff responsible for antenatal care)									

Figure 4.4: Check list of risk factors requiring referral or hospital delivery

Obstetric history

- Previous stillbirth
- Previous neonatal death
- Previous low birth weight baby (<2.5 kg)
- Previous large baby (>4.5 kg)
- Previous pregnancy admission for hypertension or pre-eclampsia/eclampsia
- Previous caesarean section
- Previous myomectomy
- Previous cone biopsy
- Previous cervical cerclage

Current pregnancy

- Diagnosed or suspected multiple pregnancy
- Age <16 years Age \geq 37 years
- Rhesus isoimmunisation in previous or current pregnancy
- Vaginal bleeding
- Pelvic mass
- Systolic blood pressure \geq 140mmHg and/or diastolic blood pressure \geq 90 mmHg

General medical conditions

- Diabetes mellitus
- Cardiac disease
- Kidney disease
- Epilepsy
- Asthma on medication
- Active tuberculosis
- Known substance abuse including alcohol
- Any severe medical condition

Risk factors requiring hospital delivery

- Previous postpartum haemorrhage
- Parity \geq 5

Further risk factors that arise during antenatal care

- Anaemia not responding to iron tablets
- Uterus large for dates (>90th centile symphysis-fundal height)
- Uterus small for dates (<10th centile symphysis-fundal height)
- Symphysis-fundal height decreasing below 10th centile
- Breech or transverse lie at term
- Extensive vulval warts that may obstruct vaginal delivery
- Pregnancy beyond 41 weeks
- Abnormal glucose screening (GTT or random blood sugar)
- Reduced fetal movements after 28 weeks

Figure 4.5: Clinic checklist: Booking & follow-up of hiv negative patient

Clinic checklist: Booking & follow-up of HIV negative patient					
First visit for all women at first contact with clinics, regardless of gestational age. If first visit later than recommended, carry out activities up to that time	VISITS				
	1	2	3	4	5
DATE:					
Approximate Gest Age in weeks	(<12)	(20)	(26-28)	(32-34)	(38)
Classifying form which indicates eligibility for BANC					
History taken					
Clinical examination					
Estimated date of delivery calculated					
Blood pressure taken					
Maternal height/weight (BMI) + MUAC					
Haemoglobin test					
Rapid syphilis test done					
Urine tested (dipstix)					
Rapid Rh performed					
Counselled and voluntary testing for HIV					
Iron, calcium and folate supplementation provided					
Information for emergencies given					
TB Screening (current cough, fever, loss of weight, drenching night sweats)					
Antenatal card/MCR completed and given to women					
Uterus measured for excessive growth (twins), poor growth (IUGR)					
Instructions for delivery/transport to institution					
Recommendations for lactation and contraception					
Detection of breech presentation and referral					
Complete MCR and remind woman to bring it when in labour					
Give follow-up visit date for 41 weeks at high risk clinic if still pregnant					
Initials staff member responsible					
Additional Visits					
Date	Reason			Action/Treatment	

5

LABOUR AND DELIVERY

Purpose of this Chapter

This chapter discusses the steps to take to support all aspects of labour from diagnosis to delivery. It also discusses abnormalities and emergencies during labour, and performing a caesarean section.

CHAPTER 5: NORMAL LABOUR AND DELIVERY

SKILLED ATTENDANCE AT BIRTH AND MOTHERS' WAITING AREAS

Health services should make every effort to ensure skilled professional attendance at birth for all pregnant women. Mothers' waiting areas are boarding facilities at Community Health Centres (CHCs) and District Hospitals where women with advanced pregnancy may stay until they go into labour. Such facilities should be established in rural areas and in districts where transport problems and remoteness make it difficult for women to access skilled attendants at birth.

DIAGNOSIS OF LABOUR

Labour is diagnosed if there are persistent painful uterine contractions accompanied by at least *one* of the following:

- Change in cervical effacement and dilatation.
- Ruptured membranes.
- Show.

Latent phase: the woman is in labour and the cervix is <4 cm dilated and ≥1 cm long.

Active phase: the woman is in labour and the cervix is ≥4 cm dilated and <1 cm long.

Sometimes one cannot be immediately certain if the woman is in the latent or active phase.

ADMISSION OF A WOMAN IN LABOUR

History taking

- Carefully review the antenatal record, especially the gestational age, blood results and HIV status. Clearly note all the risk factors. Interview "unbooked" women as if they are attending antenatal clinic for the first time.
- Note the nature of labour pains, show, vaginal bleeding, fetal movements, passage of liquor and any other relevant symptoms.

Physical examination

- Note the psychological state, heart rate, temperature, blood pressure, respiratory rate and any oedema or pallor.
- Examine the abdomen:
 - Inspect for previous scars, possible multiple pregnancy or abnormal lie.
 - Measure the symphysis-fundal height in centimetres.
 - Determine the fetal lie (longitudinal, oblique or transverse), presentation (cephalic or breech) and attitude of the head (the amount of flexion or extension).
 - Level of the presenting part in fifths palpable above the pelvic brim.
 - Liquor volume (probably normal if the fetal head is ballotable).
 - Uterine tone, and duration and frequency of uterine contractions.
 - Auscultation of the fetal heart before and immediately after a contraction.
 - Clinical estimation of fetal weight.

- Perform a vaginal examination:
 - Vulva and vagina: look for abnormal discharge, warts or ulcers.
 - Cervix: effacement (length in cm), position, consistency, and dilatation in cm.
 - Membranes ruptured or not and whether there is meconium-stained liquor.
 - The presenting part: its position, degree of sagittal (parietal-parietal or PP) moulding and caput.

Special investigations

- Test the urine for glucose, ketones and protein.
- Perform rapid syphilis and rhesus group testing in “unbooked” women or women whose results are not available.
- Provide HIV counselling and testing if no result is available.
- Measure the Hb if no recent result (<4 weeks) is available.

GENERAL CARE OF WOMEN IN LABOUR

Assessment of problems and risks

Note risk factors and problems and consult or refer to a district hospital depending on the specific problem. Women at low risk (absence of any factors listed in figure 4.4 in chapter 4) should be able to give birth at a CHC.

Respect, privacy and companionship

Treat all women in labour with respect and courtesy. Address the women by her name. Ensure privacy and always perform intimate examinations behind screens, with a chaperone if needed. Allow family and friends to provide companionship during labour.

Diet and fluids

Allow low-risk women to eat and drink during labour. An intravenous drip is not needed. High risk women (figure 5.7, page 65) require an intravenous drip of ringer’s lactate to run at 80-120 mL/hour, but are allowed to take clear fluids.

Mobility and posture

Encourage women in the latent phase of labour and early active phase to walk around. Any posture (sitting, standing, lying) is acceptable, except the flat supine position (lying on the back), which may compress the aorta and vena cava, causing low blood pressure and reduced blood flow to the uterus.

Enema, pubic hair shaving and insertion of urinary catheter

None of these procedures is necessary or desirable in the routine management of normal labour.

Artificial rupture of membranes (amniotomy)

Amniotomy may contribute to neonatal infection and HIV transmission and should not be part of the routine management of normal labour.

Partogram

During the active phase of labour, all observations, fluid intake and output, and medications must be entered on the partogram. Latent phase observations may be entered on the partogram or on a separate observation sheet.

ROUTINE MONITORING IN THE FIRST STAGE OF LABOUR

Latent phase (cervix <4 cm dilated):

- Temperature, heart rate, respiratory rate and blood pressure 4 hourly.
- Uterine contractions and fetal heart rate 4 hourly.
- Vaginal examination 4 hourly.

Any change in phase of labour, or abnormal observation, warrants more frequent observation or action.

Active phase (cervix \geq 4 cm dilated, <1 cm long):

- Maternal condition
 - Heart rate, BP, respiratory rate hourly.
 - Temperature 4 hourly.
 - Urine volume and test for protein and sugar when urine is passed.
- Fetal condition
 - Fetal heart rate half-hourly, before and immediately after contractions, ideally using a hand-held Doppler device.
 - Colour and odour of the liquor 2 hourly if the membranes have ruptured.
- Progress of labour
 - Duration and frequency of uterine contractions half-hourly, per 10 minutes.
 - Vaginal examination 2 hourly noting cervical dilation, sagittal moulding and caput.
- Treatment given
 - All medications.
 - All fluids, by whatever route.
- Summary of findings
 - Identified problems.
 - Management plan.

The partogram: alert and action lines

Record all findings of maternal and fetal condition, and progress of labour, on the partogram. As soon as the active phase of labour is diagnosed, place the first entry for the active phase at the point where the recorded cervical dilatation is exactly on the alert line. Alternatively, on a blank partogram where there are no pre-drawn lines, draw an alert line at a slope of 1 cm/hour from the first cervical dilatation in the active phase.

The action line is drawn 2 hours to the right and parallel to the alert line, and represents the extreme of poor progress where 'action' is mandatory (e.g. transfer from a CHC to hospital, oxytocin infusion, caesarean section).

Examples of completed partograms are shown in figure 5.8, page 66.

Analgesia in labour

Pain relief should be offered to all women in labour:

- Support and companionship have been shown to reduce the need for analgesic medication in labour. Promote companionship in labour.
- Pethidine 100 mg with promethazine 25 mg intramuscularly 4 hourly is acceptable in both the latent and active phases, even up to full dilatation of the cervix.
- Inhaled Entonox[®] (a mixture of 50% nitrous oxide and 50% oxygen) by mask is useful in the late first stage (\geq 8 cm cervical dilatation).

- Epidural anaesthesia is generally not available in CHCs and district hospitals. Some institutions may however have the necessary skills and equipment to provide this form of pain management.

MANAGEMENT OF THE SECOND STAGE OF LABOUR

The second stage starts when the cervix reaches full dilatation (10 cm) and ends with delivery of the baby. Time (up to two hours) can be allowed for the head to descend onto the pelvic floor if fetal distress and cephalo-pelvic disproportion (CPD) have been ruled out. The bladder should be empty or emptied, using a catheter if necessary. The observations of the active first stage of labour should continue. Efforts at bearing down are only encouraged when the fetal head starts to distend the perineum and the woman has an urge to push.

When the woman is ready to push (bear down):

- Always communicate clearly with the woman to gain co-operation.
- Be supportive and encouraging.
- Put the woman in a suitable position: propped up, sitting, squatting, kneeling, semi-Fowler's or wedged supine. Avoid the flat supine position (lying flat on the back), as the pregnant uterus will compress the aorta and inferior vena cava.
- Encourage pushing/ bearing down only during contractions.
- Listen to the fetal heart after every second contraction.
- Protect the perineum when the fetal head crowns.
- Dry the baby and place the baby on the woman's abdomen, skin to skin, for her to hold immediately after delivery for at least an hour. Postpone all routine neonatal procedures that are not lifesaving (e.g. washing, weighing and non-urgent medical procedures).
- Help the mother to initiate breastfeeding within an hour after birth (which can decrease the risk of maternal haemorrhage, new-born hypoglycaemia and increase exclusive breastfeeding) unless there is a medical indication not to breastfeed.
- Assess the baby's Apgar score at 1 minute.
- Wait 1-2 minutes before clamping the umbilical cord, but clamp and cut the cord earlier if the baby needs urgent resuscitation.
- Record the times of onset of the second stage, onset of bearing down efforts and delivery, as well as the status of the fetal heart rate during the delivery.

Episiotomy

Routine episiotomy is discouraged. Consider episiotomy only for the following reasons:

- Thick or rigid perineum preventing delivery and prolonging the second stage.
- Fetal distress in the second stage of labour.
- Maternal conditions where rapid delivery is required, e.g. cardiac disease.
- Breech or forceps delivery.
- Previous third degree tear.
- Preterm delivery where the perineum is tight.

Local anaesthetic (lignocaine 1% solution, maximum 20 mL) must be infiltrated into the perineum before cutting the episiotomy. Perform a mediolateral episiotomy, where the cut is started in the midline at the fourchette, bearing laterally at about 45 degrees. Avoid median or lateral or bilateral episiotomy.

Repair of episiotomy

- Polyglactin is recommended. Use 1/0 to 2/0 absorbable sutures.
- Place a vaginal tampon high in the vagina with an artery forceps attached.
- Make sure that the anal sphincter is not disrupted.

- Insert a suture close to the apex of the episiotomy in the vaginal epithelium.
- From the apex down, close the vaginal epithelium with a continuous suture.
- Ensure correct alignment by checking the apposition of the hymen and the vaginal-perineal junction.
- Approximate the perineal muscles and fascia with interrupted sutures.
- Close the skin with interrupted sutures or a continuous subcutaneous suture.
- Always remember to remove the vaginal tampon and record this in the notes.
- Do a rectal examination after suturing, check for any stitches placed in the rectum and record the absence of any sutures in the notes. Remove any sutures found in the rectum and repair again (use clean gloves).

MANAGEMENT OF THE THIRD STAGE OF LABOUR

The third stage starts immediately after delivery of the baby and ends with delivery of the placenta. The active method of managing the third stage is recommended, to prevent excessive bleeding:

- Immediately after delivery of the baby, ensure by abdominal palpation that there is no previously undiagnosed second twin, even if antenatal ultrasound found a singleton pregnancy.
- If there is no second twin, immediately give oxytocin 10 units intramuscularly.
- Await uterine contraction for 2-3 minutes then feel for uterine contraction every 30 seconds.
- Do not massage or squeeze the uterus with the placenta still inside.
- When the uterus is felt to contract, put steady tension on the umbilical cord with the right hand, while pushing the uterus upwards with the left hand.
- Deliver the placenta by applying continuous gentle traction on the umbilical cord.
- Examine the placenta for completeness and for any abnormalities.

MANAGEMENT OF THE FOURTH STAGE OF LABOUR

The fourth stage is defined as the first hour after delivery of the placenta. The woman is at risk for postpartum haemorrhage and must be observed closely:

- Check and record the woman's heart rate, BP, respiratory rate and temperature just after delivery of the placenta.
- Regularly check that the uterus is well contracted.
- Ensure frequently that there is no excessive vaginal bleeding.
- Show and encourage the woman how to rub her own uterus to maintain contraction.
- Assist the woman with her baby, encouraging her to hold it, skin to skin, and put it to the breast unless the woman has decided not to breastfeed.
- Record the women's heart rate, respiratory rate and BP measurement after one hour.
- At the end of the fourth stage, offer the woman a light meal and transfer her to the postnatal ward if all observations are normal.

ABNORMALITIES OF THE FIRST STAGE OF LABOUR

PROLONGED LATENT PHASE OF LABOUR

The latent phase of labour is prolonged when it exceeds 8 hours in a birth facility. Prolonged latent phase can be difficult to diagnose, but is likely if there are cervical changes and increasing uterine activity over 8 hours of observation.

Management of apparent prolonged latent phase

- Exclude other causes of abdominal pain, e.g. abruptio placentae, urinary tract infection.
- Consider false labour, characterized by no cervical changes and no increase in duration, regularity or frequency of labour pains. Women with false labour may be discharged home if there are no other obstetric problems.
- If certain that the woman has a prolonged latent phase, exclude fetal distress and CPD, then 'stretch and sweep' the cervix, rupture the membranes and/or start an oxytocin infusion as for active phase augmentation (figure 5.1) Transfer the women from the CHC to the hospital.

POOR PROGRESS IN THE ACTIVE PHASE OF LABOUR

There is poor progress if the cervix dilates at a rate of <1 cm/hour in the active phase (crosses the partogram alert line). Partograms illustrating poor labour progress are shown at the end of the chapter.

Management of poor progress in the active phase

- Use the rule of 4 Ps in the assessment (Patient, Powers, Passage, Passenger).
- Ensure adequate maternal hydration: Give a bolus of Ringer's lactate (200-300 mL intravenously) and continue with an IV infusion of Ringer's lactate to run at 120 mL/hour.
- Ensure that the bladder is empty: catheterise if necessary.
- If there is evidence of CPD in a multipara (increasing grade of sagittal moulding with no descent, or grade 2 sagittal moulding with the head $\geq 3/5$ palpable above the brim), arrange caesarean section or transfer from CHC to hospital.
- Exclude malpresentation: for breech and oblique/transverse lie, arrange caesarean section or transfer from CHC to hospital.
- Exclude fetal distress (late decelerations, thick meconium): if the fetus is in distress, do immediate caesarean section or transfer from CHC to hospital urgently.
- With good hydration, bladder empty, no CPD in a multipara, no malpresentation and no fetal distress:
 - Support and reassure the woman
 - Offer analgesia
 - Rupture the membranes if still intact
 - Continue labour observations as before and reassess progress 2 hourly
- If progress crosses the 2 hour action line:
 - Transfer from CHC to hospital
 - If no CPD in a primigravida and no evidence of fetal distress, start oxytocin infusion
- Continue with 2 hourly assessments: if progress in cervical dilatation is still less than one cm/hour, perform caesarean section.

Figure 5.1 Oxytocin for induction or augmentation of labour

OXYTOCIN FOR INDUCTION OR AUGMENTATION OF LABOUR

It is accepted that different regimens may be used in different facilities all delivering similar infusion rates of oxytocin.

Precautions

- Only use intrapartum oxytocin in facilities with 24-hour caesarean section facilities.
- There must be no evidence of fetal distress.
- Use oxytocin with great caution in multiparas, after excluding CPD.
- Do not use oxytocin in women with parity ≥ 5 , or with previous caesarean section.
- Use CTG for fetal monitoring.
- For cardiac and hypertensive women, use oxytocin at lower fluid infusion rate in a 200 mL bag.

Regimen

- Add oxytocin 5 units to 1 L of Ringer-Lactate.
- Start infusion at a rate of 25 mL/hour (≈ 2 mU/minute or 6 drops/minute using a 15 drops/mL set).
- Increase the infusion rate by increasing by 50 mL/hour every 30 minutes – 50, 100, 150, 200 mL/hour – until 3-4 strong contractions (>40 seconds) are achieved.
- Do not increase the infusion rate once strong contractions are achieved.
- If the infusion rate reaches 200 mL/hour and strong contractions are not achieved, increase the dose by starting an infusion of 10 units in 1 litre at 150 mL/hour, increasing to 200 mL/hour if necessary.
- Do not increase the infusion rate beyond 200 mL/hour of oxytocin 10 units/L.
- Oxytocin may be given with intact membranes if amniotomy is difficult, contraindicated, or needs to be delayed.

MECONIUM STAINING OF THE LIQUOR

Thin (grade 1) meconium staining of the liquor (MSL) requires no special management. Intrapartum passage of thick (grade 2-3) MSL is associated with an increased risk of fetal distress:

- Transfer from CHC to hospital.
- Monitor the fetus with a CTG continuously in labour.
- Before delivery, ensure readiness for neonatal resuscitation and suction of meconium from the trachea.
- Deliver normally at vaginal birth or caesarean section, and resuscitate and suck meconium only if the baby is not vigorous.
- For babies not breathing adequately, suck meconium from below the cords under direct vision using a neonatal laryngoscope and meconium aspirator.

FETAL MONITORING

- For low risk labour, listen to the fetal heart with, ideally, a hand-held Doppler device, or a fetal or normal stethoscope, before and immediately after contractions.
- CTG is used for high risk labour only (figure 5.2) and must be available in all hospitals. CTG monitors are not recommended for intrapartum use in CHCs.
- After CTG interpretation, write a note about the findings in the woman's notes, so that a record of the CTG is still available even if the CTG tracing is lost.
- All CTG tracings must be kept safely in the woman's file and be stored with the file after delivery.

Figure 5.2 Common indications for CTG monitoring in labour

Common indications for CTG monitoring in labour

- Previous caesarean section
- Suspected intrauterine growth restriction
- Multiple pregnancy
- Pre-eclampsia
- Antepartum haemorrhage
- Prolonged rupture of the membranes (>24 hours)
- Suspected chorioamnionitis or offensive liquor
- Meconium stained liquor
- Poor progress in labour
- Oxytocin infusion

ABNORMALITIES OF THE SECOND STAGE OF LABOUR

PROLONGED SECOND STAGE OF LABOUR

The second stage is prolonged if:

- The fetal head has not descended onto the pelvic floor after 2 hours of full dilatation.
- Delivery has not occurred after 45 minutes of pushing in a nullipara, or 30 minutes of pushing in a multipara.

If the woman is not bearing down after 1 hour of full dilatation:

- Re-examine the woman to make sure the cervix is truly fully dilated.
- Rupture the membranes if they are intact.
- Attempt delivery by asking the woman to bear down.
- If these efforts do not result in delivery efforts at a CHC, transfer to hospital; unless skills and equipment for vacuum extraction are available (see below).
- Exclude CPD or fetal distress: if found, arrange caesarean section.
- Consider oxytocin infusion for nulliparous women only.
- Continue routine monitoring of labour.
- Re-assess after one hour: if still no delivery efforts, do vacuum extraction if the head has descended to the pelvic floor or caesarean section if head is $\geq 2/5$ palpable above the brim.

Failure of the head to descend despite maternal pushing

If delivery has not occurred after 45 minutes of pushing in a nullipara, or after 30 minutes in a multipara:

- Take care with assessing the level of the head: excessive caput or moulding may give the impression that the head is deep in the pelvis when it is not truly engaged. Use fifths palpable above the brim to assess head descent.
- Perform vacuum extraction if the head is 0/5 or 1/5 palpable above the brim, if necessary with oxytocin infusion. Transfer from CHC to hospital if skills and equipment are not available for vacuum extraction, or head $>1/5$ palpable.
- Arrange for emergency caesarean section or transfer from CHC to hospital if the head $\geq 2/5$ palpable above the brim.

VACUUM EXTRACTION/VENTOUSE DELIVERY

Vacuum extraction (ventouse delivery) may be performed at CHCs by experienced advanced midwives and in hospital by advanced midwives and doctors. Disposable vacuum cups are preferred because they are easy to use and reliable.

Conditions for safe vacuum extraction

- Woman fully informed and co-operative.
- Vertex presentation.
- Head 0/5 or 1/5 palpable above the brim (0/5 only at a CHC).
- Certainty about the position of the presenting part.
- Cervix fully dilated.
- Membranes ruptured.
- Bladder empty.
- Strong uterine contractions (duration >40 seconds duration).

Technique

Vacuum extraction techniques vary with different equipment and operators:

- Check the equipment thoroughly before use by testing suction on the gloved hand.
- Aim for a negative pressure of at least -0.6 Bar to -0.8 Bar in the cup (do not exceed a pressure of 0.8 Bar/80 Kilopascal/600 mmHg- the red zone on the disposable cups).
- Apply traction only during contractions.
- The vacuum extraction has failed if:
 - There is no noticeable head descent during traction.
 - The head has not delivered after three pulls (one pull = one contraction) with functioning equipment.
 - There have been 2 cup detachments with functioning equipment.
- Failed vacuum extraction requires caesarean section unless the baby's head has already extended and can be easily delivered by pushing without further use of the vacuum extractor.
- Write up the procedure fully: indication, initial findings, times, cup type and size, number of pulls, number of detachments, and infant's condition at delivery.

FORCEPS DELIVERY

Forceps delivery should only be performed in hospitals, by experienced operators, where all conditions for forceps delivery are met.

CAESAREAN SECTION

All district hospitals should have staff and facilities for the performance of a caesarean section 24 hours a day. Surgical techniques vary according to the circumstances and the experience of the operator. All hospitals should be able to perform an emergency caesarean section within 1 hour of the decision to operate.

Requests by pregnant women for caesarean section

Caesarean section is associated with an increased risk of maternal infection, haemorrhage, thromboembolism, postpartum death, and obstetric complications in subsequent pregnancies. Women who ask for caesarean section and have no clinical indication for the operation should be counselled about the risks and benefits of the procedure.

Women who ask for caesarean section and have a relative indication, e.g. previous caesarean section, may be booked for caesarean section after counselling. In general, the performance of caesarean section without a valid indication is unacceptable practice.

Fetal maturity testing before elective caesarean section with uncertain gestational age

If elective (non-urgent) caesarean section is planned for a woman at term, and the gestational age is uncertain but apparently close to term, fetal lung maturity testing may be helpful. After performing amniocentesis, amniotic fluid is sent to the laboratory to assess surfactant content. The local laboratory will first need to be consulted to ask what fetal lung maturity tests, if any, they perform.

Alternatively, consider doing a foam test at the bedside:

- Obtain a sample of amniotic fluid, in which there is no visible trace of blood or meconium.
- Add 1 mL of amniotic fluid to 1 mL of 95% alcohol in a clean dry test tube; cover with clean plastic or plastic top (not rubber).
- Shake the tube vigorously for 30 seconds.
- Tap the side of the tube to get rid of large bubbles.
- Examine the meniscus (surface) of the fluid mixture 30 seconds after shaking, holding the tube upright.
- If at least a thin and complete ring of foam remains on the meniscus, the fetus is likely to have mature lungs and is unlikely to develop hyaline membrane disease.
- Absence of an adequate ring of bubbles suggests that the fetus is immature, but sometimes does occur with a mature fetus. Rather postpone the procedure for a week.

Preparation and precautions before caesarean section

- Obtain signed informed consent for surgery with the operation and its indication clearly explained to the woman.
- Ensure that emergency blood for transfusion is available in the hospital.
- Measure the woman's Hb level.
- Ensure an experienced operator is available to do, or to assist at, caesarean sections in the second stage of labour.
- Consider transfer to a specialist hospital if difficulties with surgery are expected, e.g. placenta praevia, previous myomectomy, abruptio placentae with a dead baby, transverse lie, morbid obesity and serious co-existing medical or surgical conditions.

Just before starting the operation, ensure that:

- Tubal ligation has been considered, and informed consent obtained if requested by the woman.
- The fetal heart can still be heard.
- The fetal presentation and position are known.
- The indication for caesarean section is still valid.
- A broad-spectrum prophylactic intravenous antibiotic is given, e.g. cefazolin 1 g, irrespective of whether the operation is an emergency or elective procedure.

Haemorrhage at caesarean section

At caesarean section, excessive bleeding and its complications can be prevented by:

- Having an experienced surgeon available or transferring to specialist care pre-operatively if severe bleeding is anticipated, e.g. placenta praevia or caesarean section in the second stage of labour.
- Having blood for transfusion available if Hb <10 g/dL pre-operatively.
- Routinely giving oxytocin 2.5 mg IV immediately after delivery of the baby (anaesthetist).
- Delivery of the placenta by cord traction, not manual removal.
- Good surgical technique, including careful haemostasis.

Manage excessive bleeding at caesarean section as follows:

- Call for help.
- Remove excessive blood with suction or swabs.
- Inform the anaesthetist to provide uterotonics, fluid resuscitation and blood replacement if needed.
- Determine whether blood loss is from an atonic uterus, placental site, or from bleeding incisions or tears.
- If blood loss is from an atonic uterus, proceed as for atonic uterus after vaginal delivery.
- If blood loss is from the placental site (e.g. placenta praevia):
 - Place square sutures in the placental bed.
 - Consider a brace suture (e.g. B-Lynch suture), systematic devascularisation, balloon tamponade or hysterectomy.
 - If hysterectomy is required but cannot be done, tie a Foley catheter around the uterus (to arrest bleeding) and await help or transfer to specialist care.
- If blood loss is not from an atonic uterus:
 - Define all anatomy well.
 - Remove sutures if necessary to expose bleeding areas.
 - Arrest bleeding with figure-of-eight sutures; if possible, avoid placing sutures near the ureters in the base of the broad ligament.
 - Consider systematic devascularisation or subtotal hysterectomy.
 - Consider other causes of bleeding, e.g. ruptured liver in pre-eclampsia.
 - With persistent bleeding from the uterus, tie a Foley catheter tightly around the uterine lower segment including the broad ligaments and wait for help, or transfer to specialist care for hysterectomy. Ensure that blood pressure and heart rate are stable before transfer.

Postoperative orders

- Prescribe analgesia:
 - Opiate, e.g. papaveretum (Omnopon®) 20 mg intramuscularly with prochlorperazine 12.5 mg intramuscularly 4-6 hourly when necessary for 24 hours
 - Indomethacin 100 mg suppository 12 hourly, or ibuprofen 400 mg orally 3 times daily (not in patients with asthma, peptic ulcer or kidney dysfunction) for 2 or 3 days when necessary.
 - Paracetamol 1 g orally 4 times daily when necessary.
- Prescribe intravenous fluids: Ringer's lactate 1 litre with 20 units oxytocin over 8 hours, then Maintelyte® or 5% Dextrose-saline 1 litre over 8 hours.
- Prescribe additional (therapeutic) doses of antibiotics for 24 hours to 5 days in women who have risk factors for infection, (e.g. all HIV infected women; prolonged labour or prolonged ruptured membranes; caesarean section in second stage labour, chorioamnionitis, >5 vaginal examinations during labour, when the fetal head needed to be pushed up vaginally).
- Give prophylaxis against thromboembolism for women at risk (sodium heparin 5000 units subcutaneously 12-hourly or enoxaparin 40 mg SC daily while in hospital). Risk factors to consider are advanced maternal age, obesity, HIV infection, pre-eclampsia, immobility and co-existing illnesses.

EMERGENCIES DURING LABOUR

FETAL DISTRESS

Fetal distress is suspected when the fetal heart rate is abnormally high or low, or if decelerations are heard, or a CTG tracing is suspicious or pathological.

Management of fetal distress

- Explain the problem to the woman.
- Perform a vaginal examination for cervical dilatation and to exclude cord prolapse:
 - If the cervix is fully dilated, deliver normally or by vacuum extraction.
 - If there is cord prolapse manage appropriately (see below).
 - If delivery is not imminent, proceed as below.
- Place the woman in the left lateral position.
- Stop oxytocin infusion if applicable.
- Give oxygen by face mask at 6 L/min for 20-30 minutes.
- Start an IV infusion of Ringer's lactate to run at 240 mL/hour for 1-2 hours, unless the woman is hypertensive or has cardiac disease.
- Give salbutamol 250 µg (½ of a 500 µg ampoule diluted in 20 mL saline) IV slowly.
- Transfer from CHC to hospital and monitor with CTG.
- If a pathological tracing persists, arrange emergency caesarean section.

CORD PROLAPSE

In cord prolapse, the umbilical cord comes out of the cervix in front of the fetal presenting part, with the membranes ruptured. Frequently, the cord may appear at the vulva.

If the fetus is alive (fetal heart heard) and viable:

- Call for help.
- Explain the problem to the woman.
- Perform vaginal examination.

If the cervix is fully dilated and the fetal head has engaged in the pelvis immediately deliver the baby by vacuum extraction or forceps delivery if necessary.

If the cervix is not fully dilated, arrange for urgent caesarean section or for transfer from CHC to hospital, and proceed as follows:

- Replace the umbilical cord in the vagina and try to keep it inside the vagina using sanitary pads and closing the mother's thighs.
- Handle the cord as little as possible.
- If the presenting part is felt to be compressing the cord, push the presenting part up with the fingers, and turn the woman to a knee-elbow position with the fingers continuing to hold the presenting part of the cord, if necessary.
- Insert a urinary catheter, at least size 18 G, and empty the bladder.
- Fill the woman's bladder with 400 mL of normal saline and clamp the catheter.
- Start an IV infusion of Ringer's lactate.
- Give Salbutamol 250 µg (½ of a 500 µg ampoule diluted in 20 mL saline) IV slowly as a single dose.
- If the presenting part is not compressing the cord, place the woman in a left lateral (Sims) position with a pillow under the hips.
- Make accurate notes of all that has been done, with times.

- Before starting caesarean section ensure that the fetus is alive.
- If the fetus is dead or not viable, and there is no other indication for caesarean section, await vaginal birth.

SHOULDER DYSTOCIA

In shoulder dystocia delivery of the baby's head is not followed by delivery of the rest of the body because the shoulders are too broad and become stuck in the pelvis. This usually happens with large babies (>3.5 kg). Emergency management is as follows:

- Call for at least 2 assistants.
- Explain the problem to the woman.
- Immediately move the woman to the edge or to the lower end of the delivery bed.
- Help the woman to hyper flex the hip joints (McRoberts' position). Her knees should almost touch her shoulders.
- Apply downward suprapubic pressure.
- Tell the woman to push, even if she does not have a contraction.
- Gently guide the head downwards to help delivery but do not stretch the neck or jerk forcefully on the head.
- If unsuccessful so far, deliver the posterior arm by locating the posterior shoulder in the vagina and sweeping the arm in front of the baby's chest. Once the posterior arm is delivered, delivery of the anterior shoulder should not be very difficult.
- If the posterior arm cannot be easily delivered, insert a loop of plastic tubing, e.g. urine bag tube or feeding tube, through the posterior axilla of the baby and pull down on the loop until it becomes possible to deliver the posterior arm as above.
- Posterior arm delivery may be easier if the woman turns to a knee-elbow position (all-fours position).
- An alternative method is to rotate the baby through 180 degrees to bring the posterior shoulder forward. During rotation hold both the arm and the head to facilitate rotation and reduce the risk of injury to the baby.
- If delivery has not been achieved at this point the baby is likely to die. If the baby is dead, await spontaneous delivery and call for help or advice to deliver the baby without injuring the woman.
- Irrespective of the outcome for the baby, debrief the woman after the delivery, giving a full explanation of the emergency management and potential complications.

ABNORMALITIES IN THE THIRD AND FOURTH STAGES

THIRD DEGREE PERINEAL TEAR

In a third degree tear the anal sphincter is disrupted and there may be injury to the rectal mucosa (fourth degree tear). It is important after every vaginal birth to inspect tears and episiotomies well to identify third degree tears. Women with third degree tears must be transferred from a CHC to a district hospital. If there is no expertise at the district hospital, transfer to a specialist facility.

Repair of a third-degree tear

- The repair should be performed by an experienced doctor in theatre, ideally using spinal anaesthesia.
- Use polyglactin absorbable suture: repair the rectal mucosa first with 3/0 suture, continuous or interrupted.
- Follow this by repairing the rectal muscularis layer with 3/0 suture, continuous or interrupted. Include the internal anal sphincter in this suture.
- Identify the disrupted ends of the external anal sphincter on each side just above the anal verge and extract and hold them with Allis clamps.
- Repair the external sphincter with four simple 2/0 sutures, either as an end-to-end or as an overlapping anastomosis.

- Complete the repair as for episiotomy.
- Give antibiotic prophylaxis – ampicillin 1 g IV 6 hourly for 24 hours followed by amoxicillin 500 mg orally 3 times daily, with metronidazole 400 mg orally 3 times daily, for a total of 5 days.
- Give oral analgesia e.g. paracetamol 1 g orally 6 hourly or ibuprofen (if not contraindicated) 400 mg orally 8 hourly for 3-4 days.
- Prescribe stool softeners e.g. ispaghula (Agiolax®), or bran, or lactulose 10 g twice daily orally for 5 days. Advise on a high fibre diet and pelvic floor exercises.
- Write a clear discharge summary with clear instructions for a follow-up doctor visit.

RETAINED PLACENTA

The placenta is retained when it is not delivered from the uterus within 30 minutes of delivery of the baby. At times, the placenta is not truly retained, and it may be removed by simply lifting it out of the vagina, or manually helping it out of the cervix.

Management of retained placenta

- Insert a urinary catheter.
- Start an infusion with oxytocin 20 units in 1L Ringer's lactate at 120-240 mL/hour.
- Observe the woman constantly for vaginal bleeding or placental delivery.
- If there is excessive vaginal bleeding insert a second intravenous line as fluid resuscitation and attempt manual removal of the placenta if the cervix is sufficiently open or if the placenta is partially expelled.
- If the placenta cannot be delivered or if it has not been delivered after one hour of oxytocin infusion, arrange for manual removal under general anaesthesia, or transfer from CHC to hospital.
- Take blood for Hb and cross match.
- For manual removal try to remove the whole placenta with the hands. Use the ulnar surface of the palm to create a cleavage plane. If instruments are required to remove retained cotyledons or products, use the largest available forceps and curettes to prevent uterine perforation.
- Call for help if bleeding persists or if placenta accreta is suspected, or transfer to specialist level facility after stabilizing the patient.
- Give ampicillin 1 g IV followed by amoxicillin 500 mg 3 times daily orally and metronidazole 400 mg 3 times daily orally for 5 days.

PRIMARY POSTPARTUM HAEMORRHAGE

This is defined as excessive blood loss from the genital tract during the first 24 hours after delivery. Postpartum haemorrhage (PPH) is considered mild with blood loss from 500-1000 mL, severe with blood loss from 1000-2500 mL, and massive with blood loss of >2500 mL. However, estimating blood can be subjective and may not be accurate.

POSTPARTUM HAEMORRHAGE AFTER VAGINAL DELIVERY

Prevention

PPH and its complications can be prevented by:

- Ensuring skilled attendance at delivery if necessary by providing maternity waiting homes in rural areas.
- Iron supplementation in pregnancy and antenatal screening and treatment of anaemia.
- Partogram-based management of the first stage of labour to prevent prolonged labour.
- Routinely practising active management of the third stage of labour.
- Identifying women at risk for atonic uterus and giving additional oxytocin (20 units in 1 L Ringer-Lactate at 120-240 mL/hour) after active management of the third stage.
- Close observation of vital signs, uterine contraction and bleeding in the fourth stage of labour.

Management of PPH after vaginal delivery

All women with PPH must be transferred from a CHC to hospital. CHC midwives and doctors should take whatever emergency steps they can, as listed below, to arrest bleeding and achieve fluid resuscitation. Patients with PPH must, wherever possible, be adequately stabilized before transfer from CHC to hospital.

Stepwise management of PPH should proceed as follows:

- Call for help and rub the uterus to expel clots and induce contraction.
- Start a rapid infusion with 1 litre Ringer's lactate solution in one arm.
- In the other arm start oxytocin 20 units in 1 litre Ringer's lactate at 240 mL/hour.
- Insert an indwelling urinary catheter.
- Check placenta: if retained or incomplete, proceed as for retained placenta discussed above.

Look for the cause of bleeding by examining the woman's abdomen:

- **Atonic uterus:** suggested by a large soft uterus: add ergometrine 0.5 mg IM or Syntometrine® 1 ampoule IM (if not contraindicated by cardiac disease or hypertension) and massage the uterus continuously; if clots are retained in the uterus, remove them manually.
- **Lacerations:** suggested by a well contracted uterus with fresh bleeding. The lacerations need to be repaired following examination of the entire birth canal, in the lithotomy position, under anaesthesia if necessary. If the apex of a cervical laceration cannot be reached from a vaginal approach, suspect uterine rupture and perform laparotomy for definitive repair, Foley catheter tourniquet or total hysterectomy.
- **Uterine inversion:** suggested by inability to feel the uterus through the abdominal wall and can be confirmed by performing a vaginal examination. Uterine inversion needs immediate reduction.

If haemorrhage from an atonic uterus cannot be controlled:

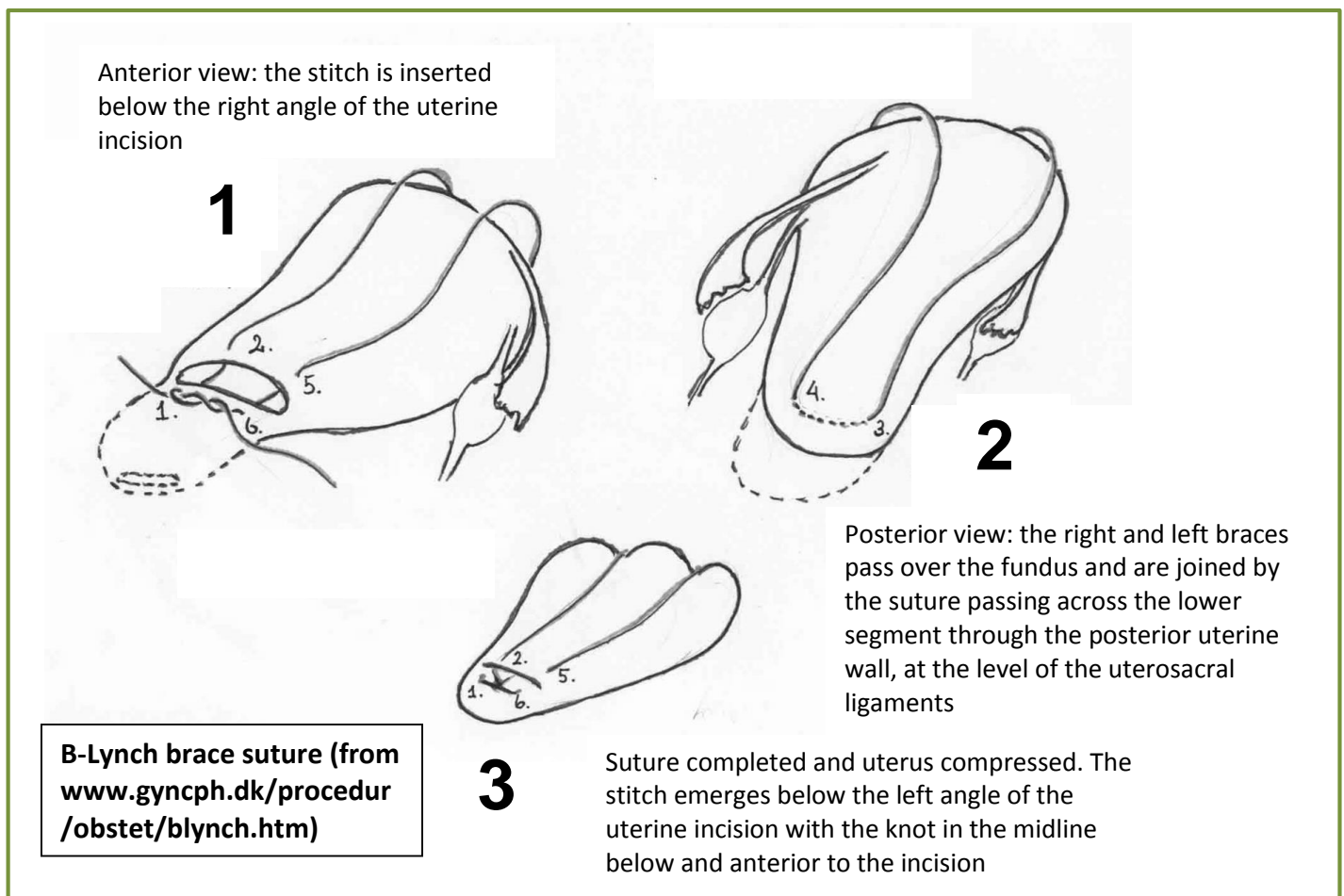
- Continuously massage the uterus and manually remove newly formed clots.
- Apply bimanual pressure to the uterus if necessary.
- Continue with oxytocin infusion and give one repeat dose of ergometrine or Syntometrine®.
- Continue fluid resuscitation and order blood for transfusion.
- Give tranexamic acid 1 g IV over 10 minutes (also useful with lacerations).
- Inject prostaglandin F2-alpha 0.5 mg into the myometrium as follows: dilute a 5 mg ampoule in 10 mL water and inject 1 mL through the skin into the uterine fundal myometrium; avoid in asthma and cardiovascular disease. Can repeat up to a total dose of 2.5 mg (5 mL).
- Insert a condom catheter (an open condom slipped over a large Foley catheter and secured at its base with string to provide a makeshift balloon catheter) into the uterus, inflate with 400-500 mL of saline and clamp; and pack the vagina with swabs to prevent expulsion. Transfer for urgent further specialist care or (if stable and bleeding has stopped) observe for 8-12 hours before removal of the catheter.
- If oxytocin and ergometrine are not available or if the uterus will not contract in response to all of the above measures, give misoprostol 400 mg sublingually as a single dose.
- With further bleeding, arrange for urgent examination in theatre with manual exploration of the uterus for rupture and for retained products, and possible laparotomy with brace suture (B-Lynch or Hayman), systematic devascularisation (uterine and ovarian arteries), or hysterectomy.
- If unable to do hysterectomy and with persistent bleeding from the uterus, tie a Foley catheter tightly around the uterine lower segment, including the broad ligaments, and transfer to specialist care for hysterectomy. Ensure that blood pressure and heart rate are stable before transfer.
- As a last resort, apply firm and sustained pressure to the aorta above the level of the umbilicus while awaiting help or while attempting to control bleeding points surgically.

Inserting a B-Lynch brace suture

- This may be done for PPH after normal delivery or after caesarean section.
- Put the woman in a modified Lloyd Davies position (thighs spread but not flexed much), to allow surgery while observing for vaginal bleeding.
- Exteriorise the uterus and open the lower segment (if not already open) with a transverse incision.
- Explore the inside of the uterus for bleeding points and place figure-of-8 sutures over any single large bleeding points.
- Compress the uterus with the hands. If this stops the bleeding, a B-Lynch brace suture (alternative is Hayman sutures) is likely to be successful.
- Use a single 1 metre length of thick absorbable suture material (chromic or polyglycolic 1 or 2) with a large needle.
- Ensure that the assistant compresses the uterus well while the suture is tightened and tied.

Figure 5.3 below shows a B-Lynch brace suture.

Figure 5.3: B-Lynch brace suture (from www.gyncph.dk/procedur/obstet/blynch.htm)



ACUTE INVERSION OF THE UTERUS

This emergency requires immediate action. Acute uterine inversion may be caused by inappropriate cord traction on a fundal placenta in a flaccid uterus, without providing the necessary upward counter-pressure on the uterus. At times it occurs spontaneously. Clinical shock may be greater than expected for the amount of blood loss.

- Immediately treat shock with Ringer's lactate given through 1 or 2 lines using large bore (16G) IV cannulas.
- Order blood for transfusion if there is haemorrhage.
- Give pethidine 50-100 mg IV if systolic BP \geq 90 mmHg.
- Do not remove the placenta if it is still attached to the uterus.
- Give salbutamol 250 μ g ($\frac{1}{2}$ of a 500 μ g ampoule diluted in 20 mL saline) IV to relax the uterus.
- Place the flat hand against the inverted surface of the uterus and push the uterus (with placenta if attached) as high up into the vagina as possible and hold that position for several minutes. Reduction should occur with sustained upward pressure.
- If reduction is not achieved, attempt reduction by filling the vagina with 500-1000 mL of saline, using a soft vacuum cup or other device to provide an external seal.
- Once reduction is achieved, give ergometrine 0.5 mg IM and oxytocin 20 units in 1 L Ringer-Lactate at 240 mL/hour. Do not remove the hand from the uterine cavity until a firm uterine contraction is felt.
- Carefully deliver the placenta when signs of separation are observed.
- If the placenta is not expelled spontaneously from the uterus, manual removal needs to be done in theatre.
- Observe the woman closely for haemorrhage or re-inversion.
- Failed reduction requires laparotomy. Using Allis clamps pull on the round ligaments where they enter the uterine constriction ring, with an assistant pushing the inverted uterus up from below.
- A tight constriction ring may prevent reduction. At laparotomy, the ring can be opened by a 1 cm low vertical posterior incision in the uterus. Then proceed as discussed in the point above.

HAEMORRHAGE AFTER CAESAREAN SECTION

Haemorrhage during caesarean section is discussed above under caesarean section. PPH may occur after the operation in the theatre recovery area or in the postnatal ward. Haemorrhage may be internal (intra-peritoneal, extra-peritoneal), or external (vaginal). Internal bleeding can be difficult to diagnose clinically- be aware of a post-CS patient with tachycardia and tender abdomen, as the Hb does not drop immediately and the bleeding is concealed.

PPH after caesarean section can be prevented by:

- All the steps above for preventing haemorrhage at caesarean section (above).
- Routinely checking all incisions and tubal ligation sites for bleeding before closing the abdominal cavity.
- By ensuring (with the anaesthetist) that the mother's pulse rate is less than 100/minute, systolic BP is greater than 100 mmHg and that the respiratory rate is less than 24 /minute before closing the anterior abdominal wall. Any abnormality of the vital signs requires a call for help.
- Routinely giving oxytocin 20 units in 1 L Ringer's lactate over the first 8 hours postoperatively.
- Routinely rubbing the uterus and expelling clots immediately after completing the caesarean section.
- Regular postoperative observation of general condition, BP, heart rate and pad checks.
- Intensive observation (in high care) of women who had excessive bleeding at caesarean section or who are at risk for further haemorrhage.

Manage excessive bleeding after caesarean section as follows:

- Record general condition, heart rate, respiratory rate and BP.
- Insert one or two large bore IV lines and resuscitate with Ringer's lactate.
- Insert a urinary catheter.
- Determine the cause of bleeding:
 - If the uterus is atonic, massage the uterus (this can be painful) and evacuate clots, then give uterotonics as for atonic uterus after vaginal delivery (as above).
 - If the uterus is well contracted, arrange a re-look laparotomy and proceed as for haemorrhage at caesarean section (as above).

Figure 5.4: Postpartum haemorrhage (PPH) after vaginal birth

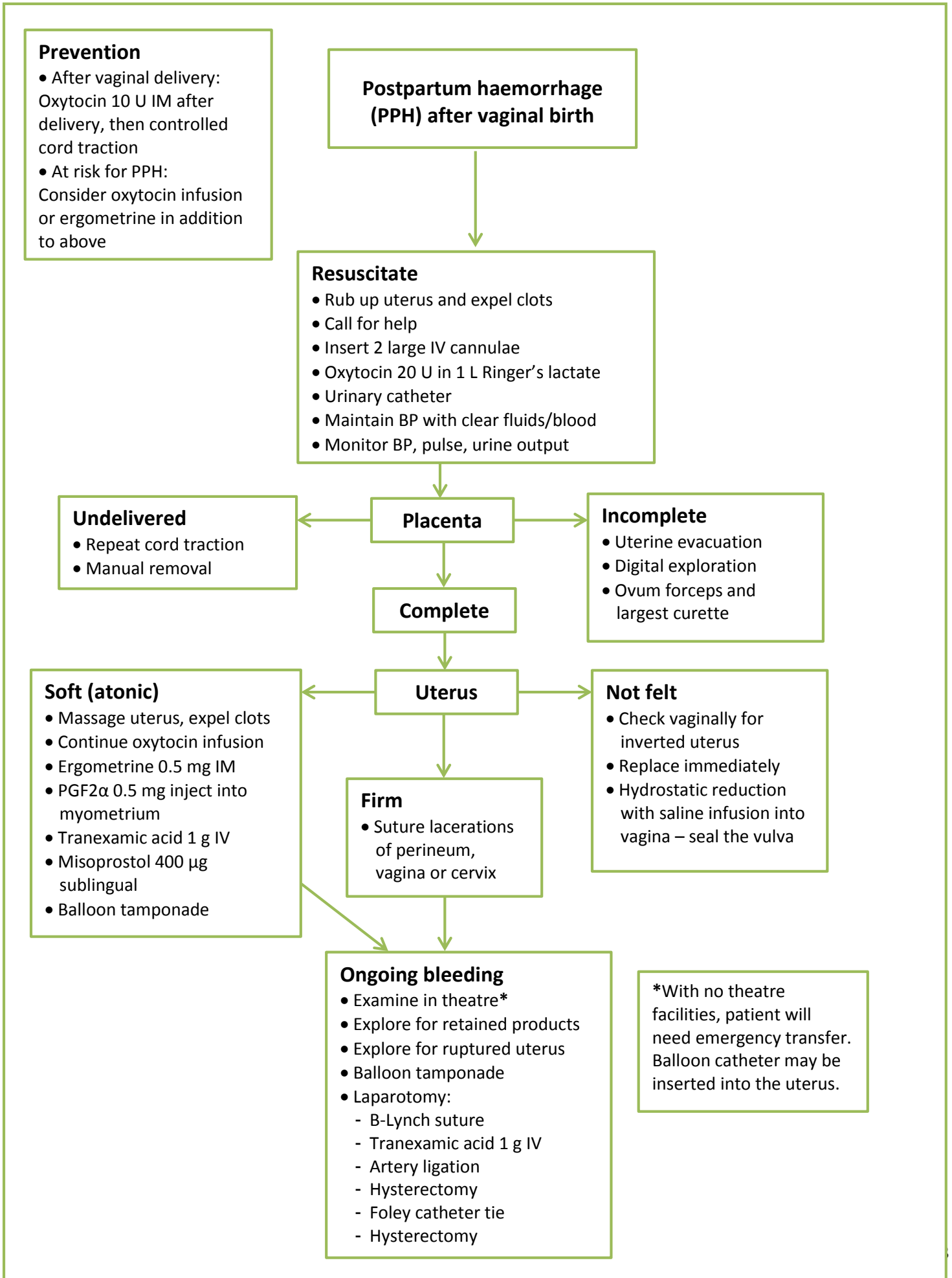


Figure 5.5: Bleeding at caesarean section

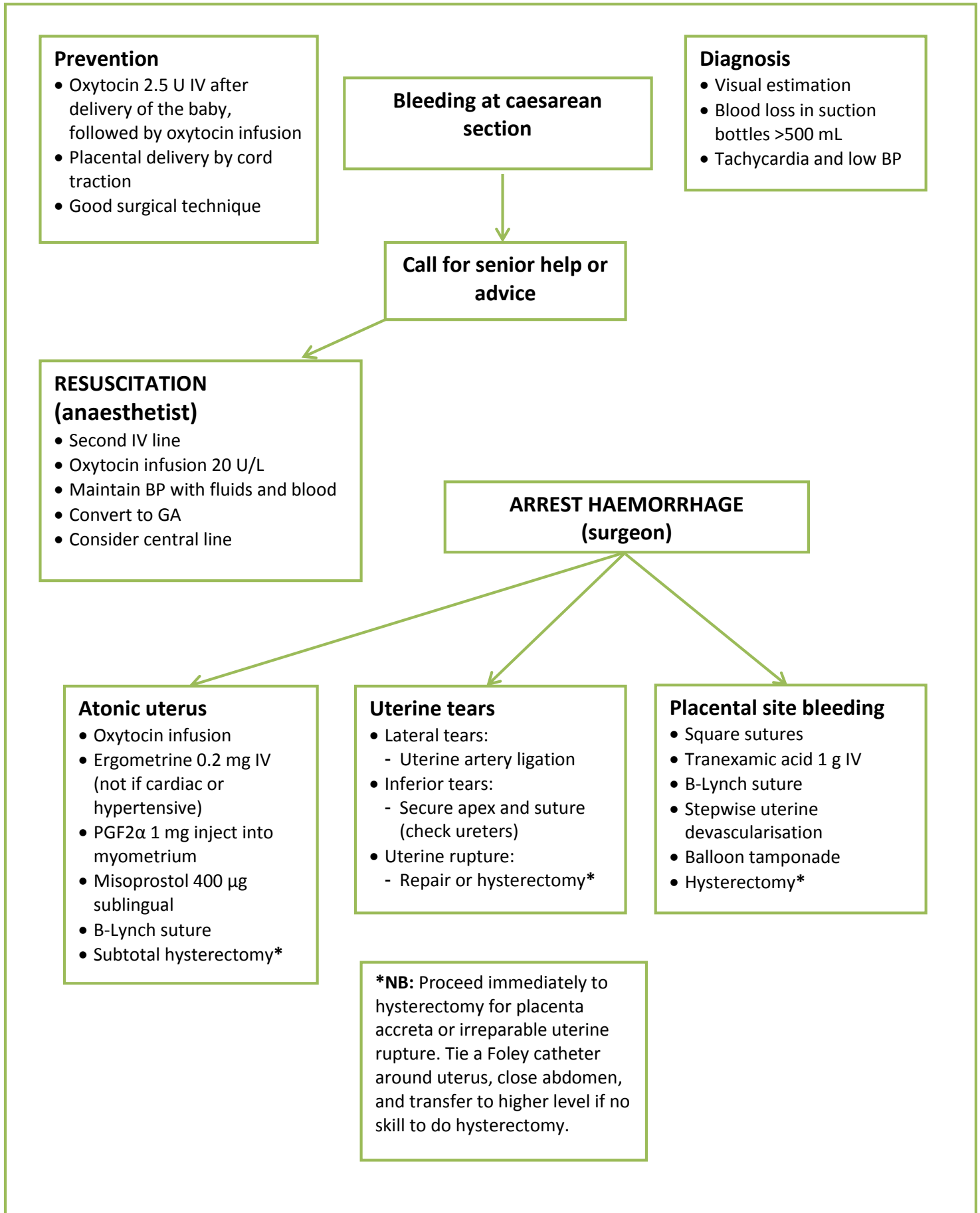


Figure 5.6: Bleeding after caesarean section

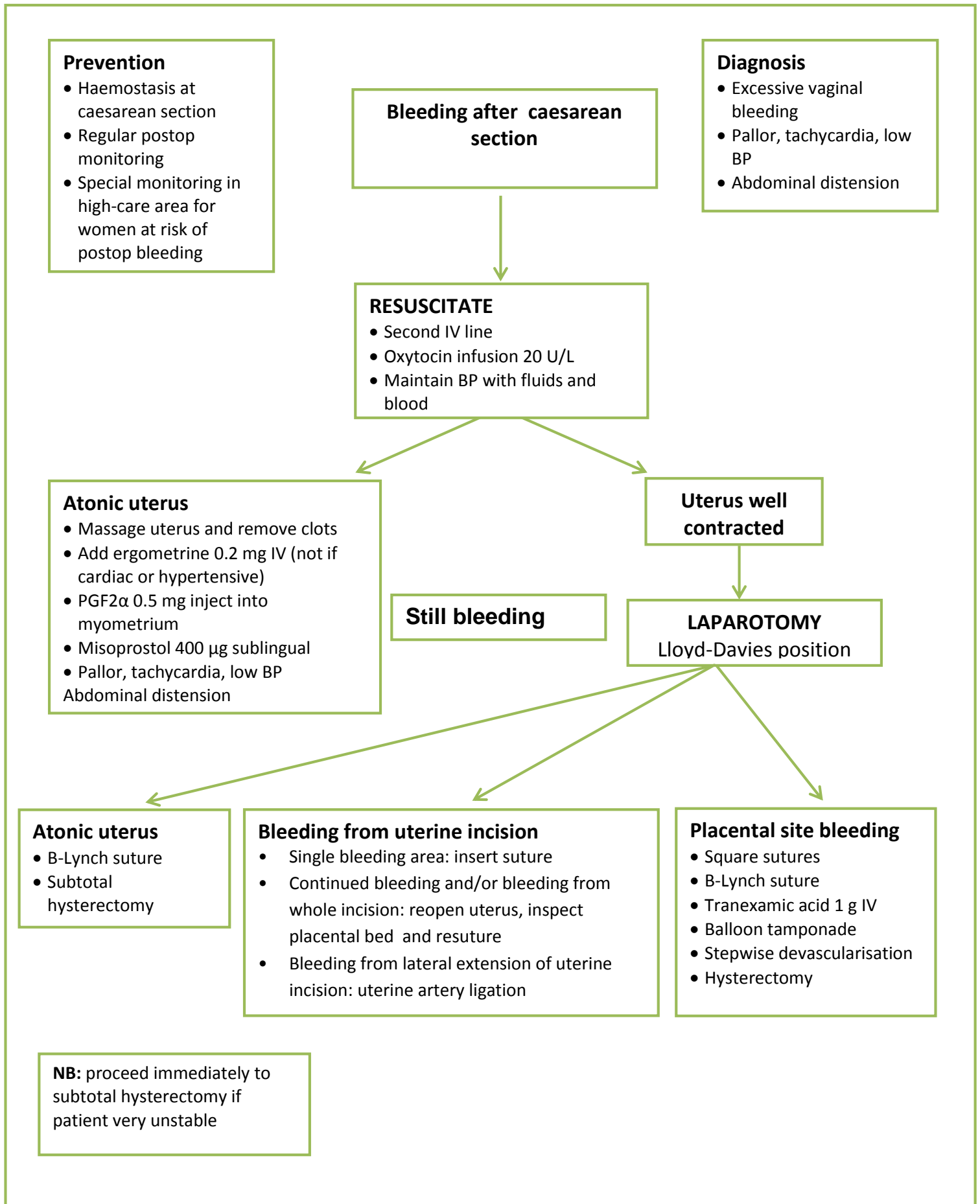


Figure 5.7: Problems requiring referral from chc to hospital during labour or postpartum

PROBLEMS REQUIRING REFERRAL FROM CHC TO HOSPITAL DURING LABOUR OR POSTPARTUM

During labour

Nullipara aged ≥ 37 years
Parity ≥ 5
Previous caesarean section
Previous surgery on the uterus, cervix, vagina, bladder or pelvic floor
Previous postpartum haemorrhage requiring blood transfusion
Serious medical disorder (e.g. cardiac disease, current TB, currently symptomatic asthma, epilepsy)
Cardiac disease
Anaemia (Hb < 10 g/dL)
Hypertension ($\geq 140/90$ mmHg)
Multiple pregnancies
Breech presentation or transverse lie
Estimated fetal weight < 2 kg
Rupture of the membranes before the onset of labour (refer if no spontaneous labour within 12 hours)
Maternal pyrexia ≥ 37.5 degrees C
Vulvovaginal blisters or ulcers
Extensive vulvovaginal warts that may obstruct delivery
Antepartum haemorrhage
Suspected fetal distress
Thick meconium staining of the liquor
Offensive liquor
Cord prolapse
Prolonged latent phase (≥ 8 hours)
Poor progress in the active phase of labour (crossing 2 hour partogram action line)
Prolonged second stage of labour not suitable for vacuum extraction
Failed vacuum extraction
Any woman who is in shock, is short of breath or appears very ill

After delivery

Retained placenta
Delivery of incomplete placenta or suspected retained products of conception
Postpartum haemorrhage
Anaemia (Hb < 8 g/dL)
Maternal pyrexia ≥ 37.5 degrees Celsius
Third degree perineal tear
Inverted uterus
Hypertension (persistently $\geq 150/100$ mmHg or symptomatic for imminent eclampsia, or eclampsia)
Any woman who is in shock, is short of breath or appears to be very ill

Figure 5.8: Completed partogram

Name: MS. X 3		Gravidity: 1	Parity: 0	Gestation: 40/53	Spontaneous labour: X	Induced labour:																
Age: 23		Risk Factors: None		Time of ROM: 1	Duration of labour (on arrival): 6 hours																	
Pelvis: Adequate																						
Date: 22/11/2011		Date: 22/11/2011																				
Duration in hours		LATENT PHASE		ACTIVE PHASE																		
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6

BLEEDING IN EARLY PREGNANCY

Purpose of this Chapter

This chapter discusses the importance of and methods for treating bleeding in early pregnancy, the various forms of miscarriage and ectopic pregnancy.

CHAPTER 6: BLEEDING IN EARLY PREGNANCY

Early pregnancy complications are usually neglected because they are often not seen as part of the maternity skills package. Complications in early pregnancy however require specific skills best provided by competent midwives and medical practitioners appropriately trained to manage any problems in early gestation.

Seven to 10% of pregnancies are associated with complications in early gestation and account for 5.2% of all institutional maternal deaths recorded in South Africa. Facilities providing maternity service must have a system in place to ensure that women with early pregnancy complications are managed by health professionals with the relevant skills.

Miscarriages are usually spontaneous but could be induced processes. Induced miscarriages (termination of pregnancy) could have been done through legal or illegal sources.

BLEEDING IN EARLY PREGNANCY

Bleeding in early pregnancy is defined as vaginal bleeding that occurs within the first 22 weeks of gestation. Follow the steps below for diagnosis and treatment:

Do a rapid assessment of the patient including:

- Vital signs: pulse rate, respiration rate and BP.
- Abdominal assessment: tenderness, size of uterus.
- Other: vaginal examination, pallor, assess the extent of vaginal bleeding (vaginal bleeding is regarded as “heavy” if a new pad is soaked within 5 minutes and “light” if it takes more than 5 minutes to soak).

Assess for complications

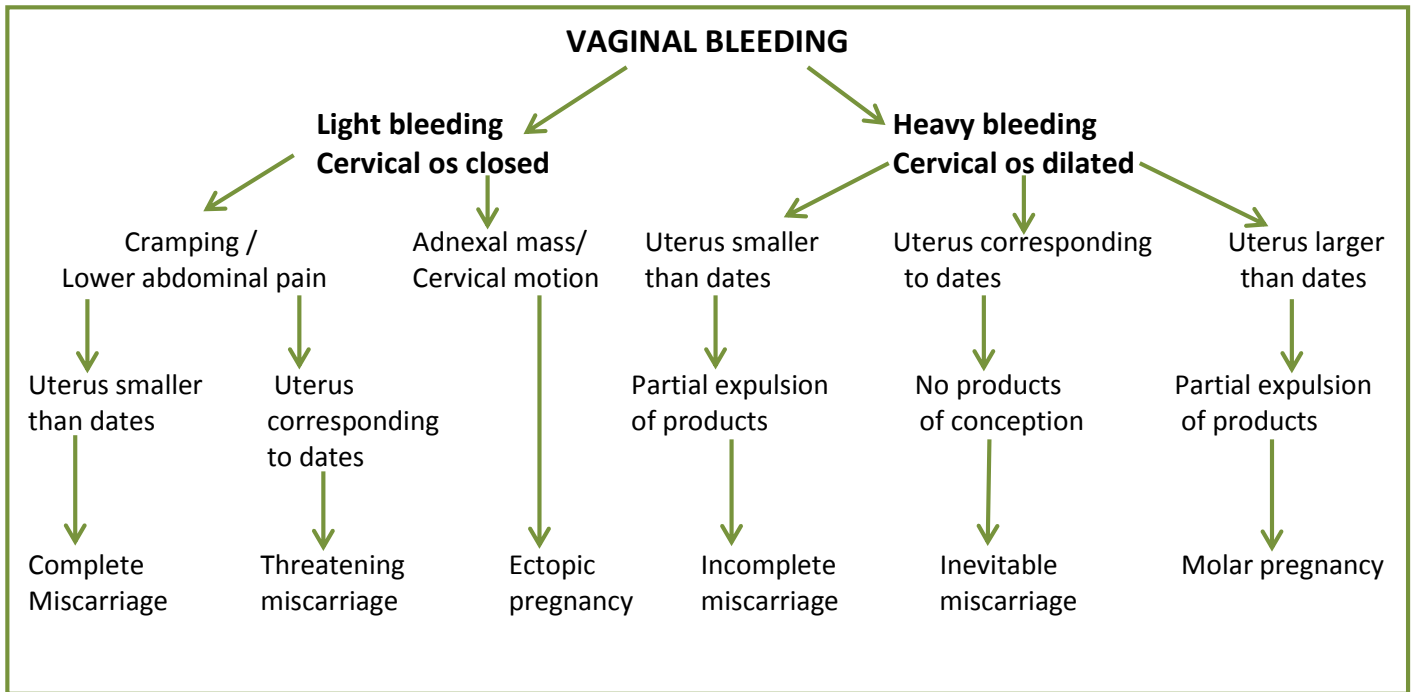
- If shocked, the patient needs active resuscitation.
- Determine if the patient has had a safe or unsafe miscarriage (see below).

Differential Diagnosis

- Pregnancy test positive: consider miscarriage, ectopic pregnancy or molar pregnancy.
- Pregnancy test negative: consider pelvic inflammatory disease (PID), torsion of an ovarian cyst, acute appendicitis.

Safe miscarriages are those unlikely to have a serious adverse outcome to the patient. Unsafe miscarriages are more likely when done illegally or where existing conditions makes it likely for the women to develop sepsis.

Figure 6.1: Problems associated with vaginal bleeding



MISCARRIAGE

Safe miscarriage
Normal vital signs:
<ul style="list-style-type: none"> • Pulse rate <90 beats per minute • Respiratory rate <20 breaths per minute • Temperature <37.5°Celsius • Haemoglobin ≥10g/dl
Uterus <12 weeks in size
Products of conception not foul smelling
No clinical signs of infection
No suspicious findings on evacuation of the uterus

Safe miscarriages can be managed at community health centres and district hospitals. If there is any abnormality among the criteria for safe miscarriage, stabilise and refer the patient to a district hospital with a 24-hour theatre available. If there is any organ dysfunction present, stabilise and refer urgently to a specialist facility.

Signs of organ dysfunction with miscarriage
Systolic blood pressure <90mmHg
Respiratory rate >24 breaths per minute
Oliguria (urine output <30mL for 2 hours despite fluid load)
Signs of tissue hypoperfusion:
<ul style="list-style-type: none"> • Altered mental status • Decreased capillary filling

Miscarriage is a clinical diagnosis and ultrasound is not needed to make this diagnosis. If there is cervical bleeding and the cervical os is open with products palpable, the uterus must be evacuated.

THREATENING MISCARRIAGE

Mild bleeding in early pregnancy without cervical dilatation can indicate a threatening miscarriage. The uterus size corresponds to the expected gestation.

- Surgical treatment is usually not needed.
- Not necessary to admit patient to hospital.
- Advise the woman to avoid strenuous activity and any sexual activity.
- If bleeding stops, continue antenatal care as scheduled.
- If the bleeding continues, assess for fetal viability with ultrasound examination. This should be done by a skilled professional.

COMPLETE MISCARRIAGE

After a complete miscarriage the bleeding is usually mild and the cervical os closes. The uterus on palpation is smaller than expected for the gestational period.

- Medical treatment or surgical evacuation of the uterus is usually not needed.
- Advise the woman to report any continuous bleeding and make a booking for post-miscarriage follow-up.

INEVITABLE MISCARRIAGE

When a threatening miscarriage progresses, the volume of vaginal bleeding increases and the cervix dilates. This is usually associated with an increase of cramping lower abdominal pains.

In pregnancy less than 16 weeks gestation:

- Plan for evacuation of uterine contents.
- If evacuation is not immediately possible:
 - Give ergometrine 0.2 mg intramuscularly (repeated after 15 minutes if necessary) / Syntometrine®
OR
 - Misoprostol 400 µg by mouth (repeated once after four hours if necessary); then arrange for evacuation of uterus as soon as possible.

In pregnancy greater than 16 weeks:

Wait for spontaneous expulsion of the products of conception.

- If products are incomplete on inspection, evacuate the uterus to remove any remaining products of conception.
- If necessary, infuse oxytocin 20 units in 1 litre intravenous fluids (normal saline or Ringer's lactate) over 8 hours to help achieve expulsion of products of conception.
- Make sure the woman is booked for follow-up after treatment.

INCOMPLETE MISCARRIAGE

With an incomplete miscarriage, the cervix remains open, products of conception may be visible or felt, and the bleeding may be light or heavy. The uterus size does not correspond with the gestation.

In pregnancy less than 16 weeks:

- If the **bleeding is light**, remove visible products of conception with fingers or a ring forceps (swab holding forceps) and observe. If bleeding remains light, no further action will be required.
- If the **bleeding is heavy** after visible removal of products of conception the uterus must be evacuated.
 - Manual vacuum aspiration is the preferred method of evacuation if the uterine size is <12-14 weeks. (Sharp curettage should only be done if MVA is not available or possible).

- If evacuation is not immediately possible give ergometrine 0.2 mg IM or misoprostol 400 µg orally to reduce the risk of severe bleeding while arranging the evacuation.

In pregnancy greater than 16 weeks:

Later in the pregnancy, chances are better that complete spontaneous expulsion of the products of conception may occur.

- Set up an intravenous line and infuse oxytocin 20 units in 1 litre ringers lactate every 8 hours until expulsion of the products of conception occurs.
 - Misoprostol 200 µg orally four hourly may be given if the abortion does not progress on oxytocin (maximum 800 µg).
- After expulsion, examine the uterus and evacuate any remaining products of conception.

UNSAFE MISCARRIAGES

Unsafe miscarriages should not be managed at community health centres or district hospitals without appropriate operative facilities.

Any miscarriage with a significant **tachypnoea** (respiration rate above 24/minute) should be diagnosed as a **septic abortion/miscarriage** and must be **referred immediately to a specialist facility**. Commence with the standard sepsis miscarriage management protocol.

MANAGEMENT OF A SEPTIC MISCARRIAGE

Septic miscarriages should be managed at a specialist hospital; make immediate arrangements for the transfer and discuss with the receiving facility. Stabilise before referral as follows:

- Do a rapid assessment of the patient- circulation, airway and breathing.
- Insert an intravenous infusion and start rehydration with Ringer's lactate or normal saline.
- Prescribe antibiotics and give the first dose before transfer:
 - Ampicillin or Cephalosporin (usually 1 gram 6 hourly intravenously). Use Clindamycin (600 mg 8 hourly intravenously) as alternative for penicillin allergy.
 - Metronidazole 400 mg three times per day orally.
- Reduce the toxic load through surgical removal of source within 2-4 hours after commencing antibiotics.

Any miscarriage with a pulse rate exceeding the systolic blood pressure must be regarded as shocked and resuscitation must start immediately.

- If the patient is shocked (pulse rate > systolic blood pressure), determine if the shock is due to hypovolemia or sepsis:
 - Give 1 litre Ringer's lactate rapidly over 20 minutes in an attempt to raise the blood pressure levels and decrease the pulse rate.
 - If the blood pressure value increases and the pulse rate normalises, it is most likely hypovolemic shock due to haemorrhage. Continue resuscitation.

- If there is poor response (blood pressure values do not increase), repeat with another litre of Ringer's lactate.
- If there is still no response in spite of adequate fluid therapy, the patient is in septic shock.

All women in septic shock with organ dysfunction MUST be managed at a specialist hospital.

POST-MISCARRIAGE/ABORTION FOLLOW-UP

Women who have had a miscarriage must be provided with appropriate information.

- Inform her that spontaneous miscarriage is common and occurs in 1 out of every 7 pregnancies.
- Reassure her that the chances of a subsequent pregnancy being successful are good (unless the pregnancy was complicated by sepsis or a recurrent cause for the miscarriage has been identified).
- Women should only consider a next pregnancy after full recovery from the miscarriage.

Women who have had an unsafe miscarriage must be counselled regarding the factors that affected her pregnancy, and how to prevent this in future. Appropriate counselling must be done for family planning and the methods available to her.

- Hormonal pills, injections, implants as well as intrauterine devices and tubal ligation may be provided immediately.
- Implants, intrauterine devices and surgery should be delayed if:
 - Infection is present or suspected. Delay until such infection is cleared.
 - Severe anaemia (Hb <7g/dL). Delay until anaemia has improved.

Screen for other health problems and correct if needed:

- Anaemia.
- Rh factor (if unknown) and Rh prophylaxis if Rh negative.
- Sexually transmitted diseases (including HIV). All women must be offered HIV counselling and testing.
- Ask patient to return for a Pap smear.

Management of miscarriages is based on treating the underlying pathology and to prevent further complications. This is done irrespective of the cause of the miscarriage, either spontaneous or induced.

Management of miscarriages is one of the key signal functions that should be rendered at any of the basic or comprehensive emergency obstetric care centres.

MANUAL VACUUM ASPIRATION TECHNIQUE

Manual Vacuum Aspirations (MVA) is the best technique for the removal of products of conception in women with incomplete abortions, inevitable abortions prior to 16 weeks gestation, molar pregnancies or delayed post-partum haemorrhage due to retained placental fragments.

Advantages of MVA:

- Can be done as an out-patient procedure.
- Does not require anaesthesia or an operation theatre.
- Significantly reduces blood loss and the need for blood transfusion.

Initial steps:

- Inform the patient of the diagnosis and treatment options.
- Obtain informed written consent.
- The patient must empty her bladder just before the procedure.
- Provide emotional support and encouragement.
- Provide pre-procedure analgesics: Paracetamol 500 mg 30 min before the procedure.

When starting the procedure:

- Make sure the bladder is empty.
- Prepare a Karman syringe with the vacuum by locking the plunger arms.
- Give the patient 10 units oxytocin intramuscularly to make the myometrium firmer.
- Perform a bimanual examination to assess the size and position of the uterus.
- Insert a vaginal speculum and clean the vagina and cervix with an antiseptic solution (water based).
- Check the cervix for tears or products of conception. (If products are visible, remove with a sponge holding forceps).
- Gently grasp the anterior lip of the cervix with sponge holding forceps.
- Gently introduce the widest gauge suction cannula through cervical os, push the cannula into uterine cavity until it touches the fundus (max 10 cm) and pull back slightly.
- Attach the MVA syringe to the cannula and release the valves to transfer vacuum to the uterine cavity.
- Evacuate uterine contents by gently rotating the syringe and moving the cannula backward and forward.
- Check for signs of completion:
 - Red or pink foam but no more tissues
 - A grating sensation.
 - Uterus contracts around the cannula.
- Withdraw the cannula. Empty contents of the syringe into a strainer.
- Remove the speculum and perform bimanual examination to check the uterus size and firmness.

Note: The absence of products of conception raises a strong possibility of an ectopic pregnancy.

Post procedure care

- Give analgesia (Paracetamol 1 g 6 hourly orally as needed).
- Encourage the woman to eat, drink and walk around as she wishes.
- Offer other health services before discharge:
 - Family planning
 - HIV and syphilis testing and counselling
 - Rh blood group screen if not known

Discharge the patient in 1-2 hours if there are no complications and advise her to watch for symptoms that would require immediate action. Ask the patient to return if she experiences:

- Prolonged cramping (more than 2 days).
- Prolonged bleeding (more than 2 weeks).
- Bleeding more than a menstruation.
- Severe or increasing pain.
- Fever, chills or malaise.
- Fainting.

It is important to carefully document all actions, procedures and observations.

Be aware of illegal practices in the community of providing misoprostol to pregnant women to terminate pregnancies. All women should be advised of such practices and risks associated with inappropriate use of misoprostol.

ECTOPIC PREGNANCY

A woman with a positive pregnancy test and an acute abdomen mostly likely has a ruptured ectopic pregnancy. This is a surgical emergency and the patient must be taken to the operating theatre immediately for explorative laparotomy. Order blood, but do not wait for the blood to arrive before doing the laparotomy. Ultrasound may assist with the diagnosis, especially if it shows an empty uterus and free fluid in the abdomen, but with an acute abdomen the investigation of choice is surgery. If ultrasound and serum beta-HCG is not available and the diagnosis is doubtful, a culdocentesis may be of value; if non-clotting blood is obtained, start treatment immediately.

Surgical management of a ruptured ectopic pregnancy

- Do adequate fluid resuscitation on the way to theatre, but do not delay surgery to try and correct the fluid balance first- see anaesthetic notes. The woman is bleeding actively and unless you stop the bleeding surgically, she will die.
- Do a midline (up-and-down) incision in the abdomen, as there may be other unexpected pathology. A Pfannenstiel incision allows very limited exposure and should only be used for elective surgery or if the site of the ectopic pregnancy can be clearly identified on ultrasound.
- Be careful not to damage the bowel when opening the peritoneum as the bowel will be pushed against the peritoneum by the blood clots in the abdomen.
- Use a large suction and your hand to remove as much blood clots as possible to quickly visualise the tubes; if there is too much blood put your hand behind the uterus and feel on which side the ruptured tube is.
- Clasp the ruptured tube between your fingers to temporarily stop the bleeding; then remove all the clots until you have good visibility.
- Identify both ovaries and make sure they are left intact (except if one is involved in the mass). Inspect the other tube and the uterus.
- If there is extensive damage to the tube, the surgery of choice is partial or total salpingectomy, removing the pregnancy and the tube at the same time.
- Apply clamps on both sides of the ectopic or ruptured tube with 45 degree angles to the tube, so that their points touch.

- Excise the ruptured part and then gently tie off each clamp, ensuring good haemostasis. Be careful not to damage or tear the very friable tissue below the tube, as it will cause more bleeding.
- As soon as haemostasis is obtained, remove all the remaining clots and rinse the abdomen with saline. Inspect the rest of the abdomen and remove all swabs. Inform the anaesthetist of the amount of blood loss.
- Close the abdomen. Do not do any additional surgery at this stage- the patient can be referred at a later stage for reconstructive tubal surgery if the fimbriae were not removed.
- In your notes, state which side was removed and how much, the condition of the remaining tube and of the ovaries, and if any additional pathology was present.

Anaesthetic management of an unstable ruptured ectopic pregnancy

- When a patient is too unstable for a referral to a specialist centre, but the anaesthetic skills to manage such an unstable patient are not available at the district hospital, the management of such a case is difficult.
- A spinal anaesthetic must **not** be administered, as the cardiovascular effects of such an anaesthetic **will** lead to severe shock and possibly death.
- Initial attempts to stabilise the patient to a suitable condition for transfer should be made. If the patient has not responded to 2 litres of Ringers Lactate then surgery will need to be performed urgently.
- Mobilise the most skilled practitioners available to assist with this case.
- Prepare theatre and all resuscitation equipment.
- Assess patient and the potential for a difficult airway.
- Monitor the patient with ECG, NIBP and Pulse oximeter.
- Pre-oxygenate with 100% oxygen anaesthesia.
- Induce anaesthesia by administering Etomidate 0.3 mg/kg intravenously or ketamine 2 mg/kg intravenously (provide cricoid pressure if the skills are available).
- Suxamethonium 100 mg intravenously can be given by practitioners confident of intubation.
- The trachea should be intubated.
- Capnography and agent analysis should be utilised (confirm position of the tube by capnograph trace, and auscultation of both axillae and over the stomach.)
- Ventilation should be provided at 12 breathes per minute and 400 mL tidal volume. Where possible PEEP of 5 cmH₂O should be applied.
- Isoflurane 0.3 to 1.0% should be titrated to provide anaesthesia.
- Muscle relaxation should be provided by giving Vecuronium 0.1 mg/kg (only after intubation and commencement of satisfactory ventilation).
- After the abdomen is opened and the bleeding controlled attempt further resuscitation with fluid and blood.
- Once the Systolic blood pressure is >100 mmHg, 1 mg IV morphine titration each five minutes can be commenced until 0.1 mg/kg has been given. Treat any resulting hypotension with further fluid and blood administration.
- Reverse the muscle relaxation with 2.5 mg of Neostigmine and 0.4 mg glycopyrrolate once spontaneous movement has been observed to occur.
- Discontinue the isoflurane and allow the patient to extubate herself.
- If the patient does not stabilise after clamping the abdominal bleeder and fluid resuscitation keep the patient intubated and ventilated for transport to a more specialised level of care.
- This method of anaesthesia will be associated with a high incidence of awareness. Counsel the patient with respect to this if it occurs.
- If the skills exist to provide more complete and effective anaesthesia this description should not be followed. However without appropriate training and skills providing a more potent anaesthetic combination to a shocked patient could result in harm.

A stable, unruptured ectopic can be referred to a specialist centre for medical or laparoscopic management, but it remains an urgent referral as the tube can rupture on the way.

Unruptured ectopic pregnancy	Ruptured ectopic pregnancy
Symptoms and signs of early pregnancy. Patient haemodynamically stable.	Haemodynamically unstable patient (low blood pressure, tachycardia, tachypnoea, collapse, weakness, pallor).
Abdominal and pelvic pain.	Acute abdominal and pelvic pain.
Tenderness with vaginal examination.	Abdominal distension.
	Rebound tenderness; marked cervical excitation tenderness.

If there is access to ultrasound and serum beta HCG (human chorionic gonadotrophin), it is much easier to diagnose doubtful, early and stable ectopic pregnancies:

- If the serum beta HCG is ≥ 1500 mIU/mL and the uterus is empty on ultrasound, there is a pregnancy of unknown location (ectopic) and further work-up and surgery is needed.
- If the serum beta HCG is < 1500 mIU/mL and the uterus is empty in an otherwise stable patient, it may be a very early normal pregnancy or an ectopic pregnancy. Keep the patient for observation and repeat the beta HCG 48 hours later.
 - If the beta HCG value doubles in 48 hours it is most likely an early intra-uterine pregnancy and ultrasound can be repeated in 2 weeks' time.
 - If the beta HCG value increase by less than $\frac{2}{3}$ rds it is most likely an ectopic pregnancy.
 - If the value decreases it may be possible to manage the patient conservatively or with medical management; discuss with your specialist referral hospital for further management.

7

BLOOD TRANSFUSION

Purpose of this Chapter

This chapter discusses the guidelines for ordering of blood and blood products, the process of managing transfusions in obstetric hemorrhage, and managing adverse effects from transfusion.

CHAPTER 7: BLOOD TRANSFUSION

In order to ensure the safety of blood transfusion, guidelines on ordering of blood and blood products should include:

- Preparation of the patient.
- Correct identification and verification of the patient and the blood unit.
- Correct aseptic technique.
- Careful observation of the patient.

REQUEST FOR BLOOD AND BLOOD PRODUCTS

- The form should be completed in full and must include the patient's identification, the name of the hospital, ward and area to which the blood needs to be delivered.

Specimen collection

- The doctor who orders blood is responsible for ensuring that the correct procedure is followed.
- Use a blood collection tube supplied or recommended by the blood bank.
- The label on the specimen tube must be completed in full at the patient's bedside.
- Please ensure that the label with patient's details is securely affixed to the blood specimen tube.
- The tube must be full of the blood specimen.
- Record the date and time the specimen was taken.
- Both the specimen and the 'Request for Blood or Blood Components' form must be signed.
- If special services are required the doctor must discuss his/her request with the blood bank prior to submitting the order, as some products are not stored at the blood bank and may need to be transported from the processing centre.
- Details of the blood order should be noted in the patient's records to ensure that the right blood is given to the right patient and to prevent duplication of services.

ORDERING PRIORITIES

Un-crossmatched blood

Note: Un-crossmatched blood must not be used unless there is acute life-threatening haemorrhage.

- Use only in dire emergencies.
- No compatibility testing as no blood specimen is provided. Blood group confirmed.
- Un-crossmatched group O blood is:
 - Issued within 5-10 minutes from the Blood Bank.
 - Readily available from the Emergency Fridge. Be sure to complete the form, if this is not done the blood will not be replaced and the next patient will be compromised.
- This has a small risk that the patient may have an irregular antibody which may result in a haemolytic transfusion reaction.
- All units must be recorded in the patient records.

Emergency crossmatch

- A blood specimen is provided to the blood bank.
- Tested for ABO group, Rh type, and antibodies.
- Blood is available within 20-30 minutes.

- Small risk that patient may have irregular antibodies.
- All units must be recorded in the patient records.
- Weigh up the benefit against the risk when ordering blood on emergency.

Type and screen

- Tested for ABO and Rh groups.
- Screened for irregular antibodies and the doctor will be informed if there are irregular antibodies.
- Compatibility testing is done (blood is made available).
- Specimen will be retained for a period of 72 hours within which blood may be ordered.

Standard crossmatch

- Blood is fully crossmatched using standard compatibility testing methods.
- Blood is available in 2 hours from when the specimen arrives at blood bank.
- Compatibility problems will result in delays.
- An after-hours service levy is charged if blood is ordered after 18h00.
- Specimens will be retained for 72 hours and more blood can be ordered if the serum is enough.
- All units must be recorded in the patient records.

Crossmatch and hold

- This is a special request that should be communicated to the blood bank staff.
- Blood is fully cross matched and is kept on standby.
- Retained in the blood bank for 24 hours.
- Blood is available immediately when patient needs it.
- A cancellation levy is charged per unit cancelled.

Blood on Returnable Basis (BRB)

(Blood conservation)

- Blood is issued in a BRB hamper, the hamper has two compartments. Blood is stored with ice packs and temperature monitoring devices.
- The patient/hospital is only charged for blood transfused and credited for blood not used.
- These units can be returned to the blood bank within 12 hours of issue provided the hamper is still sealed.
- All units transfused must be recorded in the patient's records.

GUIDELINES ON THE MANAGEMENT OF ACUTE MODERATE/SEVERE TRANSFUSION RELATED ADVERSE EVENTS

Differential Diagnosis

- Haemolytic Transfusion Reaction.
- Anaphylaxis.
- Transfusion Related Acute Lung Injury (TRALI).
- Transfusion associated circulatory overload (TACO).

Management

- Stop the transfusion.
- Change the transfusion set.
- Check for identification errors.

- Visual check for haemolysis.
- Notify the blood bank.
- Repeat patient's ABO
- Send blood unit with giving set to the blood bank.
- Bloods for FBC, U&E and LFT.
- Maintain intravascular volume with crystalloid/colloid solutions.
- Strict input/output.
- Refer the patient for specialist attention as management will need high/ICU care.
- If anaphylaxis is suspected give O₂, adrenaline, and steroids.

HYPERTENSIVE DISORDERS IN PREGNANCY

Purpose of this Chapter

This chapter provides definitions and classifications of hypertension in pregnancy, identifies those at risk, and provides advice for the treatment and management of various hypertension disorders at different health facilities.

CHAPTER 8: HYPERTENSIVE DISORDERS IN PREGNANCY

Hypertensive disorders are one of the most common direct causes of maternal mortality and are responsible for significant perinatal and maternal morbidity. These disorders include chronic hypertension, pre-eclampsia, eclampsia and HELLP Syndrome. Early detection and timely intervention is essential to prevent maternal and perinatal complications.

The exact cause of pre-eclampsia is unknown, therefore there is no effective method of treatment and the only known cure is delivery of the baby. Early detection and treatment of the hypertension until fetal viability and timely delivery will result in reducing death and morbidity from complications associated with pre-eclampsia.

DEFINITIONS

Hypertension
A <u>diastolic</u> blood pressure ≥ 90 mmHg but < 110 mmHg on two occasions, taken at least 2 hours apart, <u>or</u> a single diastolic measurement of ≥ 110 mmHg
AND/OR
A <u>systolic</u> blood pressure ≥ 140 mmHg but < 160 mmHg on two occasions, taken at least 2 hours apart, <u>or</u> a single systolic measurement of ≥ 160 mmHg. A raised systolic pressure is indicative of hypertension - even in the absence of a raised diastolic blood pressure.
Acute severe hypertension
A medical emergency and is defined as a systolic BP ≥ 160 mmHg and/or diastolic BP ≥ 110 mmHg.
Significant proteinuria
The presence of 1+ or more proteinuria on a test strip (dipstick) in a clean catch urine specimen on 2 occasions, at least 2 hours apart. Test for proteinuria in all antenatal patients using bed side tests.

CLASSIFICATION

Chronic Hypertension
Hypertension that is present before 20 weeks of gestation or if the woman was already taking antihypertensive medication before the pregnancy.
Gestational Hypertension
New onset of hypertension presenting only after 20 weeks of gestation without significant proteinuria.
Pre-eclampsia
Hypertension with significant proteinuria developing for the first time after 20 weeks of gestation.
Pre-eclampsia can also be superimposed on chronic hypertension - evidenced by the new onset of persistent proteinuria in a woman who had an initial diagnosis of chronic hypertension.
<ul style="list-style-type: none">• Mild to moderate pre-eclampsia: a diastolic BP of 90-109 mm Hg and/or systolic blood pressures of 140-159 mm Hg, with $\geq 1+$ proteinuria; and no organ dysfunction.• Severe pre-eclampsia:<ul style="list-style-type: none">○ Acute severe hypertension (diastolic BP of ≥ 110 mmHg and/or systolic of greater than 160 mm Hg) with $\geq 1+$ proteinuria

OR

- Hypertension and/or proteinuria (any degree) with signs of organ dysfunction (platelets <100 000/ μ l; creatinine or liver enzymes (ALT) more than double the normal values; or neurological signs like persistent headache, visual disturbances and dizziness)

Unclassified hypertension

Can be any of the above, but in a patient who only booked after 20 weeks so accurate classification difficult.

Significant proteinuria without hypertension

Can be chronic (prior- or HIV related kidney problems) or new (which may be the first sign of developing pre-eclampsia).

Imminent eclampsia

Symptoms and signs that characterise severe pre-eclamptic women, i.e. severe persistent headache, visual disturbances, epigastric pain, hyper-reflexia, clonus, dizziness and fainting, or vomiting.

Eclampsia

Generalised tonic-clonic seizures after 20 weeks of pregnancy and within 7 days after delivery, associated with hypertension and proteinuria.

HELLP syndrome

The presence of haemolysis, elevated liver enzymes and low platelets, almost always in association with hypertension and proteinuria

HOW TO TAKE BLOOD PRESSURE IN PREGNANCY

Be aware that increases in BP levels of >30 mm Hg systolic and /or a rise in the diastolic of more than 15 mm Hg over BP values taken at the first booking visit may indicate the development of hypertension; even if the blood pressure is not yet in the hypertensive range.

The presence of proteinuria without evidence of hypertension is a mandatory indication for a clean catch urine specimen to be sent for investigation of urinary infection. In this circumstance the women should return for antenatal care within a week.

Hypertension may be mild prior to delivery but rise significantly following delivery.

Low platelet counts may decrease further in the first 48-72 hours after delivery.

- Use correct cuff size (length of 1.5 times the circumference of the arm)
- Use obese cuff (15x33 cm) if the middle upper arm circumference is > 33 cm
- Patient may sit or lie on her side – never flat on her back!

- Cuff should be on the level of the heart during measurement
- Measure the diastolic blood pressure at the point where the sounds disappear (Korotkoff phase 5). In patients where the sounds do not disappear, use the point of muffling (Korotkoff phase 4).

WOMEN AT RISK FOR THE DEVELOPMENT OF PRE-ECLAMPSIA

ANY pregnant women CAN develop pre-eclampsia. Those most susceptible are:

- Primigravidae, in particular teenagers and elderly primigravidae.
- Women of age 35 years and above.
- Women with a previous pregnancy complicated by pre-eclampsia.
- Women with a previous abruptio placentae or intra-uterine death.
- Women with multiple pregnancies.
- Medical complications such as chronic hypertension, renal disorders, diabetes, connective tissue disorders or antiphospholipid syndrome.
- Women who develop oedema in the mid trimester or have excessive weight gain.

Most health facilities have non-invasive blood pressure (NIBP) monitors for the measurement of blood pressure levels. Ensure that these machines are calibrated at regular intervals (every 3 months).

A mercury BP machine should be kept in every facility for calibration.

Ensure that you have two cuff sizes - normal and obese.

Women, their families and the community must be made aware of the dangers of hypertensive disorders in pregnancy and specifically informed of the early symptoms and signs of the onset of pre-eclampsia.

Such information should be disseminated to communities by the primary health care nurse and by all maternity care health professionals to pregnant women at every antenatal visit. This information can be disseminated through group sessions and pictorial charts illustrating swollen feet, symptoms of persistent headaches, visual disturbances and nausea and vomiting.

THE ROLE OF DISTRICT HOSPITALS IN MANAGING HYPERTENSIVE DISORDERS IN PREGNANCY

DISTRICT HOSPITALS

District hospitals should be able to manage women with gestational hypertension and women with mild to moderate pre-eclampsia. Staff at district hospitals should stabilise and refer patients with acute severe hypertension, severe pre-eclampsia, imminent eclampsia or eclampsia; to a specialist centre.

Patients can be stabilised by judiciously lowering high blood pressure, instituting emergency obstetric care and transferring the patient (following telephonic contact) to a specialist hospital (management should follow ESMOE-EOST training packages).

ACTIONS TO TAKE IF THERE IS A RISE IN BLOOD PRESSURE FROM A PREVIOUS VISIT

If the patient still has normal blood pressure, but there was a rise in systolic or diastolic of 30 mmHg or 15 mmHg since booking, ensure she is given an appointment to return in 3 to 5 days to repeat blood pressure measurement. Also, ensure that the base hospital is contacted with respect to further management.

MEASURES TO PREVENT PRE-ECLAMPSIA

The following may help to reduce the chance of a women getting pre-eclampsia:

- Calcium supplementation to all pregnant women - 1 g elemental calcium in divided doses daily, e.g. calcium carbonate (168 mg) 2 tablets orally, 3 times daily with food. This is best taken 4 hours before or after iron supplements.
- Low dose aspirin (75 mg; or a quarter of a standard tablet) taken daily from the 12th week of pregnancy until 34 weeks gestational age. Normally prescribed for those who have had a previous pregnancy loss due to severe pre-eclampsia or abruptio placenta. These women must be managed at a regional hospital by a specialist or by shared care with a district hospital.

HOW TO MANAGE HYPERTENSION IN PREGNANCY

GESTATIONAL HYPERTENSION

If gestational hypertension is diagnosed at a community clinic, the advice of an experienced doctor should be obtained to establish if any immediate treatment and investigations are required and as to the timing of referral.

- Check for proteinuria, oedema and increased weight gain.
- Ask again about family history of hypertension, history of hypertension in previous pregnancy, previous stillbirths, neonatal deaths, bleeding in previous or index pregnancy and any symptoms of persistent headache.
- Take a dietary history and advise appropriately
- Such patients should be referred to a district hospital within 3 - 5 days.

At the district hospital all patients should be re-assessed to confirm the diagnosis of gestational hypertension (NO proteinuria), or to see if pre-eclampsia has developed in the meantime. If the diagnosis of gestational hypertension is confirmed:

- Do an ultrasound assessment of the fetus in respect of gestational age or estimated fetal weight (if no previous dating ultrasound available).
- Test for fetal well-being with an umbilical artery Doppler test (if available).
- If the baby is viable (≥ 28 weeks), an antenatal CTG should also be carried out and fetal movement charts initiated (see figure 8.1, page 92).
- If the dipstick tests for proteinuria are doubtful, do a 24-hour protein collection to exclude pre-eclampsia.

Blood pressure in pregnancy should be controlled at values of 135-140 mmHg systolic and 85-90 mmHg diastolic. Lowering the blood pressure further than this will compromise the baby. The patient may require antihypertensive therapy but this should be based on the individual case.

- If needed, start anti-hypertensive treatment with methyldopa 1g orally; followed by 500 mg 8 hourly; orally. If the patient is less than 40 weeks, then outpatient management can occur at the antenatal clinic on a weekly basis and she can be seen by the same experienced doctor or midwife. Most of these cases will have a good maternal and perinatal outcome but some may develop pre- eclampsia.

If a woman with gestational hypertension develop proteinuria, increasing weight gain or there are decreased fetal movements, then she should be re-assessed and referred if needed. Delivery should be strongly considered at term (39-40 weeks) gestation if mother and fetus remain well.

MILD TO MODERATE PRE-ECLAMPSIA

Once labelled as stable mild to moderate pre-eclampsia:

- Prescribe methyldopa 1g stat and 500 mg 8 hourly and phone the district hospital for referral. Referral should be the same day or the next day, especially if the patient is ≥ 34 weeks gestation.
- At the district hospital, all patients should have an ultrasound assessment of the fetus in respect of gestational age or estimated fetal weight (if no previous dating ultrasound available).
- Test for fetal well-being with an umbilical artery Doppler test (if available).
- If the baby is viable (≥ 28 weeks), an antenatal CTG should also be carried out and fetal movement charts initiated.
- Confirm the diagnosis of mild to moderate pre-eclampsia with a 24 hour protein collection, except if there is persistent proteinuria $\geq 1+$ on the dipsticks.
- With confirmed significant proteinuria (≥ 0.3 g/24 hour or persistent $\geq 1+$), do a platelet count, serum creatinine and serum ALT and LDH.

If the patient remains stable, she should be managed as an in-patient until 36 weeks, when delivery (induction of labour) is strongly advised.

- Do weekly platelet counts and twice daily CTGs.
- Remember to keep plotting the growth of the baby on the antenatal card every two weeks.
- Outpatient management can be individualised for the very reliable patient who lives close by.

Contact a specialist health facility for further management if any acute severe hypertension or imminent signs of eclampsia or organ dysfunction develop during her stay. These symptoms now indicate a diagnosis of severe pre-eclampsia.

SEVERE PRE-ECLAMPSIA OR IMMINENT ECLAMPSIA

The patient should be stabilised and have immediate priority transfer to a specialist hospital.

- Insert Foley catheter and plot urine output.
- Put up a drip and give RESTRICTED IV fluid – use a 200 mL Ringers lactate ensuring against fluid overload. Give 80 mL per hour.
- Initiate magnesium sulphate (MgSO_4) prophylaxis against the development of seizures. Dilute 4 ampoules (4 gram) in 200 mL Ringer Lactate and infuse over 20 minutes. If transfer will take longer than 4 hours, also give 5 g MgSO_4 deep intramuscularly in each buttock (a total dose of 14 g). For quick transfer (specialist centre close by) the 4 g IV is sufficient.
- Give 1 g alpha methyl dopa orally stat.
- If there is acute severe hypertension (blood pressure is >160 mm systolic or >110 mm diastolic) give nifedipine 10 mg orally to swallow (not buccally, not sublingually and not bitten).
- Repeat blood pressure measurement every half hourly until the ambulance arrives; a nurse should stay with the patient. If the blood pressure is still >160 mm systolic or >110 mm diastolic 30 minutes after nifedipine, a second dose of nifedipine can be given.
- Inform EMS and the specialist hospital of the urgency for referral. Inform the clinic manager of the case and any transport difficulties.
- Ensure that the patient is accompanied by an experienced nurse or well-trained paramedic to ensure that the MgSO_4 regimen is continued, that the patient is kept on her side and that complete records accompanies the patient and are handed over to the receiving health professional.

MANAGEMENT OF SEVERE PRE-ECLAMPSIA/IMMINENT ECLAMPSIA IN A DISTRICT HOSPITAL

All efforts should be made to transfer to specialist care immediately, as the mother or baby may need high care or ICU during the course of the disease. If transfer is not possible (e.g. mother very close to delivery) manage as follows:

- Blood pressure levels must be kept below 160 mmHg systolic and 110 mmHg diastolic with the use of nifedipine 10 mg orally.

- If there is still acute severe hypertension after 3 doses of nifedipine, the patient needs intravenous labetalol to control her blood pressure. This should preferably take place within a high care setting with invasive blood pressure monitoring. The dose of labetalol is 20 mg IV.
- If there is still acute severe hypertension after 10 minutes give a further 40 mg labetalol IV.
- Be aware of fluid balance and check the pulse rate, respiratory rate, and chest examination for signs of pulmonary oedema and urine output at each observation period.
- Be aware of a pre-eclamptic patient with respiratory rate >24/minute- examine the lungs carefully for pulmonary oedema.
- Continue observations following delivery in a high care area or designate a bed in which regular observations are done (blood pressure, pulse rate, respiratory rate, chest examination and fluid balance – use a colour coded observation chart/early warning chart). Observations should be done:
 - half hourly for 2 hours
 - then hourly for 4 hours
 - then 2 hourly for 8 hours
 - then 4 hourly
- MgSO₄ should be continued for up to 24 hours after delivery.
- The best mode of delivery for severe pre-eclampsia and eclampsia is vaginally and not a caesarean section. Anaesthesia for severe pre-eclampsia is complicated and should best be done by a specialist anaesthetist. If the patient is in labour or has a favourable cervix, there is no contraindication for vaginal delivery. **Always seek specialist advice.**

On admission of women with pre-eclampsia, ensure that a full history is obtained and a full clinical assessment is done. Special attention should be given to:

- Symptoms of imminent eclampsia
- Vaginal bleeding
- Severity of oedema
- Pallor and jaundice
- Heart and lung examination
- Precise measurement of the BP, to the nearest 2 mmHg
- A repeat BP measurement after 20 minutes
- Uterine tenderness, irritability, fetal size and liquor volume
- Assessment of the cervix for induction of labour

STEP-WISE MANAGEMENT OF ECLAMPSIA

- This is an emergency; shout for help and start with immediate stabilisation. The mother now gets preference.
- Turn patient on her side, extend her neck, suction the airways and insert an oral airway, if appropriate.
- Give O₂ by facemask.
- Initiate MgSO₄. Give a loading dose of 4 g MgSO₄ diluted in 200 mL Ringer's lactate or saline over 20 minutes to arrest the seizure and to prevent further seizures.
- Follow this with maintenance: 5 g MgSO₄ intramuscularly, deep into each buttock. Repeat with 5 g every 4 hours IM into alternative buttocks. Alternatively, if infusion pumps are available put 4 grams in 200 mL fluid and infuse at 50 mL/hour (instead of the IM doses) for maintenance.
- Lower high blood pressure with 1 g methyldopa + 500 mg 8 hourly orally. If systolic or diastolic > 160/110 mmHg, use Nifedipine as above.
- Occasionally the patient may be restless; in this instance give 1 mg of clonazepam (Rivotril®) IVI slowly. Do not use diazepam.

- Draw blood for haemoglobin, platelet count, creatinine, ALT and LDH.
- Assess the fetal condition ONLY once the mother is completely stable AND the platelet count is known. Rule out abruptio placenta or intra-uterine growth restriction. Do a CTG only if the baby is viable.
- Assess whether the patient is in labour, as women with eclampsia often go into spontaneous labour. In these circumstances, if vaginal delivery is not contraindicated, allow spontaneous vaginal delivery before transfer. However, ensure that there is no excessive bearing down and do not use syntometrine or ergometrine. Instead, use oxytocin 10 units intramuscularly for the active delivery of the placenta and for prevention of postpartum haemorrhage.
- Note that irrespective of an eclamptic's condition, advice must be obtained from an experienced obstetrician, and detailed notes made. If the patient is not in labour, and once the mother is stable, she must be transferred to a specialist level of care.
- Assess the general condition of the patient using the AVPU scale (whether the patient is Alert, responds to Verbal questions, responds to Pain, or is Unresponsive). The Glasgow Coma Scale is an alternative.
- The norm for patients with acute severe hypertension, imminent eclampsia or eclampsia is that their management should be at a specialist health care facility as soon as they are stable enough for transfer. Anaesthesia in woman with eclampsia is extremely complicated and should preferably be done by a specialist.

POSTPARTUM AND POSTNATAL CARE

- Women who develop threatening signs or eclampsia for the first time after delivery need referral to specialist care after stabilisation. Use MgSO₄ as above.
- Patients with hypertension during pregnancy need to stay in hospital after delivery until the blood pressure is well controlled (< 150/100 mmHg).
- Use nifedipine 10 mg orally as needed to manage acute severe hypertensive spikes.

Management of the asymptomatic patient who had isolated high blood pressures during labour only (no hypertension in the antenatal period and no significant proteinuria)

- Observe post-partum until the blood pressure settles (usually 1-3 days).
- If diastolic blood pressure repeatedly raised ≥ 110 mmHg OR the systolic blood pressure rises to >160 mmHg (treated with 10 mg doses of nifedipine), start on maintenance anti-hypertensive medication.
- If the systolic blood pressure is 140-150 mmHg and/or the diastolic blood pressure is 90-100 mmHg, treatment is not necessary. Observe patient for 24-48 hours and follow up at a district health service postnatal clinic within 3 days.
- The patient should return for care if she experiences persistent dizziness or headaches.

Patients who had gestational hypertension

- Preferably, stop the **methyldopa** after delivery (as it can exacerbate post-partum depression) and switch to other anti-hypertensive medication if needed.
- Confirm that the blood pressure is stable for 24-hours before discharge.
- Follow up at a district health service post-partum clinic within 3 days and again at 6 weeks post-partum, to evaluate the need for continuation of medication.
- If maintenance therapy is needed, provide a prescription for 4 weeks with discharge so that the client is without medication for two weeks when followed up at the 6 weeks visit. A good assessment can then be made as to whether she will need further workup for hypertension and chronic medication.
- If she was discharged on more than one drug to control the blood pressure, rather do a step-wise withdrawal of one drug at a time with more regular follow up, preferably at a specialist high-risk clinic.
- The patient should return for care if she experiences persistent dizziness or headaches.

Patients with chronic hypertension

- Can be changed to the drugs they used before pregnancy (if it is safe to use during lactation) and discharged as soon as they are stable.
- They can be followed up after 3 days and again after 6 weeks at the district health service postnatal clinic.

Patients with severe pre-eclampsia during pregnancy

- Follow the advice from the specialist centre (if transfer was not possible before delivery).
- The patient should be managed with anti-hypertensive medication after delivery and kept in hospital until blood pressure is controlled for 48-hours and all the biochemistry / organ systems are back to normal.
- Follow up 3 days after discharge at the nearest clinic and again at 6 weeks post- partum at a high-risk postnatal (specialist) clinic, to evaluate the need for continuation of medication.
- If there is good control with one drug only, provide a prescription for 4 weeks with discharge, so that the client is without medication for two weeks when followed up at the 6 weeks visit. A good assessment can then be made as to whether she will need further workup for hypertension and chronic medication.
- If she was discharged on more than one drug to control the blood pressure, rather do a step-wise withdrawal of one drug at a time with more regular follow up at a high-risk clinic.
- The patient should return for care immediately if she experiences persistent dizziness or headaches.

CHOICE OF DRUGS FOR POST-PARTUM HYPERTENSION

- A general approach would be to use the cheapest effective drug available at all levels of care and to adhere to the guidelines on hypertension outside of pregnancy, as the clients will be managed after the puerperium according to those guidelines.
- A first choice would thus be an ACE inhibitor (enalapril) at a dose of 5 mg in the morning, can be increased to 20 mg daily. (*If the patient's renal function is within normal limits.*)
- When a second drug is needed, add a calcium channel blocker (amlodipine) 5 mg daily and increase to 10 mg daily when needed.
- When a third drug is needed, use a beta blocker (atenolol) 50 mg daily. Can be increased to 100 mg daily if needed.
- Hydrochlorothiazide can be started as a first line drug in cases of chronic hypertension (12.5 mg daily, increase to 25 mg daily when needed).
- As with the prescription of any drug, check for contra-indications and possible drug interactions before prescription.

Most frequent causes of maternal deaths associated with hypertensive disorders

- **Cerebral haemorrhage** and severe cerebral oedema usually due to acute severe uncontrolled high blood pressure. Therefore lowering of very high blood pressure requires drugs which act fairly rapidly
 - Lower high blood pressure using Nifedipine or Labetalol in such circumstances. Methyl dopa should be used at the same time but its onset is variable and may take 12 to 24 hours to act
 - **Note** that Magnesium Sulphate is not antihypertensive, therefore rapid acting agents must be used to lower very high blood pressure over 2 hours to stabilise prior to transfer.
- **Pulmonary oedema** which may be due to iatrogenic fluid overload, therefore do not overload patients with IV fluids and closely monitor urine output and fluid intake.
- Be aware of **abruptio placentae** and **liver rupture** in cases of severe pre-eclampsia.
- **Renal impairment** and **acute renal failure** may occur following delivery therefore fluid balance monitoring is essential.

Figure 8.1: Fetal movement chart

Date	Time started	Movements in first hour	NB	Movements in second hour	NB
			If less than 4 movements in the first hour go on to the second hour and count again		If less than 4 movements in the second hour please go to your clinic for a further test

Purpose of this Chapter

This chapter discusses common problems in pregnancy, including: Intrauterine growth restriction, antepartum haemorrhage, multiple pregnancies, breech presentation and transverse lie, preterm labour, pre-labour rupture of the membranes, chorioamnionitis, prolonged pregnancy, vaginal birth after previous caesarean section (VBAC), rhesus incompatibility and poor obstetric history.

CHAPTER 9: PROBLEMS IN PREGNANCY

INTRAUTERINE GROWTH RESTRICTION

Intrauterine growth restriction (IUGR) refers to the failure of a fetus to achieve its growth potential. IUGR can be classified into two main groups:

- Symmetric - the head and body both show growth failure. This may result from genetic or chromosomal defects, intrauterine infection or exposure to teratogenic substances. Liquor volume is usually normal.
- Asymmetric - the head grows, but the body shows growth failure. This is usually associated with placental insufficiency. This may result from pre-eclampsia or vascular disease (as in diabetes or lupus). Liquor volume may be reduced.

Some fetuses may appear symmetrically growth impaired, but are normal small babies, or may be suspected to be small because of wrong pregnancy dates.

SCREENING

Identifying pregnant women at risk

- Hypertensive disorders
- History of previous IUGR or low birth weight babies
- History of previous abruptio placentae
- Substance abuse - smoking, alcohol, cocaine
- Vascular disease, e.g. lupus
- Previous history of abruptio placentae
- Poor nutrition/underweight
- Chronic infections including sexually transmitted infections

Serial measurement of symphysis-fundal height (SFH)

A measurement less than the 10th centile for gestational age (as noted on the antenatal SFH graph), or failure of SFH to increase on serial measurements, should raise suspicion of IUGR, and the mother should be referred for ultrasound assessment of the fetus.

Palpation

Features that suggest IUGR include palpation of a relatively large hard fetal head with a small body, engagement of the head before 37 weeks, reduced liquor volume, and an irritable uterus before 37 weeks. Such findings should lead to referral for ultrasound to exclude IUGR.

DIAGNOSIS

Ultrasound scanning, including Doppler flow studies, is used to make a diagnosis. If ultrasound facilities are not available, clinical assessment must be used, or the mother must be referred to a specialist health facility.

If symmetric IUGR is diagnosed:

- Exclude a cause, especially chromosomal and congenital defect, or congenital infection.
- Delivery is indicated at ≥ 37 weeks.
- Before 37 weeks, evaluate the fetus (by ultrasound) for abnormalities
 - If there are no fetal abnormalities, the mother can go home with a fetal movement chart (see figure 8.1, page 92) and return for reassessment after 2 weeks.
 - If an abnormality is found, manage accordingly.

If asymmetric IUGR is diagnosed:

- Identify the cause and manage accordingly. There is a high risk for sudden IUD and mothers should preferably be managed at specialist level.
- Delivery is indicated at ≥ 34 weeks.
- If dates or the diagnosis are uncertain, perform amniocentesis for fetal lung maturity testing (shake test or laboratory tests).
- At less than 34 weeks, admit to hospital for daily fetal movement counts (see figure 8.1, page 92) and CTGs at least twice weekly.
- Repeat ultrasound assessment after 2 weeks. Delivery is indicated if there is any evidence of fetal distress.

DELIVERY

During induction of labour for IUGR, monitor the fetus closely by CTG, because of a high risk of fetal distress. Caesarean section is recommended for delivery of small babies with severe asymmetric IUGR. If the estimated fetal weight is < 1500 g, transfer the mother to a specialist hospital for delivery.

ANTEPARTUM HAEMORRHAGE

Antepartum haemorrhage (APH) is defined as bleeding from the genital tract from 20 weeks of pregnancy up to delivery of the baby.

CAUSES

- Placental - abruptio placentae, placenta praevia, vasa praevia.
- Non-placental - vaginal and cervical lesions including cancer, cervical infections, trauma and decidual bleeding.
- Unknown - APH of unknown origin.

Note: All patients presenting with APH must be regarded as obstetric emergencies until properly assessed. Transfer urgently to hospital.

EMERGENCY MANAGEMENT

At a clinic or community health centre

- Start an intravenous infusion of Ringer-Lactate solution.
- If the mother is in shock, resuscitate with 1-2 L of Ringer-Lactate.

- Do not do a digital vaginal examination, unless placenta praevia has been excluded by a previous ultrasound scan.
- Transfer urgently from a clinic or community health centre to a specialist facility where 24 hour caesarean section services and adequate blood supply is available.

At the hospital

Re-evaluate the patient. If bleeding is mild

- Take blood for FBC and cross match.
- Do an ultrasound scan to help with the diagnosis.
- If placenta praevia is found, manage accordingly.
- If no placenta praevia, exclude a minor abruption by doing a full clinical examination and CTG.
 - Frequent uterine contractions (>5/10 minutes) suggests abruptio placentae.
 - If there is fetal distress and the baby is viable, deliver the woman by an emergency caesarean section.
- Do a speculum examination to exclude a local cause.
- Further management depends on the cause.

If bleeding is severe

Make a clinical diagnosis of whether abruptio or placenta praevia and manage according to the cause.

Figure 9.1: Distinction between abruptio placentae and placenta praevia

	Abruptio placentae	Placenta praevia
Patient	Often hypertensive. History of abdominal trauma	Often previous caesarean section.
Symptoms	Pain almost always present. Fetal movements may be absent or reduced.	Usually painless. Fetal movements usually normal.
Abdominal examination	Hard, tender uterus, large for expected dates.	Soft, nontender uterus, often with malpresentation or high presenting part.
Bleeding	Dark blood with clots, at times no external bleeding visible.	Bright red blood.
Ultrasound	Fetus may be dead, placenta normally situated. Retroplacental clot may be seen.	Placenta implanted close to or over the cervix.

MANAGEMENT OF PLACENTA PRAEVIA

- Continue resuscitation.
- Check Hb level and cross match.
- If less than 10 g/dL, commence blood transfusion and transfer urgently to a specialist hospital.

At the Specialist hospital

- Obtain consent for caesarean section and hysterectomy (should hysterectomy becomes necessary during the caesarean section).
- If the bleeding is significant, perform a caesarean section (supervised or done by an experienced doctor or specialist).
- If less than 36 weeks, and bleeding subsides, manage conservatively – keep in hospital, observe vital signs and give steroids and antibiotics. Deliver electively at 36 weeks.

MANAGEMENT OF ABRUPTIO PLACENTAE

Abruptio placentae is strongly associated with pre-eclampsia: the blood pressure may be low due to the presence of clinical shock but hypertension may manifest as soon as the patient is resuscitated. Proteinuria may be an indicator of underlying pre-eclampsia with abruptio placentae.

If the fetus is alive and viable

- If the fetal heart rate >100/minute as recorded on CTG, perform emergency caesarean section, unless delivery is imminent (cervix ≥ 9 cm dilated).
- For a non-viable baby, rupture the membranes and augment labour with oxytocin. Monitor blood loss carefully.

If the fetus is dead

- A dead fetus with abruptio placentae signifies massive blood loss. Resuscitate and transfer urgently to a specialist hospital. Rupture membranes as soon as possible, even if the cervix is unfavourable; before the ambulance arrives.

If transfer to a specialist hospital is not possible, manage as follows:

- Aim to deliver vaginally within 8 hours.
 - Take blood for cross-match, FBC, INR, PTT, and urea and creatinine.
 - Blood transfusion (2-4 units) is usually necessary, with 1-2 units of fresh frozen plasma.
 - Insert a central venous pressure (CVP) line through a cubital vein, if feasible.
 - Insert an indwelling urinary catheter and monitor hourly urine output.
 - Give fluids to maintain a systolic BP ≥ 100 mmHg, or a CVP of 6 cm H₂O.
 - If there is no progress of labour within one to two hours after AROM, augment with oxytocin if not contraindicated.
 - Give analgesia using morphine 5 mg IM 4 hourly if necessary.
 - Caesarean section is indicated if:
 - There is lack of progress despite oxytocin augmentation, life-threatening haemorrhage, ongoing DIC, or severe oliguria.
 - The patient is not near delivery after 8 hours.
- This is a high-risk procedure and must preferably be done in a specialist institution.**

Following delivery, there is a significant risk of complications

- Active management of the third stage is mandatory.
- In addition, add oxytocin 20 U in 1 L Ringer-Lactate immediately after delivery and observe for bleeding. Do not remove the IV line for at least 12 hours.
- Monitor vital signs hourly, and observe for postpartum haemorrhage for at least twelve hours.
- Check Hb, platelet count, urea and creatinine on the day after delivery.
- Be aware of complications (DIC, renal failure, pulmonary oedema) and take the necessary precautions.
- Provide psychological support and advice about contraception and future pregnancies.

If delivery occurred at a District hospital, transfer to a Specialist Facility if

- The woman also has severe pre-eclampsia or eclampsia.
- There is evidence of DIC - spontaneous bleeding from the mouth or puncture sites.
- Urine output is less than 30 mL/hour for more than 4 hours.
- There is pulmonary oedema.
- There is evidence of acute renal failure - increasing urea and creatinine levels.
- There is severe thrombocytopenia ($< 50,000/\text{mm}^3$).

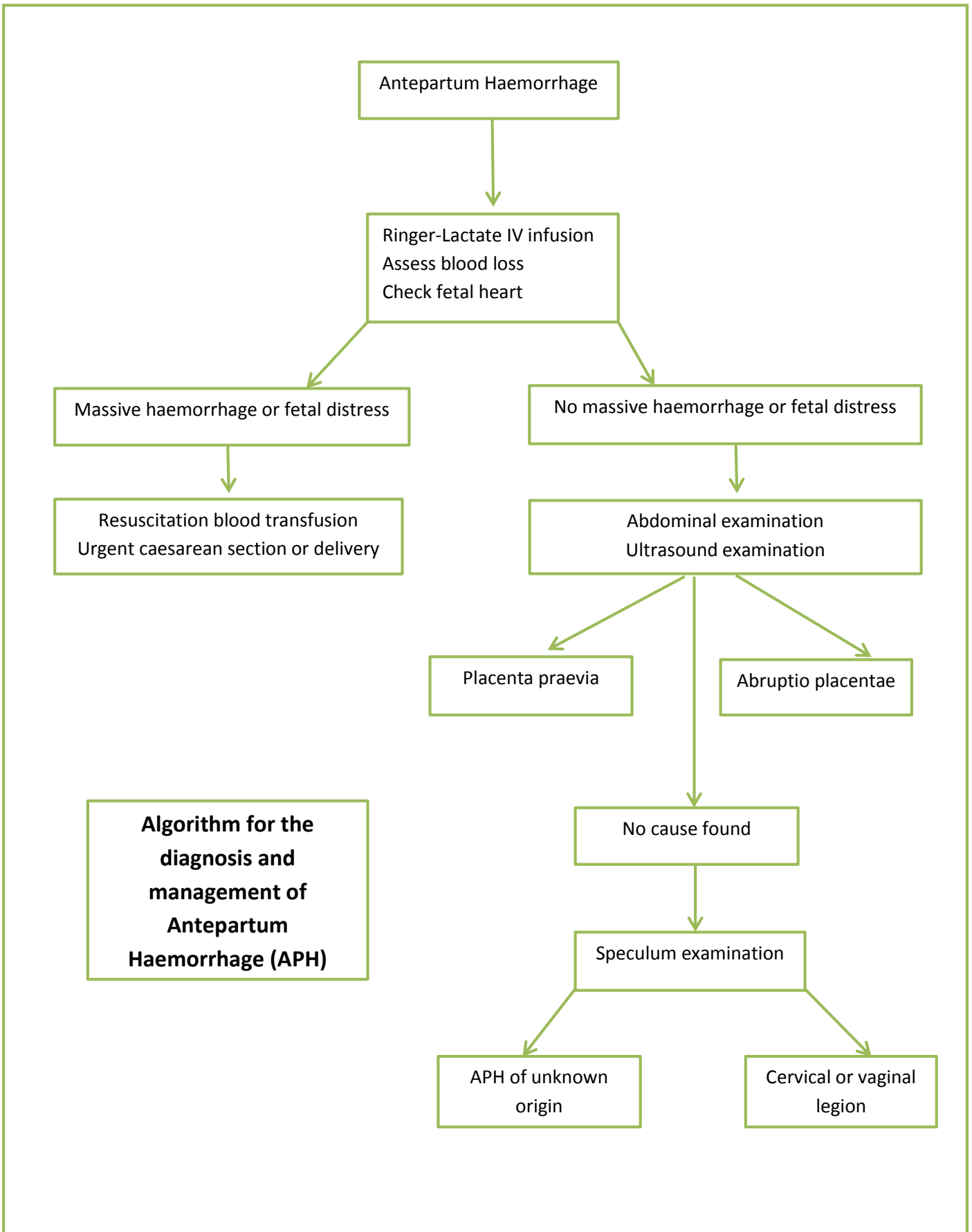
ANTEPARTUM HAEMORRHAGE OF UNKNOWN ORIGIN

This is a common problem in obstetrics, where there is no evidence of abruptio placentae, placenta praevia, or cervical or vaginal (local) causes.

- Admit the mother to hospital to exclude an abruptio that may not be clinically apparent.
- Do six hourly CTG until the bleeding stops; then daily CTG.
- Observe for symptoms and signs of abruptio placentae.
- Observe for any evidence of chorioamnionitis
- Discharge from hospital 24-48 hours after bleeding has stopped.
- Assess the cervix before discharge to excluded imminent preterm labour.
- Continue antenatal care at hospital, with attention to fetal growth and fetal movements.

See figure 9.2 below for the algorithm for the diagnosis and management of antepartum haemorrhage.

Figure 9.2 : Algorithm for the diagnosis and management of Antepartum Haemorrhage (APH)



MULTIPLE PREGNANCY

Multiple pregnancies are diagnosed most accurately by ultrasound examination. Where this is not routinely offered to all pregnant women, multiple pregnancy needs to be suspected on history and clinical examination. A family history of multiple pregnancies and history of ovulation induction should raise suspicion. Pregnancies with the following signs need referral for ultrasound assessment:

- Exaggerated symptoms of pregnancy
- Symphysis-fundal height >90th centile for gestational age (if no previous ultrasound)
- An unusually wide and round uterus
- Increased liquor volume
- More than 2 fetal poles felt
- Head feels smaller than expected for the uterine size

ANTENATAL MANAGEMENT

- All antenatal visits must take place at a hospital with level 2 sonography (see chapter 14); preferably at specialist hospital. Refer twins as early as possible to make a correct ultrasound diagnosis of chorionicity. Monochorionic pregnancies must be referred to a fetal medicine unit for further follow up.
- Warn the mother of possible complications: preterm labour, anaemia, hypertension and general discomfort.
- Scheduled visits are every 4 weeks to 28 weeks, then every 2 weeks to 36 weeks, and then weekly to delivery.
- Give ferrous sulphate tablets 200 mg orally twice daily and folic acid 5 mg orally daily to prevent anaemia.
- Ultrasound scan is done every 4 weeks from 28 weeks to follow fetal growth.
- Assess the cervix at each visit.

DELIVERY

All multiple pregnancies should be delivered in a hospital with ultrasound, 24 hour caesarean section and 24 hour neonatal facilities (preferably at specialist level).

Indications for elective caesarean section

- Triplets (or higher order pregnancy).
- Intrauterine growth restriction.
- First twin breech or transverse lie after 37 weeks.
- Previous caesarean section.

Principles of labour and delivery

- Treat preterm labour as for singleton pregnancies.
- Induction of labour is not contraindicated.
- Use a partogram for observing labour progress.
- Monitor both fetuses during labour with CTG.

Delivery

- The most experienced doctor/midwife in the unit must be present at (or conduct) the delivery, as well as an additional person to do fetal resuscitation.
- Deliver the first baby as for a singleton pregnancy, clamp the cord but do not administer IM oxytocin or attempt to deliver the placenta now.

- As soon as the first baby is delivered, check the fetal heart of the second fetus. If there is fetal distress, and delivery is not imminent, do a caesarean section.
- If there is no fetal distress, check the lie; and if the baby is not in a longitudinal lie, do external version to a longitudinal lie- whether breech or cephalic does not matter, turn whichever way is quickest and easiest to obtain a longitudinal lie. Administer salbutamol (see suppression of labour regime) to facilitate the version, if needed.
- Await the return of contractions and the descent of the presenting part into the pelvis. Do not rupture the membranes of the second baby before the presenting part is on the perineum.
- If there are poor or no contractions, and no fetal distress, oxytocin may be used for labour augmentation. Put 10-20 units oxytocin in 1L Ringer's lactate and titrate until there are 3 strong contractions.
- Wait until the presenting part has descended to the level of the ischial spines or below, then rupture the membranes.
- After excluding a possible third baby, do active management of the third stage and deliver the placentas.
- In addition, add 20 units of oxytocin to 1L Ringer-Lactate and infuse at 120-240 mL/hour, to prevent postpartum haemorrhage.

BREECH PRESENTATION AND TRANSVERSE LIE

Clinics and community health centres should refer a suspected breech presentation or transverse lie to hospital at 36 weeks gestation.

EXTERNAL CEPHALIC VERSION

External cephalic version (ECV) should be attempted on all normal singleton breech presentations from 36 weeks gestation, with the following precautions:

- Exclude contraindications, i.e. hypertension, scarred uterus, antepartum haemorrhage, or ruptured membranes.
- Only perform ECV in a hospital.
- Give Anti-D 100 micrograms IM to all rhesus-negative mothers after the procedure.
- Do not anaesthetise or sedate the mother.
- Use Salbutamol IV to relax the uterus if necessary.
- Never use excessive force.
- Perform CTG tracings before and after ECV, whether successful or not.
- Observe the mother for a few hours after the procedure for complications, i.e. labour, rupture of membranes, antepartum haemorrhage.

LABOUR AND DELIVERY

Management of a woman with breech presentation in early labour

- Transfer the mother from a clinic or community health centre to hospital.
- Exclude fetal abnormality or multiple pregnancies by ultrasound if necessary.
- Attempt external cephalic version if there are no contraindications.
- Estimate fetal weight and pelvic adequacy.
- Determine cervical dilatation and station of presenting part.
- Perform caesarean section unless suitable for vaginal delivery (see below).

Vaginal breech delivery

Elective caesarean section is the safest method of delivery for a primigravid woman with a breech presentation, if ECV is not successful. This should be done after 39 weeks, but before she goes into labour. Multigravid woman may prefer vaginal breech delivery, and some may arrive at hospital or at a community health centre in advanced labour. Vaginal breech delivery must be personally supervised by the most experienced person available.

Breech presentation suitable for vaginal delivery

- Mother understands and accepts vaginal delivery.
- Operator experienced and confident with vaginal breech delivery.
- No signs of pelvic contraction on clinical assessment.
- Estimated fetal weight less than 3.5 kg.
- Frank or complete breech.
- Presenting part at or below the level of ischial spines.
- Labour progress ≥ 1 cm per hour.

Dead and grossly abnormal babies, and those with estimated weight < 1 kg should preferably be delivered vaginally.

Technique of delivery

- Put the mother in lithotomy position.
- Cut an episiotomy after infiltration of the perineum with local anaesthetic.
- Encourage spontaneous breech delivery and only assist in keeping the fetal back facing upwards.
- For extended knees, assist by flexing at the knees and gently delivering each leg.
- After delivery of the trunk, allow the breech to hang, pull the cord down and cover the delivered parts with a cloth.
- As the scapulae appear, be ready to assist with delivery of the arms.
- Deliver the arms if necessary by running your fingers from the fetal back over the shoulder and sweeping the arms down in front of the chest, and then out.
- The neck will deliver up to the nape.
- Deliver the head by laying the fetus over the right forearm (right-handed midwife or doctor) and inserting the right middle finger into the baby's mouth, with the index and ring fingers supporting the cheek, to flex the head.
- Simultaneously, the left hand exerts suprapubic pressure to flex the head (Wigand-Martin method) or pushes directly onto the occiput to assist flexion (Mauriceau-Smellie-Veit method).
- Ease the baby out, with gentle traction, and continuous flexion as described.
- Should the fetal back face downwards after delivery of the arms, the head may be trapped. The best chance of delivery is to swing the fetus anteriorly over the maternal abdomen to flex the head.

TRANSVERSE LIE

Do an ultrasound scan to exclude a cause such as placenta praevia, congenital abnormalities, or multiple pregnancy. External version may be attempted from 37 weeks' gestation. Caesarean section is required if version fails to achieve a stable longitudinal lie.

Any woman presenting in labour with a transverse lie needs delivery by caesarean section by a specialist or experienced doctor. A classical or low vertical uterine incision should be considered.

PRETERM LABOUR

This is defined as the onset of labour after the gestation of ≥ 24 w0d and before 37 completed weeks (37 w0d) of pregnancy. Management depends on the gestational age and/or estimated fetal weight (by palpation or ultrasound).

The onset of labour is determined by:

- Documented regular uterine contractions (at least one every 10 min), **with**
- Documented cervical changes: Dilation of > 2 cm at internal os and cervix length ≤ 1 cm, **or**
- Documented rupture of membranes

Gestational age ≥ 34 weeks (or estimated fetal weight ≥ 2 kg if gestation unknown)

- Look for underlying causes of preterm labour, e.g. chorioamnionitis or other infections (with fever and tachycardia), or abruptio placentae.
- Manage labour as for term pregnancies. There is no need to transfer from a clinic or community health centre to a hospital.

Gestational age 26-33 weeks (or estimated fetal weight 800 g – 1999 g if gestation unknown)

- Transfer from a clinic or community health centre to a hospital*. Give tocolysis (single dose Nifedipine or IV salbutamol- see below) to suppress contractions during transfer.

At the hospital

- Look for a possible cause for the preterm labour- e.g. vaginal discharge or UTI; do urine MCS (before commencement of antibiotics).
- Run a CTG tracing.
- If there is evidence of abruptio placentae or chorioamnionitis, allow labour to proceed under close fetal monitoring with CTG, or consider caesarean section.
- If cervix ≥ 6 cm dilated and there are strong contractions, allow labour to proceed (but do not augment labour). Deliver the baby in a slow and gentle fashion, with an episiotomy if the perineum is very tight.
- If cervix < 6 cm dilated, continue tocolysis. Try and continue suppression of labour until 48 hours have passed since the first dose of β -methasone.
- Give ampicillin 2 g IV followed by 1 g IV 6 hourly and metronidazole 400 mg orally 3 times daily for 4 days (for penicillin allergy, substitute erythromycin 500 mg orally 4 times daily).
- Give steroids (preferably betamethasone 12 mg IM; repeated after 24 hours, or dexamethasone 4 mg (1 ampoule) 8 hourly for 48 hours (total dose of 24mg).
- The patient can be discharged if she was successfully suppressed [i.e. no contractions for 48 hours]. Repeat cervical assessment before discharge. Make good notes in the Maternity Case record and change her risk category to "high risk".
- Follow up in 1 week at a high-risk clinic; continue follow up until 34 weeks. Reassess patient for follow up at a CHC/MOU from 34 weeks onwards.

If the estimated fetal weight is < 1500 g, transfer the mother to a hospital with neonatal intensive care facilities (specialist hospital).

Gestational age < 26 weeks or estimated fetal weight < 900 g

- Transfer from a clinic or community health centre to hospital.
- Allow labour to proceed.
- If the baby is born alive, resuscitate actively and transfer it from a clinic or community health centre to hospital.

Tocolysis regimen

1. Calcium channel blocker: Short acting Nifedipine (Adalat®) to be used as 1st line treatment.
 - Dose: 30 mg loading dose orally (do not chew or take sublingually) and 20 mg 3 hours later. If there are still contractions, continue with 20 mg 6 hourly per os for 48 hours.
 - Contraindications: All cardiac diseases, hypotension and hypertensive diseases.
2. Prostaglandin synthetase inhibitor – Indomethacin (Indocid®)
 - To be used as second line treatment after Nifedipine, if initial tocolysis was not successful.
 - Dose: 100 mg rectal suppository 12 hourly for 3 doses.
 - Contraindications: pre-existing gastrointestinal ulcers/lesions, known allergy to NSAIDS, significant renal or hepatic impairment, sure gestation of ≥ 32 w0d (If unsure gestation an EFW ≥ 1500 g).
3. If at this stage tocolysis is not effective in stopping the contractions, the use of a beta 2 stimulant (Salbutamol) as an adjunct can be considered.
 - Salbutamol (Ventolin®) Dose: 250 μ g ($\frac{1}{2}$ of 500 μ g ampoule diluted in 20 mL saline) slowly IV as a single dose as soon as possible.

- Can continue with an infusion: 2 mg (4 ampoules) in 200 mL saline at 1 mL/minute and increase every 10 minutes by 1 mL/minute until maximum of 4 mL/minute or pulse >120 bpm.
- Contraindications include cardiac arrhythmias, maternal tachycardia (pulse > 110 bpm before treatment), all underlying cardiac and diabetic disease.
- NB! Salbutamol continuous infusions can only be started if the maternal monitoring can be done with continuous ECG and oxygen saturation monitoring. Increase salbutamol dosage until contractions is suppressed OR pulse rate 110-120 bpm maximum.

4. Contraindications for Tocolysis

- Mother does not consent to suppression
- Pathological or suspicious fetal heart rate pattern
- Lethal fetal anomaly
- Intra uterine fetal death
- Suspected chorioamnionitis (clinical signs of infection)
- Severe hypertensive conditions in pregnancy
- Abruptio Placentae
- Severe IUGR

5. There is no benefit in continuing suppression for longer than 48 hours.

PRELABOUR RUPTURE OF THE MEMBRANES

This is a rupture of the membranes before the onset of labour. The diagnosis must be confirmed by visual inspection, by speculum examination, pH testing of vaginal fluid or, if necessary, liquor volume assessment on ultrasound. Digital vaginal examination must be avoided. Management depends on gestational age and/or estimated fetal weight (by palpation or ultrasound).

Gestational age \geq 34 weeks or estimated fetal weight \geq 2 kg

- Transfer from a clinic or community health centre to hospital.
- Give ampicillin 1 g IV 6 hourly and metronidazole 400 mg orally 3 times daily.
- Allow labour to proceed.
- If the mother is not in labour within 12-24 hours, do CTG and induce labour with oxytocin or with oral misoprostol.
- Do not perform digital vaginal examinations until the patient has at least two hours of strong contractions and the head has engaged.

Gestational age 24-33 weeks or estimated fetal weight 600 g –1 999* g

- Transfer from a clinic or community health centre to hospital.
- Do not do digital vaginal examination as this may contribute to fetal infection.
- Give erythromycin 250 mg orally 4 times daily and metronidazole 400 mg orally 3 times daily for 7 days.
- Give steroids (preferably betamethasone 12 mg IM repeated after 24 hours, or dexamethasone 4 mg IM 8 hourly for 6 doses).
- Give tocolysis if contractions start in the first 24 hours after admission.
- Observe temperature, maternal heart rate, fetal heart rate, and pad checks 6 hourly.
- Do abdominal examination for tenderness; and CTG daily.
- Induce labour at 34 weeks (or EFW of 2 kg if unsure), or if there are any signs of chorioamnionitis.
- During labour, give ampicillin 2 g IV, followed by 1 g IV 6 hourly (to prevent beta haemolytic streptococcal infection).

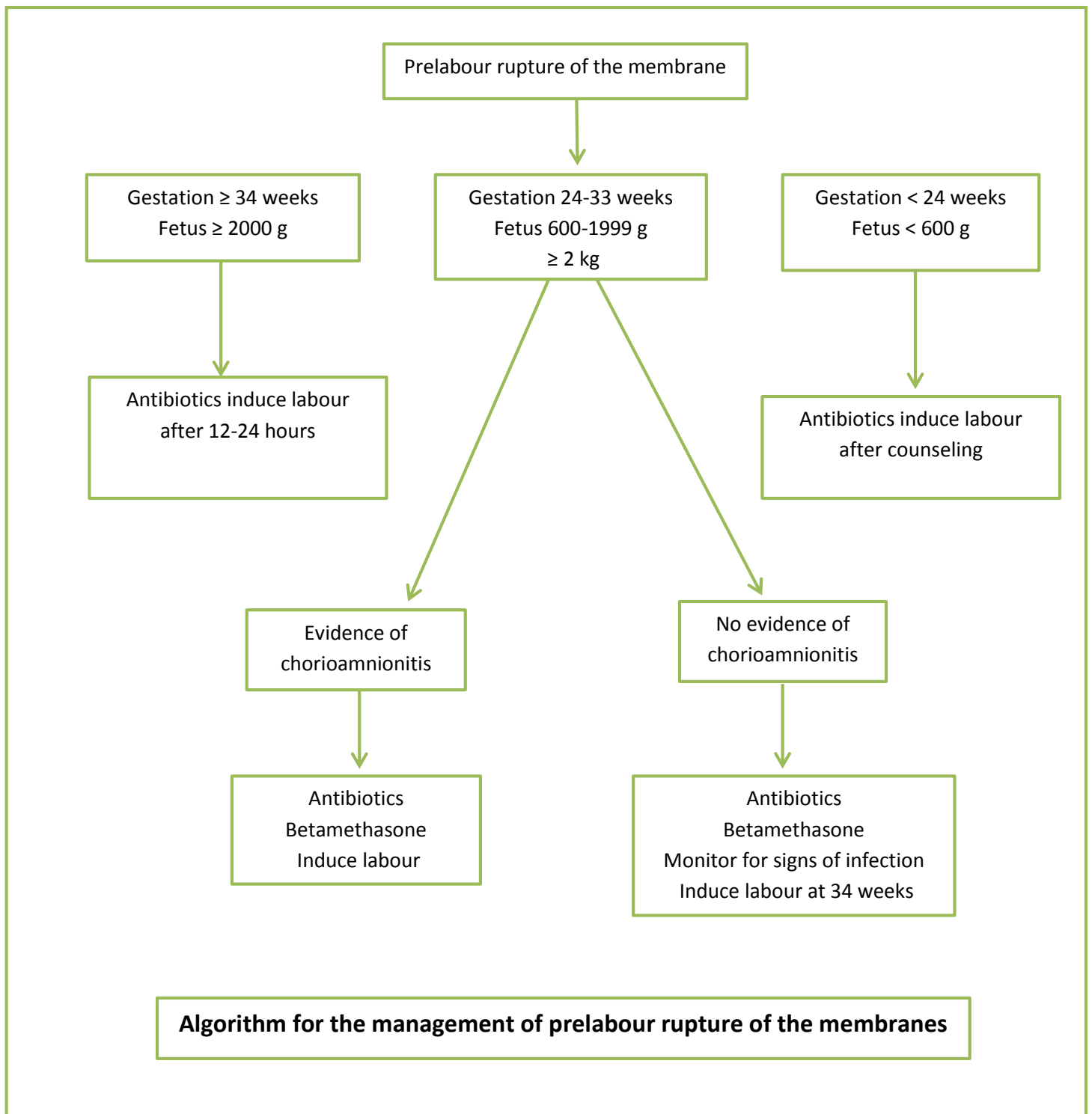
If delivery is expected for a baby of weight <1500 g, transfer the mother to a hospital with a neonatal intensive care unit, (level 2 or level 3).

Gestational age <24 weeks or estimated fetal weight <600 g

- Transfer from a clinic or community health centre to hospital.
- Ensure that the membranes have definitely ruptured (reduced liquor volume on ultrasound).
- Induce labour with oxytocin 10-20 units in 1L Ringer-lactate at 120 mL/hr, after counselling the mother appropriately.

See figure 9.3 below for the algorithm for the management of preterm labour and prelabour rupture of the membranes.

Figure 9.3: Algorithm for the management of prelabour rupture of the membranes



CHORIOAMNIONITIS

This infection (previously called intrauterine infection) may be associated with preterm labour, pre-labour or prolonged rupture of membranes, intrauterine death or antepartum haemorrhage of unknown origin.

Signs of chorioamnionitis include:

- Temperature ≥ 38 degrees Celsius.
- Maternal heart rate ≥ 100 /minute.
- Uterine tenderness and/or irritability.
- Fetal heart rate ≥ 160 /minute.
- Offensive liquor or meconium stained liquor.

Management

- Transfer from a clinic or community health centre to a district hospital (or specialist hospital if the gestation is below 32 weeks). Chorioamnionitis is an indication for delivery of the fetus.
- Give ampicillin 2 g IV followed by 1 g IV 6 hourly, with metronidazole 400 mg orally 3 times daily; if allergic to penicillin use Clindamycin, intravenously, 600 mg 8 hourly instead of ampicillin.
- Induce labour with a bulb (Foley Catheter), misoprostol or oxytocin if vaginal delivery is possible (see later-induction of labour). Try to avoid a Caesarean section as far as possible, but do it for the usual indications.
- During labour, monitor the fetus closely, with CTG if possible.
- Continue ampicillin (or Clindamycin) and metronidazole for 5 days after delivery.

PROLONGED PREGNANCY

DEFINITIONS

Prolonged pregnancy
Pregnancy exceeding 42 weeks (294 days).
Postdates pregnancy
Pregnancy exceeding the Estimated Date of Delivery (EDD).
Clinical (uncertain) prolonged pregnancy
Where the dates are unsure, and it is clinically estimated that the pregnancy exceeds 42 weeks.
Post maturity syndrome
When placental insufficiency has developed in a prolonged pregnancy.

The most serious associated problems with prolonged pregnancy are intrapartum related birth asphyxia, meconium aspiration, fetopelvic disproportion and postmaturity syndrome. The management is as follows:

- With certain gestation:
 - Pregnancy is induced beyond 41 weeks. Ensure that the gestational age has been correctly calculated.
 - At 41 certain weeks of gestation, stretch and sweep the membranes and refer the mother from a clinic or community health centre to a district hospital for induction of labour within the next 3 days.
 - During labour, monitor the fetus with CTG if possible.

- When the EDD is unsure, induction at a suspected 42 weeks is not advisable but careful fetal surveillance is done. Do a stretch and sweep of the membranes at every visit.
 - Fetal surveillance: do a weekly CTG and ultrasound amniotic fluid assessment.
 - Induce labour only once the largest deepest amniotic pool is ≤ 3 or the AFI ≤ 5 .
 - If ultrasound is not available, do a fetal lung maturity test.

INDUCTION OF LABOUR WITH A LIVE BABY

The most frequent indications for induction of labour at district level are post term pregnancy, hypertensive disorders and pre-labour rupture of membranes. Only induce labour in a hospital with 24 hour emergency operating theatre capacity. Elective delivery must only be done with a valid indication and beyond 39 weeks gestation (or with proven lung maturity if gestation is unsure and the indication valid).

Contra-indications for induction of delivery at a district hospital

- Placenta praevia.
- Transverse lie persisting after attempted version.
- Breech presentation.
- Fetal distress.
- Previous caesarean section.
- Parity ≥ 5 .

Approach to induction of labour

- Confirm the indication.
- Examine the mother carefully to confirm gestational age and presentation.
- Assess the Bishop score- use the table and assign points for a total score.
- Perform a pre-induction CTG.

If all prerequisites are fulfilled, and the pre-induction CTG is normal; induction of labour can be performed using one of the available methods.

The Bishop score for cervical assessment

Points given:	0	1	2	3
Cervical dilatation (cm)	<1	1-2	2-4	>4
Cervical length (cm)	>4	2-4	1-2	<1
Station	-3	-2	-1/0	Engaged
Cervical consistency	Firm	Average	Soft	
Cervical position	Posterior	Mid-position	Anterior	

Cervix favourable: (Bishop score ≥ 9)

- If HIV negative, (or HIV positive on HAART >4 weeks/ or with recent undetectable viral load)- rupture the membranes; and start oxytocin if there are not adequate contractions within 2 hours.
- If HIV positive and viral load unknown, or on HAART for <4 weeks; start oxytocin with membranes intact, or use misoprostol.

Cervix unfavourable: (Bishop < 9)

- Mechanical cervical dilatation (Bulb induction) is the first line of induction agent:
 - Pass a sterile Foley catheter (F16-18, with a 30 mL balloon) through the internal cervical os, during a sterile speculum exam or with vaginal examination; and inflate it with 30-50 mL of water.
 - Put it on gentle traction against the cervix by strapping the catheter to the thigh. To maintain gentle traction, periodic repositioning of the distal tip on the thigh may be necessary. Alternatively, it can be put on traction with a piece of string suspended over the foot end of the bed with 2x200 mL bags of fluid used as counterweight.
 - As soon as the bulb is expelled, do ROM or start oxytocin.
 - The induction can be expedited by doing extra-amniotic saline infusion (EASI) through the catheter- consider if the induction is urgent or catheter expulsion has not occurred after 4-6 hours:
 - Infuse an initial 200 mL saline bolus at room temperature through the catheter into the extra-amniotic space.
 - Continue with saline 40-50 mLs/h through the intra-cervical catheter.
 - Do not exceed 2 litres in total.
 - Bulb induction should preferably not be done for patients with overt lower genital tract infection, severe immuno-compromised patients/AIDS or patients with ruptured membranes (cover with antibiotics if no other induction method feasible).
- Misoprostol is not registered for use in labour in South Africa, but its use has been extensively studied and the WHO recommends a low dose (20-25 microgram) orally 2 hourly for induction of labour. The titration method is less labour intensive, and CTG is required once the woman is in labour.

Misoprostol regimen (parity < 5; live baby, no previous surgery on the uterus).

- The maximum oral dose is 20 ug 2 hourly for 24 hours. Administer as follows:
 - Add a single 200 microgram tablet of misoprostol to a bottle of 200 mL tap water.
 - Shake the bottle well until the tablet has dissolved. Discard unused solution after 24 hours.
 - Give 20 mL of the solution orally every 2 hours, for 24 hours.
- As soon as the woman reports painful contractions, do a vaginal examination and a CTG. If she is in established labour, stop the misoprostol.
- If there are no contractions in 24 hours, repeat the Bishop score and act accordingly (bulb, oxytocin or rupture of membranes if ≥ 9 ; if < 9 repeat misoprostol). Do not give oxytocin less than 6 hours after giving misoprostol.
- Do not repeat the misoprostol course more than twice.
- If there are no cervical changes after 2 courses of misoprostol, review the indication for induction.
- Do a Caesarean section for failed induction only if all the methods above have failed.

VAGINAL BIRTH AFTER PREVIOUS CAESAREAN SECTION (VBAC)

Antenatal care for a woman with one previous CS may be conducted at a clinic or community health centre, but labour must be managed in hospital with continuous CTG and 24 hour theatre facilities. A doctor should see the mother at the first antenatal visit (to review the history) and again at 36 weeks (to plan the mode of delivery). Women with a previous caesarean section are at risk for ruptured uterus during labour. The woman must have reliable transport if she chooses to VBAC; or stay in a maternity waiting home close to the hospital to await the onset of labour.

Indications for elective repeat caesarean section

- A previous vertical uterine incision (classical scar or any scar that extends into upper segment).
- Previous ruptured uterus.
- Previous caesarean section for a very preterm baby where the type of incision is unknown.

- Two or more previous caesarean sections.
- Where the mother requests and elective CS after appropriate counselling.
- Other obstetric problems, e.g. multiple pregnancy, breech, transverse lie.
- An estimated fetal weight >3500 g or a SF of 40 cm or more at term. (This may indicate a large baby and one should be very cautious to allow VBAC).
- Maternal BMI > 40

Management of vaginal birth after caesarean section (VBAC)

Management is similar to normal labour with the following precautions:

- Exclude all the contraindications for VBAC listed above.
- Conduct labour in a hospital that can perform caesarean section on a 24-hour basis.
- Run an intravenous drip with Ringer's lactate solution at 80-120 mL/hour and pass a urinary catheter to monitor urinary excretion.
- Monitor with continuous CTG.
- Always use a partogram (do 2 hourly vaginal examinations once in active labour) and intervene timeously.
- Do not augment labour with oxytocin.
- Observe carefully for signs of imminent uterine rupture and do an emergency Caesarean section immediately if rupture is suspected (any of the following signs):
 - Fetal tachycardia or fetal heart rate decelerations.
 - Significant vaginal bleeding.
 - Macroscopic haematuria.
 - Strong abdominal pain between contractions.
 - Sudden cessation of contractions.

Indications for emergency caesarean section at attempted VBAC:

- The latent phase of labour exceeds 8 hours.
- Progress in the active phase of labour crosses to the right of the alert line (progress <1 cm/hour).
- There are signs of imminent uterine rupture (above).

Postpartum observations

Close observation is necessary during the fourth stage of labour, as the uterus may occasionally rupture during vaginal delivery of the baby and only become evident after delivery. Signs of rupture, which should immediately be reported to a doctor, include:

- Rising maternal heart rate.
- A fall in blood pressure values.
- Lower abdominal pain.
- Moderate to severe lower abdominal tenderness.
- Postpartum haemorrhage.
- Haematuria.

If uterine rupture is suspected, do a laparotomy to repair the uterus. Obtain prior consent for hysterectomy, should this become necessary.

Note: waiting mother's areas should be considered for elective caesarean section and previous caesarean section awaiting spontaneous labour for VBAC, if the patient has transport problems.

RHESUS INCOMPATIBILITY

Rapid rhesus (D) blood group testing must be done on all pregnant women at the first antenatal visit, or at delivery in unbooked mothers. Rhesus-positive mothers need no further specific management.

If a mother is rhesus-negative*, send blood for atypical antibody testing at 24, 32 and 36 weeks (6 weekly, align with the BANC visits):

- If no antibodies are found, continue with antibody testing every 6 weeks.
- If antibodies are found at a titre of < 1:16, repeat the antibody test every 2 weeks.
- If antibodies are found at a titre of \geq 1:16 send the mother to a unit that specialises in managing rhesus incompatibility (usually a specialist referral hospital) within 3 days.

If no antibodies are found, give prophylactic anti-D 100 μ g intra-muscularly as follows:

- After delivery to all rhesus-negative mothers, if the baby is rhesus-positive or its rhesus status is unknown, within 72 hours.
- If amniocentesis or external cephalic version is performed.
- If there is significant antepartum haemorrhage.
- If the mother suffers any abdominal trauma.
- After abortion, miscarriage or ectopic pregnancy.

*If the father of the baby is tested and also found to be rhesus-negative, no further management will be necessary, as the baby will then be rhesus-negative.

POOR OBSTETRIC HISTORY

This is a history of poor obstetric performance in the absence of a demonstrable cause. Women with a poor obstetric history should be referred from a clinic or community health centre to a hospital for assessment and further management.

TWO OR MORE CONSECUTIVE PREVIOUS SECOND TRIMESTER MISCARRIAGES OR THREE OR MORE CONSECUTIVE FIRST TRIMESTER LOSSES

Need referral to a specialised unit after booking (if <34 weeks). In the older (>35 years) woman, consider referral earlier. Manage the woman according to the plan from the specialist referral unit.

A **cervical cerclage** is only done for specific indications and in singleton pregnancies at a specialist referral centre. It should not be done at district level. The specific indications include a history of three or more preterm deliveries and/or second trimester losses, or a short cervix on ultrasound scan (<2.5 cm) before 24 weeks, plus a history of one or more spontaneous mid-trimester loss or preterm birth.

PREVIOUS SPONTANEOUS PRETERM DELIVERY

This refers to the delivery of a preterm baby (<34 weeks) that died or required special care, in the last previous pregnancy. Patients must be referred to a district hospital for initial work up. Refer for specialist management if possible. At the hospital:

- Do an ultrasound scan at the first antenatal visit, including estimation of the cervical length.
- Obtain a good history of the preterm birth(s).
- Review the mother every 2 weeks up to 34 weeks and then refer back to clinic level.
- Look for evidence of bacterial vaginosis or trichomonas infection and treat appropriately (metronidazole 2 g orally as a single dose).

MANAGEMENT OF INTRA-UTERINE DEATHS, STILLBORN BABIES AND NEONATAL DEATHS

Purpose of this Chapter

This chapter discusses the management of intra-uterine deaths, stillborn babies and neonatal deaths, including legal definitions, diagnosis and management, postnatal investigation of stillbirths and neonatal deaths and the management of a patient with a previous stillbirth.

CHAPTER 10: MANAGEMENT OF INTRA-UTERINE DEATHS, STILLBORN BABIES AND NEONATAL DEATHS

LEGAL DEFINITIONS

NON-VIABLE FETUS (MISCARRIAGE)
Less than 28 weeks* gestation and where there is no evidence of life at delivery.
STILL BIRTH
Gestational age of 28 weeks or more and where there is no evidence of life at delivery.
NEONATAL DEATH**
Death after a live birth whatever the duration of the pregnancy.
When the gestational age is not known, a legal weight cut-off of 1000 g is used.

*According to the Births and Deaths Registration Act, No. 51 of 1992, a stillbirth means that the fetus had at least 26 weeks of intra-uterine existence (or 28 weeks since last menstrual period), but showed no signs of life after complete birth.

**Any infant that shows signs of life after birth is regarded as live born. These signs include breathing, beating of the heart, pulsation of the umbilical cord, and/or definite movement of voluntary muscles.

All stillborn babies and neonatal deaths require a notification of death (form DHA-1663) and need to be buried or cremated. Babies below 1000 g or 28 weeks can be incinerated according to hospital policy.

PPIP

For statistical purposes, all dead babies with gestational age of 22 weeks and more (or 500 g and more) are regarded as perinatal deaths and must be recorded in the Perinatal Problem Identification program (PPIP).

Local gestational limits

- Certain specialised obstetric units have a lower limit for fetal viability (e.g. 27 weeks or 850 gram). Use the limits of viability as determined by your referral unit.
- The viability of <28 weeks refer to the management of a pregnancy where delivery is imminent. In cases of preterm labour, severe maternal disease, preterm rupture of the membranes etc. before 28 weeks where there is a reasonable chance that further treatment can extend the gestation beyond 28 weeks, manage according to the protocols in this book, including the administration of steroids, suppression of labour where indicated and referral.
- All non-viable (<28 weeks) babies born in a CHC or district hospital must be evaluated at birth and given supportive treatment; if the baby is strong and survives, contact a specialist referral hospital to obtain advice on further management. Never abandon a live but non-viable baby or put him/her in a refrigerator or sluice, no matter how small. Keep the baby warm and allow the parents to hold the baby or keep it comfortable in an incubator or overhead heater.
- Complications of gestation <24 weeks are usually managed in a gynaecology or general ward, but use local hospital protocols to guide you.

INTRAUTERINE DEATH (IUD)

DIAGNOSIS

Typical clinical findings

- Absent fetal movements.
- Disappearance of symptoms of pregnancy.
- Symphysis-fundal height does not increase as expected.

- Difficult or abnormal fetal palpation.
- Fetal heart not heard.

Making the diagnosis

- Refer the woman to a hospital to confirm the diagnosis with an ultrasound scan.
- Offer induction of labour, but do not discourage a woman who wants to go home for a day or two to discuss and make arrangements with her family. Some women prefer to await the onset of spontaneous labour.
- Consider a diagnosis of abruptio placenta if there is accompanying bleeding and hypertension.

EXPECTANT MANAGEMENT

- Only for a completely stable patient with no maternal disease or rupture of membranes, who chooses this management.
- See the mother weekly at the antenatal clinic.
- Perform platelet count weekly after the presumed date of IUD, to detect coagulopathy (platelet count $<100,000/\text{mm}^3$). If the patient develops coagulopathy, refer to a specialist facility.
- Deliver if there is rupture of membranes, vaginal bleeding, abdominal pain, pyrexia or hypertension.

Induction of labour for IUD

- Follow the same protocol for induction as with a live baby, but delay amniotomy until late in the first stage (cervix ≥ 8 cm dilated).
- Provide good analgesia - morphine 5 mg IM and promethazine 25 mg IM 4 hourly if necessary.
- Labour management follows the same principles as for normal labour - enter all observations, fluids and medications on a partogram and treat labour abnormalities appropriately.

POSTPARTUM CARE

This differs from normal postpartum care in some aspects:

- Be sympathetic and supportive at all times
- Encourage the mother, or parents to hold and spend time with the baby
- If possible, transfer the mother to a non-maternity ward
- Take into account the normal grief responses during counselling and refer to a social worker if available
- Provide basic genetic counselling if an abnormality is suspected and refer appropriately
- Explain the cause of fetal death to the mother, if known
- Treat breast discomfort with simple analgesics, breast binding and fluid restriction

POSTNATAL INVESTIGATION OF STILLBIRTHS AND NEONATAL DEATHS

Where a birth defect or genetic disorder is suspected, the following steps should be followed to obtain a diagnosis so that appropriate postnatal counselling may be provided about risks of recurrence of the condition in a future pregnancy.

History and basic external examination

- This may be done by a doctor or nurse
- Obtain a full pregnancy history
- Obtain a full family history
- Ask about possible exposure to teratogens
- Note whether there was oligohydramnios or polyhydramnios
- Record head circumference, weight, length, right foot length, and all abnormal external clinical features

Placenta

Weigh the placenta and examine for:

- Placental insufficiency- (placenta small with calcifications).
- Abruptio placentae (definitive blood clot making an indentation in the placenta and covering at least 15% of the placental surface).
- Infection (products of conception foul smelling, membranes opaque).
- True knots or other abnormalities in cord (examine for the presence of the expected one vein, two arteries).

Examination of a dead baby

- Weigh the baby; consider if fetus is small for gestational age- use a percentile chart.
- Examine if stillbirth is fresh or long standing (maceration).
- Look for signs of fetal macrosomia (very fat baby) - consider maternal diabetes.
- Look for obvious congenital abnormalities.
- Motivate parents to request a post-mortem examination, especially for a fresh, term stillborn where no diagnosis can be made at birth. If congenital abnormalities are present, get consent for digital photography and whole body X-ray from parents and send photographs to a geneticist for an opinion.
- If parents do not consent to post-mortem, do a whole body X-ray of baby to look for skeletal deformities.
- Cord around the neck is very seldom a cause of stillbirth.

Further management of the mother

- Do HbA_{1c} (EDTA tube) to exclude diabetes; and blood group, HIV and syphilis tests (always repeat syphilis tests, even if it was negative at the booking and 32 weeks test).
- Suppress breast milk, if indicated (tie breasts up, or prescribe Cabergoline (Dostinex® 1 mg orally- only available on private prescription).
- Give adequate contraceptive counselling.
- **Make follow up date at 6 weeks to discuss the results.**
- If congenital abnormalities were present, refer to a genetic counsellor for counselling before the next pregnancy.

MANAGEMENT OF A PATIENT WITH A PREVIOUS STILLBIRTH AFTER 24 WEEKS

A perinatal death in a previous pregnancy is an indication for a referral to a district or specialist hospital for evaluation/assessment as soon as the patient books for her next pregnancy.

- If the previous loss was due to a documented non-repeatable cause (e.g. syphilis or cord prolapse) continue management at the CHC.
- If a clear, repeatable cause is identified (e.g. late onset IUGR, diabetes, maternal lupus etc.), refer for specialist management.
- If it was an unexplained death or unexplored previous loss, (no attempt made to find a diagnosis), rather refer for specialist opinion and follow their instructions for further shared care.
- Patients with a previous unexplained stillbirth are at risk for development of maternal complications, especially diabetes or pre-eclampsia in the following pregnancy and should receive antenatal care at a hospital, preferably a specialist hospital. If they remain stable they can be induced at term (>39 weeks).

MANAGEMENT OF A STILLBORN "BODY" (28 WEEKS GESTATIONAL AGE AND MORE)

After the delivery of the fetus, the responsible midwife

- Completes the relevant documentation:
 - Nursing records
 - Delivery register

- Early notification of birth
- Ensure correct identification of the body and placenta.
- The registered midwife ensures that the relevant documentation is completed:
 - Doctor's notes (if applicable)
 - Notification of death (form DHA-1663- can be completed by a midwife if at a MOU/CHC)
 - Consent for autopsy – if indicated
 - Consent for cremation – if indicated
 - Refer the patient for grief counselling as appropriate.
- The responsible midwife must ensure that the consent for cremation is signed by the mother, if requested. (Inform the patient whether ashes will be provided to parents according to the local policy.)
- Once all the relevant documentation is completed, the midwife can contact the mortuary for the removal of the body.

MANAGEMENT OF A STILL BORN "BODY" BELOW 28 WEEKS GESTATIONAL AGE

The patient must be informed that current legislation has determined that the department of Home Affairs will issue no death certificate for a fetus less than 28 weeks gestational age.

The responsible midwife must complete all the relevant documentation:

- Nursing records
- Delivery register
- Early Notification of Birth
- Consent for disposal of human tissue (inform the patient that no ashes will be provided to the parents after incineration)
- Referral for grief counselling where appropriate
- **All bodies should be handled according to the CHC/hospital policy**

If the mother is completely stable, she can be discharged from the CHC/MOU. If there is any underlying maternal disease (abruptio placentae, severe hypertension or pre-eclampsia, severe blood loss etc.) the mother must be stabilised and transferred to the next level of care. If no emotional support service (social worker, grief counsellor) available at the CHC, refer to the next level of care for grief counselling.

The clinical notes (maternity case record, delivery record and notification of birth) must be retained to ensure correct completion of the relevant documents, entry in the PPIP programme and discussion at the morbidity and mortality meetings and to plan for the 6 weeks follow up visit and next pregnancy.

MANAGEMENT OF A NEONATAL DEATH

In cases of neonatal death, the notification of death form has to be completed by a doctor. The mother, baby, placenta and all relevant notes must be transferred to a hospital for further management by an ambulance or funeral undertaker if there is no doctor available at the CHC/MOU.

Management of dead babies born before arrival (BBA)

These cases are managed by the police and the body usually goes for a forensic post mortem.

11

MEDICAL DISORDERS IN PREGNANCY

Purpose of this Chapter

This chapter reviews the treatment for various medical disorders in pregnancy such as anaemia, diabetes mellitus, cardiac disease, asthma, thromboembolism and epilepsy.

CHAPTER 11: MEDICAL DISORDERS IN PREGNANCY

ANAEMIA

All pregnant women should have an Hb measurement at the first antenatal visit, and if ≥ 10 g/dL it should be repeated between 28 and 32 weeks and again at 36 weeks. Any Hb level of < 10 g/dL should be followed up with more frequent Hb measurements after initiating treatment. A haemoglobinometer should be used, so that the result is available at the same visit.

Most cases of anaemia in pregnancy are caused by iron deficiency. There are multiple factors that can contribute to iron deficiency in pregnancy, including poor diet and parasitic infestations such as hookworm and bilharzia. The iron deficiency can be pre-existing, or it can occur for the first time in pregnancy due to the increased iron requirements.

Other causes of anaemia in pregnancy include folate (folic acid) deficiency and the anaemia of chronic infections such as HIV and AIDS. Malaria is an important cause of anaemia in pregnancy in malaria areas. There is often a combination of causes (e.g. iron and folate deficiency). Women with a multiple pregnancy are at higher risk of developing anaemia, and should have their Hb checked monthly during the antenatal period.

PREVENTION OF ANAEMIA

- Give all women with Hb ≥ 10 g/dL ferrous sulphate 200 mg oral daily and folic acid 5 mg oral daily for the duration of the pregnancy (combined iron and folic acid preparations do not usually contain an adequate folic acid dose, so folic acid should be given separately).
- Continue with iron and folic acid supplementation during lactation. Give advice on a balanced diet to prevent nutritional deficiency.
- Steps to be taken to improve compliance with and absorption of oral iron tablets:
 - Encourage honesty about compliance with medication.
 - Discourage consumption of soil, charcoal etc.
 - Discourage excessive consumption of tea or coffee. Do not take more than 2 to 3 cups of coffee or tea. Use rooibos tea, decaffeinated tea and coffee, water or fruit juice.
 - Advise taking iron tablets during meals if side effects are affecting compliance.
 - Avoid taking the iron tablets at the same time as calcium tablets.

MANAGEMENT OF ANAEMIA

In all cases, look for an underlying cause, and address the cause where possible.

Referral criteria

Refer from a primary health clinic/ community health centre as follows:

Hb < 6.0 g/dL	Urgent transfer to hospital the same day.
Hb 6.0-7.9 g/dL	Urgent transfer to a hospital if symptomatic (dizziness, tachycardia, shortness of breath at rest). If not symptomatic, refer to the next high-risk clinic within one week.
Hb 8.0 to 9.9 g/dL	Transfer to a high-risk clinic if no improvement after one month of treatment.
Hb < 10 g/dL at 36 weeks gestation or more	Transfer to hospital for further antenatal care and delivery.

Management of mild anaemia (haemoglobin 8-9.9 g/dL)

- Increase ferrous sulphate 200 mg to orally 3 times daily and continue with folic acid 5 mg orally daily.
- Follow up all women < 36 weeks pregnant with mild anaemia with a repeat Hb after 4 weeks.

- If there is no response to oral iron/ folate treatment or if ≥ 36 weeks, refer to the district hospital for further investigations.
- If no response to oral iron treatment or if ≥ 36 weeks, and if iron deficiency confirmed (minimum investigation: full blood count), consider intravenous iron therapy (in hospitals only). Intravenous iron will raise the Hb faster than oral iron.
- Avoid blood transfusion if there are no other complications.

Management of moderate to severe anaemia (Hb ≤ 7.9 g/dL)

Investigate the anaemia at the hospital/high risk clinic and look for underlying causes:

- Take blood for a full blood count (FBC): the mean cell volume (MCV) indicates the probable cause of anaemia:
 - A below-normal MCV suggests iron deficiency anaemia (microcytic).
 - A normal MCV suggests anaemia of chronic disease (normocytic).
 - An above-normal MCV suggests folate or vitamin B12 deficiency anaemia (macrocytic).
 - If the FBC shows a microcytic picture, it is reasonable to initially treat as iron-deficiency anaemia.
 - If the FBC shows a normocytic or macrocytic picture, do further tests: iron studies, red cell folate and vitamin B12 levels to identify the cause.
- Send urine away for microscopy and culture, and a stool sample for occult blood and parasites.
- Do a malaria smear, where relevant.
- Start treatment for anaemia with ferrous sulphate 200 mg oral 3 times daily, and continue with folic acid 5 mg oral daily.
- If the Hb is < 6.0 g/dL or if the patient is symptomatic (dizziness, tachycardia, shortness of breath at rest), then she must be admitted to hospital.
- Avoid overloading with intravenous fluids.
- Transfuse only if symptomatic.
- Give one unit at a time over 4-6 hours.
- Review need for further transfusion after each unit transfused, based on symptoms, rather than Hb level. Give furosemide 20 mg intravenously after each unit transfused.

If there is a failure to respond to oral iron therapy, compliance with the supplements should be checked and the results of iron studies, red cell folate and vitamin B12 levels should be checked and treat accordingly. If there is no response to oral iron treatment or if ≥ 36 weeks, and if iron deficiency confirmed, consider administering parenteral iron therapy (in hospitals only).

BLOOD TRANSFUSION FOR ANAEMIA

(See section on blood transfusion for further details)

- As a guideline, an anaemic patient should be transfused at least one unit of packed red cells if:
 - Hb < 8.0 g/dL and the woman is going for an emergency caesarean section.
 - Hb < 6.0 g/dL and the woman is in labour (vaginal delivery anticipated).
- Patients booked for elective caesarean section should have their anaemia corrected, preferably by means other than transfusion, before they undergo their caesarean section.

DIABETES MELLITUS

PREGESTATIONAL DIABETES MELLITUS

This is diabetes that has been present before the current pregnancy. These women require tight control of their blood glucose levels from the time of conception and should book for antenatal care as soon as pregnancy is confirmed. Ideally,

they should plan their pregnancy, and attend a specialist clinic to optimise the control of their diabetes, before they get pregnant.

Diabetic women who get pregnant should be referred to a specialist health facility/clinic with expertise in managing diabetes in pregnancy. Follow-up care may be continued at a district hospital, in accordance with instructions from the specialist clinic, depending on facilities, levels of skill, and the stability / control of her diabetes.

GESTATIONAL DIABETES MELLITUS

This is diabetes that develops during pregnancy or is diagnosed for the first time during the current pregnancy.

Screening and diagnosis

All pregnant women with risk factors for diabetes in pregnancy should be screened at the first antenatal visit and again at 28 weeks, if the initial screen was negative.

Note: for patients with pre-gestational diabetes (i.e. already known to be diabetic before pregnancy), there is no need for diabetes screening. Screening is for at risk women who have not yet been diagnosed as diabetic.

Figure 11.1: Risk factors for gestational diabetes

Underlying patient factors	Patient from an ethnic group with high prevalence of diabetes (e.g. Indian)
	Obesity (patient BMI ≥ 35)
	Age ≥ 40 years
Previous history	Previous history of gestational diabetes (diabetes in a previous pregnancy)
	First degree relative with diabetes
	Previous unexplained intrauterine fetal death
	Previous macrosomic baby (birth weight ≥ 4 kg)
Current pregnancy	Polyhydramnios
	Fetus large for gestational age
	Glycosuria (glucose 1+ or more on urine dipstick)

Screening method

There is a lack of consensus regarding the best screening method for gestational diabetes. Different screening methods may be used depending on the preference at the local specialist referral centre. Clinics and district hospitals are therefore advised to liaise with their specialist referral centre and follow their local recommendations regarding screening method and diagnostic criteria.

For the convenience of both patients and health care professionals, it is recommended that the screening method chosen should be one which can be done on-site on the same day that the woman is first seen, and one which uses glucometer readings, rather than laboratory tests.

Example of a screening method

- When the woman arrives at the antenatal clinic (unfasted) give oral glucose 75 g dissolved in 250-300 mL water and take glucometer reading 1 hour after giving glucose.
- A value of ≥ 7.8 mmol/L is a positive test and indicates that a diagnostic glucose tolerance test is required. This requires the patient to come back fasted on another day and may be done on-site or may require referral to a high-risk clinic, depending on local specialist referral centre protocol.

Example of a diagnostic test

- The patient must be fasting (drink only water from 22h00 the night before). Do screening first thing in the morning.
- Take a fasting glucose test, and then give oral glucose 75 g dissolved in 250-300 mL water and take blood for glucose level 2 hours after giving glucose.
- A fasting blood glucose level of ≥ 5.6 or a 2 hour value of ≥ 7.8 mmol/L indicates diabetes and the woman should be managed as a gestational diabetic.
- Alternatively, the patient can bring her own breakfast to the clinic instead of the glucose load.

MANAGEMENT OF DIABETES MELLITUS

Referrals

- All pregnant women with pre-gestational diabetes should be referred to a specialist clinic with expertise in managing these conditions in pregnancy, usually at a specialist hospital.
- Follow-up care may be continued at a district hospital, in accordance with instructions from the specialist clinic, depending on facilities, levels of skill, and the stability / control of her diabetes.
- Screening for gestational diabetes can be done at clinics/CHCs.
- Any woman who tests positive should be given dietary advice and referred to the next high-risk clinic at the local hospital within one week at the latest.
- Women with gestational diabetes can be managed at the district hospital level if blood sugar levels are controlled on diet (fasting blood sugar < 6 mmol/L, 2 hours post-prandial < 8 mmol/L).
- If diet alone is inadequate to control blood sugar levels, then the patient should be referred to a specialist hospital with expertise in managing diabetes in pregnancy.
- Follow up care may be continued at a district hospital, in accordance with instructions from the specialist clinic, depending on facilities, levels of skill, and how stable the diabetic control is.
- Management of any diabetic at a district hospital must be “shared care” with a specialist health facility.

Initial management of gestational diabetes

- Advise the woman to start with lifestyle modifications (stop smoking, moderate exercise), dietary advice immediately and refer to a dietician.
- Call the woman back to the high-risk clinic two weeks later; advise her to come “fasted” in the morning, carrying her breakfast with her.
- Check fasting blood glucose level (glucometer) on arrival and then two hours after breakfast (post-prandial).
- If fasting blood sugar < 6 mmol/L, post-prandial < 8 mmol/L, it is appropriate to continue with dietary management. Recheck fasting and post-prandial blood glucose every two weeks.

CARDIAC DISEASE

At the first antenatal visit, all women should be asked about a history of heart disease (including heart operations and attendance at cardiac clinics), and about current symptoms of heart disease. Clinical examination of the cardiovascular system should include auscultation of the heart. As a minimum the blood pressure must be checked and the pulse rate checked separately (manually).

SYMPTOMS AND SIGNS

- Shortness of breath at rest or with mild exercise
- Shortness of breath when lying flat
- Haemoptysis
- Palpitations

- Chest pain
- Tachycardia at rest ($\geq 100/\text{min}$) or irregular heart rate
- Loud heart murmurs

REFERRALS

From primary health clinic / community health centre:

- All women with symptoms or signs of cardiac disease or with a history of cardiac disease must be referred to a doctor to confirm or exclude cardiac disease.
- Stable patients must be referred to a high-risk clinic within one week, while unstable patients (e.g. respiratory distress) should be referred to the hospital urgently.

From district hospital to a specialist hospital:

- All women with a diagnosis of cardiac disease should be referred to a regional or tertiary centre with expertise in the management of cardiac conditions in pregnancy.
- Stable patients could be booked at the specialist antenatal clinic.
- Unstable patients should be transferred as an emergency.
- Further management of the pregnancy and delivery should follow the instructions of the specialist centre.

MANAGEMENT DURING LABOUR

Cardiac patients should deliver in a specialist health facility and can be referred there if in early labour. However, there may be occasions when a cardiac patient presents in advanced labour to the MOU/CHC or the district hospital and may deliver there before transfer can be arranged. The following recommendations **must** be followed in such circumstances:

First stage of labour

- Nurse the mother with her upper body raised to 45 degrees.
- Secure intravenous access (for drug administration), but avoid giving large amounts of intravenous fluids (use a 200 mL fluid bag and run slowly if at all). Oral fluids should be available to the patient whenever thirsty.
- Give adequate analgesia - Pethidine 100 mg IM with Promethazine 25 mg IM and/or nitrous oxide 50% and oxygen 50% (Entonox[®]) as required.
- Give Ampicillin 1 g IV 6 hourly and Gentamicin 240 mg IV as a single dose; or Vancomycin 1 g IV as a single dose (for women allergic to penicillin).

Second and third stage of labour

- Avoid the lithotomy position: the mother must remain upright or semi-upright when delivering, with her legs supported by 2 assistants below the level of her chest.
- Once the fetal head has engaged and the mother is bearing down, perform instrumental delivery unless delivery is rapid and easy.
- Local anaesthetics for episiotomy should not contain adrenaline. Episiotomy should not be done routinely.
- **Do not give ergometrine or Syntometrine[®]** in the third stage; instead use oxytocin 10 units intramuscularly.
- Give furosemide (Lasix[®]) 20 mg intravenously after delivery of the baby.

Fourth stage and puerperium

- The first 24 hours post-delivery is the most common time for the cardiac patient to decompensate and go into pulmonary oedema.
- Try to avoid intravenous fluids. If an oxytocin infusion is required to control or prevent PPH, it should be given in concentrated form (20 units in 200 mL, at 20 mL/hour).

- High-care observations in a high-care setting are required for at least 24 hours post-delivery. Thus, even after an uneventful delivery, transfer to a specialist hospital is recommended for observations and specialist assessment, and to arrange follow-up for the cardiac problem and for post-partum sterilisation if requested by the mother.

MANAGEMENT OF PULMONARY OEDEMA

- Nurse the mother with her upper body raised to 45 degrees.
- Give oxygen by facemask.
- Secure intravenous access (for drug administration), but avoid giving intravenous fluids.
- Give Lasix® 40 mg intravenously, and repeat if necessary.
- Give morphine 5 mg as slow intravenous bolus.
- Transfer immediately to a specialist hospital for further care.

ASTHMA

REFERRAL

- Pregnant women with an acute asthmatic attack must be referred as an emergency from a clinic / CHC to the district hospital.
- Women with a history of asthma (no current attack) should be referred to the next high-risk antenatal clinic. Women with recurrent severe attacks should be referred to a centre with specialist physicians/ pulmonologists.
- Management of asthma in pregnancy does not differ from that in non-pregnant women. Beta-2 stimulants (e.g. salbutamol), inhaled and systemic steroids, aminophylline and ipratropium bromide are all safe in pregnancy.
- Manage labour and delivery according to normal obstetric principles.
- Women who are on chronic oral steroid treatment should receive hydrocortisone 100 mg IV 6 hourly during labour or at the time of caesarean section.

THROMBOEMBOLISM (VTE)

Women are at increased risk of thromboembolism in pregnancy and in the puerperium. Thromboprophylaxis may be required throughout pregnancy and the puerperium for the highest risk patients, including those with:

- A previous personal history of VTE.
- Strong family history of VTE.
- Patients with prolonged immobility (e.g. due to AIDS or paraplegia).

These patients should be discussed and managed in conjunction with a specialist hospital.

SIGNS/SYMPOMS OF DEEP VEIN THROMBOSIS (DVT)

- Acute unilateral diffuse leg swelling
- Pain
- Redness
- Heat

Pulmonary embolus may present with acute shortness of breath and tachycardia, with or without chest pain or haemoptysis. Consider pulmonary embolism as a cause of recurrent episodes of unexplained chest pain.

REFERRAL

Any suspected case of DVT or pulmonary embolus should be referred urgently from clinic / CHC to hospital to be reviewed by a doctor. If clinical assessment by the doctor at the district hospital suggests DVT or pulmonary embolus, then the patient should be urgently referred to a specialist facility to confirm the diagnosis.

MANAGEMENT OF DVT IN PREGNANCY

- If there is a strong suspicion of DVT or pulmonary embolus start treatment with low molecular weight heparin sub-cutaneous e.g. enoxaparin 1 mg/kg twice a day.
- Alternatively, use unfractionated heparin sub-cutaneous 20,000 units immediately, followed 12 hours later by 15,000 units twice a day.
- Arrange transfer to a specialist centre to confirm diagnosis and advise on further management.
- Warfarin therapy is acceptable for women from the second trimester up to 36 weeks' gestation if heparin treatment throughout pregnancy is not feasible.

EPILEPSY

Ideally, women with epilepsy should plan their pregnancy, and attend a specialist clinic to optimise the control of their disease and review the anti-epileptic drug regimen, before they get pregnant.

REFERRALS

- A pregnant woman with an acute epileptic seizure should be stabilised and referred from clinic/CHC to hospital for further treatment and observation.
- A pregnant woman with epilepsy or suspected epilepsy (no acute seizure) should be referred to the next high-risk antenatal clinic.
- A pregnant woman with recurrent seizures despite treatment should be referred to a specialist health facility for management and shared care where possible.

MANAGEMENT OF EPILEPSY IN PREGNANCY

- Arrange a second trimester detailed ultrasound scan to exclude fetal abnormalities.
- The anti-epileptic drug of choice in pregnancy is carbamazepine. However, do not change non-carbamazepine treatment during pregnancy (e.g. phenytoin) if it is controlling the seizures.
- Use carbamazepine blood levels (through levels, before the morning dose is taken), if available, to monitor therapy.
- Use monotherapy if possible.
- The dose of antiepileptic medication may need to be increased from the pre-pregnancy dose to maintain control during the pregnancy due to the increased volume of distribution.
- Give folic acid 5 mg oral once daily throughout the pregnancy; ideally this should be started before pregnancy.
- From 36 weeks add vitamin K 20 mg oral once daily (for all women on phenytoin).
- Always exclude other causes of seizures e.g. eclampsia or meningitis, even in a known epileptic.
- Treat status epilepticus as for non-pregnant women.

Obstetric care, labour and delivery are the same as for non-epileptic women. Breastfeeding is not contra-indicated when the mother is on anti-epileptic drugs; however, the control of seizures should be good before the mother is allowed to care for her new born without supervision. Readjust treatment to pre-pregnancy doses after delivery.

Purpose of this Chapter

This chapter discusses the various infections during pregnancy that need to be carefully monitored and treated. These include sexually transmitted infections, acute pyelonephritis and malaria.

CHAPTER 12: INFECTIONS IN PREGNANCY

SEXUALLY TRANSMITTED INFECTIONS

ABNORMAL VAGINAL DISCHARGE

Vaginal discharge should be considered abnormal if it is itchy, excessive, yellow or green, or offensive-smelling. Wherever possible, use a vaginal speculum to observe the discharge and inspect the cervix.

Vaginal Candidiasis

- **Vaginal Discharge Syndrome** Thick, white vaginal discharge with itch.
- Give a clotrimazole pessary to insert into vagina that evening.
- If vulval burning/itching give a clotrimazole cream to vulva twice daily, continue for 3 days after symptoms resolve for maximum of 2 weeks.

Treat syndromically for gonorrhoea, chlamydia and trichomonas, with triple antibiotics:

- Ceftriaxone 250 mg IM as a single dose, and
- Azithromycin 1 g orally as a single dose (azithromycin 1 g stat is an alternative to amoxicillin; stat dose would be preferable compared to prolonged course of amoxicillin. See the new STI guidelines), and
- Metronidazole 2 g stat (can be used in all trimesters of pregnancy).

Severe penicillin allergy

Avoid ceftriaxone. This includes a history of any of the following:

- Angioedema
- Anaphylactic shock
- Bronchospasm
- Steven-Johnsons syndrome

Replace ceftriaxone with high dose azithromycin 2 g orally as a single dose (Spectinomycin 2 g IM currently recommended for gonorrhoea in penicillin allergic patients; however increasing the dose of azithromycin would be simpler. See the new STI guidelines). This high dose will treat both gonorrhoea and chlamydia.

If symptoms persist after 7 days, repeat treatment if possible reinfection or poor adherence to treatment; otherwise refer the patient to specialist care. Notify the partner to come for examination and treatment.

Doxycycline is not part of these guidelines and should be avoided in pregnant women.

GENITAL WARTS

These are caused by the human papilloma virus (HPV) and are sexually transmitted. They can be external on the vulva or perineum, or internal in the vagina or on the cervix.

Treatment

- Podophyllin is contraindicated in pregnancy.
- If small (<10 mm), soft and involve the skin, no treatment is indicated in pregnancy and can be treated postpartum.
- If very large, bleeding or infected, refer to a doctor.
- Consider elective caesarean section if warts are very large and may obstruct vaginal delivery.
- Do a Pap smear (if not done within the past year); this can be done up to 30 weeks' gestation.

GENITAL ULCERS

Painful small ulcers

Treat for genital herpes:

- Acyclovir 400 mg orally 8 hourly for 7 days.
- Pain relief if necessary; keep lesions clean and dry.
- Counsel that HSV infection is life long and recurrent episodes may occur.
- If the first ever episode of genital herpes (primary infection) occurs in the third trimester, there is a risk of neonatal herpes. Refer the patient: caesarean section may be advised.
- Patients should be advised to inform their partners. Sexual transmission of HSV can occur even in the absence of symptoms.

Painless ulcer with or without swollen inguinal lymph nodes

- Take blood for syphilis tests (see below for treatment of positive syphilis test in pregnancy).
- Treat for primary syphilis and chancroid:
 - Benzathine penicillin 2.4 million units IM single dose and azithromycin 1 g orally single dose.

Penicillin allergy

- Refer for further investigation of primary syphilis; if primary syphilis proven, admit to hospital for penicillin desensitisation (see figure 14.1, page 142). Only penicillin will adequately prevent transmission to the fetus, and prevent congenital syphilis. There are no proven alternatives.

If no improvement within a week

- Refer
- Notify partner to come for examination, syphilis and HIV testing, and treatment.

Note that a genital ulcer caused by syphilis will resolve spontaneously within 4-6 weeks without treatment; however the syphilis infection persists, and the ulcer resolving does not represent cure.

SYPHILIS AND POSITIVE RPR TESTS

SYPHILIS SCREENING IN PREGNANCY

- Rapid syphilis screening must be done at the first antenatal visit.
- If the first test is performed before 20 weeks and is negative, a second test should be done at 32-34 weeks.
- A rapid card test, done in the antenatal clinic, gives a result before the woman goes home. This allows immediate treatment.

Treatment

- Treat all women with a positive screening test, irrespective of titre.
- Give benzathine penicillin, 2.4 million units IM once weekly, for 3 doses.

URINARY TRACT INFECTION

CYSTITIS

This presents with urinary discomfort and/or frequency. There may be some lower abdominal tenderness. The patient usually has no fever and does not appear ill. Urine dipstick testing may show nitrites and protein.

Asymptomatic bacteriuria is a condition in pregnancy that sometimes precedes acute pyelonephritis. If detected on urine culture, it should be treated in the same way as cystitis.

Management

- If possible, send a midstream urine specimen for microscopy, culture and sensitivity (MC&S).
- Treat empirically with one of the following:
 - Nitrofurantoin 100 mg orally 4 times daily for 7 days (only before 36 weeks).
 - Cotrimoxazole 2 tablets twice daily for 5 days.
- If urine culture is positive, change antibiotics according to sensitivity results. Discuss with microbiologist at your laboratory if advice needed on antibiotic choice.
- Encourage a high oral fluid intake.

Penicillin Allergy

- Ciprofloxacin 500 mg twice a day orally for 5 days.

ACUTE PYELONEPHRITIS

This is a common and serious cause of pyrexia in pregnancy, and may precipitate pre-term labour. The patient usually appears ill and has a pyrexia and tachycardia. There is almost always renal angle tenderness.

Management

- Admit to hospital.
- Obtain a midstream urine specimen for MC&S.
- Take blood for urea and creatinine, FBC and smear, and blood culture.
- Start ceftriaxone 1 g daily IV; change to oral treatment co-amoxiclav 1 g bd 24-48 hours after the fever subsides. Treat for 14 days in total.
- If urine culture is positive, change antibiotics according to sensitivity results. Discuss with microbiologist at your laboratory if advice needed on antibiotic choice.
- Ensure a high oral fluid intake: give Ringer-Lactate solution IV 3 L/day, or more if dehydrated. Give anti-emetics if vomiting.
- Refer the patient if renal impairment, or not responding to treatment within 48 hours.
- Following treatment, take 2 further urine specimens for MC&S to ensure that the infection is eradicated.

Penicillin allergy

- Ciprofloxacin 400 mg IV 8 hourly; change to oral ciprofloxacin 500 mg bd 24-48 hours after fever subsides.
- Treatment with ciprofloxacin requires only 7 days in total.

Alternative

- Gentamicin 5-6 mg/kg intravenous daily; treat for 14 days; should only be given if therapeutic drug monitoring is available. Do not give in renal impairment.

MALARIA

Malaria in pregnancy is associated with serious complications. These are due both to the effects of a severe febrile illness in pregnancy, and to the malaria parasite itself, which becomes sequestered in the placenta, and in the small blood vessels of the brain, kidneys and other organs. Fetal complications include miscarriage, preterm delivery, fetal growth restriction, and perinatal mortality. Severe maternal complications include cerebral malaria, hypoglycaemia, ARDS and maternal death.

Most severe malaria in South Africa is due to *Plasmodium falciparum*; drug treatments below are for *falciparum* malaria. For treatment of non-*falciparum* malaria, consult local guidelines. If unsure of species, treat for *P falciparum*. Malaria is a notifiable disease.

PITFALLS IN THE DIAGNOSIS AND TREATMENT OF MALARIA

Not recognising the diagnosis

- Malaria presents as a febrile illness, with a wide differential diagnosis. There are no specific symptoms or signs. It can often be mistaken for influenza, or another viral infection.
- Jaundice or anaemia and thrombocytopenia may be the leading symptoms.
- Cerebral malaria and eclampsia may be difficult to distinguish. If in doubt, treat for both.
- People from endemic areas are a major risk group when moving to a country where malaria is not endemic: their immunity wanes over time, and they do not realise that returning to their home country can result in severe malaria.
- The 'VFR' group of patients (Visiting Friends and Relatives) are often not recognised by healthcare workers as at risk. Always ask patients about travel history, and for people from other countries in Sub-Saharan Africa, when they last returned home.

Delay in laboratory testing

- Alert the laboratory to test the specimen urgently, and to phone the result to a named doctor caring for the patient.

Not recognising that severe malaria is a medical emergency

- All pregnant women with malaria should be admitted to hospital.
- All pregnant women with severe malaria should be admitted to the highest possible level of care: preferably an intensive care or high care unit in a tertiary hospital.
- Disease severity can easily be underestimated: if a patient is diagnosed with uncomplicated malaria, regular and repeated examination is necessary.

Not ensuring that the first dose of malaria treatment is given when it is prescribed

- Don't just write the prescription chart – ensure the medicine is given. The best rule is that the prescribing doctor gives the first dose. Medication delays can cost the life of mother and baby.

DIAGNOSIS OF MALARIA

- Thick and thin blood film: for parasite count, and to confirm the species and stage of parasites. The parasite count is also used for monitoring response to treatment.
- Rapid diagnostic test (RDT) using a finger prick blood sample, for diagnosis of malaria antigen. These are less sensitive than the malaria blood film; a blood film should always be requested. RDTs are very useful in hospitals where they may be readily available, with an offsite laboratory needed to read a blood film.
- In a febrile patient where suspicion of malaria is high, a single blood film cannot rule out malaria. Three blood films over 12-24 hours are necessary to rule out the diagnosis.

MALARIA SEVERITY

Uncomplicated malaria

- Patient shows none of the clinical or laboratory features below.
- Patients have mild symptoms, are ambulant, with normal mental function and no organ dysfunction.

Severe malaria

- Patient shows one or more of the clinical or laboratory features below.
- If the patient has any clinical evidence of severe malaria, start treatment. Don't wait for the laboratory tests listed below to be available.

Figure 12.1: Assessing malarial severity

Clinical features
• Impaired consciousness
• Convulsions
• Severe weakness (unable to sit)
• Hypotension (systolic BP < 80 mmHg)
• Respiratory distress (acidotic breathing or RR > 30 breaths/minute)
• Visible jaundice
• Macroscopic haematuria
• Abnormal bleeding: (eg retinal haemorrhages, DIC)
Laboratory features
• Hyperparasitaemia (>4% parasites)
• Severe anaemia (Hb < 5 mg/dL)
• Hypoglycaemia (Hgt < 2.2 mmol/L)
• Acidosis (pH < 7.25 or plasma bicarbonate < 15 mmol/L)
• Renal impairment (serum creatinine >250 µmol/L)
• Hyperlactataemia (venous lactate > 4 mmol/L)
• Hyperbilirubinaemia (bilirubin > 50 µmol/L)

Management of uncomplicated malaria (none of the features of severity are present)

- If a patient with uncomplicated malaria is vomiting, give an antiemetic, e.g. metoclopramide. Repeated vomiting after antiemetic treatment is an indication for intravenous treatment.

Oral artemether-lumefantrine (Coartem)

- Four tablets (80mg artemether and 480 mg lumefantrine) immediately (if > 35 kg).
- Repeat dose after 8 hours on day 1.
- Then repeat dose 12 hourly on following 2 days: 5 doses in total.
- Give each dose with fat containing food/drink to ensure adequate absorption.

If artemether-lumefantrine is not available

- Oral quinine, 600 mg 8 hourly for 7-10 days.
- Add oral clindamycin 10 mg/kg 12 hourly for 7 days, 2-3 days after starting quinine.

General measures for treating uncomplicated malaria

- Admit all pregnant women with malaria to hospital, monitor blood sugar 4 hourly.
- Monitor regularly for clinical and laboratory markers of severity; if any deterioration, change to IV treatment and refer.
- Ensure adequate hydration, but avoid over-hydration: see note on ARDS as above.
- Control pyrexia; fan or tepid sponge, paracetamol may be given, avoid NSAIDS (nephrotoxic).

Follow up

- All women with ongoing pregnancies need follow up at hospital antenatal clinic due to the risk of impaired fetal growth.

Management of severe malaria

- Severe malaria is a medical emergency, ideally requiring intensive care unit treatment.
- After rapid clinical assessment and confirmation of the diagnosis, give correct dose of IV treatment immediately. Transfer urgently for specialist care.
- Good nursing care is vital.
- If it is not possible to transfer the patient immediately discuss with an Infectious Diseases Specialist, Intensive Care Specialist or Physician at the referral centre, and transfer as soon as possible.

Treatment of severe malaria while preparing the patient for transfer

- Start intravenous quinine: loading dose of 20 mg/kg stat, in 5 mL/kg of 5% dextrose saline, by slow intravenous infusion over 4 hours. This is followed by quinine 10 mg/kg given over 4 hours, every 8 hours. Give IV treatment for at least 24 hours.
- Monitor blood glucose for hypoglycaemia
- Monitor respiratory rate and oxygen saturation
- Monitor all intake and output
- Add broad-spectrum antibiotics to treat secondary bacterial infection
- Reduce high body temperatures (> 39°C) by tepid sponging and anti-pyretics

Figure 12.2 below shows the outpatient oral desensitisation protocol for patients with penicillin allergy.

Figure 12.2: Outpatient oral desensitisation protocol for patients with penicillin allergy¹

Use oral penicillin V (phenoxymethyl penicillin) suspension (250mg/5ml strength; 5 ml is equivalent to 400 000 Units).

Dilute as follows and administer orally every 15-20 minutes:

Penicillin V (250mg/5ml strength) suspension concentration:	Resulting concentration (units/mL)	Amount in ml of the concentration to be swallowed (add to ~30ml water for easier drinking)	Units	Cumulative dose (units)
1 Dilute 1ml suspension into 80ml of water	1,000	0.1ml	100	100
2 Dilute 1ml suspension into 80ml of water	1,000	0.2 ml	200	300
3 Dilute 1ml suspension into 80ml of water	1,000	0.4 ml	400	700
4 Dilute 1ml suspension into 80ml of water	1,000	0.8 ml	800	1,500
5 Dilute 1ml suspension into 80ml of water	1,000	1.6 ml	1,600	3,100
6 Dilute 1ml suspension into 80ml of water	1,000	3.2 ml	3,200	6,300
7 Dilute 1ml suspension into 80ml of water	1,000	6.4 ml	6,400	12,700
8 Dilute 1ml suspension into 8ml of water	10,000	1.2 ml	12,000	24,700
9 Dilute 1ml suspension into 8ml of water	10,000	2.4 ml	24,000	48,700
10 Dilute 1ml suspension into 8ml of water	10,000	4.8 ml	48,000	96,700
11 Use undiluted suspension	80,000	1.0 ml	80,000	176,700
12 Use undiluted suspension	80,000	2.0 ml	160,000	336,700
13 Use undiluted suspension	80,000	4.0 ml	320,000	656,700
14 Use undiluted suspension	80,000	8.0 ml	640,000	1,296,700

- Observe for 30 minutes after last oral dose before parenteral administration of penicillin.
- Can be performed in an outpatient setting with emergency resuscitation equipment ready to manage anaphylactic reactions; it must be prescribed by a doctor. Start early in the morning so that the procedure is completed long before the clinic closes. Stop if there are any skin reactions, vomiting or severe itching/flare.
- Example: first step: take 1ml Pen V oral solution (250mg/ml) and add it to 80ml of water. Take 0.1ml of this solution, add it to 30ml of water and give to the patient to drink.

¹ Adapted from the New England Journal of Medicine (Wendel GO, Jr, Stark BJ, Jamison RB, Melina RD, Sullivan TJ. Penicillin allergy and desensitization in serious infections during pregnancy. N Engl J Med 1985; 312: 1229–32.).

Purpose of this Chapter

This chapter discusses the management of HIV positive women during and post pregnancy, including treatment for the infant. It also examines HIV and TB co-infection and other opportunistic infections.

CHAPTER 13: PREVENTION OF MOTHER TO CHILD TRANSMISSION (PMTCT) AND MANAGEMENT OF HIV POSITIVE PREGNANT WOMEN

There are four elements of PMTCT care:

- Primary prevention of HIV, especially among women of childbearing age.
- Preventing unintended pregnancies among women living with HIV.
- Preventing HIV transmission from a woman living with HIV to her infant.
- Providing appropriate treatment, care, and support to women living with HIV and their children and families.

PMTCT is part of an expanded package of care for the mother-infant pair, and their family. This chapter is an overview of the 2013 National PMTC Guidelines. For more in-depth information, consult the full guideline. Ensure that any guideline updates are available in your clinic, and that any guideline changes are disseminated to all staff, and are rapidly implemented.

PMTCT IN ANTENATAL CARE

Aims

- Identify all women who are HIV positive including those who seroconvert during pregnancy and breastfeeding.
- Provide ART, as soon as HIV positive status is known, for maternal health reasons and to prevent mother to child transmission of HIV.
- Improve maternal health and prevent mortality.

HIV COUNSELLING AND TESTING

- All women attending antenatal care should be given routine information about HIV testing and the PMTCT programme, with a group information session, followed by individual counselling for women who have never tested, or have previously tested negative. See the algorithm below.
- Verbal consent must be obtained before testing. A woman may refuse an HIV test (opt-out).
- A rapid test will be performed on a finger prick sample of blood. If the test is positive, a second rapid HIV test using a test kit from a different supplier will be performed on a second finger prick sample. If both tests are positive, the woman is confirmed HIV positive.
- If the first rapid test is positive and the second rapid test is negative, then a laboratory ELISA test performed on a venepuncture blood sample. The healthcare provider should explain the reason for the laboratory test, and the woman should be asked to return for the ELISA results. Results should be obtained within a week.
- Post-test counselling should be offered to both HIV positive and HIV negative women.
- Women who opt-out of HIV testing should have individual 'post refusal' counselling, and HIV testing offered at each antenatal visit.

Women with a confirmed positive result

- Should be clinically staged, and have blood taken for CD4 count, and serum creatinine.
- All women should be started on HAART (see the following section).
- Women are to return after 7 days for results.

Women who test negative

- Seroconversion in pregnancy or while breastfeeding has a high risk of vertical transmission, due to a high maternal viral load in the absence of any intervention to prevent transmission.
- All women who test HIV negative are to be offered repeat HIV testing after 3 months, and/or around 32 weeks gestation, and every 3 months while breastfeeding.

- At the initial individual information session, mothers will be consented once for the protocol of initial and repeat testing. Further individual counselling is not required, unless requested by the mother.

ANTENATAL MANAGEMENT

Initial assessment

At their first antenatal clinic visit all HIV positive women should undergo the following:

- Routine testing for Haemoglobin, Rh, syphilis tests
- CD4 cell count
- HIV clinical staging
- Clinical screening for TB and STIs
- Clinical & laboratory screening for renal disease, including serum creatinine
- Screening for active psychiatric illness
- Initiation of antiretroviral prophylaxis and/or treatment
- Viral load testing if already on HAART

Women testing HIV positive in pregnancy, or previously testing HIV positive but not on HAART

- All HIV positive pregnant women are eligible to start HAART, irrespective of CD4 count.
- To avoid unnecessary delays, women should start HAART the same day as the first antenatal visit, unless there are specific contraindications for doing so.
- Women who test positive at any time during pregnancy or breastfeeding are also to start HAART the same day.
- Women who have symptoms of TB at the first antenatal visit should not be started on HAART on the same day. Instead they are 'TB suspects' and should be investigated for TB, and HAART deferred until after TB treatment is started, or until TB is excluded. See the section on Tuberculosis below.

HAART is continued lifelong in women who are eligible for HAART according to the national ART programme:

- CD4 \leq 350, or
- Stage 3 or 4 defining condition, including TB, or
- Hepatitis BsAg positive.

HAART is given as prophylaxis and discontinued one week after all breastfeeding has ceased, **if all of the following** criteria are fulfilled:

- CD4 > 350, and
- Stage 1 or 2, and
- Hepatitis BsAg negative.

INITIATION OF ANTIRETROVIRAL PROPHYLAXIS OR TREATMENT

- First choice ART regimen for prophylaxis and lifelong treatment:
 - Tenofovir/Emtricitabine/Efavirenz, as a fixed dose combination (FDC)
 - See below if there is a contraindication to the FDC
- Women who are eligible for lifelong treatment should be identified early in pregnancy:
 - CD4 count and staging are therefore necessary
 - Blood should be taken for HepBsAg
- Women who are not eligible for lifelong treatment:
 - Discuss during antenatal care that HAART will be stopped 1 week after all breastfeeding ceases

Figure 13.1: HIV testing and counselling (from National PMTCT Guidelines)

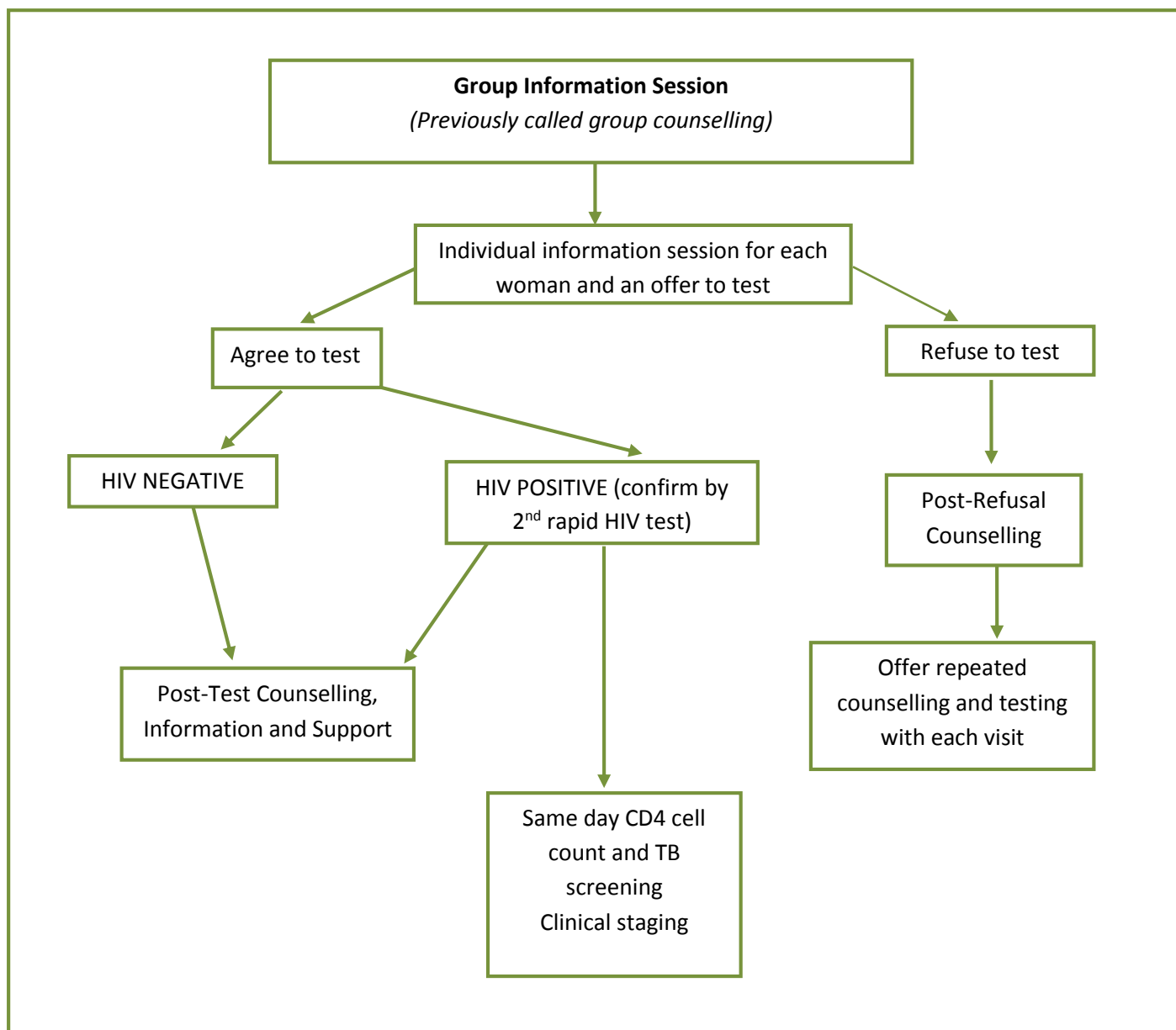


Figure 13.2: PMTCT Algorithm

For all women who are newly diagnosed as HIV positive anytime during pregnancy AND women who enter ANC with known HIV positive status and not yet on ART.

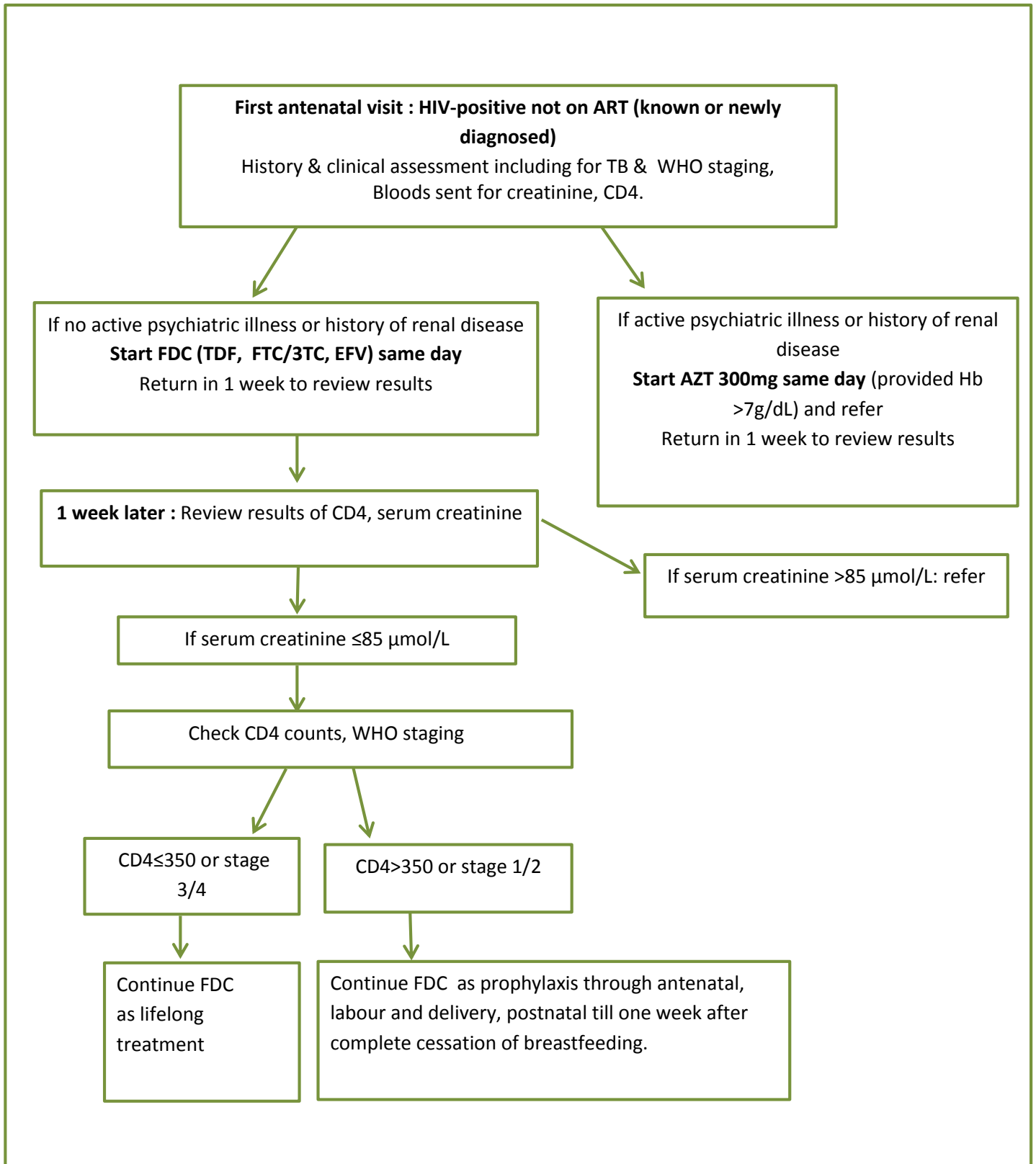
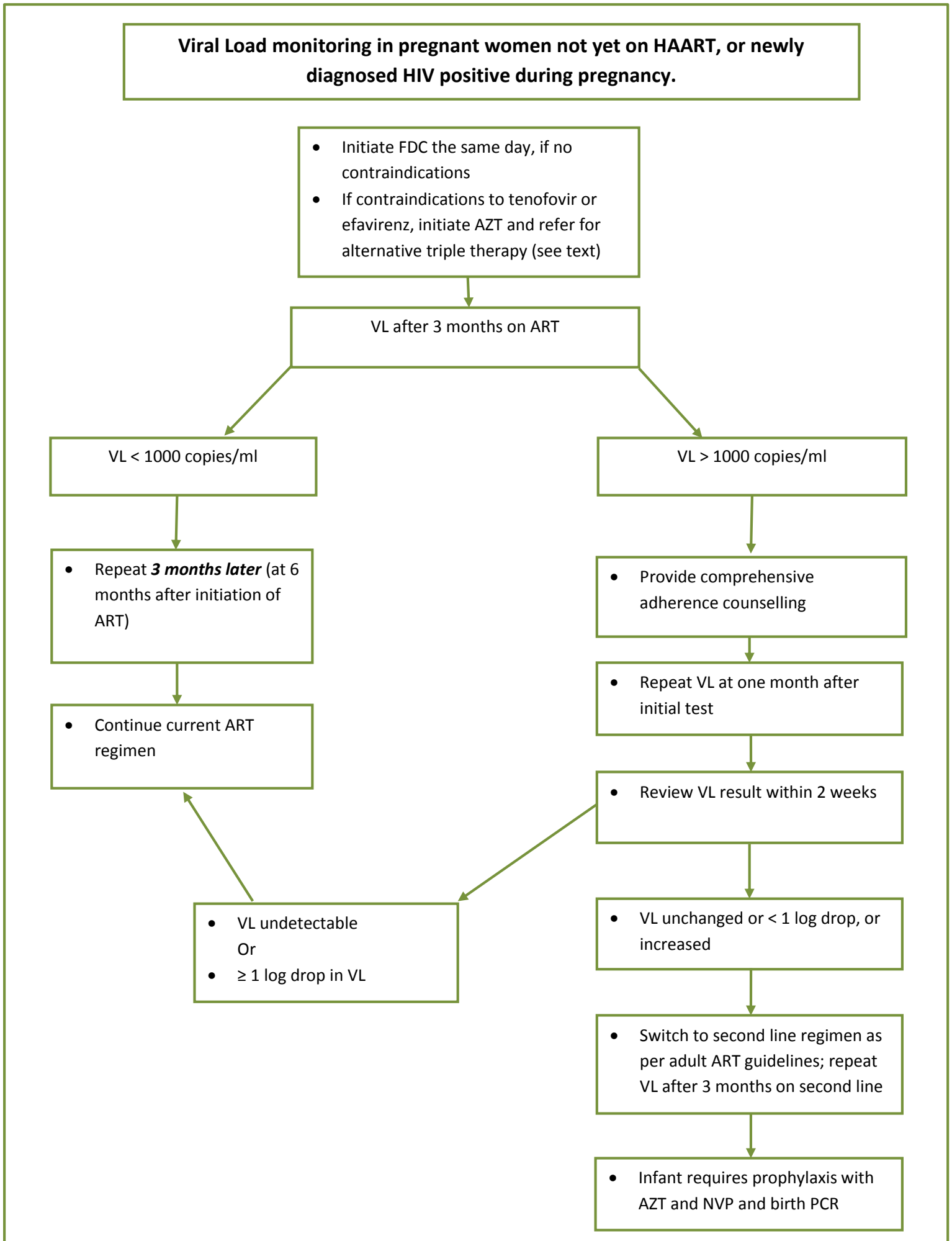


Figure 13.3: Viral Load in pregnant women not yet on HAART or newly diagnosed



IF THE FDC IS CONTRAINDICATED

Women with renal impairment

- In pregnancy, renal impairment is defined as a serum creatinine >85 µmol/L.
- Pregnant women with renal disease are high risk and need antenatal care and delivery in hospital.
- All pregnant women with renal impairment need referral. The cause of renal impairment needs investigation, and specific management implemented; obstetric complications may also occur, e.g. superimposed pre-eclampsia.
- HIVAN (HIV Associated Nephropathy) is a common cause of renal disease in HIV positive people, can occur at any CD4 count, and is a stage 4 defining disease.

ART for women with renal impairment

- Tenofovir is contraindicated in renal impairment.
- Women eligible for lifelong HAART (see criteria above) should start a non-tenofovir based regimen. This would generally be AZT/3TC/Efavirenz. If Hb < 7 g/dL, AZT is contraindicated. Alternatives are D4T or abacavir.
- Women not eligible for lifelong HAART should start AZT prophylaxis at booking (AZT 300 mg bd) and be referred. The referral unit will decide whether to continue AZT or to start non-tenofovir based HAART (HIVAN may be the cause or contribute to renal impairment).

Women with active psychiatric disease

- Efavirenz is contraindicated in active psychiatric disease that involves psychotic symptoms: it is not contraindicated in depression. All women with active psychiatric disease need referral, and review by a psychiatrist.
- Women eligible for lifelong HAART should start a non-efavirenz containing regimen; TDF/3TC/NVP if CD4 < 250, or TDF/3TC/Lopinavir/ritonavir (LPV/r) if CD4 > 250.
- Women not eligible for lifelong HAART should start AZT prophylaxis at booking (AZT 300 mg bd). The referral unit will decide whether to continue AZT or to start non-efavirenz containing HAART (for example, if HIV is thought to be contributing to the psychiatric disease).

Women on lifelong HAART who become pregnant

- Continue HAART.
- Perform viral load testing at booking; if this is high, refer to HIV clinic to assess whether there is virological failure, and ensure intensive adherence counselling.

HEPATITIS B CO-INFECTION

- TDF and 3TC/FTC are both active against Hepatitis B.
- Hepatitis B surface antigen testing should be performed during pregnancy for women who are not eligible for lifelong HAART on the basis of CD4 or staging criteria.
- If HepBsAg is positive, she is eligible for lifelong HAART, irrespective of CD4 count or staging.
- Hepatitis B screening should be performed as early as possible in pregnancy, so that women know if they are to continue lifelong HAART or stop one week after all breastfeeding has ceased.

LABORATORY MONITORING FOR WOMEN ON ART

All women on FDC

- Serum creatinine at 3 months, 6 months and 12 months.
- The upper limit of normal for creatinine in pregnancy is 85µmol/L.
- If there is any evidence of renal impairment, refer the patient for investigation of the cause, and to change from tenofovir to alternative ART (most commonly this would be to AZT/3TC/Efavirenz, in the absence of anaemia).

Women on AZT

- HB and FBC AT 1 month, 2 months, 3 months and 6 months.

Women who not eligible for lifelong HAART

- Repeat CD4 count 6 months after HAART is stopped; this will be 6 months after breastfeeding has ceased for women who continue HAART until one week after all breastfeeding has ceased.

Improving maternal health and preventing mortality

- Tuberculosis (TB) is the single most common disease causing maternal mortality in South Africa.
- Symptom screening for TB should be performed at every antenatal visit, and on admission to labour ward. This applies to HIV positive and HIV negative women.
- See the section on TB below; other opportunistic infections are also considered below.

LABOUR AND DELIVERY

INTRAPARTUM MANAGEMENT

- Check HIV status is known, and that details of antiretroviral medication that she is taking are documented.
- If HIV status is unknown, and she is in the first stage of labour, HIV counselling and testing should be provided.

Antiretroviral treatment

Women on HAART:

- Continue treatment throughout labour and delivery; ensure all doses are taken.

Women on AZT monotherapy:

- 3 hourly AZT during labour.
- Single dose of the following drugs at the onset of labour: nevirapine 200 mg stat, lamivudine 300 mg, tenofovir 300 mg. If caesarean section is necessary, these drugs should be given prior to the procedure.

Women newly diagnosed HIV positive in labour:

- 3 hourly AZT during labour.
- Single dose of the following drugs at the onset of labour: nevirapine 200 mg stat, lamivudine 300 mg, tenofovir 300 mg. If caesarean section is necessary, these drugs should be given prior to the procedure.
- For women who plan to breastfeed, the FDC should be initiated as soon as possible thereafter. Request CD4 count and creatinine, as for all women starting FDC.

Note that women who are taking HAART do not need 3 hourly AZT during labour.

MANAGEMENT OF LABOUR

- The mode of delivery should be planned and discussed during antenatal care.
- Caesarean section in HIV positive women is performed for the same obstetric indications as in HIV negative women.
- Only suction the baby's nose and airway when there is meconium-stained liquor.

Vaginal delivery

- Avoid artificial rupture of membranes unless there is a specific obstetric indication. Duration of ruptured membranes prior to delivery should be as short as possible (ideally 4 hours or less); augment labour if there is slow progress. Do not use AROM as a means of augmenting labour, use alternatives e.g. oxytocin.
- Avoid invasive monitoring, fetal blood sampling and episiotomy.
- Avoid instrumental delivery.
- Prophylactic antibiotics are not required for HIV positive women who have normal deliveries.

Caesarean section

- Prophylactic antibiotics are given for both elective and emergency caesarean section:
 - Cefazolin 1 g IVI when on the operating table prior to the start of surgery, followed by a broad-spectrum antibiotic for 3-5 days.

Pre-labour rupture of membranes

- Augment labour if not in spontaneous labour after 4 hours
- Prophylactic antibiotics as for all women with pre-labour rupture of membranes

POSTNATAL CARE

Within an hour of delivery:

- All Infants born should receive skin-to-skin contact with their mothers, regardless of the mother's HIV status and mode of infant feeding, almost immediately after delivery.
- All infants should start feeding within an hour after delivery. The benefits of breastfeeding and the risks of not breastfeeding should have been discussed during antenatal care; exclusive breastfeeding is recommended.

Infant prophylaxis

- All infants are given prophylaxis with nevirapine syrup. Dosing is determined by birth weight, and is given daily:
 - birth weight >2500 grams: 15 mg (1.5 mL)
 - birth weight 1000-2500 grams: 10 mg (1 mL)
 - birth weight <1000 grams: 2 mg/kg initially
- Start as soon after birth as possible, at the latest within 72 hours.
- All women on HAART: nevirapine is continued for 6 weeks.
- Women who received AZT monotherapy during pregnancy: infants receive nevirapine until 1 week after all breastfeeding has ceased.
- If maternal HIV status is unknown, including if the mother is indisposed (due to severe illness, coma, mental illness, or death), start infant NVP and perform an HIV antibody test (ELISA or rapid test) to detect if the infant has been exposed to HIV. If the test is positive, continue nevirapine as above.
- Maternal virological suppression is essential for prevention of vertical transmission in infants not on prophylaxis. Therefore infant prophylaxis should only be discontinued if the mother is virologically suppressed.
- Breastfed infants should receive 6 weeks of nevirapine if the mother has been on ART for more than 12 weeks and has a suppressed viral load; viral load is checked for the first time after 12 weeks on HAART. Until she has had a viral load and the result available, the infant should stay on nevirapine.
- Extended prophylaxis is needed in breastfed infants if mother has been on ART for < 4 weeks; with viral load testing after 12 weeks of ART, and discuss with HIV paediatrician if viral load > 1000.
- However women who have been on ART for 4-12 weeks: should also ensure a viral load is done before prophylaxis is stopped, and those on ART for 4-6 weeks will need infant prophylaxis for > 6 weeks to enable 12 week viral load to be done and result to be obtained.

Before discharge from the health facility

- All breastfeeding women must be counselled on breast health to reduce the risk of HIV transmission to the infant through breastfeeding, and the need for maternal antiretroviral use for prophylaxis and/or treatment, as well as infant prophylaxis.
- Contraception must be offered to all women before discharge.
- All women taking FDC should have at least 6 weeks' supply of medications, and should know the name and location of the health facility where they will receive ongoing medication. They should be given a referral letter, and told when to attend.
- All women should have 6 weeks' supply of NVP for their infants.
- All women, whether on antiretroviral prophylaxis or treatment, and their infants should receive follow-up at

the health facility within the first 3 to 6 days postpartum, and should be seen again at the health facility at 6 weeks postpartum. Infant testing is performed at 6 weeks (see below).

- In order for the recommendation above to be followed through correctly all RTHBs (Road To Health Booklets) need to be correctly completed prior to discharge with all relevant information regarding HIV exposure and PMTCT recorded for **all** babies on pages 7 & 8 of the RTHB. This is a mandatory requirement and **not** optional.
- Infants should be vaccinated per EPI (Expanded Programme on Immunisation) guidelines. BCG vaccine must be given unless the mother has active TB and has been on treatment for less than 2 months prior to delivery. If the mother has active TB, the infant must be screened for congenital TB and INH prophylaxis or TB treatment started as appropriate (per National TB guidelines) and BCG vaccination deferred.

Figure 13.4 below shows an algorithm on Infant prophylaxis and PCR testing during the first few months of life.

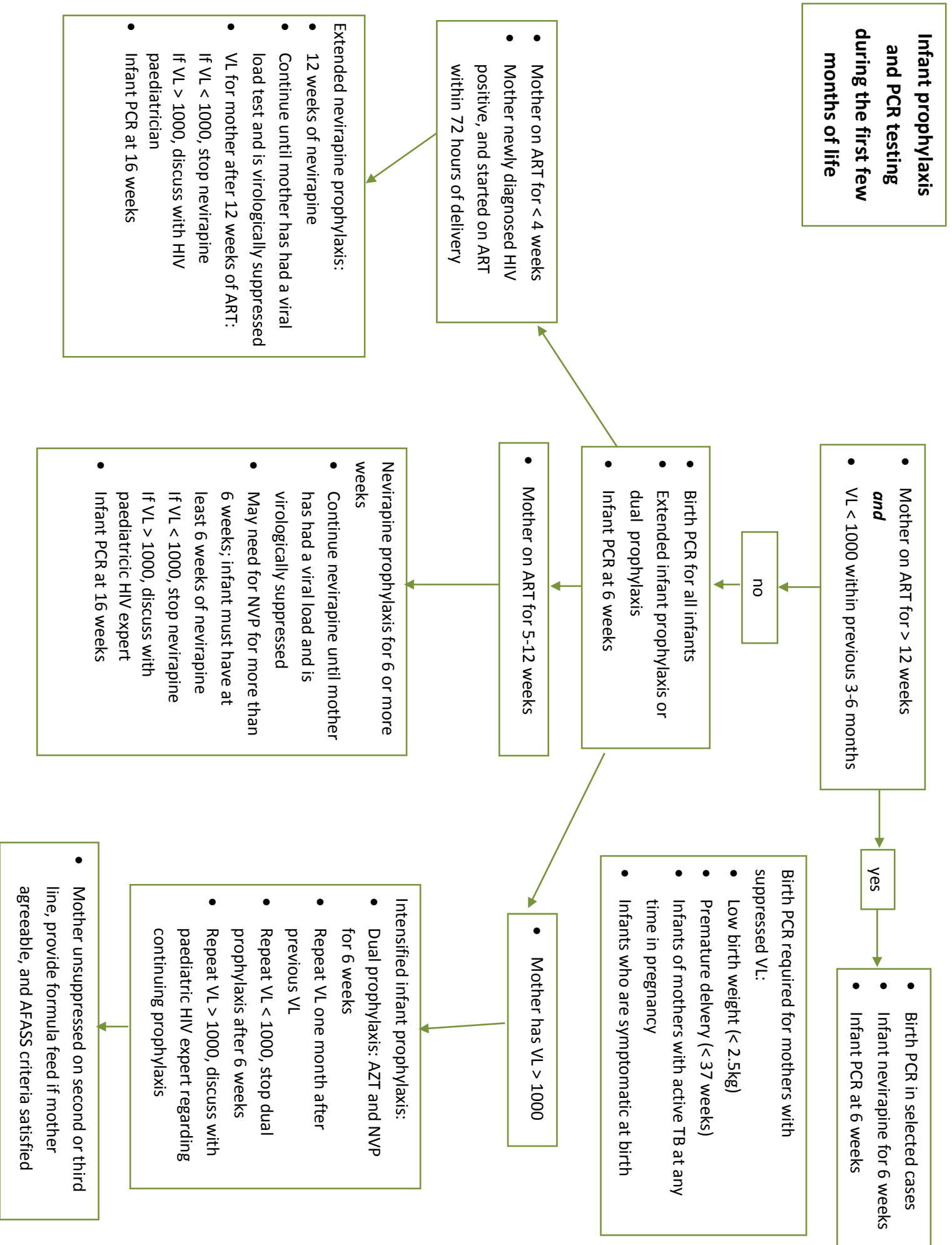
STOPPING MATERNAL HAART

- Women who are not eligible for lifelong HAART, and start the FDC for prophylaxis during pregnancy or in the postpartum period should continue this regimen until 1 week after the cessation of all breastfeeding.
- Prior to discontinuation, hepatitis B infection should be excluded and HIV staging, including screening for TB disease, completed. Women with stage 3 or 4 disease or hepatitis B infection should continue ART lifelong.
- CD4 count should be checked 6 months after stopping the FDC.

WOMEN NEWLY DIAGNOSED HIV POSITIVE DURING BREASTFEEDING

- HIV testing is offered to women 3 monthly during breastfeeding.
- Women who are newly diagnosed HIV positive during breastfeeding should have blood taken for CD4 count and creatinine, and be clinically staged. They should start on FDC, unless contraindicated. The baby should have blood taken for HIV PCR, and started on nevirapine syrup.
 - If the infant is PCR positive, nevirapine syrup should be stopped, the infant fast-tracked for HAART, and breastfeeding should continue for 2 years with the mother on FDC.
 - If the infant is PCR negative, the mother should continue FDC, and the infant be given nevirapine syrup for 6 weeks.
- If the FDC is contraindicated and the woman not eligible for lifelong HAART, the infant should continue nevirapine prophylaxis until 1 week after all breastfeeding has ceased.

Figure 13.4: Infant prophylaxis and PCR testing during the first few months of life



Infant feeding

- South Africa actively promotes, protects and supports exclusive breastfeeding.
- Mothers with HIV and whose infants are HIV uninfected or of unknown HIV status and are not on lifelong ART should exclusively breastfeed their infants for six months, with continued breastfeeding up to 12 months, and should receive ART to prevent HIV transmission.
- Breastfeeding should only stop once a nutritionally adequate and safe diet without breast milk is available. Breastfeeding cessation needs to occur gradually over one month. Abrupt cessation is discouraged.
- HIV-positive mothers (and whose infants are HIV uninfected or of unknown HIV status) on lifelong ART should exclusively breastfeed their infants for six months and continue breastfeeding for 12 months (recommended). The infant should receive ARVs from birth until six weeks of age as prescribed in accordance with current PMTCT guidelines.
- At every antenatal visit, HIV-positive women should be counselled on exclusive breastfeeding, and to avoid mixed feeding.
- Formula feeds will no longer be provided at public health facilities solely for the purpose of PMTCT.
- Formula feeds will be available on prescription by appropriate healthcare professionals for mothers, infants and children with approved medical conditions. Nutritional supplements will be provided to the supplementation guidelines.

HIV positive mothers who decide not to breastfeed should only feed formula to their HIV infant when **all of the specific conditions are met:**

- They are able to provide sufficient infant formula and safely feed their infants for the first 6 months of age.
- Safe water and sanitation are assured at the household level and in the community.
- The mother or other caregiver can reliably provide sufficient infant formula milk to support normal growth and development of the infant.
- The mother or caregiver can prepare it cleanly and frequently enough so that it is safe and carries a low risk of diarrhoea and malnutrition.
- The mother or caregiver can, in the first six months, exclusively give infant formula milk.
- The family is supportive of this practice.
- The mother or caregiver can access health care that offers comprehensive child health services.

Women who choose to formula feed should receive practical support, including demonstrations on how to safely prepare formula and how to feed the infant. Cup feeding should be encouraged, rather than bottle feeding.

Infant feeding: HIV infected infants

- Infants with confirmed HIV infection should exclusively breastfeed for the first six months, and continue breastfeeding for 24 months or longer with the introduction of complementary foods from age of six months.

Infant HIV testing schedule

At the 6 weeks EPI visit

- Infant HIV PCR testing should be performed.
- NVP syrup is discontinued, unless the mother is not taking HAART.
- The HIV PCR result must be obtained within one week. If positive, initiate ART urgently, and request viral load.
- If PCR test result is negative and infant is breastfeeding, start co-trimoxazole syrup.
- Cotrimoxazole syrup should be continued until the infant is confirmed HIV uninfected and is fully weaned.
- Adherence counselling for the mother.

At 6-12 month visits

- Infants who have stopped breastfeeding more than 6 weeks earlier should have an HIV PCR test.
- If PCR is positive, the infant needs fast-tracking for HAART.
- If PCR is negative, co-trimoxazole can be discontinued.

At 18 months EPI visit

- All HIV-exposed infants, except those with positive PCR test results and on ART, should have a rapid HIV ELISA test.
- If two HIV rapid ELISA tests are positive, the infant is HIV infected and ART must be initiated urgently.

At any visit if the infant is failing to thrive or is unwell

- An infant HIV PCR test should be performed.

TERMINATION OF PREGNANCY

HIV positive pregnant women who have undergone termination of pregnancy must receive antibiotics. Treatment of any obvious genital infection is mandatory before the procedure is undertaken.

Regimen

- Doxycycline 100 mg orally twice daily for 5 days.
- Ciprofloxacin 500 mg stat.
- Metronidazole 400 mg orally three times a day over 5 days or 500 mg suppository every 12 hours for three days.

IMPROVING MATERNAL HEALTH AND PREVENTING MATERNAL MORTALITY

Prophylaxis of opportunistic infections

- All women with CD4 <200 or stage 3 or disease should start co-trimoxazole 2 tablets daily.
- Discontinue when CD4 >200 for more than 6 months.

TUBERCULOSIS (TB) IN PREGNANCY

Non-pregnancy related infections remain the most common cause of maternal mortality in South Africa. TB is responsible for the up to half of these deaths. The national PMTCT guidelines strongly emphasise that screening for TB is an essential component of antenatal care. Deaths from TB were also reported in HIV negative women. All pregnant women should therefore be symptom screened for TB at every visit, with early detection, and prompt initiation of TB treatment essential.

Symptom screening for TB

At all antenatal visits and other contacts with maternity services – ask the following:

- Any cough
- Fever
- Night sweats
- Loss of weight, or not gaining weight in pregnancy

If positive for **any** symptom:

- Collect 2 sputum samples (ask the patient to cough outside), and send to laboratory for geneXpert and microscopy and culture, as per National TB guidelines.

- Do this at the antenatal clinic; do not refer to a TB clinic to collect sputum, this causes avoidable delays.
- Ensure the patient has a follow up appointment for the results.
- Note that if symptom screen is negative, HIV positive pregnant women are eligible for Isoniazid Preventative Therapy (see below).

Do not start HAART if TB symptoms are identified

- Until the TB result is available, the patient is a TB Suspect, and should not be initiated on HAART.

If sputum sample shows drug sensitive TB

- Start TB treatment as per national guidelines.
- All of the oral drugs are safe to use in pregnancy.
- Women taking aluvia based HAART need to double the dose if they are taking rifampicin: increase to 4 tablets twice a day.

If sputum sample shows rifampicin resistant TB

- **Drug resistant TB should be confirmed by culture and sensitivity.**
- Ensure that INH sensitivity and second line sensitivities are requested.
- Discuss with local Infectious Diseases (ID) specialists or senior doctors at local TB hospital for advice on regimen.
- Drug resistant TB has a high mortality, particularly without an aminoglycoside as part of the regimen; for this reason ID specialists would generally recommend that an aminoglycoside should be included as part of the regimen in pregnancy despite any potential risk to the fetus.

If sputum sample is negative and there are ongoing symptoms of TB

- HIV positive patients with TB and low CD4 counts more frequently have negative sputum smears, may have normal CXR, and more often have disseminated TB.
- If symptoms persist, or there are additional clinical findings (for example, peripheral lymphadenopathy, pleural effusion) refer promptly for inpatient or outpatient investigation; empiric TB treatment may be necessary.
- Do not delay initiation of ART in pregnant women due to long delays in diagnosis of TB or initiation of treatment: discuss with local TB clinic or referral centre about starting empiric TB treatment if there is a strong suspicion of TB, but it has not been proven.

Management of the new-born if the mother has TB

- If the mother has active TB and has been on treatment for less than 2 months before delivery, BCG vaccination for the new-born should not be given. The infant should be screened for congenital TB. If the mother has drug sensitive TB and there is no evidence of congenital TB, INH prophylaxis should be started.
- If the mother has drug resistant TB discuss with local paediatric Infectious Diseases specialists regarding infant prophylaxis.

When to start HAART in pregnant women with newly diagnosed TB

If a pregnant woman is newly diagnosed with TB, and not yet on HAART:

- Early introduction of HAART increases the risk of immune reconstitution inflammatory syndrome (IRIS); however delaying HAART increases the risk of other opportunistic infections in women with low CD4 counts, and increases the risk of vertical transmission if there is a significant delay.
- Do not start antiretrovirals in women who are TB suspects, and are being investigated for TB.

- AZT monotherapy should be started at the same time as TB treatment, and change to Fixed Dose Combination (FDC) 2 weeks later. However, be aware that AZT can also cause IRIS. Start FDC 2 weeks after starting TB treatment. If in the third trimester where there is a more urgent need to start ART, this can be started after 1 week. If there is TB meningitis, steroids should also be given. Do not reduce the dose of steroids until after ART is started.
- Do not delay initiation of ART in pregnant women because of long delays in diagnosis of TB or initiation of TB treatment. Discuss with local TB clinic or referral centre whether empiric TB treatment is warranted or FDC should be initiated in the absence of TB treatment.

Isoniazid Preventative Therapy (IPT)

IPT has been shown to reduce the incidence of TB in all people living with HIV, including those on ART. All HIV positive pregnant women who screen negative for TB are eligible for IPT. This can be started irrespective of whether she is on HAART prior to the pregnancy, or whether HAART is started in pregnancy. Initiate once the patient is stable on HAART. Tuberculin skin testing is not mandatory prior to initiation of IPT, however for pregnant women on lifelong HAART, if they are TST positive, the duration of IPT can be extended.

IPT regimen:

- Isoniazid 5 mg/kg daily to a maximum of 300 mg daily.
- Pyridoxine 25 mg daily.

Duration of treatment:

- 12 months.
- For HIV positive pregnant women who have a positive TST, IPT can continue for 36 months.

Symptom screening for TB should still continue at all visits to maternity services:

- If symptom screen is positive, discontinue IPT and send 2 sputum samples as above.
- If sputum sample is TB culture negative and there is no ongoing concern about TB, restart IPT.

Adverse effects of isoniazid:

These are not common, however discontinue IPT and refer if any of the following occur:

- Drug induced liver injury: symptoms are jaundice, right upper quadrant pain or tenderness, nausea and vomiting.
- Skin rash.
- Peripheral neuropathy (numbness and/or tingling of the feet).

OTHER OPPORTUNISTIC INFECTIONS (OIS) IN HIV POSITIVE PREGNANT WOMEN

HIV positive pregnant women with low CD4 counts are at risk of other opportunistic infections and malignancy in addition to TB.

Treatment of opportunistic infections

- Stage IV defining opportunistic infections have a high mortality. The most common are Pneumocystis jirovecii pneumonia, and cryptococcal meningitis.
- Pregnant women who are unwell need prompt and intensive investigation for opportunistic infections.
- Initiate treatment promptly, do not delay, reduce or withhold treatment because of pregnancy; the benefit of treatment far outweighs any theoretical risks to the fetus.

Starting HAART in pregnant women with OIs

- In general, start HAART 1-2 weeks after initiation of treatment for OIs.
- However, for cryptococcal meningitis, it is recommended that HAART is delayed for 4-6 weeks after initiation of treatment, because early HAART leads to increased mortality. If a pregnant woman has cryptococcal meningitis, discuss with local Infectious Diseases specialists regarding when to start HAART. In certain cases it may be justified to start HAART earlier than 4 weeks to reduce the risk of vertical transmission.

Pneumonia in pregnant women

Respiratory disease is a significant cause of maternal mortality. Respiratory symptoms or signs need prompt investigation: a raised respiratory rate (>24 per minute) is indication of underlying respiratory disease, and further investigation is indicated. Treatment of pneumonia is the same as in non-pregnant patients. All pregnant women with respiratory symptoms should be investigated for TB; and pneumocystis pneumonia considered in the differential diagnosis if CD4 < 200 mm³.

GUIDELINES FOR PERINATAL REVIEW MEETINGS AT FACILITIES

Purpose of this Chapter

This chapter provides detailed information on conducting perinatal review meetings; including who should attend, what the meeting should focus on, how it should be run and pre and post meeting actions.

CHAPTER 14: GUIDELINES FOR PERINATAL REVIEW MEETINGS (PNRM) AT FACILITIES

Perinatal Review Meetings are an essential quality improvement activity in the facilities. The District Clinical Specialist Teams (DCST) have a role in ensuring that they occur and achieve their purpose.

PURPOSE OF THE PERINATAL REVIEW MEETING

The PNRM is a key component of the broader audit process that aims at improving the quality of perinatal care and perinatal outcomes.

The following are achieved through the PNRM

- Reviewing perinatal (including maternal) outcomes.
- Following trends in perinatal indicators.
- Identifying gaps in the provision of quality perinatal care.
- Determining actions to prevent deaths and morbidity from similar causes.
- Identifying progress on action plans identified at the previous meeting.
- Sharing good practices and providing educational input.
- Building relationships between hospital and clinics, and amongst different the participants at the facility.
- Monitoring implementation of policy guidelines.

WHICH FACILITIES SHOULD HOLD PERINATAL REVIEW MEETINGS?

- Every hospital should hold perinatal review meetings, and these need to be attended by the representatives from the Community Health Centres, midwife obstetric units, and clinics in the catchment area of the hospital.
- Every community health centre and all midwife obstetric units conducting more than 50 deliveries per month (these facilities should still attend the PNRM at the referral hospital as well).

HOW OFTEN SHOULD THE PNRM BE HELD?

- At least monthly in District Hospitals.
- In CHCs and MOUs, it may be sufficient to conduct them quarterly, depending on the number of deliveries.
- In Regional or District Hospitals with large numbers of deliveries (e.g. over 500 per month), it may be useful to conduct PNRM weekly in order to accommodate discussion of a larger number of mortality or morbidity cases. However, there are certain components of the meeting which are better suited to a monthly schedule, such as the statistics presentation and the setting of an action plan. Therefore where weekly PNRMs are held, there should be a different format or agenda, depending on which week of the month it is.
- The PNRM should be scheduled at a regular time each month (or week) so that the participants can plan their schedule accordingly. The dates of the meetings should be distributed well in advance (e.g. yearly).

WHO SHOULD ATTEND THE PNRM?

An attendance register should be developed that specifies the people (designation) that should be present at the PNRM, with a space provided for them to enter their name and sign in their attendance.

Participation in the perinatal mortality meetings should be included in the performance agreements of the participants listed below, and monitored.

District Hospital

- At least one representative from the senior hospital management (CEO, Medical Manager, Nursing Manager- all 3 if possible).
- The Doctor in charge of maternity.

- The Doctor in charge of neonatal ward.
- All available doctors, including sessional doctors, who have to cover maternity and/or neonates- even if just on-call.
- Operational managers in Maternity.
- Relevant facility-based programme coordinators (e.g. PMTCT) and trainers.
- All available hospital midwives (excluding those who never work in the maternity/neonatal sections).
- Hospital quality assurance manager.
- Hospital monitoring and evaluation manager.
- Facility information officer.
- Primary Health Care Supervisors who cover the catchment area of the hospital.
- Representatives from each of the community health centres and clinics in the catchment area of the hospital.
- Community outreach facilitators.
- DCST (ideally the obstetrician, advanced midwife and primary health care nurse should attend). At the minimum, there **must** be a representative.
- District MCWH and PMTCT Coordinators.
- Visiting outreach specialists (obstetric, neonatal) and medical students from regional and or tertiary referral hospital.
- Representative of relevant NGOs working in the district.
- Nursing College Representative and student midwives (where local college exists).
- According to the cases discussed, some may attend the PNRM by invitation, for example:
 - Social worker
 - Dietician
 - Ambulance representative
 - Anaesthetic specialist from regional and or tertiary referral centre

Regional Hospital

All of the above should attend, and in addition:

- Medical students doing obstetrics or neonatal rotations.
- Medical interns doing obstetrics or neonatal rotations.
- If meetings are held weekly, it is acceptable for the top management of the regional hospital to limit their attendance to the specific meetings (e.g. monthly) where the action plans are made and followed-up on.
- According to the cases discussed, some may attend the PNRM by invitation, for example:
 - HOD or other doctors from Anaesthetics, General Medicine Department, or other specialised departments.

WHAT IS THE ROLE OF SENIOR MANAGEMENT IN THE PERINATAL REVIEW MEETINGS?

- To take responsibility for the meeting occurring regularly and running smoothly according to the principles in this document.
- Be involved in decision making and action planning.
- Facilitate implementation of actions decided on at the meetings.
- To be role models for their subordinates in encouraging quality improvement in the facility.
- The representation of senior hospital management is required in the PNRM so that they can keep in touch with what is happening in their institution with regard to perinatal care.

HOW TO ENCOURAGE DOCTORS TO ATTEND THE MEETING?

- Accreditation of PNRM for CPD points.
- Presence of senior management at the meetings.
- Include participation in PNRMs in performance agreements.

HOW LONG SHOULD THE MEETING TAKE?

- For PNRMs which are held on a monthly basis, the recommended duration of the meeting is two hours.
- If a joint perinatal and child mortality meeting is held, then the meeting may take longer.
- If a weekly meeting is held, it may be reasonable to restrict the meeting to one hour per week.

WHO SHOULD CHAIR THE MEETING?

- Senior manager in maternity or neonatal department, either medical or nursing.
- Can have a rotating or a fixed chair, depending on the circumstances within the hospital.
- If the medical or nursing manager of the hospital has a special interest and expertise in perinatal care, they could chair the meeting. This would increase the ownership by management of the perinatal audit process and the actions that flow from the audit.
- However, whoever chairs the meeting must have been involved in preparing for the meeting and must be familiar with the statistics, the cases that will be presented, and the actions required. The chair is also responsible for ensuring the minutes are completed and distributed timeously.

WHAT SHOULD THE AGENDA INCLUDE?

- Welcome
- Distribution and signing of attendance register.
- Apologies
- Ratification of previous meeting minutes.
- Matters arising from minutes: with a specific focus on following-up on the actions planned at the previous meeting.
- Presentation and discussion of statistics. This should include information about referrals to the next level of care, and the outcomes of these cases at the referral unit.
- Case presentations and discussion of cases.
 - All maternal deaths need to be presented
 - Selected perinatal deaths
- Educational topic (e.g. presentation/discussion/demonstration).
- Summary of key issues and setting of new action plan.
- Announcements
- Date of the next meeting.

WHAT PREPARATION SHOULD THERE BE FOR THE MEETING?

- A schedule of PNRMs for the year needs to be published at the beginning of the year, and dates planned should be adhered to.
- There should be a small committee at the facility responsible for the preparation of the meeting. As a minimum this should include the chairperson of the meeting, and a senior manager from both nursing and medical components (e.g. nurse manager and clinical manager for maternity).
- The committee must ensure the following is done in preparation for the meeting:
 - Every maternal and perinatal death should have been discussed and analysed prior to the meeting (ideally within 72 hours of the event). Where there is little mortality this could be extended to cases of severe morbidity. Perinatal deaths should have been analysed according to the PPIP format.
 - Confirm the agenda for the meeting.
 - Prepare monthly statistics (may be done together with Faculty Information Officer). While the previous month's stats should be prepared for presentation, it is also important to present the trends over time for certain key perinatal indicators.
 - Select cases for presentation (all maternal deaths and selected perinatal deaths with learning points).
 - Prepare of educational topic for presentation.

- Select and notification of presenters for the various presentations.
- Prepare of preliminary action plan (based on stats and lessons to be learnt from selected cases). The action plan will be further developed through discussion at the meeting.
- Invitations can be sent by email or fax as a reminder prior to each PNRM. This is important especially for those who will have to travel to the meeting from other facilities.
- Organise transport to transport participants from the clinics where necessary.
- Copy the prepared attendance register.
- Prepare the venue.
- Copy minutes of the previous meeting (just a few copies, as the minutes of the previous meeting should have been distributed within a week of the previous meeting, and participants should come with their copy of the minutes).

WHAT FORMAT SHOULD THE MINUTES BE WRITTEN IN?

- A standardised format (template) for recording the minutes should be used to make taking the minutes an easier task (a suggested template with instructions is attached).
- The minutes must be a functional document which contributes to the quality improvement process of perinatal audit.
- The minutes should be concise. They are not a detailed record of everything that is said at the meeting.
- The attendance register should be attached as an addendum.
- The key components of the minutes should be:
 - The main issues/gaps in perinatal care identified through the statistics and the case presentations.
 - The action plan to address these issues.
 - Feedback on progress with implementing the previous month's action plan.
- In the minutes, a brief summary is all that is required regarding:
 - Monthly statistics (a few key indicators)
 - Cases presented
 - Educational topic presented
- However, if requested by the participants, copies of the full statistics presentation, the educational presentation, and the case presentations could be attached as an addendum.

WHO SHOULD TAKE THE MINUTES AND DISTRIBUTE THEM?

- The minutes should be taken by a medical or nursing member of staff, who is familiar with the terminology, and can write insightful minutes.
- If a ward clerk is to write the minutes, then the clerk must be trained and supervised.
- Following the meeting, the minutes must be typed up (if required, support staff can help with the typing). They must be checked and corrected by the meeting chairperson before distribution.
- The chairperson has responsibility for distribution of the minutes, but support staff may help with the process.
- Minutes must be distributed (usually by email) to all people on the attendance list within one week of the PNRM, so that people responsible for tasks in the action plan can be reminded of what they are meant to do.

WHAT IS THE PLACE OF THE PPIP IN THE PERINATAL MEETING?

- If the PPIP database is up to date, the PPIP can be used to present the monthly key perinatal indicators with trends. However, this can also be done without using PPIP.
- All hospitals must use PPIP as a quality improvement tool.
- It is recommended that every six months a special PPIP meeting be held (this could be at the time of a scheduled PNRM) to review the accumulated data from the previous six months, in particular the major causes of death and the most common avoidable factors in the facility. Trends in the key perinatal indicators

compared to the previous 6-month period can also be reviewed. An action plan should be made based on this data.

- Presenting this data every month will have limited value.

SHOULD PEOPLE RESPONSIBLE FOR POOR PERINATAL OUTCOMES BE IDENTIFIED AND COUNSELLED AT THE PERINATAL REVIEW MEETING?

- The PNRM is not a forum for disciplinary action. It is primarily an educational meeting, and a meeting for setting action plans to prevent deaths from similar causes.
- If there has been substandard or negligent practice that has led to a maternal or perinatal death, there should be a meeting between the health workers concerned and their line managers in a private and confidential meeting before the PNRM, and disciplinary action taken if appropriate.
- To maintain anonymity and confidentiality, names of patients and health care workers should not be included in presentations. If copies are made of the patient charts for educational purposes at the meeting, all identifying information for the patient and the health workers should be removed.

WHO IS CUSTODIAN OF THE ACTION PLAN?

- The quality assurance manager of the facility has a responsibility to follow-up on progress with implementing the action plan in between meetings. However this role could be delegated by the top hospital management to another suitable individual.
- This individual can follow-up to ensure that urgent actions get implemented without delay.
- Those named for specific responsibilities in the action plan should send progress reports during the month to the quality assurance manager.

WHAT IS THE ROLE OF THE DCST IN THE FACILITY BASED PERINATAL MEETING?

- Ensure meetings happen in facilities.
- Ensure that the meeting follows the desired format.
- Ensure that a feedback process is in place, so that information and actions arising from the meeting are known throughout the sub-district.
- Ensure that good action plans are developed and that follow-up on the actions occurs.
- DCSTs can add value by sharing their clinical expertise.
- Support and mentoring role.
- Must not take over the meeting – if PNRM are not happening or are poorly conducted, the DCST can chair one meeting to demonstrate how a meeting should be run, can co-chair the next meeting, but by the third meeting they must observe the PNRM being chaired by someone from the hospital and provide reflective feedback.

15

BASIC ULTRASOUND AT DISTRICT LEVEL

Purpose of this Chapter

This chapter discusses the use of ultrasound for supporting pregnant woman, including when they should be done, by whom and the various cases where an ultrasound is indicated.

CHAPTER 15: BASIC ULTRASOUND AT DISTRICT LEVEL

Note: These guidelines are written for public sector doctors, midwives and sonographers who are indemnified against medico-legal claims by the government. Recent changes in medical protection limits private general practitioners, -radiographers, -sonographers and other private sector non-specialists to the performance of very basic fetal dating scans during the first trimester only; and private sonographers and -clinicians are advised to make sure that they are insured against medico-legal claims that can arise from performing ultrasound.

DISTRICT LEVEL (LEVEL 1 SCAN)

- This level scan should preferably be performed by accredited ultrasonographers, but due to capacity constraints can be done by radiographers without formal accreditation such as a National Diploma or B Tech degree, midwives who completed a basic ultrasound course, or medical officers and family physicians at district hospitals.
- At this level of scanning, one cannot expect to detect most of the serious fetal anomalies and patients should be specifically informed about this limitation. The basic scan is therefore only suitable for patients at a low risk for a fetal anomaly and should only be offered to these women.
- All pregnant women should preferably have access to one basic obstetric ultrasound examination, at 18-20 weeks gestation (if the infrastructure allows this) for the following:
 - To confirm an intra-uterine pregnancy
 - To determine fetal viability
 - To determine the number of fetuses
 - To determine the basic gestational age
 - To confirm the location of the placenta
 - To determine the amniotic fluid volume

Wherever possible, all patients should be referred to ultrasound as long as the SF measurement at booking is < 24 cm. Patients who book very early should only be referred for the scan when the SF is approaching or at the level of the umbilicus (this may be only weeks after the booking visit).

In addition, the following patients need to be referred to ultrasound at level 1:

- **Unsure presenting part** and/or breech at the 34 weeks visit - refer for ultrasound at 36 weeks gestation. If a non-cephalic presentation confirmed at this 36 weeks visit - refer directly (within 2 days) to an experienced doctor or to a specialist hospital for appropriate management (external cephalic version or planned elective Caesarean section).
- **Amniotic Fluid Index (AFI)** or deepest amniotic fluid pool for suspected (clinical) postdates pregnancy (at estimated 41-42 weeks with uncertain gestational age due to late booking).
- **Clinical suspicion of multiple pregnancy** at any gestation, with no previous ultrasound.
- **Suspicion of intra-uterine fetal death.**

REQUESTS FOR DOPPLER OF THE UMBILICAL ARTERY

The following patients can be referred for a Doppler test (in areas where this is available and if Doppler studies were not already performed during the ultrasound visit); or to the appropriate specialist hospital, high risk or district specialist outreach clinic (preferably to a unit with the appropriate ultrasound equipment) for evaluation by a specialist:

- SF growth <10th centile or no SF growth in 6 weeks.
- All patients with hypertension in pregnancy (at 24 weeks or as soon as possible thereafter).
- Previous unexplained mid-trimester or third trimester fetal loss (at 24 weeks or as soon as possible thereafter).
- Diabetics at 24 weeks.

Interpretation of umbilical artery Doppler (resistance index)

Manage the client according to the instructions from the high risk clinic. If there are no instructions with the Doppler results, the suggested management is as follows:

- Resistance Index (RI) < 75th centile - normal. Repeat only if the clinical condition changes.
- RI 75th-95th centile: repeat the Doppler after 2 weeks (patient preferably needs to be managed at a high risk clinic).
- RI > 95th centile - repeat the Doppler after 1 week (patient needs to be managed at a high risk clinic) and arrange twice weekly for CTG as soon as viability is reached.
- Absent end diastolic volume (AEDV): refer for specialist/tertiary care as soon as the diagnosis is made; provided there is no fetal distress in a clearly viable fetus (the fetus may need an urgent caesarean section if at a regional health facility (if gestational age < 28 weeks - specialist at regional facility must discuss patient with tertiary unit before referral).
- Reversed end-diastolic flow (REDV) - baby needs to be delivered by caesarean section within 24 hours if it is viable; if possible transfer mother before delivery to a specialist/tertiary unit.

Any of the following abnormalities noted in the BASIC ultrasound should be scanned by an accredited sonographer (National Diploma or more, at any level of care) or referred to a specialist obstetrician supported service for evaluation (level 2 scan):

- **Multiple pregnancies** - as soon as possible; to determine chorionicity.
- **Discordant measurements** - if there is (around 20 weeks) a discrepancy of 10 days or more between any of the following: BPD, FL, AC; refer within 1 week.
- **Placental location** - if placenta < 2 cm from the internal os at the initial scan, the person performing the scan must make an appointment for a repeat scan at a specialist health facility at 32 weeks of gestation to determine the exact placental location.
- If there is **decreased amniotic fluid** (deepest pool < 3 cm) or **increased fluid** (deepest pool > 8 cm) - refer within 1 week.
- Any "abnormality" seen or suspected by a non-accredited practitioner must be referred to an accredited sonographer or obstetric specialist with referral within 1 week; preferably discuss the specifics of the findings by phone prior to referral.

Any structural fetal anomalies (or any soft markers for anomalies) noted during the routine examination by an accredited sonographer should be referred directly to a specialist health facility or maternal-fetal evaluation unit by the sonographer doing the initial scan.

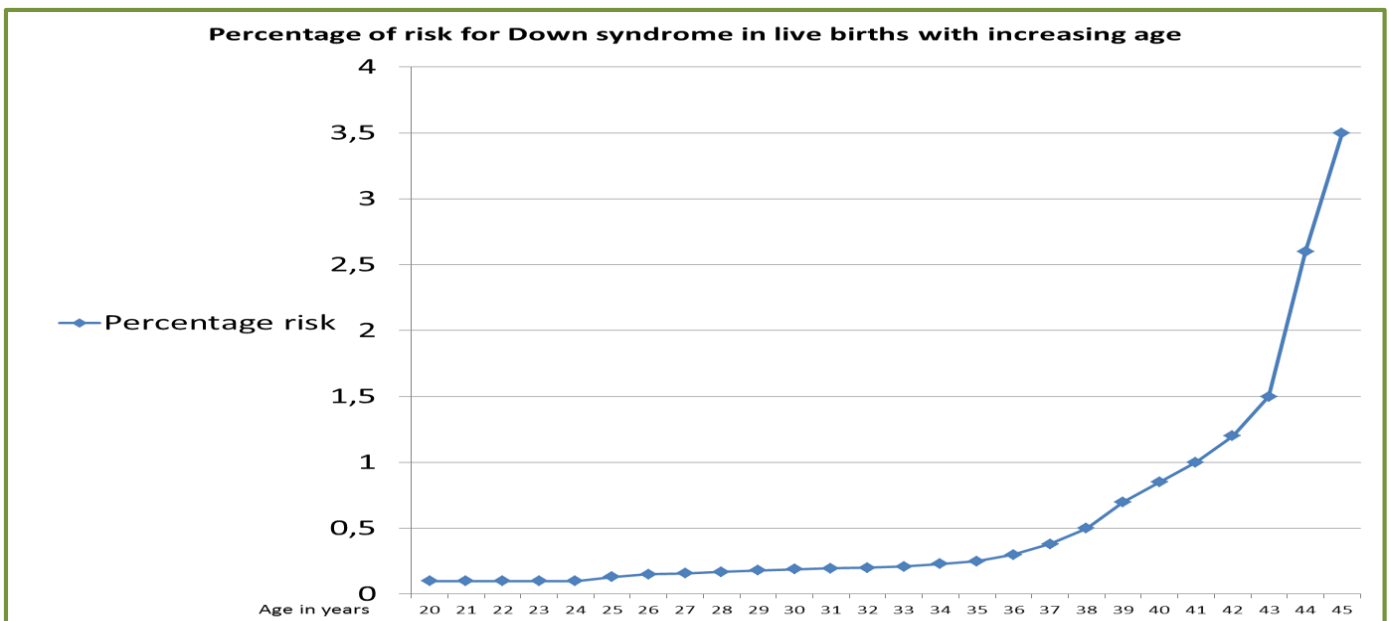
SCREENING FOR CONGENITAL ANOMALIES

Routine screening for structural and chromosomal fetal anomalies is not yet practical in the public sector in South Africa. Targeted screening can be offered and the following pregnant women need referral to a specialist health facility or a maternal fetal ultrasound unit:

All women with advanced maternal age (37 years or older with conception, but the age cut-off may vary due to local protocols)

- Should be informed of their increased risk for trisomy 21 (T21).
- Should be offered referral to a genetic clinic, either at 11-13 weeks or as soon as possible from 16 or 18 weeks onwards, up to an estimated gestation of 22 weeks and 6 days.
- Consenting women will be routinely offered a scan and formal genetic counseling and invasive testing to rule out T21.
- Use the graph to show women the increase in risk for Down syndrome according to her age.

Figure 15.1: Graph showing percentage risk for Down Syndrome in live births with increasing age



The following high-risk women must be referred for structural screening and management decision to specialist hospitals

- Pre-gestational diabetes.
 - For Nuchal Translucency scan (NT) at 11-13 weeks
 - For fetal anomaly scan at 18-20 weeks
- Exposure to any teratogenic drugs, refer at 20 weeks.
- Previous history or family history of structural, chromosomal or genetic anomalies - at 11-13 weeks or as soon as possible thereafter.
- Monochorionic twins – at 11-13 weeks or as soon as diagnosis is made and then every 3 weeks for follow-up.
- Any other abnormal ultrasound findings - on diagnosis.

To achieve all the above, it is essential that all unnecessary requests for ultrasound examinations are identified and declined.

The following are usually not indications for referral to ultrasound at any level

- Patient's request after 24 weeks, or for fetal sexing.
- Diagnosis of pregnancy.
- Vaginal bleeding with a negative pregnancy test.
- Amniotic Fluid Index (AFI) in suspected postdates less than 41 weeks.

ULTRASOUND DATING POLICY

When a BANC clinic has access to routine basic obstetric ultrasound for every client, the ultrasonographer can determine the correct Gestational Age and Estimated Date of Delivery and record this on the antenatal card. If routine ultrasound is not yet available, or the person "books" after 24 weeks, the health professional at the BANC clinic **must** do the determination of gestational age according to the BANC protocols.

Certain menstrual history is defined as

- Certain of the exact date of the first day of the Last Menstrual Period (LMP)
- Normal LMP i.e. normal amount and duration of vaginal bleeding
- Regular cycle of 25-31 days, no bleeding since LMP
- No hormonal contraception within 3 months prior to LMP
- In-vitro fertilisation treatment: use as "LMP" the date 16 days before the day of embryo transfer

First trimester: CRL, BPD, HC, AC

- Crown Rump Length (CRL) can be used for dating purposes up to a CRL of 80 mm, provided the measurement is taken accurately with the fetus in a neutral position i.e. do not measure when the fetus is stretched out or significantly curled up. Wait for the baby to move and re-measure when the fetal spine is only slightly curved.
- If possible, perform full fetal biometry even in the first trimester and gestational age (GA) will be determined by the composite GA of all measurements, rather than the CRL alone. Femur Length (FL) is not used for dating since the reference ranges of the database are not accurate.
- If the first trimester Ultrasound (US) age is compatible with the menstrual age within a 7-day margin: accept the LMP-expected date of delivery (EDD).
- If discrepancy of more than 7 days: Find out whether an early pregnancy scan was done and compare the results. Re-date according to US if scans both give a compatible EDD.
- If US smaller than LMP: Check the timing of the first pregnancy test. If the pregnancy test was positive shortly after the first missed period: do not re-date from US but regard as early intrauterine growth restriction (possible chromosomal abnormality) and review yourself in a few weeks. If no early pregnancy test was done: re-date from CRL.
- If uncertain menstrual age or US larger than LMP: re-date from US but confirm at 18-22 weeks.
- Pregnancy following in-vitro fertilisation: never re-date from US!

Second trimester: BPD, HC, AC, FL (18-24w)

- Dating from US-measurements is only accurate if the different measurements are compatible with one another and the fetus is normal. If there is significant discrepancy between head, abdomen or limbs, one should search for abnormalities or signs of intra-uterine growth restriction (IUGR).
- Dating in the second trimester relies heavily on head measurements. Unless the head is significantly dolichocephalic (long, flattened head), the biparietal diameter (BPD) and head circumference (HC) are used for dating purposes. In case of dolichocephaly, only the HC is used.

- If all measurements are concordant, the US-gestational age is determined as the average gestational age from all 3 or 4 parameters, provided “Chitty reference ranges” are used for all.
- If the biometry-age is compatible with certain menstrual age within a 14-day margin: accept LMP for EDD.
- If more than 14-day discrepancy with uncertain menstrual age: assign US-EDD if less than 24 weeks.
- If more than 14 day discrepancy with certain menstrual age:
 - If smaller but very early pregnancy test available: Consider as early IUGR and review in 2-3 weeks **and do Doppler**.
 - If smaller but no early pregnancy test: re-date from US if no signs of abnormality or asymmetry and normal placenta and liquor.

Third trimester (> 24 weeks) BPD, HC, AC, FL

- If > 24w: No accurate dating from US possible. If the patient is obese (Body Mass Index > 35 weeks) ultrasound dating can still be done up to 28 weeks.
- Look for signs of IUGR in the measurements and fetoplacental features. Dopplers should be done if any of these suggest IUGR in a more advanced gestation than what the measurements suggest.
- In the absence of any signs of IUGR, provisionally assign US-EDD but refer to the doctor for assigning a working EDD and offer rescan for growth in 2-3 weeks if indicated.
- Results of informal earlier scans that were done by inexperienced and non-accredited staff may be ignored for the purpose of allocating Expected Date of Delivery.
- NOTE: in any cases of uncertainty advice must be obtained telephonically from a fetal maternal unit or the specialist hospital or the high risk clinic at the district hospital.

16

RESPONDING TO A MATERNAL DEATH AT A HEALTH CARE FACILITY

Purpose of this Chapter

This chapter discusses the detailed steps to take to respond to a maternal death at a health care facility over time, including who to inform and how notifications should be done.

CHAPTER 16: RESPONDING TO A MATERNAL DEATH AT A HEALTH CARE FACILITY

The following action must be taken to respond to a maternal death at a health care facility.

IMMEDIATELY

- Inform most senior clinician on duty (e.g. consultant obstetrician on-call).
- Inform most senior nurse on duty (e.g. night matron).
- These senior staff must decide whether a post-mortem is required.
- Inform the family.
- Make arrangements for photocopying of the case file.

WITHIN 72 HOURS

- Inform top management of facility (CEO, Medical and Nursing Managers).
- Inform District Clinical Specialist Team (DCST).
- Hold a formal meeting to:
 - Clarify all the facts about the case.
 - Make and record an initial action plan to prevent a recurrence.
 - Fill the maternal death notification form (Maternal Death Notification Form - draft).
- The meeting should include at a minimum:
 - All health care personnel who were responsible for the care of the patient around the time of death (example: doctor on-call, including sessional doctors, nurses on duty in the relevant ward, doctors from other disciplines where relevant).
 - The most senior clinician in the relevant disciplines at the facility (e.g. HOD or Clinical Manager for obstetrics, but also for anaesthetics, medicine etc where relevant).
 - The Assistant nurse manager for maternity and for other sections where relevant to the case (e.g. theatre, medical wards and casualty).
 - At least one of the top management of the facility.
 - Relevant member(s) of the DCST (includes obstetric specialist, advanced midwife, family physician, PHC nurse, and anaesthetist).
- Arrange a meeting to discuss the case with the family (an experienced senior doctor and nurse who know the case well should be present).
- Debriefing / supportive counselling should be conducted by senior staff for any members of staff closely involved in the case who feel mentally effected by the death.

WITHIN ONE MONTH

- All relevant documentation related to the case should have been compiled. This includes notes from other institutions who managed the patient during pregnancy (the patient may have been referred to the facility where she died), all theatre notes, ICU notes, investigation results and any provisional post-mortem report.
- Feedback should have been given to other facilities who may have managed the patient during her pregnancy (e.g. PHC clinics who conducted the antenatal care or District hospital that referred to the regional hospital. It is preferable to invite members of the referring hospital /clinic to the meeting).
- The case should have been discussed at a scheduled monthly perinatal mortality meeting, using the case to highlight any lessons learnt, and to give feedback on progress with the initial action plan. Representatives

from all the referring clinics should be present at a hospital's perinatal meeting. The DCST should also be represented. Preliminary information of post mortem if done should be obtained if at all possible.

- Following the discussions at the PNMM, any additions to the action plan and to the filling of the maternal death notification form (MDNF) can be finalized. The MDNF **must** be signed by the head of the maternity unit.
- A copy of all documentation related to the case, together with the completed MDNF must be delivered to the Provincial MCWH Office, for the purposes of the Confidential Enquiries into Maternal Death.

WITHIN 3 MONTHS

- The case should be presented at the District Perinatal Meeting. At this forum, the focus should be on feedback regarding the implementation of the action plan drawn up at the facility in response to the maternal death.

Purpose of this Chapter

This chapter discusses the various steps in postnatal care, including potential emergencies and how to prevent and treat them.

CHAPTER 17: ROUTINE POSTNATAL CARE

OBJECTIVES

The objectives are to manage the normal psychological and physical changes that occur in the first days after delivery; to assist, counsel and provide advice, and to screen for and detect problems that threaten the health of the mother and baby.

POSTNATAL CARE AFTER NORMAL VAGINAL DELIVERY

- Do not separate the mother and her baby unless one of them requires special or intensive care.
- On the mother's arrival in the postnatal ward, check the BP, the heart rate, that the uterus is firmly contracted and that there is no evidence of active vaginal bleeding.
- Consider and note any problems that the women may have had during the antenatal period and during labour.
- Ensure that the mother is mobile and can pass urine.
- Prescribe paracetamol 1 g orally if the mother complains of mild pain.
- Counsel on infant feeding, contraception, and self-care in the puerperium.
- Ensure that mothers are offered the support necessary to acquire the skills of correct positioning and attachment of their infants for optimal breastfeeding. Explain the necessary techniques to the mother, thereby helping her to acquire the skill for herself.
- Mothers who have decided not to breastfeed after counselling and education should be given information on age specific types of infant formula to purchase and shown how to prepare and use formula safely
- Ensure 4 hourly BP, heart rate, temperature, and pad check assessments.
- Call a senior midwife or doctor if there are abnormalities: consider transfer from a CHC to hospital.

Discharge from clinic or hospital is permissible 6 hours after delivery provided that:

- There are no medical, surgical or obstetric problems that require attention.
- The mother looks and feels well.
- There is no evidence of anaemia.
- The heart rate (< 100/min), respiratory rate (< 20/minute) temperature (< 37.5 °C) and the blood pressure are all normal.
- There is no unexpected uterine tenderness.
- There is no active vaginal bleeding.
- The woman is mobile and has passed urine normally.
- There is no excessive pain in the abdomen or perineum.
- Infant feeding has been explained and demonstrated.
- Information where to get continued infant feeding support if she needs it after discharge
- Contraception has been discussed and provided.
- All blood results – Hb, syphilis, Rhesus group, and HIV – are recorded and appropriate actions taken.
- A discharge summary form has been completed appropriately.

Self-care of healing episiotomy or perineal tear

- Advise on perineal hygiene: sitz baths twice daily in warm water (salt or antiseptics not essential).
- Advise that the sutures will absorb and fall out spontaneously (check that the sutures used are absorbable).
- Pain can be managed with ice packs and/or oral paracetamol 1 g orally 4 times daily.
- The mother should return to the clinic if pain worsens or does not respond to simple measures.
- First and second degree tears heal faster than episiotomies.
- With episiotomy, it may take up to one month before sexual intercourse can resume.

The postnatal visit at 3-6 days

All mothers should attend their local clinic 3-6 days after normal delivery, for check-up of themselves and their babies. Essential elements of the woman's check-up are as follows:

- Any orders or special concerns noted on the discharge summary.
- Check temperature, heart rate, blood pressure, respiratory rate.
- Palpate the abdomen and uterus for tenderness.
- Examine the legs for evidence of thrombosis.
- Check for vaginal bleeding and offensive vaginal discharge.
- Check breasts and nipples for any problems.
- Assess the baby's condition.
- Counsel and advise on self-care, mood problems, infant care and feeding, and the 6-week follow-up.
- Call a senior midwife or doctor if there are abnormalities: consider transfer from a CHC to hospital.

The postnatal visit at 6 weeks

Most activities at the 6-week visit relate to care of the baby (HIV, vaccinations, weighing, feeding). When attending to the mother:

- Attend to special concerns noted on the discharge summary.
- Assess general well-being of the mother.
- Check for pallor and measure the BP and heart rate.
- Do bedside Hb test, if low send off full blood count and get advice from a specialist.
- Review contraception choices: an intrauterine device may be inserted at this time /alternately implants may be considered.
- Counsel on any problems.
- Remind HIV-negative breastfeeding mothers to return at 3 months for HIV testing.

POSTNATAL CARE AFTER CAESAREAN SECTION

- Do not separate the mother and her baby unless one of them requires special or intensive care.
- On the mother's arrival in the postnatal ward, check BP, heart rate, uterine contraction, wound dressing and pad for bleeding.
- Check the caesarean section notes for indication and complications, and ensure all surgeon's and anaesthetists' orders and prescriptions are clearly understood and followed.
- Check BP, heart rate, pad checks:
 - Half hourly for 2 hours
 - Hourly for 4 hours
 - 2 hourly for 6 hours
 - 4 hourly until the mother is discharged
- Check temperature and urine output 4 hourly.

- Remove the urinary catheter after 6 hours, unless there is a note from the surgeon to keep the catheter in.
- Allow the woman to be up and about as soon as she feels strong enough.
- After uncomplicated caesarean section, give oral fluids and a light meal as soon as the woman feels hungry.
- Call a doctor if there are abnormalities: consider transfer from a CHC to hospital.
- A doctor's ward round must be done at least once daily.
- The mother may be discharged on the second day (36-48 hours) after an uncomplicated caesarean section, if all observations are normal, as above for vaginal delivery. **In particular, women with a heart rate > 100/min or respiratory rate > 20/minute require thorough assessment and investigation, and should not be discharged.**
- Women with risk factors for infection (HIV infection, prolonged labour, prolonged rupture of membranes, chorioamnionitis, or caesarean section in the second stage) may need to be kept in hospital on antibiotics for 3-5 days.
- Write a clear discharge summary with orders for removal of sutures and follow-up visits.
- The six-week postnatal visit will be the same as after normal vaginal delivery.

ABNORMALITIES OF THE PUERPERIUM

This section describes postnatal problems occurring after discharge from the labour ward or operating theatre. Frequently, women will present with secondary postpartum haemorrhage or puerperal sepsis after discharge from CHC or hospital.

SECONDARY POSTPARTUM HAEMORRHAGE

This is passage of fresh blood or clots from the vagina more than 24 hours after delivery. Common causes are uterine sub-involution, retained products of conception, and wound breakdown or haematomas.

Emergency management

- Assess general condition, especially consciousness, temperature, colour, BP, heart rate and respiratory rate.
- Resuscitate if necessary as for management of primary postpartum haemorrhage.
- Take blood for FBC and cross-match.
- Give oxytocin 10 units intramuscularly as a single dose.
- Add oxytocin 20 units to 1 L Ringer-Lactate and run at 125 mL/hour.
- Consider adding Syntometrine 1 ampoule IM or ergometrine 0.5 mg IM as a single dose unless the mother is hypertensive or has cardiac disease.
- Admit the patient or transfer from CHC to hospital.
- Look for and treat the cause of bleeding:
 - If there is evidence of puerperal sepsis, proceed as for puerperal sepsis (section below).
 - On vaginal examination, feel for retained products through the cervix, and do a trans-abdominal ultrasound scan if no products are felt. If products are retained, arrange for evacuation in theatre.
 - Examine carefully for secondary haemorrhage from healing lacerations or wounds, and treat appropriately.
 - With no evidence of puerperal sepsis or wound breakdown, assume sub-involution and continue with oxytocin infusion. Add oral antibiotics: amoxicillin 500 mg orally 3 times daily and metronidazole 400 mg orally 3 times daily.
- Severe haemorrhage that does not respond to the above measures may require examination in theatre, and even laparotomy and hysterectomy, ideally at specialist referral level.

PUERPERAL SEPSIS

This is infection of the upper genital tract after delivery, which may involve the endometrium (decidua), myometrium, operative incisions, pelvic peritoneum or the entire peritoneal cavity. Severe puerperal sepsis is life threatening and its early signs can easily be missed because of atypical presentation or incomplete clinical assessment on admission.

The most common presentation of puerperal sepsis is lower abdominal pain and/or abnormal vaginal discharge during the postpartum period. Additional symptoms (e.g. fever, weakness, vaginal bleeding) are frequent.

Clinical risk factors for puerperal sepsis

- Caesarean section
- Prolonged labour
- Frequent vaginal examinations in labour
- Prolonged rupture of membranes
- Traumatic delivery
- Antenatal anaemia
- Poor immunity – HIV infection, diabetes mellitus or chronic use of corticosteroids
- Extensive vulvar warts
- Retained placenta or products of conception

MILD PUERPERAL SEPSIS

Clinical features include mild uterine tenderness without evidence of peritonitis, heart rate < 100/minute, temperature < 37.5 degrees C, and offensive lochia (discharge).

Management

- On vaginal examination, exclude retained products of conception by feeling for retained products through the cervix. If products are retained, arrange for evacuation in theatre with IV antibiotic cover and oxytocics, or transfer from CHC to hospital.
- Give amoxicillin 500 mg 3 times daily orally and metronidazole 400 mg 3 times daily orally for 5 days.
- If the patient is allergic to penicillin, give erythromycin 500 mg 4 times daily orally instead of amoxicillin.
- Encourage adequate intake of oral fluids.
- Follow up for reassessment in 36-48 hours.
- If not improving, admit and transfer to specialist level.

SEVERE PUERPERAL SEPSIS

Clinical features include temperature ≥ 37.5 degrees C and a heart rate ≥ 100 /min in the presence (not always) of offensive lochia and uterine/abdominal tenderness. Consider other causes of infection, e.g. meningitis, TB, pneumonia. After initial assessment and emergency management, patients with severe puerperal sepsis should be transferred to specialist level.

Emergency management

- Take a full but relevant history of the pregnancy and delivery with reference to documentation if available.
- Do a full physical examination, with special attention to consciousness, temperature, heart rate, respiratory rate, colour, chest, abdomen and vaginal examination.
- Watch out for signs of septic shock and proceed as below, with additional measures for septic shock (below).
- Evaluate organ systems clinically: big 5 (cerebral, cardiovascular, respiratory, liver and kidney), forgotten 4 (haematological, immune, endocrine, musculoskeletal, and core 1 (urogenital)).

- Take blood for FBC, U&E and culture.
- Insert an intravenous line with Ringer-Lactate, and run at 125-240 mL/hour.
- Insert a urinary catheter.
- Ensure that antibiotics are given within 1 hour of presentation: start with ampicillin 1-2 g IV, gentamicin 6 mg/kg mg IV, and metronidazole 400 mg orally (or 500 mg IV if vomiting).
- Monitor heart rate, blood pressure and urine output hourly.
- Transfer from CHC or district hospital to specialist level.

Emergency treatment of septic shock

- Treat for septic shock if the systolic BP is less than 90 mmHg with a heart rate ≥ 100 /minute in the presence of signs of infection.
- Give a rapid infusion of Ringer-Lactate 1-2 L (20 mL/kg).
- Observe BP, heart rate and respiratory rate half hourly, and oxygen saturation continuously (if equipment available).
- Give oxygen by mask.
- Aim for systolic BP ≥ 100 mmHg, or mean arterial BP ≥ 65 mmHg, respiratory rate < 30 /minute, oxygen saturation $> 90\%$, and haematocrit $> 30\%$.
- Consider adding adrenalin and emergency blood transfusion.
- Transfer from a district hospital to a specialist health facility with full documentation of treatment given, as soon as the patient is reasonably stable.

CAESAREAN SECTION WOUND SEPSIS

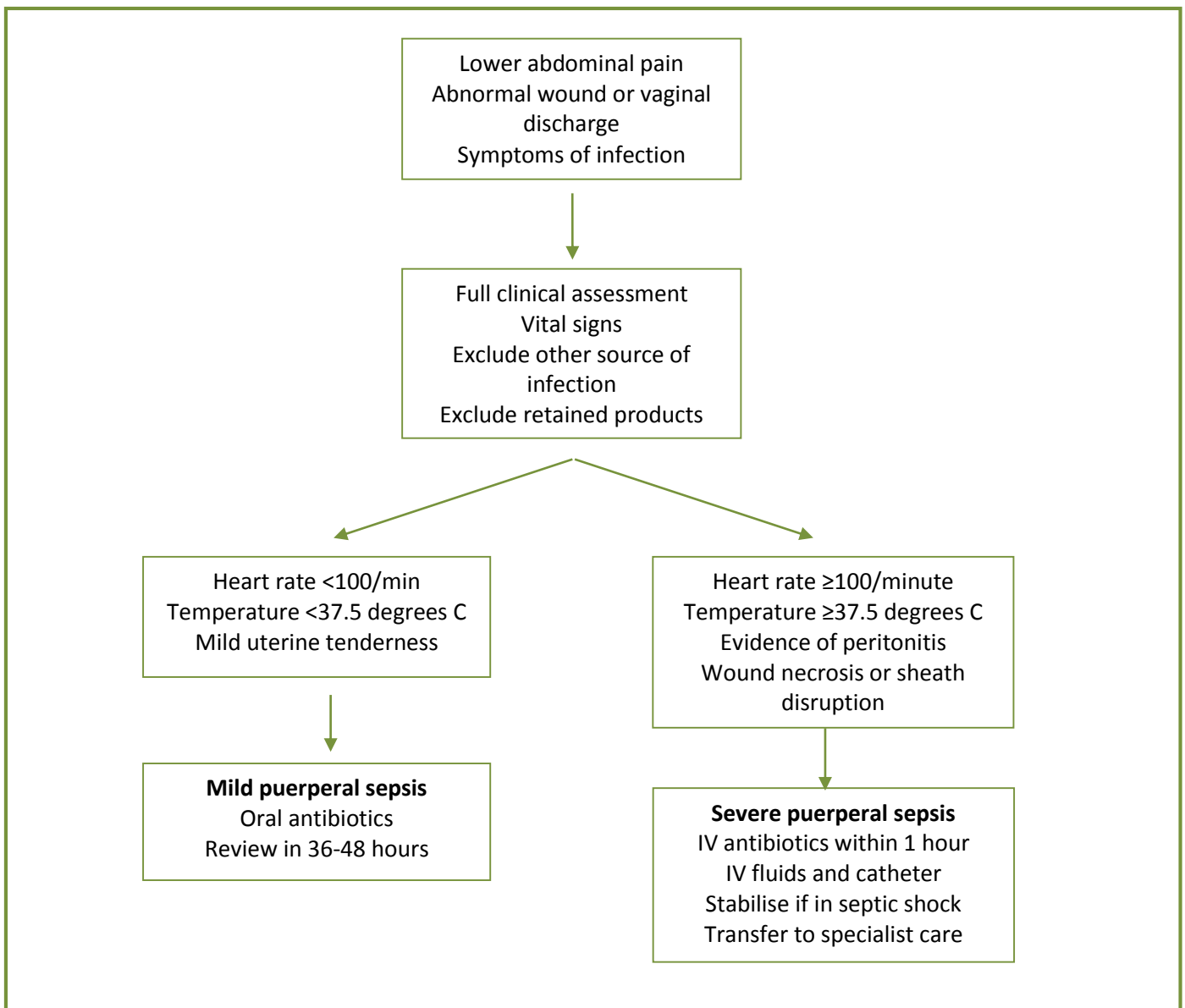
This usually presents 4-10 days after caesarean section. The wound is tender and indurated, and pus may be expressed from the suture line.

Assessment and management

- Assess for mild or severe wound sepsis, including full physical and gynaecological examination, and manage as above, including transfer from CHC to hospital, or to specialist care if necessary.
- Open the wound and remove sutures from the skin and subcutaneous tissue.
- Aspirate tender or fluctuant areas with a needle and syringe, and send blood or pus for MC&S. Do not send pus swabs.
- Subcutaneous abscesses may be drained using local and/or opiate analgesia.
- If the wound is frankly necrotic or the surrounding skin has areas of blistering or gangrene, treat for severe sepsis and transfer to specialist care.
- Inspect the depth of the wound: if the rectus sheath is not intact, transfer to a specialist health facility.
- Add cloxacillin to the antibiotic regimen.
- Order wound dressings as appropriate for the dressing method used.

Figure 17.1 below shows the management of puerperal sepsis.

Figure 17.1: Management of puerperal sepsis



APPENDIX 1: ESSENTIAL EQUIPMENT, DRUGS AND TOOLS PER LEVEL OF CARE FOR MATERNAL HEALTH SERVICES

1. Equipment					
Level one				Level two	Level three
A	B	C	D	E	F
Mobile services	Day clinic (no 24 hour service):	24 hour clinic & community health centres	District hospital	Regional hospital	Tertiary / quaternary hospital
	As for A +	As for B +	As for C +	As for D +	As for E
<ul style="list-style-type: none"> • BP machine and different size cuffs • Working scale for both adults and neonate • Tape measure • Thermometer • Adult stethoscope • Fetal stethoscope • Haemoglobino-meter • Good light source • Vaginal specula of different sizes • Cold box (for storage of drugs and vaccines) 	<ul style="list-style-type: none"> • Haemoglobino-meter • Glucometer • Hand held Doppler • Emergency delivery pack • Watch or clock with second hand that can be seen easily • Refrigerator or cold box (for storage of drugs and vaccines) • Equipment for IUCD insertion and removal • Effective communication system • Instrument & Forceps sterilizer • Jar for forceps • Dressing forceps • Kidney basins • Sponge bowls • Scissors • Surgeon's hand brush • Heat source 	<ul style="list-style-type: none"> • Hand held Doppler • Bedpans • Delivery pack • Episiotomy / tears repair set • Fixed / mobile suction • Vacuum extractors and cups? (for use by advanced midwives) • Equipments for neonatal resuscitation - mucous • extractor and infant face mask • Overhead radiant • Heater • Equipment for adult resuscitation? • Adult ventilator bag and mask and Mouth gag 	<ul style="list-style-type: none"> • CTG • Ultrasound scan • Oxygen source (portable cylinder or central wall supply) together with mask or nasal cannula, tubing and flow meter • Intravenous infusion pumps • Functioning theatre with equipment • Equipment for resuscitation of adults including defibrillator • Equipments for neonatal resuscitation • Craniotomy equipment? • Theatre packs for C/S,minilaparatomy evacuation of the uterus • X-Ray facilities • Laboratory facilities 	<ul style="list-style-type: none"> • Forceps • Facilities for major • Surgery (e.g hysterectomy) • High care and ICU • Blood bank 	

2. Drugs and supplies

Level one				Level two	Level three
A Mobile services	B Day clinic (no 24 hour service):	C 24 hour clinic & community health centres	D District hospital	E Regional hospital	F Tertiary / quaternary hospital
	As for A +	As for B +	As for C +	As for D +	As for E
<ul style="list-style-type: none"> • Urine dipstix • Intravenous infusion sets • Intravenous fluids • Venepuncture supplies • Alcohol/Betadine / Savlon • Gloves – examination & utility / heavy-duty household gloves for cleaning • Puncture-proof-container for sharps disposal • Disinfectant • Chlorine for making decontami-nation solution • Condoms - male & female • Hormonal contraception pills & injectables • Vaccines for immunisation (both mothers & children) • Haematinics - Fe, folate • Supplies to take pap smear 	<ul style="list-style-type: none"> • Oxygen • Drugs for obstetric emergencies • IV administration sets • IV solutions: Ringer's lactate, normal saline, glucose • On site testing kits for: pregnancy, Rh D syplillis, HIV, urine alysis • Supplies for drawing blood - (tourniquets, syringes and needles,tubes, labels) • Soap at all sinks • Drugs for obstetric emergencies - MgSO4, tocolytics, oxytocic, antibiotics antimalaria (in affected provinces) 	<ul style="list-style-type: none"> • Drugs for resuscitation of neonates • Drugs for resuscitation of adults • Urine catheters and bags • Oxytocic drugs for active management of third stage of labour • Local anaesthetic • Suture needles and material • Antibiotics • Tocolytics • Analgesia 	<ul style="list-style-type: none"> • Emergency blood • Drugs to manage hypertension, diabetes and other pregnancy-related / medical complications • Induction of labour drugs • Tubal ligation facilities • Insertion of IUCD facilities • Anti-hypertensive drugs • Diuretics • Anti-allergy drugs 	<ul style="list-style-type: none"> • Antidiabetic drugs • Anti-coagulants and antidote 	

3. Tools

Level one				Level two	Level three
A Mobile services	B Day clinic (no 24 hour service):	C 24 hour clinic & community health centres	D District hospital	E Regional hospital	F Tertiary / quaternary hospital
<ul style="list-style-type: none"> • Appropriate documentation sheets for narrative notes, etc. • Antenatal cards (Mother -Baby- Package) • Antenatal register (EmOC) • Guidelines (EDL) 	<p>As for A +</p> <ul style="list-style-type: none"> • Referral forms • Laboratory request forms • Postnatal register 	<p>As for B +</p> <ul style="list-style-type: none"> • Maternity case records • Delivery register referrals 	<p>As for C +</p>	<p>As for D +</p>	<p>As for E</p>

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