Emergency Obstetric Care and Newborn Care training for Skilled Health Personnel

A Manual for Participants

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Welcome to the Emergency Obstetric and Neonatal life-saving skills course

Despite some improvements in recent years, global maternal mortality and morbidity remains too high. In 2017, global estimates of maternal death annually stood at 295,000 (WHO 2019), with a global maternal mortality ratio (MMR) of 211 maternal deaths per 100,000 live births. Twenty countries had an MMR of greater than 500/100,000 live births. Of these, all but Afghanistan are located in sub- Saharan Africa. Three countries had an MMR greater than 1000, South Sudan, Chad and Sierra Leone. For each woman who died, there were many more who suffered serious morbidity.

There are many reasons for this loss of life. For example, the Kenyan Confidential Enquiry into Maternal Death 2017 revealed that in 9 out of 10 reported cases of maternal death, women received substandard care and commented that, had the care been different, the deaths could have been averted. In a significant proportion of these deaths, inadequate clinical skills were cited as reasons for substandard care.

To achieve the Sustainable Development Goal 3 global maternal mortality ratio of less than 70 maternal deaths per 100, 000 live births, we have to scale up evidence-based interventions that improve access to and utilization of quality maternal health services. Competent skilled health personnel who can provide Emergency Obstetric Care and Newborn Care working within enabling environments are required.

It is therefore of great importance that all skilled health personnel receive adequate training in the early detection and management of obstetric emergencies.

This short course aims to provide basic training in obstetric emergency and newborn care skills, applying a structured approach to the management of all obstetric and newborn emergencies. This manual is not intended as a comprehensive textbook, but rather may be used as a “quick look book” to remind you of the skills taught on this course.

This manual can be used on our in person or blended learning training course.

We appreciate all authors of previous editions and all those who contributed to the development of this third edition.

Charles Ameh March 2021

MODULE 1: QUALITY OF MATERNAL AND NEWBORN CARE

1.1: The quality of care

Key learning objectives

- Quality of care
- Respectful maternity care
- The rights-based approach to health
- Communication skills
- How and when to obtain informed consent
- The importance of male involvement and companionship

Internationally, there has been much progress made concerning increasing the coverage of maternal and newborn health interventions over the past two decades. However, further improvement in maternal and newborn health outcomes will depend on the ability of healthcare leaders and providers to address the gap between availability and quality of care. Improving the quality of facility-based healthcare services and prioritising quality improvement as an integral component of scaling-up of effective, evidence-based interventions is crucial if health outcomes for women and babies are to improve.

There are many definitions of quality of care, all of which are important for antenatal, intrapartum and postnatal care.

Definitions of quality of care

- Quality of care is defined as the extent to which health services provided to individuals and populations improve desired health outcomes. To achieve this, health care needs to be safe, effective, timely, efficient, equitable, and people-centred.
- Quality of care is the degree to which maternal health services increase the likelihood of timely and appropriate treatment to achieve desired outcomes that are both consistent with current professional knowledge and uphold basic reproductive rights.
- The quality of medical care is an index of civilisation.

Multi-disciplinary teamwork with midwives, nurses and doctors is essential to provide good quality evidence-based care. Sometimes, healthcare providers may provide care that is not proven to be effective (i.e. non-evidence-based) simply because “that is the way it has always been done”. Therefore, all healthcare providers must be

knowledgeable and keep up-to-date regarding which aspects of care are evidence-based and beneficial and, conversely, which aspects of care are detrimental and for which there is no evidence of benefit to either the woman or her baby.

Components of good quality care

- Care is provided in line with currently available evidence (evidence-based care)
- Care that is supportive, responsive and sensitive to the values and context of each woman's culture.
- Each woman is welcomed and called by her name.
- Special attention is given to each woman's specific needs and wishes.
- Each woman's physical, social and mental health needs are taken into account.
- Each woman is treated with compassion, kindness, and patience.
- Women are given information in plain language and play an active role in the decision-making process for the care they receive. Privacy and confidentiality are maintained at all times.
- Women are allowed to ask questions and to have their concerns addressed.
- The woman's partner of choice is consulted, involved and informed of decisions, interventions and needs as they arise, with the woman's permission.
- A mother and her newborn are enabled to remain together from birth and throughout their stay in or visit to a healthcare facility.

1.2 Respectful maternity care

Respectful maternity care is an essential part of quality improvement. This includes woman-centred care, empowering, supportive, evidence-based, enabling open communication and full expression of trust and commitment between a woman and her healthcare provider. Respectful maternity care highlights that women have a right to receive the highest quality of care possible, in a way that addresses their physical, psychological and social needs. Treating women with dignity and respect means that the healthcare provider has a caring attitude, listens to women, respects their wishes and demonstrates empathy.

- **Respect:** This can be a certain feeling or holding someone in high regard, having respect for someone's knowledge, their judgement or hard work. The healthcare provider can show respect by introducing her/himself by name and greeting the woman by her name.

- **Empathy:** Showing empathy for someone means understanding their situation, thinking about how you would feel if you were in a similar situation and being able to share their feelings. The healthcare provider can show empathy by active listening to understand a woman's specific health concerns. Having sympathy is slightly different and involves showing compassion or sorrow for someone's

problem or hardship.

- **Dignity:** Showing dignity means that a woman is valued and care is given in a way that supports and promotes and does not undermine, a woman's self-respect regardless of any difference. The healthcare provider can demonstrate dignity by ensuring privacy and confidentiality at all times.

To provide respectful maternity care, healthcare providers need to have the right attitude, beliefs and values. An attitude is how we evaluate a person, place, thing or event, and maybe favourable or unfavourable. A belief is a thought that we hold deeply and trust and, because of this, this can cause automatic reactions in us. People do not often question beliefs as they hold them to be true. Attitudes and values are shaped by our beliefs and we may not always be aware of these unless we stop to think about them. Everyone has a right to their own beliefs but when caring for women, healthcare providers may have to explore and understand how these affect the care they give (both positively and negatively).

These are reasons that may explain why disrespect and abuse during antenatal and postnatal care occurs and a review of these may help healthcare providers work out ways to resolve the issues. Sometimes there are factors in the health system itself or in the community that act as barriers to being able to provide good quality care. Healthcare providers and managers can usually influence these factors to help facilitate improvement and overcome these barriers.

1.3 The rights-based approach to reproductive health

The definition of reproductive health highlights the importance of a rights-based approach to health care. Reproductive health is the complete physical, mental and social well-being in all things related to the reproductive system, including a satisfying sex life, the ability to have children and freedom to decide if when and how often to have children.

Barriers and enabling factors for delivery of respectful maternity care

	Barriers	Enabling factors
Health system factors	Inadequate infrastructure	The reorganisation of available space, raise funds for seating
	Shortage of equipment and supplies	Regularly check stock and report any shortages to management regularly and early
	Poor supervision and management of healthcare facilities	Start a system of peer support
	Poor resource management of existing staff	Make a clear rota and schedule for clinics
	Inadequate communication linkages between healthcare facility managers, providers and community members	Organise quality of care meetings
Community-level factors	Gender imbalances in communities where the man is the sole decision maker	Ensure discussions with both female and male community leaders
	Lack of knowledge about the importance of maternity care	Community education
	Financial barriers including the need to pay for transport to access care	Mobilise community resources
	Limited opportunities for communities to seek redress if women are unhappy with services received	Encourage the community and women to give feedback about the quality of care they have received, both positive or negative experiences
	Traditional beliefs, practices, customs and taboos making it difficult to discuss issues around childbirth	Respect tradition and deliver care in culturally appropriate ways

Reproductive rights include the right to:

- Decide how many children they want and the spacing of their children
- Have an education about and the means to choose the contraception method of their choice
- Have the highest possible standards of reproductive health
- Access to a skilled birth attendant
- Make decisions about reproduction free from discrimination, coercion and violence

Not treating a woman with respect and dignity when providing health care is a violation of their rights as a human being. Examples of abuse of human rights in maternal health are:

- **Physical abuse**: a woman is slapped during childbirth by the healthcare provider.
- **Non-consensual care**: care is provided without the woman's permission and/or agreement, for example performing a routine episiotomy, especially without analgesia.

- **Non-confidential care**: test results for a woman are shared with others without her permission.
- **Discrimination**: illiterate women are not treated with the same regard as educated women.
- **Abandonment or withholding of care**: a woman who needs care is not given this care by the healthcare provider for example analgesia is not offered during and after childbirth.

The rights-based approach to reproductive health

	Examples of rights	Example of disrespect and abuse	Example of how rights can be met
1	Freedom from harm and ill Treatment	Physical or verbal abuse	Ensure a policy of no physical or verbal abuse is implemented
2	Right to information, informed consent and refusal of care	Non-consensual care	A clear explanation is given to women about the care they need and why. They are not penalised if they refuse the care offered to them
3	Respect for choices and preferences for care, including having a companion during maternity care	No companion allowed in the examination room during antenatal or postnatal care	Healthcare providers allow the companion of the woman's choice to be with the woman at all times
4	Confidentiality, privacy	Non-confidential care	Healthcare provider speaks with the woman on her own when needed
5	Equality, equitable care, freedom from discrimination	Discrimination based upon specific characteristics of the woman	All women are treated the same
6	Right to timely health care and to the highest standard of care available	Abandonment or denial of care or poor quality of care	Good organisation of antenatal and postnatal care to reduce waiting time. Evidence-based, timely care is provided safely
7	Liberty, autonomy, self-determination and freedom from coercion	Detention in a healthcare facility against a woman's wishes	Explanations are given regularly as to why a woman needs to stay in a healthcare facility. Process for self-discharge against medical advice in place

1.4 Communication Skills

Good communication skills, both verbal and non-verbal, are essential for all healthcare providers. Any interaction between healthcare providers and a woman and her family is an opportunity to build rapport and demonstrate respectful care. The experience of the visit and consultation is likely to affect how the women and her family perceive the

care they receive and this will influence their decision to continue coming to the healthcare facility.

Effective communication includes:

- Having the ability to listen to the woman and her family
- Being able to explain what the care is, what investigations are being offered and the meaning of the results of the test in words that the woman will understand
- Using the local language that a woman understands, an interpreter may be needed
- Demonstrating empathy for the women and her family
- Being non-judgemental

Ways to improve communication:

- Allow some time for introductions explaining who you are and what you plan to do
- Sit at the same level as the woman when you are talking with her when taking a history
- Sit beside a woman rather than behind a table or desk during a consultation
- Use language that is not medicalised and can be understood by the woman and her family
- Provide a private space for the discussion to happen whenever possible

1.5 Informed consent

Giving consent in maternal health for treatment is based upon the principle that a woman must give their permission before medical treatment, a test, a medical procedure or an examination is carried out. Consent can only be given after a clear explanation is given by a healthcare provider and understood by the woman.

Consent needs to be:

- **Voluntary**: The decision must be made by a woman without influence or coercion from healthcare providers, friends or family.
- **Informed**: A woman must be given correct information about what the treatment or examination involves, including the benefits and risks, reasonable alternatives and what will happen if the treatment or examination goes ahead, all in plain language.

In principle, a woman must be capable of giving consent, which means they can understand the information that has been given to them and can use it to make an informed choice. Consent can be verbal, such as when taking a blood sample or written such as required in the case of a Caesarean section.

Different forms of consent

- **Lack of consent**: Obtaining voluntary and informed consent can be difficult if a woman has an impaired state of mind or is unconscious, such as after an eclamptic fit. In such cases, the partner or family member can be asked to provide consent for treatment.
- **Refusal of care**: Even if refusing treatment might cause harm or death, a woman's decision should be respected within the laws of the country. This can be very difficult, for example, when a woman with a very low haemoglobin level refuses a blood transfusion for religious reasons. In these cases, a woman can be asked to sign a form or statement which declares that she understands the risks of going against medical advice and still wishes to decline treatment, accepting responsibility for any risks to her health. If a woman is pregnant and a refusal of care (e.g. the need for a Caesarean section) will result in harm to the unborn baby then a legal judgement may have to be made for the treatment to go ahead.
- **Age**: In the case of a woman who is under the legal age of consent then she may still be able to give consent if she can demonstrate to the healthcare provider that she fully understands what she is consenting to. If this is not the case, then parents or guardians may have to give consent. Laws regarding consent vary from country to country. In most countries, the age of consent is either 16 or 18 years of age.

In practical terms, it may not be possible to obtain written consent in emergencies, for example, a massive obstetric haemorrhage and in these cases, a healthcare provider can proceed with verbal consent before treatment.

1.6 Male involvement and companionship

In some settings, pregnancy is considered a subject/topic for women and men may not be equipped with sufficient information and knowledge on specific aspects of maternal and newborn health. There is, therefore, a need to empower men through the provision of information and services in their homes, communities and their workplaces. It is important to involve the woman's husband or partner and family whenever possible so that they are well informed about the care that the woman needs. This will enable them to anticipate any problems and support the woman during and after pregnancy and childbirth.

Advantages of involving the husband/partner and family include:

- Increased information regarding the pregnancy, childbirth and postnatal processes
- Increased awareness of possible danger signs during the pregnancy
- Development of a birth plan including the availability of finances and planning for transport to the healthcare facility
- Increased understanding of the specific needs of the mother and baby when

returning to the family home

- Increase in the general community and public awareness of issues around maternal and newborn care

Support from a husband, partner, another family member or friend is important during pregnancy, labour, birth and the postpartum period. Women can be encouraged to bring their husband or partner during antenatal care, delivery and postnatal care as the husband or partner must understand the woman's health. Men are more supportive of their wives and partners
when they understand what is happening during and after pregnancy. Male involvement and participation are associated with improved maternal health outcomes.

In the absence of a husband or partner and/or if this considered culturally more appropriate, women can be encouraged to bring a family member or friend with them. A companion can provide important support to a woman. Companionship during labour leads to a better birth experience for the woman

MODULE 2: COMMUNICATION, TRIAGE AND REFERRAL

Key learning objectives

- Why effective communication skills are important
- The process and components of effective communication in case of an emergency
- The components of the ACCEPT approach which can be used when referring a patient

2.2: Communication

It is important that:

Women and their families are treated with respect and dignity

The care provided is based on the best available evidence (evidence-based care)

Healthcare providers are committed to providing the best quality of care possible

Effective communication

Communication is a process that involves transmitting and receiving information between two or more persons. The communication process includes: a sender, a message and a receiver. Effective communication implies that the receiver has heard and understands the message of the sender. In a healthcare setting, effective communication between healthcare providers and between healthcare providers and those receiving care is essential. In an emergency, it is particularly important that communication is clear and unambiguous. Messages may be conveyed face to face or via telephone. It is generally more difficult to convey messages clearly over the telephone than face to face and it is therefore useful to plan what to say and perhaps write this down when using a telephone.

Privacy and confidentiality

In all contacts with the woman and her family:

- Ensure a private place for the consultation and examination.
- When discussing sensitive subjects, make sure that you cannot be overheard.
- Organise the examination area so that, during examination, the woman is protected from the view of other people (use curtains, screens, etc).
- Never discuss confidential information about patients outside the healthcare facility.
- Remember all patient information is confidential and records should be correctly stored.

What do you communicate?

When communicating with a colleague in an emergency, key elements of what you communicate should include:

Who you are
What you want the listener to know
What the relevant patient details are
What the problem is
What has been done to address the problem so far
Why you need help and what you think needs to happen next

The SBAR Framework (Table below) may be used to help organise the information you want to communicate.

The SBAR framework

Situation	Identify yourself Your unit The patient's name Your reason for calling or communicating face-to-face (what is bothering you about the patient)
Background	Reason for admission Relevant obstetric and medical history Treatment to date
Assessment	Your current assessment of the woman – including vital signs pulse, blood pressure, temperature, bleeding, etc.
Recommendation	State why you need help Explain what you think needs to happen Ask for advice; are there recommended actions to be taken? Agree time scale Record time, name and contact for further advice or referral if needed

Why do you communicate?

- Effective communication is important:
- To provide accurate information about the condition of the patient (mother and/or baby)
- To identify clearly what the problems are
- To provide details of any planned interventions and expected or possible outcomes
- Helps patients to make decisions and give consent for an intervention
- Helps families understand what the problem is and why investigations and treatment are needed
- Lessens distress and vulnerability
- Leads to greater job satisfaction for the healthcare provider

How do you communicate?

In case of an obstetric emergency (mother and/or baby), this often occurs unexpectedly. Many obstetric emergencies are potentially life-threatening to either the mother or the baby

or to both. Therefore, the healthcare provider needs to remain calm and needs to have a clear understanding of what the problem is, what needs to be done, and, needs to be able to communicate this. It is important to act quickly and precisely. You will need to communicate effectively to colleagues as well as explain to the patient and her family what is happening and what you are going to do. Try to remember the seven 'C's of effective communication.

The seven 'C's' of effective communication

■ Clear ■ Concise ■ Concrete ■ Correct	■ Coherent ■ Complete ■ Courteous

2.2: Triage and prioritisation of care

Triage means to 'sift as through a sieve' or in other words to **prioritise**.
As part of the triage process;

Assess: Provide a quick but thorough assessment of a woman and/or her baby. This usually means you need to take a history, conduct an examination and investigation.

Prioritise: Prioritise who requires what type of treatment when.
The table below outlines the steps and tasks the healthcare provider who first attends to the woman and/or baby should take:

Steps and tasks during triage and prioritisation

Ask	Examine	Check	Prioritise
MOTHER			
- Why did you come? - Who came with you? - What are the problems?	- Breathing? - Conscious? - Convulsing? - Bleeding? - In pain?	- Patient records - Breathing - Pallor - Pulse - BP - Temperature - Fetal heart rate	- Emergency - In labour – no complications - In labour – high risk of complications - Not in labour
NEWBORN BABY			
- Why did you bring the baby? - How old is the baby? - What are the problems?	- Any sign of life? - Breathing? - Bleeding from umbilical stump? - Breast feeding?	- Birth record - Breathing - Colour - Heart rate - Temperature - Weight - Umbilical cord	- Emergency - Routine care

For the mother

Suspect labour if:

- Abdominal pains and contractions ≥1/10 minutes
- Passage of bloody mucus from vagina
- Drainage of liquor from vagina

Immediate actions to take:

- Transfer to labour ward or labour room
- Call for immediate assessment

Suspect an emergency if:

- Unable to talk or respond to questions
- History of convulsions
- Ongoing convulsion
- Breathing with difficulty
- Bleeding from the vagina
- Foul smelling liquor or discharge
- Severe abdominal pain
- Headache and visual disturbances
- Vomiting
- Fever
- Fetal heart rate <120 or >160 beats per minute
- Rupture of membranes pre-term
- Fresh meconium in liquor

Immediate actions to take:

- Get help
- Ensure RAPID and top-to-toe assessment
- Commence management as needed e.g. insert iv cannula, start fluids, start treatment
- Pay attention to comfort and safety of the woman and her baby
- Explain to the woman what is happening and reassure her that she will be taken care of immediately
- Ask relatives to stay
- Do not leave the woman unattended and/or where she cannot be observed

For the newborn baby

Suspect an emergency if:

- Baby has problems breathing
- Umbilical cord oozing blood or foul-smelling discharge
- Change in colour of skin or mucosa (pale, blue or yellow)
- Vomiting and passing watery stools excessively
- Signs of dehydration
- Not feeding and crying excessively
- Mother reports baby has had convulsions or baby having convulsions
- Fever

Immediate actions to take:

- Get help
- Ensure RAPID and top-to-toe assessment
- Commence management as needed e.g. insert iv cannula start fluids, start treatment

Routine care can be provided for

- Mothers who have delivered a live baby and are not in any apparent danger with stable vital signs (pulse, BP, temperature, breathing)
- Mothers in labour who are not in any apparent danger with regular contractions and normal fetal heart rate 120-160 beats per minute.
- Newborn babies who are well and have no 'danger signs' with stable vital signs (pulse, temperature, breathing)

Action

- If the woman is pregnant and not in labour, provide antenatal care and arrange for follow-up antenatal care visit.
- If the woman had recently delivered, provide immediate postnatal care for the mother and arrange for follow-up postnatal care visit.

Prioritise treatment

Prioritisation of who gets what care, when, and, in what order, is important. This is done regularly in a labour ward with many patients, or, if you are the only healthcare provider caring for many patients and you have to decide who to care for first.

The aim is to do the **'most for the most'** and do this **'in the right order'**. There are generally three categories of patients that may present as an emergency.

Examples of priority are provided below:

Priority 1: A woman or a baby who requires emergency resuscitation and treatment soon or she may die.

Examples:

A woman bleeding excessively and in hypovolaemic shock

A woman with convulsions

A baby who has just been born with no apparent signs of life.

Priority 2: A woman or baby whose care may be delayed for a few hours without significant risk.

Examples:

A woman with rupture of membranes – no prolapsed cord

A baby who is low birth weight, feeding well, and, has a normal temperature.

Priority 3: A woman or baby who can sustain a significant delay

Examples:

A woman with a breech presentation who is not in labour and where the fetal heart rate is

normal.
A baby born healthy and resting with the mother but who needs checks before discharge home.

[!] The management of care in the labour ward is a dynamic process and regular re-assessment and prioritisation is vital.

3.3: Referral

This is the act of referring a patient (mother or baby) for consultation, review, or further action to another healthcare provider and/or another healthcare facility.

The **right** patient must be taken at the **right** time by the **right** people to the **right** place using the **right** form of transport and receiving the **right** type of care before transfer and throughout the time of transfer.

A good referral is well planned and prepared. This can be done by following the **ACCEPT** approach:

The ACCEPT approach

A	**Assess**
C	**Control**
C	**Communicate**
E	**Evaluate**
P	**Prepare**
T	**Transport**

A: Assess

Assess the situation thoroughly but quickly; what is the woman and/or baby's condition? What can be done immediately? Why is a referral needed? Where do they need to be referred to?
Assess availability of services and/or staff required in the healthcare facility you are referring to. Make a phone call where/ when possible.
Assess the transport alternatives; what is available? Who can help? Liaise with volunteers in the community if no ambulance available at the healthcare facility.
The need to accompany the woman and/or the baby. Sometimes the person who has given care to the woman until the time of referral will also accompany her during the referral but often it is someone else who takes over the care during transfer. They may not have any prior knowledge of the woman's condition so need to be fully briefed. If the woman or baby is very ill and cannot be stabilised during transfer or may be at risk of giving birth during transfer, healthcare provider should also accompany the patient.

C: Control

The lead healthcare provider needs to take control quickly; identify and agree who is in charge, identify what needs to be done and who is going to do it. The most experienced healthcare provider needs to be involved in person or, if this is not possible, by phone. Allocate clearly explained tasks to those who are helping provide care. Make sure there is a clear 'chain of command' working as a team.

C: Communicate

It is very important that the woman and her relatives are aware and informed of what is happening.
Referral of any patient always requires the cooperation and involvement of several healthcare providers. Identify the key people involved and inform them as accurately and as early as possible.
Pass on information clearly and unambiguously (verbally and on paper if possible).

Important information to pass on is:

- Who you are
- What are the patient's relevant details
- What is the problem
- What has been done so far to address the problem
- What is needed next
- The reason for the referral

E: Evaluate

The risks of referral must be balanced against the risks of staying and continuing to provide care. What is the benefit of referring the patient to another place for care? Can care only be given by the receiving centre?
For example, a critically ill woman may need transfer because she needs:
Basic Emergency Obstetric Care (BEmOC) and is at home in the village
Needs Comprehensive Emergency Obstetric Care (CEmOC) and is in a healthcare facility which is only able to provide (BEmOC).
Once it has been established that referral is needed, it is also important to evaluate the urgency. The degree of urgency for referral and the severity of the woman and/or baby's condition will help to decide, 1) the type of transport to be used, and, 2) whether or not a healthcare provider needs to accompany the patient during transfer.

Signal functions of Basic and Comprehensive Emergency Obstetric Care (EmOC)

Basic Emergency Obstetric Care (BEmOC)	Comprehensive Emergency Obstetric Care (CEmOC)
1. IV/IM antibiotics 2. IV/IM oxytocics 3. IV/IM anticonvulsants 4. Manual removal of placenta 5. Removal of retained products of conception (e.g. Manual Vacuum Aspiration (MVA)) 6. Assisted vaginal delivery (e.g. ventouse) 7. Newborn resuscitation with bag and mask	All Basic EmOC signal functions (1-7) plus: 8. Caesarean Section 9. Blood Transfusion

P: Prepare

Make sure that the woman and/or baby's condition is as stable as possible before transfer and remains so or improves during transfer. Identify the safest and shortest route. The aim is to ensure that there is no change in the level of care provided during transfer and that there is no further deterioration in the woman and/or baby's condition during transfer. It is very important to inform the receiving healthcare facility about the condition of the woman and/or the baby and when they can expect arrival. This so the accepting healthcare facility and healthcare providers are ready to receive the patient and can start care as soon as the patient arrives at the healthcare facility.

Decide what is needed and make sure that:

- A healthcare provider is present who can receive and treat the patient
- Relatives who can donate blood are identified
- The baby travels with the mother
- Essential emergency drugs and supplies needed during the transfer are available (i.e. there is no interruption in the care required by the woman or baby during transfer
- A referral note is written clearly setting out condition of the patient and the reasons for referral.
- Adequate resuscitation has been carried out (e.g., the airway is clear, IV line is in place before and during the transfer)
- Supplies of drugs and fluids should be more than adequate for the whole of the journey.
- All IV lines, catheter (if applicable) should be well secured to the patient.
- The patient (woman and baby) should be in a secure and safe position during the transfer.
- All written documents (such as case notes, antenatal records, handover letter) should accompany the patient.

T: Transport

As much as possible the standard of care received before transfer needs to be maintained during transfer and until the patient is received by, and handed over to, the next healthcare provider at the receiving healthcare facility.

During the journey:

Watch the IV infusion.

If the journey is long, administer all required treatment on the way

Keep a record of all IV fluids and medication given and the time of administration

Continue to monitor and record the woman and/or baby's condition including vital signs, blood loss, any change in condition etc.

Examples of emergency drugs and supplies that may be needed during transfer of a patient

Emergency drugs	**Emergency supplies**	**If delivery is anticipated on the way:**
- Oxytocin	- Gloves	- Soap, towels
- Ergometrine	- Set for giving IV fluids	- Disposable delivery kit (blade, 3 ties)
- Magnesium sulphate	- IV fluids	- Clean cloths (3) for receiving, drying and wrapping the baby
- Calcium gluconate	- Sterile syringes and needles	- Gloves
- Diazepam	- Urinary catheter	- Plastic bag for placenta
- Ringer's lactate	- Antiseptic solution	- Pinard stethoscope or Doppler to assess fetal heart rate
	- Container for sharps	- Resuscitation bag and mask for the baby
	- Bag for rubbish - Torch and extra battery - Gauze/ cotton wool (sterile) - Pinard stethoscope or Doppler	

On arrival at the healthcare facility to which the woman and/or baby are referred, direct contact must be made with the receiving healthcare provider who will take over care of the woman and/or the baby. All documents should be handed over and a full explanation given of the course of events. The receiving healthcare facility and healthcare provider should ensure feedback is provided back to the referring facility once the condition of the woman and/or baby is stabilised.

Although in the past the 'first delay' was considered the most important delay, there is new

evidence to show that the majority of women and/or babies do access care at time of birth and/or when complications occur but there are very significant 'third delays' at healthcare facility level. Healthcare providers can work together to reduce the 'third delay' and this will save lives.

Points to remember

	Need to know and prepare for
Before Referral	■ **WHAT - are the reasons for the referral?** ■ **WHEN - should you move the woman and/or baby?** ■ **HOW - will you arrange transport - will you let the receiving healthcare facility know?** ■ **WHO - should accompany the woman and/or baby?**
During Transfer Referral	■ **WHAT - will the woman or baby need during transfer?** ■ **HOW - long will the transfer take? Will the woman and/or baby be monitored during transfer?**
On arrival	■ **Who – will receive the woman or baby?** ■ **HOW - will the woman and/or her baby be seen as soon as possible by the right person?** ■ **WHAT - information does the receiving healthcare provider need?**

MODULE 3: THE STRUCTURED APPROACH

Introduction

The structured approach is a way of managing seriously ill or injured patients. It prioritises their medical problems according to severity and the speed with which they need to be treated. It is logical and avoids major, immediately life-threatening medical problems being overlooked. It is used internationally.

This is the structured approach:

1. Primary survey
2. Resuscitate patient based on problems identified in the primary survey
3. Assess the foetus
4. Secondary survey
5. Treat problems identified in the secondary survey

3.1: Approaching a woman with a life-threatening condition

Prior to dealing with the life-threatening situation using the primary survey, assess (hearing and seeing) for any **DANGER** to you or your assistants or the patient (pool of blood with a risk of someone slipping, furniture or equipment causing obstruction of movement etc.). Then quickly make the area safe before proceeding.
Then assess for a **RESPONSE** from the woman with a life-threatening condition by calling her name if no response, by holding both shoulders, **SHAKE** and **SHOUT** her name (Hello, Hello Mrs Tilt!).

NOTE: If there are several women with life-threatening conditions, those that are unresponsive take priority

3.2: Primary survey

The primary survey is the ABCD approach. It identifies in turn life-threatening problems with the:

- **A**irway
- **B**reathing
- **C**irculation
- **D**isability (level of consciousness)

A is assessed and as a problem is identified it is treated	then...	**B** is assessed and as a problem is identified it is treated	then...	**C** is assessed and as a problem is identified it is treated	then...	**D** is assessed and as a problem is identified it is treated

As each problem is assessed and treated it is important to reassess to see if the treatment has been successful

Assessment in the primary survey

A is assessed by:	■ "Hello, how are you, Mrs Tilt?"
	■ Look for chest movement, listen for noisy breathing, feel for air movement in and out of the mouth or nose
B is assessed by:	
	■ listen with stethoscope for air entry, crackles. ■ count the respiratory rate
C is assessed by:	■ heart rate ■ capillary refill
	■ skin temperature and colour
	■ level of brain function
	■ urine output
	■ foetal heart
	■ blood pressure
D is assessed by the AVPU method:	
	■ **A** – if the patient is alert
	■ **V** – if the patient is not alert but is responding to voice
	■ **P** – if the patient is not responding to voice but is responding to pain
	■ **U** – if the patient is unresponsive

Resuscitation then takes place, depending on the problems found in the primary survey, then assess foetal wellbeing, then treatment of problems found in the secondary survey.

3.3: Secondary survey

The secondary survey looks for problems not found in the primary survey, by taking a detailed history exploring the presenting symptoms then carrying out a detailed examination working from head to toe to identify important signs. As this is done, think of other potential problems or complications associated with the main condition. For example, in a case of pre-eclampsia, there may be liver and blood complications (HELLP-haemolysis, elevated liver enzymes and low platelets). During the lecture and breakout sessions, it is important to make the students think about causes and other potential problems in detail.

MODULE 4: SHOCK AND THE UNCONSCIOUS PATIENT

Key learning points

- To learn to recognise shock and understand the main causes of shock during or after pregnancy
- To be confident in providing an appropriate response to a woman in shock
- To learn to grade the levels of consciousness
- To be confident in providing an appropriate response to an unconscious woman
- To understand the main causes of loss of consciousness during or after pregnancy

4.1 Shock

Shock is characterized by failure of the circulatory system to maintain adequate perfusion of the vital organs. It is a life-threatening condition that requires immediate and intensive treatment. Whilst initially the effects of shock are reversible, if untreated, shock rapidly becomes irreversible leading to multi-organ failure and death.

Shock occurs when there is circulatory collapse leading to inadequate perfusion of organs and cells with oxygenated blood.

Shock is categorised into four main categories:

- Distributive shock (vasodilation), which is a hyperdynamic process, as in septic shock
- Cardiogenic shock (pump failure)
- Hypovolemic shock (intravascular volume loss)
- Obstructive shock (physical obstruction of blood circulation and inadequate blood oxygenation), as in pulmonary embolism

The focus in this module will be on the two most common causes of shock and maternal death:

- Haemorrhage
- Sepsis

Haemorrhage

Haemorrhage leads to hypovolemic shock

When bleeding occurs, the circulating blood volume decreases and the **heart, lungs and skin** will attempt to compensate for this which results in increases in:

- Heart rate (HR)
- Respiratory rate (RR)
- Systemic peripheral resistance (cool peripheral skin, clammy, cold)

The body reacts this way to try to maintain circulation and perfusion of the **brain and the heart muscle itself.** Urine output decreases and fetal distress develops rapidly as perfusion of the kidneys and uterus decreases**.** This helps to maintain blood pressure for a short while but once this becomes insufficient and shock occurs, there is not much time to prevent further deterioration and death. It is very important to recognise the early signs of failure to maintain the circulation (decompensation) and so that appropriate treatment can be started early and rapidly.

Septic Shock

Septic shock (a form of distributive shock) can be more difficult to recognise than hypovolemic shock. In response to infection, the peripheral circulation starts to inappropriately vasodilate. At the same time, there is a reduced blood volume due to dehydration caused by fever, sweating and vomiting. These two changes result in the body using the same compensatory mechanisms as with hypovolemic shock such as:

- Increased heart rate (HR)
- Increased respiratory rate (RR)
- The skin will feel hot and clammy until the situation gets extremely severe when the skin becomes cold and mottled. At this stage, shock becomes irreversible and it is usually too late to save the mother.

Septic shock is defined as the presence of persistent hypotension unresponsive to fluid resuscitation with a requirement for vasopressor treatment to maintain a MAP >/= 65 mm Hg.

As with hypovolemic shock resulting from haemorrhage, it is very important that septic shock is recognised early and that appropriate treatment for both the shock and the underlying cause is started immediately.

4.2 Recognising Shock

A good way to remember what to do is to: Assess the "BIG 5" and the "Little 1".

Shock can be detected early by paying close attention to the vital signs for both the mother and fetus.

The **"BIG 5"** signs of compromised organ perfusion can be seen by assessing the **Heart, Lungs, Skin, Brain and Kidneys.**

The **"Little 1"** to listen and look for are signs of **Fetal Distress** such as late decelerations and/or fetal tachycardia and ultimately bradycardia.

Symptoms of shock

Main symptoms and signs	Other signs and symptoms
Pulse weak and fast (early sign) (>110 beats /minute	Pallor
BP low (Late sign) (Systolic <90mmHg)	Sweatiness or cold and clammy skin Anxious, confused
Rapid breathing (early sign) (30 or more breaths per minute)	Unconscious
	Fetal distress

4.3 Management of Shock

If shock is detected, intravenous fluids (Normal Saline or Ringer's lactate) should be given rapidly. Infuse 1 litre as quickly as possible and assess response. Repeat as many times as necessary to produce an adequate improvement in pulse rate (<100 beats per minute) and systolic blood pressure (>90 mmHg).

NOTE: After the rapid infusion of 3 litres, consideration should be given to other measures. In hypovolaemic shock with persistent hypotension, blood should be transfused. Continued rapid infusion of large volumes of crystalloid can cause pulmonary and cerebral oedema.
When a woman is recognised to be in shock it is important that the appropriate management is started **immediately:**

1. Call for help.
2. If the uterus is enlarged to above the umbilicus, position the woman in the left lateral tilt (to reduce aorto-caval compression) with her legs higher than her chest. If reduced level of consciousness, place in recovery (full left lateral) position
3. Assess ABC – Airway, Breathing, Circulation
4. Ensure airway patency
5. If available, give high flow oxygen (8-10l/minute)
6. Insert at least one IV line (preferably two if possible but don't take too much time)
   - □ If not able to insert peripheral IV lines, consider a venous cut-down (see below)
   - □ Give fluids at **Rapid Rate:**

- Infuse 1 litre of NS/RL in 15–20 minutes (as rapidly as possible)
- After that, infuse 1 litre in 30 minutes at 30ml/minute
- Repeat if necessary (maximum of 2 litres before re-assessment)

7. Keep her warm (cover her)
8. Assess the condition of the fetus or baby
9. Identify and Manage the cause of the shock.

Secondary survey: The two most common causes of shock are **Haemorrhage** and **Sepsis**:

- Bleeding vaginally or history of bleeding vaginally, follow management as for haemorrhage (Module 7). Remember bleeding may be concealed within the uterus or abdomen
- If no bleeding and suspected sepsis – follow management as for sepsis (Module 8).

10. Reassess the woman's response to IV fluids and oxygen within 30 minutes for signs of improvement. Signs indicating improvement include:

- ☐ Stabilising pulse rate (<90 beats/minute)
- ☐ Reducing respiratory rate (<30 breaths/minute)
- ☐ Increasing systolic blood pressure (>100mmHg)
- ☐ Improving mental status (less confusion or anxiety)
- ☐ Increasing urine output (>30ml/hour)

If the woman's condition improves:

- ☐ Adjust the rate of IV infusion to 1 litre in 6 hours
- ☐ Continue management of underlying cause of shock

Aorto-caval compression

During the resuscitation of a pregnant woman efforts must be made to avoid Aorto-caval compression. During pregnancy when the uterus is sufficiently large (usually > 20 weeks or fundal height > umbilicus) it will compress the large abdominal vessels (aorta and vena cava) when a pregnant woman is lying on her back (supine position).

The best way to stop this happening depends on the circumstances. We refer to our patient as "Mrs. Tilt" to remind us to pay attention to this problem. Placing a wedge under the right hip so that the woman is placed in a **left lateral tilt position** is a good way of stopping aorto-venous compression.
However, in the case of cardiac arrest, it is extremely difficult to ensure good quality chest compressions in any other position than supine on a hard surface and so **manual displacement** of the uterus is preferable in this situation.

The **left lateral recovery position** is useful in a semi-conscious, breathing patient.

[!] A pregnant woman has a circulation volume of about 100ml/kg (for a woman of 60kg this is 6litres).

Classification of circulating volume lost

Class	Circulating volume lost	Signs
1	15% or less (not much more than 700 ml)	You may notice only a mild rise in pulse and respiratory rate. If the woman is otherwise health and if not anaemic she will not require a blood transfusion.
2	15-30% (over 1.5 litres)	Symptoms will include rising pulse and rising breathing frequency Use crystalloids to replace fluid loss
3	30-40% (over 2 litres)	It is only at this stage that the blood pressure falls Remember a drop in BP is a late sign of hypervolaemia Patient will need a blood transfusion in addition to crystalloids
4	>40%	This is immediately life threatening Blood transfusion is required immediately

Blood Transfusion

When haemorrhage is the cause of shock, urgent efforts must be made find the site of haemorrhage and stop it.

Warm fresh whole blood should be given early in life-threatening haemorrhage to maintain organ perfusion as well as normal clotting. Rapid infusion of cold fluids (at room temperature or below) can cause hypothermia which will lead to coagulopathy. Fresh whole blood contains the highest coagulation factor content.

Blood can be requested with three levels of ascending urgency: Cross matched, type specific and O negative.

Cross-matched units: a "group & screen" sample from the patient is tested for blood group and screened for the presence of antibodies. An appropriate unit of donor blood of this group is found and then a sample of this unit and the patient's blood are tested for compatibility. Transfusing this blood has the lowest risk of causing a reaction but the process takes around 30-45 minutes from the moment that the laboratory receives the "group & screen" sample from the patient.

Group-specific units: A unit of donor blood is found in the blood bank and released for use without testing for compatibility. This blood can be obtained in much less time, dependent on the proximity of the blood bank (approx. 10mins) and is unlikely to cause a transfusion reaction if the patient doesn't have antibodies.

O-negative blood: This blood, also referred to as "universal donor", is the group least likely to cause a reaction when given to a patient of unknown blood group. If kept in the blood bank, this is the blood that can be transfused immediately in an emergency.

General Guidelines for Fluid Management

1. Insert IV line and give fluids:
   - □ Clean the woman's skin with spirit at site for IV line.
   - □ Insert an IV line using a 16–18-gauge needle.
   - □ Attach Ringer's lactate or normal saline

2. Give fluids at:
   Rapid rate if patient is in shock, systolic blood pressure (BP) < 90mmHg, pulse rate > faster than 110 beats/minute or heavy vaginal bleeding:

   - □ Infuse 1 litre in 15–20 minutes (as rapid as possible).
   - □ After that, infuse 1 litre in 30 minutes at 30ml/minute.
   - □ Repeat if necessary up to 2 litres maximum before reassessing.

   Moderate rate if patient has severe abdominal pain, obstructed labour, ectopic pregnancy, high fever >38 C or is dehydrated:

   - □ Infuse 1 litre in 1-2 hours.

   Slow rate if the patient has severe anaemia (Hb < 8.0 g/dl), heart failure or pre-eclampsia or eclampsia:

   - □ Infuse 1 litre in 6–8 hours

3. Monitor every 15 minutes for:
   - □ Pulse and BP
   - □ Respiratory rate

4. Reduce the infusion rate:
   a. To 3ml/minute (1 litre in 6–8 hours) when pulse slows <100 beats/minute, systolic BP increases to >100mmHg
   b. To 0.5ml/minute if breathing difficulty or puffiness develops

5. Monitor urine output – insert a urinary catheter if available. Urine output is abnormally low if < 100 ml in 4 hours.

6. Start a fluid input and output chart. Record time and amount of fluids given, and amount of urine produced.

Fluid management in pre-eclampsia and heart failure

Mothers with pre-eclampsia, eclampsia or heart failure (secondary to severe anaemia or cardiac disease) are at particular risk of **fluid overload**. Their fluid management is difficult and becomes even more so when their disease process is complicated by bleeding or sepsis. These cases should be managed by experienced clinicians, with close attention paid to the fluid balance of these critically ill women.

Starting IV fluids

The most common sites for finding venous access are the back of the hand, the medial (thumb) side of the forearm, the antecubital fossa (in the elbow crease), the top of the foot and the medial (big toe) side of ankle/lower leg.

It is important to know how to use a **tourniquet** appropriately to help engorge these veins.

A tourniquet should be tightened so that it reduces venous drainage from the arm, but not so tight that it stops arterial blood supply to the arm.

Lower the arm below the heart, warm it with towels or a warm (40°C) water bath and, if possible, encourage repeated contraction/relaxation of the muscles of the arm (e.g. opening and closing the hand).

Remember to loosen and remove the tourniquet once attempts at venous access have finished.

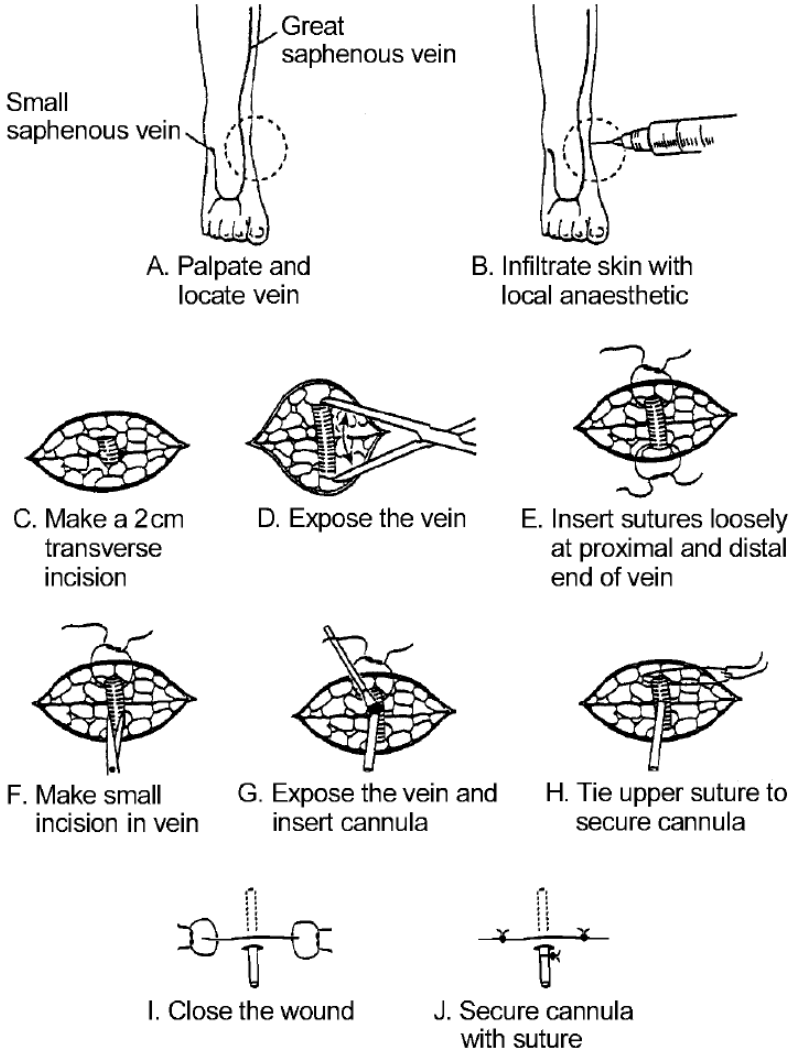
In some situations, and especially in critically ill patients, these veins may be difficult or impossible to find and cannulate. In such cases, **venous cut-down** of the saphenous vein can be used.

If IV access is not possible:

- Give oral rehydration solution (ORS) by mouth if able to drink, or by nasogastric (NG) tube, 300–500ml in 1 hour. DO NOT give ORS to a woman who is unconscious or has convulsions.
- Consider performing a venous cut-down to obtain IV access.

Procedure for venous cut-down

[!] The saphenous vein is about one finger anterior and superior to the medial malleolus (on inner side ankle).



NOTE: At stage E, ligate the distal suture to prevent additional blood loss before making an incision in the vein

4.4 The unconscious patient

A decrease in the level of consciousness is the marker of insult to the brain (lack of oxygen). The more deeply the patient is (or becomes) unconscious, the more serious the insult.

Lack of oxygen to the brain results from either reduced blood flow (such as hypovolaemia) or reduced oxygen concentration in the blood (caused, for example, by reduced breathing, convulsions, sepsis, anaemia) or both of these.

For patients with a reduced level of consciousness, a rapid assessment of conscious level is made using **A V P U**:

- Is the patient **Alert**, responding to **Voice** or only responding to **Pain** or **Unresponsive**?

Management of the unconscious patient

1. **Call for help**
2. If uterus enlarged place in left lateral tilt
3. Assess and treat Airway, Breathing and circulation
4. If she remains unconscious, **but breathing** spontaneously place in recovery(full left lateral) position to prevent aspiration of gastric contents.

Not breathing

If the woman is not breathing at all or is making irregular gasps only once the airway has been opened then assume a cardiac arrest has occurred:

- Check and ensure airway is open. If still not breathing, assume cardiac arrest and commence compressions. If help available continue CPR with a helper providing bag and mask ventilation using a bag and mask at a ratio of 30 compressions to 2 breaths and a rate of 100-120 compressions per minute. Check for reversible causes of cardiac arrest and treat as appropriate.
- Cardiac arrest will occur within approximately four minutes following respiratory arrest. But if you are present immediately when a respiratory arrest occurs, a cardiac arrest may be averted by rapid airway opening and assisted ventilation using bag and mask.
- Effective assisted ventilation requires that the patient is supine (but if the uterus is enlarged still maintain a 30 degree left lateral tilt)

[!] A patient with a reduced level of consciousness is likely to have an airway problem, as the tongue falls back into the throat and occludes the airway. This is the most common cause of airway occlusion.

Assess pregnancy state (pregnant or delivered)

1. Assess A V P U
2. Assess cause of reduced level of consciousness:
3. Are there signs of shock?
4. Has there been a recent convulsion (eclampsia)?
5. Is she a known epileptic? (but even if so, don't assume epilepsy is the cause)
6. Is there any neck stiffness (meningitis)?
7. Does she have a fever (temperature >38°C)?
8. Is the blood sugar abnormally high or low?
9. Assess pupils (to check if cerebral bleed may have occurred).

Carry out observations of vital signs: pulse, breathing, blood pressure, temperature, fetal heart.

Eclampsia

Eclampsia is a common cause of unconsciousness. Remember, eclampsia can occur before, during or after delivery.

If the woman has had a convulsion or is convulsing: give magnesium sulphate (see Module 6).

High BP

If the systolic is >/= 160 and/or the diastolic BP >/= 110mmHg: give antihypertensive (see Module 4).

Fever

If temperature greater than 38°C or history of fever, consider:

- Sepsis
- Malaria
- Meningitis
- Pneumonia

Treat accordingly

Always start specific therapy for condition leading to loss of consciousness as soon as possible!

Referring a woman in shock or unconscious

At Health Centre level (or BEmOC) it will usually be necessary to refer a woman who is in shock or is unconscious tohigher level of care.

Once the initial treatment has commenced and the woman is stabilised, refer her urgently to a hospital (CEmOC level). Ensure that management continues during the referral and that the woman is accompanied by a capable health care provider and relevant case notes.

MODULE 5: MATERNAL RESUSCITATION

Key learning Objectives

- To appreciate the principles of resuscitation
- To understand when and how to resuscitate a woman during and after pregnancy
- To understand when and how to resuscitate a newborn baby

5.1 Resuscitation of a woman during or after pregnancy

It is important that every healthcare provider should be able to recognise and be familiar with the approach to an apparently lifeless woman during or after pregnancy. It must be stressed, however, that the vast majority of cardio-respiratory arrests occur in patients with identifiable risk factors and are preceded by a period of deterioration. The identification, close observation and appropriate treatment of such patients will prevent cardiac arrest in the majority and will dramatically increase the chances of a good outcome.

Look for a response

- Ensure a **SAFE** environment for patient and healthcare provider.
- **SHAKE** and, if no response, **SHOUT** for help.

If a woman is breathing, but poorly responsive then place her in the **recovery position** whilst you perform a thorough assessment (provided there is no suspicion of any cervical spine injury). If the patient appears lifeless, open the airway. If no sign of breathing, commence Cardio-Pulmonary Resuscitation (CPR).

Left Uterine Displacement

For women who are pregnant, it is important to ensure the uterus does not press on the aorta and vena cava. Turn the patient onto her back and place a wedge under her right hip to achieve **tilt.** This should displace the uterus and relieve aortocaval compression. Once more help arrives, the resuscitation team can manually keep the uterus and contents displaced in order to optimize the quality of chest compressions. It is necessary to have at least three people in the team to perform the best quality CPR and ensure correct manual displacement of the uterus.

A woman who has a cardiac arrest will not be breathing, so there will be no chest movement. It is important to rule out or relieve airway obstruction, but this must be done very quickly. Once the airway has been opened using head tilt and chin lift or jaw thrust if the chest is still not moving you should assume that a cardiac arrest has occurred and initiate CPR without delay. The sooner cardiac compressions are initiated, the better the chance of survival.

Sequence of actions to be taken during CPR

RESPONSE	**Check the victim for a response** ■ Gently shake her shoulders and ask loudly: "Are you all right?" If she responds, leave her in the position in which you find her, provided there is no further danger; try to determine what is wrong with her and get help if needed; reassess her regularly – pulse, BP, respiratory rate, temperature and level of consciousness
AIRWAY	**Open the airway** ■ Turn the victim onto her back and ensure a left lateral tilt (you can use a wedge or manual uterine displacement if you have help available to do this) ■ Place your hand on her forehead and gently tilt her head back; with your finger tips under the point of the victim's chin, lift the chin to open the airway
BREATHING	**Look, listen and feel for normal breathing for no more than 10 seconds** In the first few minutes after cardiac arrest, a victim may be not breathing or taking infrequent, slow and noisy gasps. Do not confuse this with normal breathing. If you have any doubt whether breathing is normal, act as if it is they are <u>not</u> breathing normally and prepare to start CPR
CIRCULATION	**Start chest compressions** ■ Kneel by the side of the victim ■ Place the heel of one hand in the centre of the victim's chest; (which is the lower half of the victim's breastbone (sternum) ■ Place the heel of your other hand on top of the first hand ■ Interlock the fingers of your hands and ensure that pressure is not applied over the victim's ribs ■ Keep your arms straight ■ Do not apply any pressure over the upper abdomen or the bottom end of the bony sternum ■ Position your shoulders vertically above the victim's chest and press down on the sternum to a depth of 5–6 cm ■ After each compression, release all the pressure on the chest without losing contact between your hands and the sternum; ■ Repeat at a rate of 100–120 compressions per minute

GIVE RESCUE BREATHS	If you have support, after every 30 compressions open the airway again using head tilt and chin lift and give 2 rescue breaths with an Ambu bag, if available. ■ Maintaining head tilt and chin lift, watch for the chest to fall as air comes out ■ Repeat for a second breath. Do not interrupt compressions by more than 10 seconds to deliver two breaths. Then return your hands without delay to the correct position on the sternum and give a further 30 chest compressions Continue with chest compressions and rescue breaths in a ratio of 30 compressions for every 2 breaths (ratio of 30:2) Note: If you are untrained or unable to use an Ambu bag or one is not available, give chest compression-only CPR i.e. continuous compressions at a rate of at least 100–120 per minute

5.2 Cardio-Pulmonary Resuscitation

Good quality chest compressions are the most important aspect of CPR because if it is done correctly and as soon as the patient has been identified as having no signs of life, it will give the best chance of obtaining a return of spontaneous circulation. To perform chest compressions correctly we must pay particular attention to three aspects of our technique:

POSITION, DEPTH and RATE.

GOOD POSITION: Chest compressions are delivered to the middle of the lower half of the sternum. Place the heel of your first hand on top of the patient, put the other hand on top and interlock the fingers of both hands. Keep in the midline to ensure that pressure is not applied over the ribs. Do not apply pressure over the abdomen or bottom tip of the sternum. Lean well over the woman and, with your arms straight, press down vertically on the sternum.

GOOD DEPTH: Depress the sternum by at least 5 cm and then allow full recoil of the chest. The initial compression needs to be strong enough to push blood out of the heart and removing the pressure to allow full recoil ensures maximal filling of the heart to maximize the effects of the next compression.

GOOD RATE: Compress the chest and allow full recoil for up to 100-120 times a minute. This means performing about two compressions every second. This is very tiring to perform effectively and so the team should change the person delivering chest compressions every two minutes.

Once 30 compressions have been given then 2 ventilations can be given via the bag-valve-mask. Every effort should be made to make these effective, but it is important to limit the period of interruption to compressions and so rescue breaths (or ventilations) should ideally be given over less than 5 seconds. Given these timings, five cycles of 30 compressions with 2 ventilations will be completed in about two minutes. At this point, the opportunity should be taken to quickly change the person delivering the compressions whilst the carotid pulse is felt to check for return of spontaneous circulation. This changeover and pulse check should last no more than the 5

seconds that it takes to deliver another 2 ventilations.

If available, oxygen should be given as soon as possible.

When to discontinue resuscitation?
This routine of 5 cycles of 30 compressions and 2 ventilations followed by a quick changeover and pulse check should continue until there are signs of life or until the team has decided that all reasonable efforts have been made to treat reversible causes and to remove contributory factors and that continued efforts would be futile.

Reversible causes of cardiac arrest and contributory factors

There are many possible factors that may have contributed to the onset of cardio-respiratory arrest and may be harming resuscitation efforts. One way of remembering these is to think of the **4Hs** and the **4Ts:**

- Four Hs:
  - **Hypoxia** (primary airway or respiratory problem)
  - **Hypovolaemia** (bleeding, severe dehydration and vasodilation of sepsis, may be exacerbated by aortocaval compression)
  - **Hypo or Hyperkalaemia** and other metabolic disorders
  - **Hypothermia**

- Four Ts:
  - **Thromboembolism** (pulmonary embolism or amniotic fluid embolism)
  - **Toxicity** (magnesium sulphate, sedative, pain killing or anaesthetic drugs, snake bite, poison)
  - **Tension pneumothorax**
  - **Cardiac Tamponade** (both the latter are very unlikely outside of the context of blunt or penetrating chest trauma)

The administration of oxygen via assisted ventilation, fluid and/or blood and attention to electrolytes should address **hypoxic**, **hypovolaemic** and the common metabolic causes of cardiac arrest. Check for the administration of any drugs that may have caused a respiratory or cardiac arrest and administer the antidote if available e.g. Calcium gluconate in cases of magnesium sulphate toxicity, naloxone in cases of opioid overdose.

Remember CPR in itself will not reverse the cause of the cardio-pulmonary arrest. It is simply an alternative means of maintaining circulation whilst looking for the cause. It is important to identify the cause of the cardio-pulmonary arrest and to take measures to address this. In some cases, spontaneous circulation may be restored. However, if the patient fails to respond to resuscitation after 20-30 minutes then there is usually no hope for survival.

Unfortunately, in the absence of access to thrombolysis and interventional radiology/cardiology,

there is little extra that can be done to try to treat thromboembolism. In some settings, a defibrillator may be available. However, defibrillation is only of any possible benefit if the heart is found to have a shockable rhythm such as ventricular fibrillation or ventricular tachycardia. In most cases of pregnancy-associated arrest the rhythm will not be shockable, for example, if there is pulseless electrical activity or asystole, defibrillation is not indicated.

5.3 Peri-mortem Caesarean section

Emptying the uterus via peri-mortem caesarean section or hysterectomy to remove aortocaval and diaphragmatic compression, and divert blood from the uterine into the general circulation may result in a higher chance of successful resuscitation of a pregnant woman during cardio-pulmonary arrest.

In order to have maximum effect it is thought best to perform this as soon after the initiation of CPR as possible. Practically this means performing it in the location of the resuscitation and without paying the usual attention to surgical preparation if this is done under non-sterile conditions. The goal is to deliver the baby by 4-5 minutes after commencing CPR. The surgical site can then be simply packed whilst resuscitation continues, and this is only revisited if a return of spontaneous circulation is achieved.

Peri-mortem CS is only deemed to be of benefit after approximately 20 weeks' gestation and this can be estimated by assessing the fundal height as above the umbilicus. It is not performed to benefit the baby but, obviously, the closer to term the pregnancy the greater the baby's chance of survival and an appropriate person should be assigned to attempt neonatal resuscitation.

All cases of maternal cardio-pulmonary resuscitation are very distressing for staff and family. The performance of a peri-mortem CS is potentially even more harrowing. For these and other reasons, this procedure is not an accepted practice in all countries and cultures.

MODULE 6: OBSTETRIC HAEMORRHAGE

Key learning objectives

- To recognise an obstetric haemorrhage
- To practise the response to a woman with obstetric haemorrhage

Table 6.1: Risk of Occurrence

Bleeding can occur during	**Differential diagnosis**
Early pregnancy	Miscarriage /abortion Ectopic Pregnancy Cervical Lesions
Pregnancy	Placenta abruption Placenta praevia Cervical lesions
Labour	Placenta abruption Placenta praevia Ruptured uterus
At Caesarean section	Uterine atony Uterine incision and extension tears Placental site bleeding
After delivery	Ruptured uterus Uterine atony Trauma (Cervical, Vaginal or labial tears) Retained placenta (complete or partial) Retained products
ANY BLEEDING IS DANGEROUS BLEEDING	

General management

For management of all haemorrhages, always start with A and B then C:

A - secure **A**irway
B –**B**reathing
C- Circulation

Assess bleeding by inspection:

[!] Do not conduct digital vaginal examination until placenta praevia has been excluded. A careful speculum examination may be performed to visualise the cervix.

- Commence high flow oxygen (if available) and IV fluids immediately.
- Take blood for measurement of haemoglobin and cross-matching.
- Restore circulating volume; if the woman is in shock, follow **Management of Shock**

After general management, perform a secondary survey and manage according to cause identified, as below:

- Empty uterus; deliver fetus if not delivered.
  - The decision regarding the means of delivery will depend upon the condition of the patient and how well they can be stabilised, the location of the placenta and the condition of the fetus.
  - If fetal demise has already occurred and the patient can sufficiently haemodynamically stabilised, then it is preferable to aim for vaginal delivery and avoid scarring the uterus.
  - If not in established labour, consider whether the labour should be induced or delivery performed by means of a caesarean section.
  - If labour is established already, consider whether to continue the labour or deliver by caesarean section.
- Remove placenta or retained products of conception
- Give oxytocics (see below)
- Massage uterus
- Bimanual compression of the uterus and/or compression of the aorta (temporary control)
- Repair of genital tract injury
- Laparotomy with repair of the ruptured uterus or subtotal hysterectomy

6.1 Placental abruption

Placental abruption is the partial or complete separation of the placenta from the uterus before the baby is delivered.

With separation of the placenta, blood collects in the space between the placenta and the uterus. This may leak out via the cervix with resulting vaginal bleed (evident abruption) or blood may accumulate behind the placenta (hidden or concealed abruption). Usually there will be both revealed and concealed components to the bleed. Do not assume the revealed loss represents the entire loss as typically most of the loss is concealed within the uterus. Blood loss should be estimated based upon the patient's vital signs.

In either case, blood loss is usually significant, the mother may be in hypovolaemic shock and oxygen supply to the baby is compromised (poor or absent fetal heart rate).

The uterus is tender and hard (no relaxation between contractions). This is known as a 'woody', hard uterus or 'uterus en bois'. With extensive bleeding into the uterus, the ability of the uterus to contract is impaired due to the extravasation of blood into the uterine muscles beneath the serosa (Couvelare uterus).

Table 6.2: Causes of bleeding in pregnancy

Probable diagnosis	Usually present	Sometimes present
Placental abruption	Bleeding (vaginal or may be retained in the uterus = concealed) Intermittent or constant abdominal pain Tense, tender uterus	Shock Decreased/absent fetal movements Fetal distress or absent fetal heart sounds
Ruptured uterus	Bleeding (intra-abdominal and/or vaginal) Severe abdominal pain (may decrease on rupture) Loss of contractions	Shock Abdominal distension/free fluid Abnormal uterine contour Tender abdomen Easily palpable fetal parts (unless rupture occurred late in the second stage when fetal head is deeply engaged in the pelvis) Absent fetal movements and fetal heart sounds Rapid maternal pulse and respiratory rate
Placenta praevia	Bleeding (vagina)	Shock Bleeding may be precipitated by intercourse Relaxed uterus (although may be contracting if in labour) Presenting part not fixed in pelvis Normal fetal heart rate (unless in shock then fetal distress)

If bleeding is heavy (mother remains unstable following fluid resuscitation or heavy bleeding continues from the vagina), deliver as soon as possible:

- If the cervix is fully dilated and the fetal head less than 2/5 palpable in the mother's abdomen, you can deliver by vacuum extraction.

- If vaginal delivery is not possible, deliver by caesarean section.

[!] In every case of placental abruption, be prepared for postpartum haemorrhage.

If bleeding is light to moderate and the mother's vital signs are stable and normal and she is not in
immediate danger, the course of action depends on the fetal heart rate.

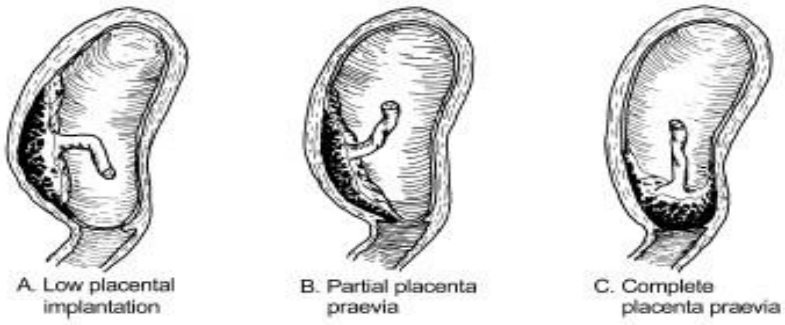
- If the fetal heart rate is normal, rupture the membranes.
- If contractions are poor, augment labour with oxytocin.
- If the cervix is unfavourable (firm, thick, closed), perform a caesarean section.
- If the fetal heart rate is abnormal (less than 100 or more than 180 beats/minute or persistent late decelerations), perform assisted vaginal delivery as soon as possible, if all the pre-requisites are met.
- If vaginal delivery is not possible, deliver by immediate caesarean section. Note however that the fetal heart should be re-checked once in theatre as if a terminal bradycardia was present before coming to theatre, fetal demise may have occurred in the interim.
- If fetal heart rate is absent, decide which method of delivery is safest for the mother, but try to avoid caesarean section if possible.

NB: The management of placental abruption is a dynamic process and it may be necessary to change the decision as to the mode of delivery depending upon the maternal condition. Beware of the possibility of the early onset of coagulopathy with placental abruption. If coagulopathy develops treat with fresh whole blood transfusion, if coagulation factors (e.g. fresh frozen plasma) are not available.

6.2 Ruptured uterus

- Restore blood volume by infusing IV fluids (normal saline or Ringers lactate) before surgery. Organise cross match of at least 4 units of blood if possible.
- When stable, perform laparotomy and deliver the baby and placenta (if not already delivered). Remember that bleeding is likely to continue until the surgery has been performed so do not delay any longer than is necessary.
- If the uterus can be repaired with less operative risk than hysterectomy would entail and the edges of the tear are not necrotic, repair the uterus.
- If the uterus cannot be repaired but the cervix is intact, perform subtotal hysterectomy.
- If the tear extends through the cervix and vagina, total hysterectomy may be required

6.3 Placenta praevia



[!] Do not perform digital vaginal examination unless preparations have been made for immediate caesarean section.

- Restore blood volume by infusing IV fluids (normal saline or Ringer lactate).
- Assess the amount of bleeding by maternal vital signs and condition.
- If bleeding is heavy and continuous, arrange for caesarean section, irrespective of fetal maturity or fetal condition.
- If bleeding is light or if it has stopped and the fetus is alive but premature, consider expectant management at centre offering CEOC until delivery or heavy bleeding occurs:
  - Keep the woman in hospital until delivery
  - Correct anaemia (iron tablets, antimalarials, anthelminthics)
  - Ensure that blood is available for transfusion if required
  - Give corticosteroids to promote fetal lung maturity
- If bleeding recurs, decide management after weighing up benefits and risks for the woman and fetus of further expectant management versus delivery.

Confirming diagnosis

- If a reliable ultrasound examination can be performed to localise the placenta, confirm the diagnosis of placenta praevia and if the fetus is mature (37 weeks of gestation or more), plan delivery as soon as is possible.
- If ultrasound is not available and the pregnancy is less than 37 weeks, manage as placenta praevia until 37 weeks.
- If ultrasound is not available and the pregnancy is 37 weeks or more, examine the woman in theatre and be prepared for either vaginal or caesarean section delivery, as follows:
  - have IV lines running and cross-matched blood available
  - examine the woman in the operating theatre with the people doing the caesarean and anaesthesia ready to proceed immediately.
  - use a sterile vaginal speculum to examine the cervix.
- If the cervix is partly dilated and placental tissue is visible on speculum

examination (placenta praevia is confirmed), deliver by caesarean section.

- If the cervix is not dilated, cautiously palpate the vaginal fornices:
  - if spongy tissue is felt (placenta praevia is confirmed), deliver by caesarean section
  - if a firm fetal head is felt (major placenta praevia is ruled out), proceed to deliver by induction of labour unless bleeding occurs, or continue to await the spontaneous onset of labour if bleeding has settled.

NB: It is good practice to deliver all women who have experienced significant bleeding in pregnancy by 40 week's gestation.

Specific other problems to note

Bleeding with severe abdominal pain

This may be caused by, for example, obstructed labour, ruptured uterus, placental abruption, puerperal sepsis or, in early pregnancy, consider post-abortion sepsis and ectopic pregnancy.

- Severe abdominal pain (not normal labour).
- Measure vital signs including blood pressure
- Measure temperature.
- If temperature more than 38 degrees centigrade, start IM/IV antibiotics

Bleeding caused or exacerbated by failure to clot

Pregnancy complications in which coagulation failure is likely to occur are:

- Placental abruption
- Pre-eclampsia
- Eclampsia
- Sepsis
- Intrauterine death – retained dead fetus (more usual if fetal death of >4 week's duration)
- Amniotic fluid embolism
- Any severe haemorrhage (consumption coagulopathy)

In case of clotting failure, it is often necessary to use blood products to help control haemorrhage.

- Give fresh whole blood to replace clotting factors and red cells.
- If fresh whole blood is not available, choose one of the following based on availability:
  - Fresh frozen plasma for replacement of clotting factors (15ml/kg body weight or one unit for each unit of blood transfused)
  - Cryoprecipitate to replace fibrinogen
  - Platelet concentrates

Causes of bleeding after delivery – symptoms and signs

Probable diagnosis	Usually present	Sometimes present
Atonic uterus	Postpartum Haemorrhage (Uterus soft and not contracted)	Shock
Episiotomy Tears of cervix, vagina or perineum	Postpartum haemorrhage Uterus contracted	Complete placenta
Retained placenta	Placenta not delivered within 30 minutes after delivery	Postpartum haemorrhage
Retained placental and/or membrane fragments	Portion of maternal surface of placenta missing or torn membranes	Postpartum haemorrhage Uterus contracted
Inverted uterus	Uterine fundus not felt on abdominal palpitation	Inverted uterus apparent at the vulva
Secondary postpartum haemorrhage	Pain Bleeding occurs more than 24 hours after delivery	Postpartum haemorrhage Bleeding is variable (light or heavy, continuous or irregular) and may be foul smelling
Ruptured uterus	Postpartum haemorrhage (bleeding is intra-abdominal and/or vaginal) Severe abdominal pain	Shock Tender abdomen

NB: Patients may have any combination of the causes of primary Post-partum haemorrhage simultaneously and each cause must be looked for and excluded or treated.

6.4 Postpartum haemorrhage (PPH)

The 4 T's:

- Tone
- Tissue (Retained products)
- Tears or Trauma
- Thrombin

NB more than one of these may be present simultaneously, so there is a need to

check for each one if simple measures to improve tone are insufficient to stop bleeding

NB for ALL PPH cases give tranexamic acid 1g IV slowly within 3 hours of birth. Repeat if bleeding is continuing after 30 minutes or if it recurs within 24 hours (WHO recommendation)

Recognising postpartum haemorrhage

- Pad or cloth soaked in less than 5 minutes
- Constant trickling of blood
- Bleeding more than 500ml

Management

- Commence oxygen
- Commence at least one IV line
- Call for extra help
- Massage uterus until it is hard and give oxytocin 10 units IM (even if a bolus has already been given in the third stage of labour)
- Give IV fluids with 30 units oxytocin/500 mls normal saline or Ringer's lactate at 40 drops/minute
- Empty bladder: catheterise if not already done
- Check and record BP, pulse and respiratory rate every 15 minutes
- Establish the cause of bleeding

Haemorrhage, placenta not delivered

- Check and ask if placenta is delivered. If delivered and available, inspect placenta and membranes for completeness
- When uterus is hard, deliver placenta by controlled cord traction
- If unsuccessful and bleeding continues, remove placenta manually and check placenta
- Give appropriate IM/IV antibiotics
- If unable to remove placenta, refer woman urgently to hospital
- During transfer, continue IV fluids with 30 units oxytocin in 500 mls of normal saline or Ringer's lactate at 40 drops/minute and keep bladder empty with an indwelling catheter

Haemorrhage, placenta delivered

- Check placenta and membranes
- If placenta is complete:
  - □ Massage uterus to express any clots
  - □ If uterus remains soft, give ergometrine 0.2mg IV
  - □ DO NOT give ergometrine to women with eclampsia, pre-eclampsia or known hypertension but give oxytocin instead
  - □ Continue IV fluids with 30 units oxytocin in 500mls of normal saline or Ringer's lactate at 40 drops/minute
  - □ Continue massaging uterus until it is hard.

- If placenta is suspected of being incomplete (or not available for inspection):
  - Remove placental fragments digitally from uterine cavity
  - Give appropriate IM/IV antibiotics
  - If unable to remove, refer woman urgently to hospital

Perineal, vaginal and cervical tears

- Examine the tear and determine the degree and extent of the tear.
- High vaginal tears and cervical tears can only be visualized with good lighting and vaginal retraction. If good lighting not available consider packing the vagina and referring.
- If third-degree tear (involving rectum or anus) or cervical tear, refer woman urgently to a facility with CEOC. If cervical tears are bleeding temporary haemostatic compression may be applied using sponge forceps placed on the cervix either side of the tear.
- For other tears: apply pressure over the tear with a sterile pad or gauze and put legs together (but do not cross ankles) pending repair.

For repair of episiotomy and tears, see **Module 8** Assisted delivery.

Use of oxytocic drugs

Heavy bleeding:

- Check if still bleeding.
- Continue IV fluids with 30 units oxytocin at 40 drops/minute.
- Insert a second IV line if necessary.

Controlled bleeding:

- Continue oxytocin infusion with 30 units/500mls IV fluids at up to 40 drops/minute for 4– 6 hours after bleeding stops.

Manual removal of placenta

Preparation

1. Prepare the necessary equipment.
2. Explain to the patient (and her support person if appropriate) what needs to be done, listen to and answer any questions and obtain informed consent.
3. Provide continual emotional support and reassurance, as feasible.
4. Ask the patient to empty her bladder or insert a urinary catheter, if necessary.
5. Give anaesthesia/sedation (IV pethidine and diazepam or 6-10mg/kg body weight IM ketamine). **DO NOT USE KETAMINE IF THE BLOOD PRESSURE IS ELEVATED**
6. Give a single dose of prophylactic antibiotics: Ampicillin 2g IV PLUS metronidazole 500mg IV

   OR
7. Cefazolin 1g IV PLUS metronidazole 500mg IV Put on personal protective equipment.

Use of oxytocic drugs

Drug	Dose and route	Continuing dose	Maximum dose	Precautions and contraindications
Oxytocin	IV: infuse 30 units in 500mls IV fluids at 30 drops/minute IM: 10 units	IV: infuse 40 units in 500 mls IV fluids at 20drops/minute	Not more than 3 litres IV fluids containing oxytocin	Give an i.m. bolus of 10 IU first prior to commencing infusion
Ergometrine	0.5mgms IM or IV (slowly) L 0.2mg	Repeat iv 0.2mgms dose after 15 minutes If required, give 0.2mg IM or IV (slowly) every 4 hours	Five doses (total 1.0mg)	High blood pressure Pre-eclampsia Heart disease
15-methyl prostaglandin F_2 (carboprost)	IM: 0.25mg	0.25mg every 15 minutes	Eight doses (total 2mg)	Asthma
Misoprostol PGE1	Sublingual or rectal: 600-800 mcg	Repeat 200–800 mcg	Not more than 1600 mcg	History of coagulopathy or active intravascular clotting, convulsions
Tranexamic acid	IV (slowly): 1 g	Repeat after 30 minutes if bleeding continues	Not more than 10 mg per kg body weight, three to four times daily	

NB: Oxytocin is active for a very short time in the body, and a second bolus should be given to treat uterine atony even if a bolus has been given during the active management of the third stage of labour.

Procedure

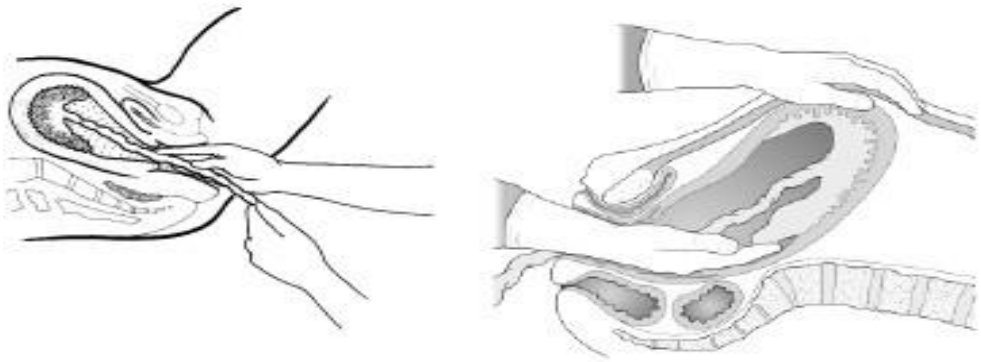
1. Use antiseptic hand rub or wash hands and forearms thoroughly with soap and water and dry with a sterile cloth or air dry.

[!] Elbow-length gloves should be used, if available.

2. Put high-level disinfected or sterile surgical gloves on both hands.
3. Place the fingers of one hand into the vagina and into the uterine cavity, following the direction of the cord until the placenta is located.
4. When the placenta has been located, move that hand onto the abdomen to stabilise

the fundusabdominally

5. Move the fingers of the hand in the uterus laterally until the edge of the placenta is located.
6. Keeping the fingers tightly together, ease the edge of the hand gently between the placenta and the uterine wall, with the palm facing the placenta.
7. Gradually move the hand back and forth in a smooth lateral motion until the whole placenta is separated from the uterine wall.



[!] If the placenta does not separate from the uterine wall by gentle lateral movement of the fingers at the line of cleavage, suspect placenta accreta and arrange for surgical intervention. In accreta, if the entire placenta is still attached and there is no bleeding, then the cord can be cut as short as possible and the placenta left in situ to re-absorb. If there is partial separation bleeding is likely to be heavy and the treatment will be total or sub-total hysterectomy.

8. When the placenta is completely separated:
   - □ Palpate the inside of the uterine cavity to ensure that all placental tissue has been removed
   - □ Slowly withdraw the hand from the uterus, bringing the placenta with it
   - □ Provide counter-traction to the fundus by pushing it in the opposite direction of the hand that is being withdrawn.
9. Give oxytocin 30 units in 500 mls of IV fluid (normal saline or Ringer lactate)at60 drops/minute.
10. Have an assistant massage the fundus to encourage atonic uterine contraction.
11. If there is continued heavy bleeding, give ergometrine 0.2mg IM or give prostaglandins (haemabate, carboprost; See Appendix 3).
12. Examine the uterine surface of the placenta to ensure that it is complete.
    NB The placenta may have been removed piece-meal rather than as one whole unit.
13. Examine the woman carefully and repair any tears to the cervix or vagina, or repair episiotomy.

Post-procedure

1. Immerse both gloved hands in 0.5% chlorine solution. Remove gloves by turning them inside out.

[!] If disposing of gloves, place them in a leakproof container or plastic bag.

If reusing surgical gloves, submerge them in 0.5% chlorine solution for 10 minutes for decontamination.

2. Use antiseptic hand rub or wash hands thoroughly with soap and water and dry with a clean, dry cloth or air dry.
3. Monitor vaginal bleeding and take the patient's vital signs:
   - □ Every 15 minutes for 1 hour
   - □ Then every 30 minutes for 2 hours
4. Make sure that the uterus is firmly contracted.
5. Record procedure and findings in the patient's record.

Bimanual compression of the uterus

Preparation

1. Explain to the patient (and her support person if desired) what needs to be done, listen to her and respond to her questions.
2. Provide continual emotional support and reassurance, as feasible.
3. Put on personal protective equipment.

Procedure

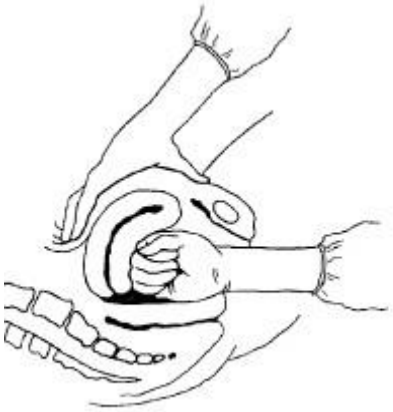
1. Use antiseptic hand rub or wash hands thoroughly with soap and water and dry with a sterile cloth or air dry.
2. Put high-level disinfected or sterile surgical gloves on both hands.
3. Clean the vulva and perineum with an antiseptic solution.
4. Insert one hand into the vagina and form a fist.
5. Place the fist into the anterior vaginal fornix and apply pressure against the anterior wall of the uterus, pushing slightly upwards as you do so.
6. Place the other hand on the abdomen behind the uterus.
7. Press the abdominal hand deeply into the abdomen and apply pressure against the posterior wall of the uterus.
8. Maintain compression until bleeding is controlled and the uterus contracts, or until more definitive action can be taken.

Post-procedure

1. Immerse both gloved hands in 0.5% chlorine solution. Remove gloves by turning them inside out.

[!] When disposing of gloves, place them in a leakproof container or plastic bag.

2. Use antiseptic hand rub or wash hands thoroughly with soap and water and dry with a clean, dry cloth or air dry.
3. Monitor vaginal bleeding and take the patient's vital signs:
   - Every 15 minutes for 1 hour
   - Then every 30 minutes for 2 hours
4. Make sure that the uterus is firmly contracted.



Compression of the abdominal aorta

Preparation

1. Explain to the patient (and her support person) what needs to be done, listen to her and answer her questions.

[!] Steps 1 and 2 should be implemented at the same time as the following steps.

Procedure

1. Place a closed fist just above the umbilicus and slightly to the left.
2. Apply downward pressure over the abdominal aorta directly through the abdominal wall.
3. With the other hand, palpate the femoral pulse to check the adequacy of compression:
   - If the pulse is palpable during compression, the pressure is inadequate.
   - If the pulse is not palpable during compression, the pressure is adequate.
4. Maintain compression until bleeding is controlled.

NB Aortic compression may be applied either externally prior to surgery, or from within the abdomen during the course of surgery, as necessary

Post-procedure

1. Monitor vaginal bleeding and take the woman's vital signs:

- □ Every 15 minutes for 1 hour,
- □ Then every 30 minutes for 2 hours.

2. Make sure that the uterus is firmly contracted.

6.5 Inverted Uterus

This is said to happen when the uterus turns inside out during delivery of the placenta. Repositioning should be performed immediately as, with time elapsing, a constricting ring around the uterus becomes more rigid and the uterus more engorged with blood. An inverted uterus may be accompanied by bleeding, although if the placenta remains attached there will be little or no bleeding. Typically, the patient rapidly becomes profoundly shocked but with bradycardia due to vagal stimulation.

- Commence oxygen therapy and IV fluids immediately as for general management of haemorrhage.
- Give pethidine IV/IM 1mg/kg (not more than 100mg) (or morphine 0.1mg/kg IM). 21.

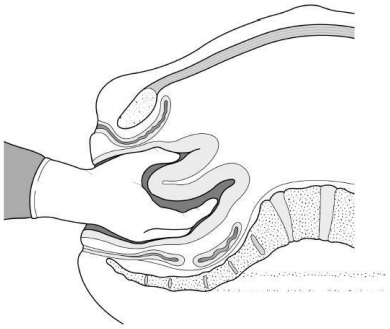
[!] DO NOT give any oxytocic drugs until inversion is corrected.

- If the placenta is still attached, do not attempt to remove this until after the uterus has been repositioned.
- Use one of the techniques below to reposition the uterus.

Repositioning of uterus in a case of uterine inversion Manual repositioning

- If possible, give anaesthesia (but all delay should be avoided).
- Under sterile conditions (if possible) reposition uterus by pushing uterus back:

- □ Push the whole mass first into the vagina then through the cervix and then finally into the normal position.



Hydrostatic repositioning

- Exclude uterine rupture first.
- Place the patient in the reverse Trendelenburg position (in a deep head-down tilt with legs in lithotomy)
- Infuse warm saline into the vagina via a rubber tube with the bag held 1–2 metres above the patient. As the vagina has recently accommodated a baby, a considerable quantity of fluid will be necessary (typically 2 litres)
- If required, drugs can be given to relax the constricting ring around the uterus (cervix) to facilitate replacement:
  - □ Magnesium sulphate 2–4g given IV over 5 minutes
  - □ Ritodrine 0.15mg IV bolus

Surgery

If the above techniques do not work, it will be necessary to perform surgery.

- Perform a laparotomy and reposition the uterus either by:
  - □ Pulling from above using Allis' forceps placed in the dimple of the inverted uterus and gentle gradual upward traction (Huntington's procedure)

  OR
  - □ Cut the cervical ring posteriorly, using a longitudinal incision first (Haultain's technique)

After repositioning

- If placenta not removed, do so manually.
- Ensure oxytocics given to keep uterus contracted.
- Give antibiotics to prevent infection (if not already commenced).

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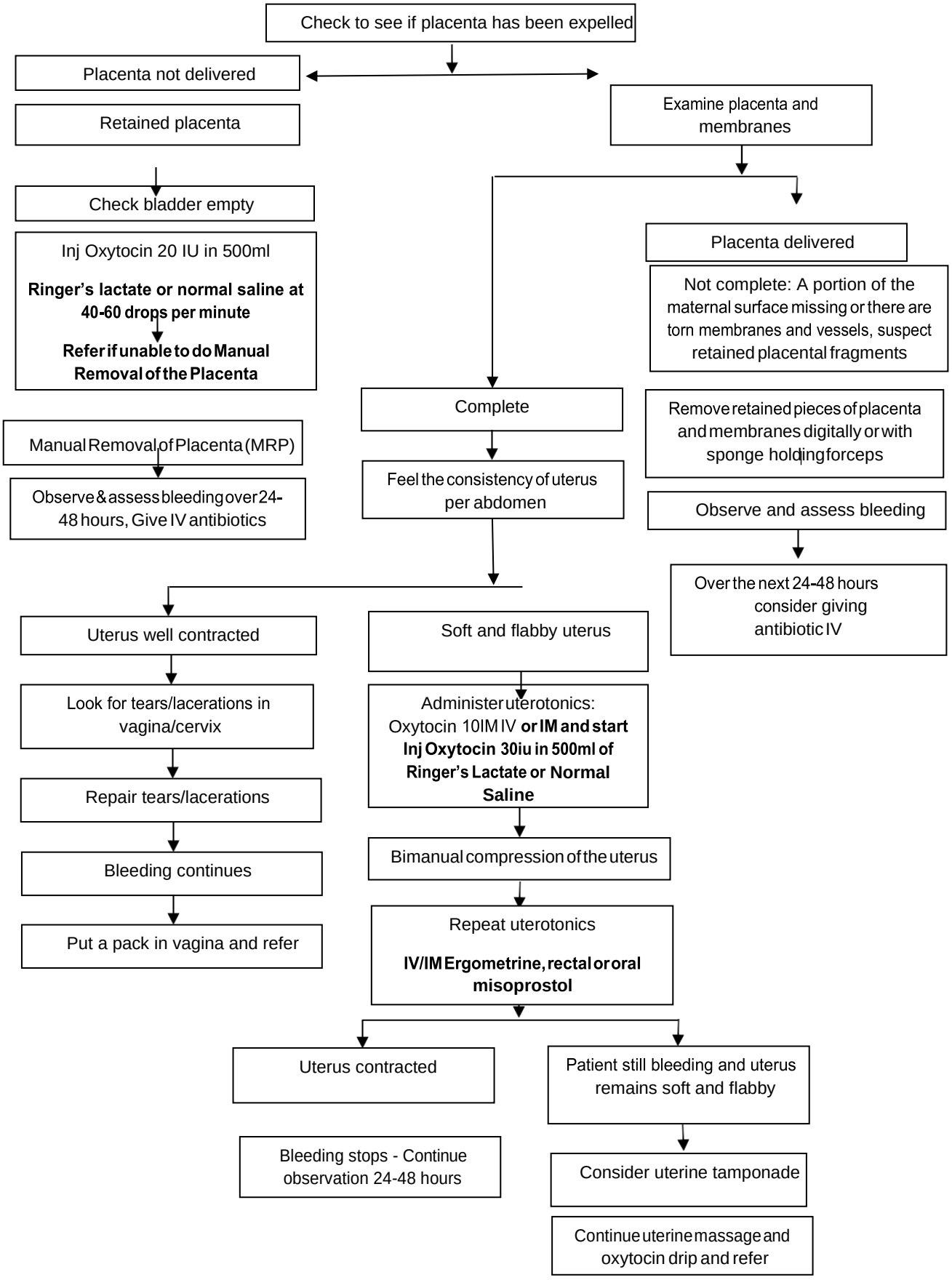
Management of PPH



MODULE 7: SEPSIS AND INFECTIONS IN OBSTETRICS

Key Learning Points

- To understand and be able to recognise sepsis
- To be confident in providing an effective response to a woman with sepsis
- To achieve competency in the skills required

Introduction

Sepsis is one of the five main causes of maternal deaths worldwide. Deaths from sepsis can be prevented with early diagnosis and treatment of women who present with signs and symptoms of sepsis. Unrecognised and untreated sepsis leads to septic shock, multiple organ failure and death. Failure to manage hypotension associated with sepsis and shock can lead to early death.

7.1 What is sepsis?

Maternal sepsis is a life-threatening condition **defined** as organ dysfunction resulting from infection during pregnancy, childbirth, post-abortion, or postpartum period. (WHO 2018)

Organ dysfunction may be measured using the SOFA (sequential organ failure assessment) score or the qSOFA score. q SOFA is suitable for low resource settings as it is a clinical assessment without the requirement for laboratory tests.

qSOFA scores three parameters:

Altered mentation

Systolic BP (score if </= 100 mmHg)

Respiratory rate (score if >/= 22 breaths per minute)

A score of >/=2 is of significance

Septic shock is defined as the inability to maintain a MAP >/= 65 without pressor therapy despite adequate fluid resuscitation and serum lactate >2 mmol/l (although the ability to measure lactate may be lacking in many low resource settings).

The vascular changes associated with sepsis are complex, leading initially to a full, bounding pulse and warm, flushed skin. If sepsis is not recognised and treated quickly, the blood pressure will fall. In cases of advanced septic shock, the temperature which was critically high (fever) will fall and the skin will become cold and clammy. It is easy to miss a case of septic shock if a health care provider is not observant.

Notes:

- **Someone in septic shock may not have a raised temperature (fever)**
- **Septic shock is easy to miss**
- **Women who present with septic shock are likely to die if treatment is not commenced immediately**

Recognition of sepsis: It is important to have a high index of suspicion.

Monitoring of vital signs including temperature, breathing, pulse, BP at regular intervals in both the

antenatal and postnatal periods is very important and helps to identify women with infection and/or sepsis early.

Women who present with fever in the antenatal or postnatal period require a full head-to-toe examination to identify the cause of the fever and type of infection. At delivery, inspect the placenta to make sure it is completely expelled and there is no retained placenta or membranes in uterus. To prevent and diagnose puerperal infection or sepsis early in the postnatal period, check the woman before discharge:

- Assess the lochia for amount and smell
- Assess the uterus for involution and/or tenderness
- Assess the breasts for swelling

Sepsis should be diagnosed if there are two or more of the following signs:

- Temperature > 38 degrees C (or < 36 degrees C)
- and/or
- Heart rate > 90 beats/minute. The pulse may be 'bounding in nature'
- Skin - warm and flushed
- Fast breathing: respiratory rate > 22 breaths/minute
- Low BP, systolic <100 mm Hg
- Altered mental state: confused, restless.
- Low urine output (<0.5ml/kg/hr or <30ml/hr)
- White cell count > 12,000 cells/mm^3 or < 4,000 cells/mm^3
- Low platelet count (< 100,000μL^{-1})

7.2 Management of Sepsis

- Check Airway and Breathing. Count respiratory rate and auscultate the chest. Give oxygen by face mask at 10-15L per minute if available.
- Check circulation: pulse, BP
  Take blood for full blood count, group and cross match two units of blood. Start IV infusion with normal saline. 1 litre of fluid should be given within the first hour as there is always a reduced intravascular volume. If shock is present the rate should be 2 litres in the first hour.
- Closely monitor fluid input and output. Insert an indwelling catheter and start a fluid monitoring chart.
- Take history and perform full head-to-toe examination to determine cause of sepsis.
- Commence appropriate broad spectrum intravenous antibiotics immediately.
- Give 1 g paracetamol either orally, intravenously or rectally to help decrease temperature and provide tepid sponging to the patient. It is of particular importance to reduce fever in a pregnant woman as the fetus has not means to cool itself. Maternal fever is a risk factor for fetal brain damage.
- If malaria is a possibility, commence the appropriate treatment.
- Hydrocortisone may additionally be used in septic shock, for example, 200-300mg administered 6 or 8 hourly in divided doses.
- Consider whether surgery is necessary in addition to antibiotics (e.g. appendicitis, typhoid related bowel perforation). Closed-space infections (abscess, retained products or intra- peritoneal collections) need surgical drainage including evacuation of the retained products of

conception.

If fever is still present 48 hours after initiating antibiotics:

- Re-evaluate and consider other causes of fever as well such as malaria
- Consider if antibiotic cover is sufficient or whether it should be added to or altered
- Consider HIV status

The choice of antibiotic treatment depends on local availability, local protocol and underlying infection or cause of sepsis.

Table 7.1: Antibiotics

Antibiotic	Preparation	Dosage/route	Frequency
Ampicillin	Vial containing 500mg as powder to be mixed with 2.5ml sterile water	First 2g IV/IM then 1g	Every 6 hours
Gentamicin	Vial containing 40mg/ml in 2ml	80mg IM	Every 8 hours
Metronidazole **DO NOT GIVE IM**	Vial containing 500mg in 100ml	500mg or 100ml IV infusion	Every 8 hours
Erythromycin	Vial containing 500mg as powder	500mg IV/IM	Every 6 hours
Cephalosporins (Eg Ceftriaxone) Use if allergic to ampicillin	Vial containing Ig powder	1-2g Daily IV	Every 24 hours
Hydrocortisone	Vial containing 100mg powder	100mg IV/IM	Every 12 hours

Antibiotic treatment for sepsis and septic shock

Give the following combination of IV antibiotics until the woman is fever-free for at least 48 hours:

- Ampicillin 2g IV every 6 hours (for women up to 50kg use 1g every 6 hours) PLUS
- Gentamicin 80mg IV every 24 hours PLUS
- Metronidazole 500mg IV every 8 hours

Laboratory changes in sepsis

Common changes in laboratory tests seen in cases of sepsis include:

- ↓ haemoglobin
- ↑ white blood cells – leucocytosis wbc>11000/mm^3
- (or ↓ white blood cells – leucopenia wbc>4000/mm^3
- ↓ platelets – thrombocytopenia

Causes of Sepsis

In pregnant or recently pregnant women, the most common causes of sepsis are:

- Chorioamnionitis
- Endometritis or infected retained products
- Wound infections
- Septic abortion
- Pyelonephritis - the risk of pyelonephritis is increased because of frequent catheterisation during labour can cause pyelonephritis in the postpartum period.

Other possible causes of sepsis are:

- Pneumonia
- Meningitis
- Typhoid fever
- Appendicitis
- Mastitis
- Tonsillitis

The risk of sepsis is increased after Caesarean Section and in women who are HIV positive with a low CD4 count (<350cells/mm3).

After commencing the treatment of sepsis according to the section above (General Management of Sepsis), further treatment will depend on the underlying cause of sepsis. These are discussed in more detail below.

7.3: Chorioamnionitis, Endometritis and Septic Abortion

These are important causes of sepsis before, during and after labour, or after unsafe abortion. Because there may be a number of different bacteria causing the infection, broad spectrum antibiotics need to be commenced as soon as possible.

Specific signs and symptoms include:

Chorioamnionitis

- History of prolonged (>24hrs) rupture of membranes
- Offensive liquor
- Cloudy or blood-stained liquor
- Uterine tenderness with signs and symptoms of sepsis
- Fever

Note: In case of chorioamnionitis, give intravenous antibiotics and expedite delivery. Endometritis and septic abortion

- Offensive lochia or vaginal discharge
- Uterus soft and not well contracted – sub-involution of the uterus
- Uterine tenderness
- Lower abdominal pain
- Generalised abdominal pain (if peritonitis present)
- Pain and bulging in Pouch of Douglas (if localised pelvic abscess)

Note: For Endometritis treatment consists of antibiotic treatment with or without surgical treatment, although it may be difficult to differentiate from infection due to retained products. Recommended treatment is a combination of clindamycin and gentamycin if available, otherwise a standard combination of broad spectrum antibiotics (ampicillin, gentamycin and metronidazole).

Surgical treatment

Remove the focus of infection if there is one. This may mean removal of retained products of conception and/or placental remnants after delivery or incomplete abortion and/or foreign bodies in case of septicabortion.

Notes:

- Surgical treatment, if necessary, should be arranged as soon as possible after stabilisation of the patient.
- Evacuation of the uterus should be done with great care as there is an increased risk of uterine perforation.

Cystitis and Pyelonephritis

Pyelonephritis (infection of the kidneys) is more common during pregnancy because of hormonal and mechanical factors causing dilation of the renal tract. Pyelonephritis can cause sepsis.
Cystitis (infection of the bladder) may predispose a woman to pyelonephritis, but does not by itself usually cause systemic sepsis and does not require intravenous antibiotics.

Cystitis

- Dysuria
- Frequency of micturition
- Lower abdominal pain

Tests:

- A dipstick leukocyte esterase test can be used to detect white blood cells and a nitrate reductase test can be used to detect nitrites.
- Microscopy of urine specimen may show white blood cells in clumps, bacteria and sometimes red bloodcells.

  Treatment for cystitis

  Treat with antibiotics:

- Amoxicillin 500mg by mouth three times/day for 3 days.
  OR
- Trimethoprim 100mg) by mouth two times/day for 3 days.
- Cephradine 500 mg by mouth four times daily for 7 days

If cystitis recurs two or more times:

- Check urine culture and sensitivity, if available, and treat with an antibiotic appropriate for the organism.
- For prophylaxis against further infections, give antibiotics by mouth once daily for the

remainder of pregnancy and 2 weeks postpartum.
Give:

- Trimethoprim 100 mg
  OR
- Amoxicillin 250mg

Acute pyelonephritis
Acute pyelonephritis is an acute infection of the upper urinary tract, mainly of the renal pelvis, which may also involve renal parenchyma.
The diagnosis of acute pyelonephritis is made by clinical examination:

- Fever
- Loin pain
- There may occasionally be symptoms of cystitis
  Ensure adequate hydration by mouth or IV. Give paracetamol 500mg by mouth as needed for pain and to help lower temperature.

Treatment for Pyelonephritis

- Start IV infusion 150ml/hour.
- Treat with IV antibiotics until the woman is fever-free for 48 hours:
- Ampicillin 2g IV every 6 hours
  PLUS
- Gentamicin 5mg/kg body weight IV every 24 hours

After 48 hours fever free:

- Amoxicillin 1g by mouth 8 hourly for 14 days

Once the woman is fever-free for 48 hours, give amoxicillin 1g by mouth three times/day to complete 14 days of treatment.
For prophylaxis against further infections, give antibiotics by mouth once daily at bedtime for the remainder of pregnancy and for 2 weeks postpartum.

Give:

- Amoxicillin 500mg

Note: In case of pyelonephritis, a clinical response is expected within 48 hours i.e. temperature reduced, symptoms reduced. If there is no response in 72 hours, think about other possible causes of fever and whether the antibiotic coverage is sufficient.

7.4: Breast conditions

Breast engorgement
Breast engorgement is an exaggeration of the lymphatic and venous engorgement that occurs prior to lactation. Both breasts are involved. It is **not** an infection.

Management
Show the woman how to hold the baby to ensure correct attachment to the nipple and give the following advice:

- Encourage and help the woman to continue breastfeeding.
- Apply warm compresses to the breasts just before breastfeeding.
- Taking a warm shower may help.
- Express some milk manually prior to breastfeeding to soften the nipple area to help the baby latch on properly and easily.
- Give paracetamol 1gm 6 hourly orally as needed.
- If there is accompanying fever, redness or pain that does **not** subside despite the above measures, the woman may be developing mastitis.

If the woman is not breastfeeding:

- Support breasts with a binder or brassiere.
- Apply cold compresses to the breasts to reduce swelling and pain.
- Avoid massaging or applying heat to the breasts.
- Avoid stimulating thenipples.
- Give paracetamol 1g 6 hourly orally as needed.

Mastitis

Mastitis usually occurs during the second or later weeks after delivery and is characterised by a tender, firm, inflamed part of one breast. If not treated it may progress to a breast abscess, which will need to be drained.

Treat with antibiotics:

- Cloxacillin 500mg by mouth four times/day for 10 days
  OR
- Erythromycin 250mg by mouth three times/day for 10 days

Encourage the woman to:

- Continue breastfeeding
- Support breasts with a binder or brassiere
- Apply cold compresses to the breasts between feedings to reduce swelling and pain
- Give paracetamol 500mg to 1g every 6 hours by mouth as needed.

Review after 3 days to ensure mastitis is subsiding and no breast abscess is developing.

Breast abscess

Treat with antibiotics:

- Cloxacillin 500mg by mouth four times/day for 10 days
  OR
- Erythromycin 250mg by mouth three times/day for 10 days.

Surgical Treatment – Incision and Drainage of a breast abscess:

- Incision and drainage of the abscess can only be done by a medical doctor or specialist, refer accordingly.
- General anaesthesia (e.g. ketamine) is usually required.
- Make the incision radially, extending from near the alveolar margin towards the periphery of the

breast to avoid injury to the milk ducts.

- Wearing sterile gloves, use a finger or tissue forceps to break up the pockets of pus.
- Loosely pack the cavity with gauze.
- Remove the gauze pack after 24 hours and replace with a smaller gauze pack.
- If there is still pus in the cavity, place a small gauze pack in the cavity and bring the edge out through the wound as a wick to facilitate drainage of any remaining pus.
- Encourage the woman to continue breastfeeding and to support breasts with a binder or brassiere.
- Apply cold compresses to the breasts between breastfeeding to reduce swelling and pain.
- Give paracetamol 500mg or 1g 6 hourly by mouth as needed.
- Follow up daily to ensure response to treatment.

Infection of perineal and abdominal wounds

If there is pus or fluid, open and drain the wound, remove infected skin or subcutaneous sutures and debride the wound. Do not remove fascial sutures.

If there is an abscess without cellulitis, antibiotics are not required. Place a damp dressing in the wound and have the woman return to change the dressing every 24 hours, or remain on the ward if transport is a problem.

In case of an infected episiotomy, advise the woman on the need for good hygiene, washing the perineum from front to back after going to the toilet and wearing clean pads or cloths that she changes often.

If infection is superficial and does not involve deep tissues, monitor for development of an abscess and give a combination of antibiotics:

- Ampicillin 500mg by mouth four times/day for 5 days
  PLUS
- Metronidazole 400mg by mouth three times/day for 5 days
  If the infection is deep, involves muscles and is causing necrosis (necrotising fasciitis), give a combination of antibiotics until necrotic tissue has been removed and the woman is fever-free for 48 hours:
- Penicillin G 2 million units IV every 6 hours
  PLUS
- Gentamicin 5mg/kg body weight IV every 24 hours
  PLUS
- Metronidazole 500mg IV every 8 hours
  Once the woman is fever-free for 48 hours, give:
- Ampicillin 500mg by mouth four times/day for 5 days
  PLUS
- Metronidazole 400mg by mouth three times/day for 5 days.

Note: Necrotizing fasciitis is a very rare infection that requires treatment with intravenous antibiotics and wide surgical debridement. Perform secondary closure 2–4 weeks later, depending on resolution of infection.

7.5: Malaria

Malaria is a common cause of fever during and after pregnancy in malaria endemic countries. It is caused by the malaria parasite and is not an infection (bacterial) per se. However, signs and symptoms of severe malaria are very similar to those of sepsis.

Treatment and Prophylaxis of Malaria during Pregnancy

- In non-endemic areas, no prophylaxis is recommended but insecticide treated bed nets should be given on priority basis to all pregnant women. WHO recommends that all suspected cases of malaria should have a parasitological test (microscopy, Rapid diagnostic test (RDT) to confirm diagnosis. This may not be possible in some settings

- In high malaria endemic areas, pregnant woman should be routinely tested for malaria at the first ANC visit and screened for malaria infection each month conducting using microscopy or RDT tests even if she does not manifest any malaria symptoms. If at any time a pregnant woman shows symptoms she should also be tested and if she tests positive for malaria she should be treated.

Note:

— **Treatment regimes vary by country and setting. Check what is best practice in our setting and adapt the guidelines accordingly.**

<u>Treating uncomplicated malaria</u>

If the malaria species is not known with certainty, treat as for uncomplicated p.falciparum malaria. Treat all pregnant women with uncomplicated P.falciparum malaria during the first trimester of pregnancy with 7 days of quinine and clindamycin. Treat women in their first trimester who have choroquine-resistant P.vivax malaria with quinine. Treat pregnant women in second or third trimesters with artemisinin-based.

Severe and Complicated Malaria

Parenteral artesunate (or artemether) for 24 hours then oral ACT to complete 3 days of treatment but if not available use quinine.

Quinine is safe in pregnancy. Quinine has unpleasant side-effects in most of the patients namely metallic taste, nausea and sometimes tinnitus. These side-effects are self-limiting once the treatment is over. Quinine salt 20mg/kg body weight (bw) as a loading dose on admission (I.V. infusion or divided IM injection) followed by maintenance dose of 10mg/kg bw 8 hourly; infusion rate should not exceed 5mg salt/kg bw per hour.

Note: Loading dose may not be given if the patient has already received quinine or if clinician thinks it is inappropriate.

The parenteral treatment should be given for minimum of 48 hours and once the patient tolerates oral therapy, quinine 10mg/kg body weight three times a day with Clindamycin 10mg/kg body weight 12 hourly should be given for 7 days in patients treated with parenteral quinine. Since quinine may induce hypoglycaemia, pregnant women should not take quinine on an empty stomach and should eat regularly, while on quinine treatment. No special diet is needed.

Treating severe malaria

Treat with intravenous or intramuscular artesunate for at least 24 hours, once the patient can tolerate orally, complete the 3-day treatment with oral ACT.

Note: Primaquine and doxycycline is contraindicated during pregnancy.

Fact box WHO Malaria treatment guidelines

Malaria chemoprophylaxis in pregnancy

In malaria-endemic areas, provide intermittent preventive treatment with sulphadoxine-pyrimethamine (SP) to all women in the second trimester (SP-IPTp) as part of ANC. A minimum of 3 doses at least 1 month apart is recommended.

Treating uncomplicated malaria

- If the malaria species is not known with certainty, treat as for uncomplicated p.falciparum malaria
- Treat all pregnant women with uncomplicated P.falciparum malaria during the first trimester of pregnancy with 7 days of quinine (oral, 600mg 8 hourly or 10mg/kg body weight) and clindamycin (450mg 8 hourly)
- If clindamycin is not available treat with quinine monotherapy (oral, 600mg 8 hourly or 10mg/kg body weight)
- Treat women on their first trimester who have choroquine-resistant P.vivax malaria with quinine.
- Use an artemisinin-based combination therapies (ACT) if quinine is not available or if quinine plus clindamycin fails or if adherence to seven-day treatment with quinine cannot be guaranteed.
- Treat pregnant women in second or third trimesters ACT for 3 days

Table 7.2: Causes of fever during pregnancy and labour

Presenting symptoms and other symptoms and signs		**Probable diagnosis**
Usually present	**Sometimes present**	
Dysuria Spiking fever/chills Loin pain/tenderness Increased frequency and urgency of urination	Retropubic/suprapubic pain Tenderness in rib cage Abdominal pain Anorexia Nausea/vomiting	Acute pyelonephritis
Foul-smelling vaginal discharge in early pregnancy Fever Tender uterus	Lower abdominal pain Rebound tenderness Prolonged bleeding Purulent cervical discharge	Septic abortion
Fever/chills Abdominal pain Tender uterus	History of ruptured membranes/or unexplained loss of fluid that is not urine Rapid/absent fetal heart rate Light vaginal bleeding or discoloured watery discharge	Chorioamnionitis
Fever Difficulty in breathing Productive cough Chest pain	Rapid breathing Rhonchi/rales or signs of consolidation on auscultation and percussion	Pneumonia
Fever Chills/rigors Headache Severe muscle/joint pain Nausea and vomiting	Enlarged spleen	Malaria (uncomplicated)
Fever/chills/rigors Coma or loss of consciousness Disorientation Severe anaemia	Convulsions* Jaundice	Severe Malaria (complicated)
Fever Headache Dry cough Malaise Anorexia Enlarged spleen	Confusion/disorientation Stupor Peritonitis	Typhoid fever
Fever Jaundice Malaise Anorexia Nausea Enlarged liver	Muscle/joint pain Urticaria Enlarged spleen	Hepatitis

*Any convulsions during pregnancy without fever should be considered to be eclampsia unless proven otherwise

Table 7.3: Causes of fever after childbirth

Presenting symptoms and other symptoms and signs		**Probable diagnosis**
Usually present	**Sometimes present**	
Fever/chills Lower abdominal pain Purulent, foul-smelling lochia Tender uterus Soft boggy, non-involuted uterus	Vaginal bleeding	Endometritis
Lower abdominal pain and distension Persistent spiking fever/chills Tender uterus Bowel symptoms, such as diarrhoea	Poor response to antibiotics Swelling in adnexa or pouch of Douglas Pus obtained upon culdocentesis	Pelvic abscess
Low-grade fever/chills Lower abdominal pain Absent bowel sounds Rebound tenderness	Abdominal distension Anorexia Nausea/vomiting Shock	Peritonitis
Breast pain and tenderness Discoloured, wedge-shaped area on breast 3-4 weeks after delivery	Inflammation preceded by engorgement Usuallyonlyonebreastaffected	Mastitis
Firm, very tender breast Overlying discoloration	Fluctuant swelling in breast Draining pus	Breast absecess
Unusually tender wound Discoloration and oedema beyond edge of incision	Hardened wound Purulent discharge Reddened area around wound	Wound cellulitis

Table 7.4: Antibiotic treatment

Antibiotics	Condition
One antibiotic e.g.: Ampicillin	- Pneumonia - Manual removal of retained placenta/fragments - Risk of uterine and fetal infection when in labour > 24 hours
Two antibiotics e.g.: Ampicillin plus Gentamicin	- Postpartum bleeding lasting >24 hours occurring > 24 hours after delivery - Upper urinary tract infection
Three antibiotics e.g.: Ampicillin plus	- Severe abdominal pain - Dangerous fever/very severe febrile disease
Gentamicin plus Metronidazole	- Complicated abortion - Uterine and fetal infection

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MODULE 8: SEVERE PRE-ECLAMPSIA AND ECLAMPSIA

Key Learning points

- To recognise severe pre-eclampsia and eclampsia.
- To practise an effective response to a woman with severe pre-eclampsia or eclampsia.

8.1 Recognising Eclampsia

Recognising mild pre-eclampsia

- Two readings of systolic BP (SBP) greater than 140/90 but lower than 160 mmHg and/or diastolic BP 90mmHg or higher but lower than 110mmHg measured four hours apart, after 20 weeks of gestation
- Proteinuria on dipstick

Recognising severe pre-eclampsia

- SBP 160 mmHg or higher and/or DBP 110mmHg or higher after 20 weeks of gestation
- Proteinuria of at least 2+ on dipstick

Symptoms may include:

- Increasing headaches not relieved by analgesics
- Blurred vision
- Epigastric pain, upper right abdominal pain
- Nausea and vomiting
- Hyperreflexia, clonus
- Jittery
- Breathlessness (pulmonary oedema)
- Reduced urine output (less than 25ml/hour or less than 100ml/4 hours or less than 400mls in 24 hours)

8.2 Principles of management of eclampsia

Mild pre-eclampsia

- If GA is less than 37 completed weeks, monitor twice weekly-blood pressure, reflexes and fetal condition as an outpatient
- Counsel the woman and her family of danger signs of severe pre-eclampsia
- Monitor the patient for signs of severe pre-eclampsia
- Do not impose any dietary restrictions
- If BP increases: Systolic BP 160 mmHg or more, diastolic BP 110mmHg or higher, or if signs of severe pre-eclampsia are identified even if BP is normal, admit and manage as severe pre-eclampsia.

NOTE: Do not give anticonvulsants, antihypertensives, sedatives or tranquilizers. Anticonvulsant

and anti-hypertensive medications are only indicated if the condition has progressed to severe pre- eclampsia or eclampsia

Severe pre-eclampsia

- If the woman is not breathing or unconscious, exclude DANGER, try to elicit a RESPONSE and then conduct a primary survey followed by a secondary survey, as covered earlier on in the course.
- The cure for pre-eclampsia (and eclampsia) is delivery of the fetus and placenta. However, a rushed delivery in an unstable patient must be avoided. Only if severe hypertension and hypoxia in the mother have been corrected and the risk of convulsions reduced can delivery be expedited.
- Treat hypertension if systolic BP is 160mmHg or over, or diastolic BP is 110mmHg or over. Aim to reduce BP to systolic 140–150 and diastolic 90–100mmHg. Commonly used antihypertensive drugs are hydralazine, labetalol and nifedipine.
- Give steroids to promote lung maturity in a fetus of gestational age of less than 34 weeks or if gestation age not known in case of suspected prematurity.
- Treat as case of eclampsia

Magnesium sulphate:

- Magnesium sulphate is used for severe pre-eclampsia
- Magnesium sulphate is used in all cases of eclampsia (fitting/convulsions).

Mode of delivery is decided at senior level after vaginal examination and assessment of fetal wellbeing to assess the possibility of induction of labour provided the mother has been stabilised and has no signs of coagulopathy.

8.3 Eclampsia

Recognising eclampsia

- The presenting symptom is convulsions (now or recently): tonic–clonic spasms similar to epilepsy, SBP >/=140mmHg and DBP >/=90mmHg after 20 weeks of gestation.
- Beware of a pregnant woman presenting unconscious or/and with a recent history of reduced level of consciousness. Try to elicit this history during the secondary survey.

[!] A small proportion of women with eclampsia have a normal blood pressure. Treat all women with convulsions as if this is eclampsia until another diagnosis is confirmed.

Action

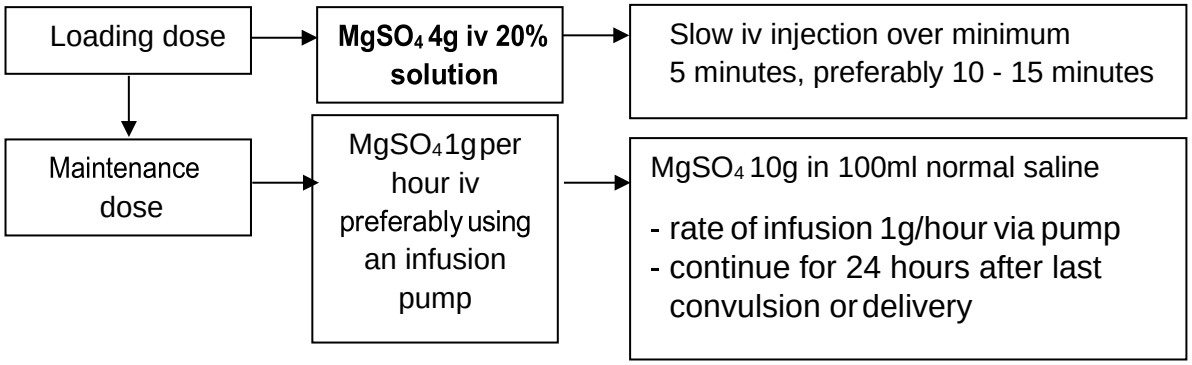
- Exclude DANGER
- Try to elicit a response (Hold by the shoulders, shake gently and call her name!)
- Place woman into the left lateral position (15-30 degree tilt to prevent aorto-caval compression)
- Do not leave the woman on her own: call for help
- Institute the Primary Survey ABCD
- Maintain airway at all times
- Insert IV cannula and give fluids slowly (normal saline or Ringer's lactate)

- Maximum 80-100 mls per hour
- **Start magnesium sulphate**
- Aim for birth to be within 12 hours of the first convulsion

Magnesium sulphate

- Magnesium sulphate ($MgSO_4$) is a lifesaving drug and should be available in all healthcare facilities at all levels of the health system. Magnesium sulphate is effective in preventing seizures (fits) in both mild and severe pre-eclampsia and for the management of eclampsia.
- Magnesium sulphate is given as a loading dose followed by a maintenance dose.
- The maintenance dose is continued for 24 hours after the delivery or after the last convulsion.
- Magnesium sulphate can be given intramuscularly or intravenously (see the regimens below).

Intravenous regimen



Intramuscular regimen

NB: In most low resource settings, Magnesium Sulphate comes in 50% solution only. This must be diluted to create 20% solution for safe intravenous use.

- For 4g dose, take 8mls of 50% solution and add 12 mls of either water for injection or saline, to a total of 20 mls this gives a 20% solution.
- For IV maintenance dose a pump is essential because Magnesium has a narrow therapeutic range. To give intravenously without a pump safely would require a dilute solution and to use such a solution would over-ride the need for fluid restriction.
- Fluid restriction is essential because of the damaged endothelium in small vessels caused by the disease, which means that fluid will leak into surrounding spaces. If such leakage occurred in the lungs and brain this would be very dangerous.

DO NOT give the next dose of magnesium sulphate if any of these signs:

- Knee jerk absent
- Urine output less than 100ml/4 hours
- Respiratory rate less than 16 breaths/minute (some protocols suggest 12 breaths as the cut off for with-holding Magnesium).

[!] Rapid injection may cause respiratory failure or death.

- If respiratory depression (breathing less than 12 breaths/minute) occurs after magnesium sulphate, with-hold Magnesium and give the antidote: calcium gluconate 1g I.V. (10ml 10% solution) over 10minutes.

If convulsions recur:

- After 15 minutes, give an additional 1- 2g of magnesium sulphate (5-10ml of 20% solution) IV over 20 minutes, depending upon the size of the woman. If small, give 1g initially. If convulsions continue, givediazepam.

After receiving magnesium sulphate a woman may feel flushing, thirst, headache, nausea or may vomit.

[!] DONOTgive intravenous fluids rapidly. Fluids should be given as 40 mls per hour plus the previous hour's urine output to a total of 80-100 mls per hour maximum.

[!] DONOTgive 50% magnesium sulphate intravenously without diluting it to 20%.

- Women receiving magnesium sulphate should never be left alone but kept under close observation.
- When IV magnesium sulphate is used in the maintenance phase, the infusion rate of magnesium sulphate should be closely monitored.
- Healthcare facilities should have calcium gluconate available in case of magnesium sulphate toxicity.

Using a treatment monitoring chart

- Hourly monitoring anddocumentation
- Vital signs andmedications
- Summary of treatmentguidelines
- Discharge summary
- Can be used to audit care

LIVKAN Eclampsia/Severe pre-eclampsia treatment monitoring chart

Name:_____Gravida:_____Para_____

___

Date: _____ Hospital No.:_____Age

Hours		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Time																									
FHR (/min)																									
Blood pressure (mmHg) and pulse (/min.)	250																								
	240																								
	230																								
	220																								
	210																								
	200																								
	190																								
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	130																								
	120																								
	110																								
	100																								
	90																								
	80																								
	70																								
	60																								
Hydralazine																									
Nifedipine																									
Labetolol																									
Number of fits (convulsions)	10																								
	9																								
	8																								
	7																								
	6																								
	5																								
	4																								
	3																								
	2																								
	1																								
	0																								
Level of consciousness	A																								
	V																								
	P																								
	U																								
Urine proteinuria	4+																								
	3+																								
	2+																								
	1+																								
Input (mls)																									
Output (mls)																									
Respiratory rate																									
Deep tendon reflex																									
MgSO4 dose																									
MgSO4 route																									
Antidote Ca gluconate																									

Deep Tendon Reflex: A: absent, B: Brisk, D: Diminished:

PLEASE DETERMINE URINE OUTPUT, DEEP TENDON REFLEX AND RESPIRATORY RATE PRIOR TO THE NEXT DOSE OF MAGNESIUM SULPHATE

Magnesium Sulphate Regimen

Treatment

1. Loading dose:

   a. 4grams I.V SLOWLY OVER 15 minutes (8mls of 50% MgS04 +12mls of water for injection or normal saline

AND (If unable to give IV, give IM loading dose only)

   b. 10grams: I.M 5gm in each buttock (10mls of 50% MgS04 + 1ml of 2% Xylocaine in the same syringe, into each buttock)

2. Maintenance dose:

   a. I.M MgSO4 5gm 4 hourly (alternating buttock)

   OR

   b. 10 gram MgS04 in 1000mls of Normal saline or Ringers lactate at rate of 100mls per hour (1gram)

Duration of treatment

- 24 hours after last fit/convulsion
- 24 hours after delivery

Treatment of recurrent fits

1-2 grams of MgSO4 I.V slowly (Please make up to 20% solution before use)

Blood pressure control

Hydrallazine: Administer IV hydrallazine 5mg slowly over 10 minutes if BP is greater or equal to 160/110mmHg. Repeat 5mg every 20mins up to a maximum of 20mg, if diastolic BP still equal to or greater than 110mmHg.

Nifedipine: BP >160/110 mm Hg: 10 mg PO initial; repeat dose may be administered in 30 min prn

Labetolol: BP >160/110 mm Hg: 20 mg IV bolus; subsequent doses of 40 mg followed by 80 mg IV may be administered at 10- to 20-min intervals to achieve BP control; may also be administered as continuous infusion 1 mg/kg/h

Monitoring of MgSO4

Do not administer MgSO4 if:

- Deep tendon reflexes is diminished or absent
- Respiratory rate is less than 15/min
- Urine output is less than 25/hour

Delivery

- Aim for delivery within 12hours of admission
- **Caesarean section**: Fetal distress, patient with unfavorable cervix, vaginal delivery not possible
- **Vaginal delivery:** No fetal distress, No cephalopelvic disproportion, cervix is favourable

Intravenous fluid therapy

USE

- Normal saline or Ringers lactate: 1ml/kg/hr or 80mls/hr

AVOID

- 5% Dextrose and Dextrose saline infusion

Antidote to MgSO4

1gram (10mls) of 10% Calcium gluconate IV slowly (over 10 minutes)

Patient discharge summary notes completed on / /201_

Number of convulsions before admission:_____

Date of Admission_____

Date of Delivery_____

Maternal Outcome (Alive/Dead)_____

Fetal Outcome (Alive/Dead)_____

Date of Discharge or Death (Please specify)_____

Mode of Delivery: (SVD ☐ C/S ☐ Vacuum ☐ others please specify_____

Complications on Admission: _____

_____

Complications on Discharge:_____

Give the appropriate antihypertensive drug:
Magnesium sulphate though not an antihypertensive drug may initially reduce blood pressure by central action causing peripheral vasodilation (and, therefore, hot flushes).

[!] Neither magnesium sulphate nor diazepam is antihypertensive: give hydralazine or labetalol or nifedipine.

The choice of hypertensive should be based on the clinician's experience with that drug, local availability and cost. There are a variety of antihypertensive drugs that can be used in pregnancy including antihypertensive drugs that can be used in pregnancy including methyldopa (oral only), nifedipine (oral), hydralazine and labetolol. There is no clear evidence that one of these is better than the others. Hydralazine and methyldopa are the most studied. Nifepidine is a calcium channel blocker and some studies suggest this gives a greater reduction to persistent high blood pressure.

- Hydralazine 5mg IV slowly (3–4 minutes). If IV not possible, give IM.
  - If diastolic BP remains above 90mmHg, repeat the dose at 30-minute intervals until diastolic BP is around 90mmHg.
  - try not to give more than 20mg in total, although further boluses may have to be added later if BP rises again
  - If hydralazine is not available, give labetalol or nifedipine.
- Labetalol 10mg IV
  - If response is inadequate (diastolic BP remains above 110mmHg) after 10 minutes, give labetalol 20mg IV.
  - Increase dose to 40mg and then 80mg if satisfactory response is not obtained after 10 minutes of each dose.
- Nifedipine 5mg orally
  - If response to nifedipine is inadequate (diastolic remains above 110mmHg) after 10 minutes, give an additional 5mg.

Note: sublingual nifedipine is no longer recommended.

Once blood pressure is reduced to non-severe levels (lower than 160/110 mmHg), ongoing treatment should be continued using oral medication

Other points of management

10. Monitor urine output:
    - using a catheter if possible
    - keep a fluid input and output chart

[!] DO NOT give intravenous fluids rapidly

11. Measure temperature:

    - If temperature higher than 38 degrees C or history of fever, also give treatment for fever (anti-malarials and/or antibiotics).

12. Assess pregnancy status:

□ If a woman with eclampsia is pregnant:
- Delivery should take place as soon as the woman's condition has been stabilised. It is recommended that delivery should be within 12 hours of the onset of eclamptic seizures.
- Delivery should occur regardless of the gestational age.
- Mode of delivery depends on many factors, including gestation, fetal lie, state of fetal wellbeing, maternal stability, and presence of adequate platelet numbers.

13. Assess the cervix:
□ If the cervix is favourable (soft, thin, partly dilated), rupture the membranes and induce labour using oxytocin.
□ If the cervix is unfavourable (firm, thick, closed) ripen the cervix using misoprostol, prostaglandins or a Foley catheter.
□ If the baby is premature (gestational age is thought to be less than 37 completed weeks) and delivery is not imminent, give corticosteroids to reduce risk of respiratory distress syndrome and perinatal death.
□ Consider delivery by emergency caesarean section:
- if vaginal delivery is not anticipated within 12 hours
- if the cervix is unfavourable
- if there are foetal heart abnormalities (less than 100 beats/minute or more than 180 beats/minute) or other pathological signs.

□ If safe anaesthesia is not available for caesarean section or if the foetus is dead or too premature for survival, aim for vaginal delivery.

Note:

Misoprostol can be used orally and vaginally for the induction of labour

Diazepam

[!] Magnesium sulphate is the drug of first choice in all circumstances and should be easily available at both BEmONC and CEmONC levels. A Cochrane review demonstrated a relative risk of maternal death of 0.59 (95% c.i.0.38-0.92) and recurrence of seizures of 0.43 (95% c.i. 0.33-0.55) when using Magnesium Sulphate as compared to Diazepam.

Give diazepam:
- If convulsions occur in early pregnancy (prior to 20 weeks)
  OR
- If magnesium sulphate is not available

Giving diazepam IV
- Loading dose IV: give diazepam 10mg IV slowly over 2 minutes. Rectal administration is preferable.
- If convulsions recur, repeat 10mg.

Diazepam: vial containing 10mg in 2ml

Dose	Administration	
	IV	**Rectally**
Initial	10mg = 2ml	10mg = 2ml
Second	10mg = 2ml	10mg = 2ml

Diazepam maintenance dose

- Stop the maintenance dose if breathing rate less than 16 breaths/minute.
- Assist ventilation if necessary with mask and bag.
- Do not give more than 100mg in 24 hours.

Giving diazepam rectally

- Loading dose: give 10mg (2ml) in a 10ml syringe (or urinary catheter).
- Remove the needle, lubricate the barrel and insert the syringe into the rectum to half its length.
- Discharge the contents and leave the syringe in place, holding the buttocks together for 10 minutes to prevent expulsion of the drug.
- If convulsions recur, repeat 10mg.

[!] The airway will need to be maintained and/or protected after diazepam treatment.

Complications in women with pre-eclampsia or eclampsia

In women with pre-eclampsia organ dysfunction may present in different ways including:

Kidney Failure

Unless a woman in already on antidiuretic treatment (for a condition other than pre-eclampsia) there is no place for diuretics in the management of pre-eclampsia or eclampsia except for the treatment of pulmonary oedema when furosemide should be used.

Pulmonary oedema

Treat as above. This condition is largely avoidable with the use of well disciplined fluid restriction.

HELLP syndrome

Up to 20% of women with severe pre-eclampsia or eclampsia develop HELLP syndrome: **H**emolysis, **E**levated **L**iver enzymes and **L**ow **P**latelet count.

Disseminated Intravascular Coagulopathy (DIC)

Stroke

Expert opinion suggests that most maternal deaths are associated with complications of uncontrolled high blood pressure. Therefore, antihypertensive treatment is recommended in all cases of severe hypertension.

Postpartum care of the woman with pre-eclampsia or eclampsia

In women who needed antihypertensive drugs antenatally or during labour and delivery for

pre- eclampsia or eclampsia continued antihypertensive treatment in the postnatal period is recommended. This would normally be at least six weeks and depending on BP measurements subsequently. The highest BP (and incidence of stroke) are often seen at the end of the first week postpartum when women.

Table 8.1: Antihypertensive medications and dosing options for acute treatment of severe hypertension

Antihypertensive Options	Dosing
Hydralazine	Intravenous treatment: - Administer 5 mg IV, slowly. - Repeat every fifteen minutes until the blood pressure goal has been - achieved. - Repeat hourly as needed or give 12.5 mg IM every two hours as needed.
Labetalol	Oral treatment: - Administer 200 mg. - Repeat dose after one hour until the treatment goal is achieved. - The maximum dose is 1200 mg in 24 hours. Intravenous treatment: - Administer 10 mg IV. - If response is inadequate after 10 minutes, administer 20 mg IV. - The dose can be doubled to 40 mg and then 80 mg with 10-minute intervals between each increased dose until blood pressure is lowered below threshold. - The maximum total dose is 300 mg; then switch to oral treatment Note: Women with congestive heart failure, hypovolaemic shock or predisposition to bronchospasm (asthma) should not receive labetalol.
Nifedipine immediate-release capsule	Oral treatment: - Administer 5–10 mg orally. - Repeat dose after 30 minutes if response is inadequate until optimal blood pressure is reached. - The maximum total dose is 30 mg in the acute treatment setting
Alpha methyldopa	Oral treatment: - Administer 750 mg orally. - Repeat dose after three hours until the treatment goal is achieved. - The maximum dose is 3 g in 24 hours.
a Other treatment options should be considered if blood pressure is not lowered within the acute treatment phase of 90 minutes with 30 mg immediate-release nifedipine.	

Table 8.2: Oral antihypertensive medications for non-severe hypertension

Antihypertensive Options	Dosing
Alpha methyldopa	• _Administer 250 mg every six to eight hours. • _The maximum dose is 2000 mg per 24 hours.
Nifedipine immediate-release capsules	• _Administer 10–20 mg every 12 hours. • _The maximum dose is 120 mg per 24 hours.
Labetalol	• _Administer 200 mg every six to 12 hours. • _The maximum dose is 1200 mg per 24 hours. **Note:** Women with congestive heart failure, hypovolaemic shock or predisposition to bronchospasm (asthma) should not receive labetalol.

Note: In some settings, nifedipine is available in more than one formulation (e.g. immediate-release, intermediate-release and sustained-release). Only immediate-release nifedipine is included on WHO's Essential Medicines List (WHO, 2015) To avoid medication errors, it is important to specify and confirm the nifedipine formulation before administering it.

References

1. World Health Organisation 2017: Managing complications in pregnancy and childbirth: a guide for midwives and doctors – 2nd ed
2. World Health Organisation 2014: WHO recommendations for augmentation of labour.

MODULE 9: OBSTRUCTED LABOUR

Key learning points

- To make a diagnosis of labour
- To describe and discuss supportive care in labour
- To be able to recognize the different types of delay that can occur during labour.
- To be able to recognise when obstructed labour has occured.
- To appreciate the skills needed to respond effectively to a woman who is in obstructed labour.

Introduction

A partograph is started once a woman is diagnosed to be in active labour; that is, when the cervix is 4cm dilated and usually there are regular contractions (three in 10 minutes) each lasting 40 seconds or more (NB some authorities state that active labour commences at 5 cms dilation).

Supportive care during labour ensures respectful care is available and that medical staff provide or facilitate the availability of psychological and physical support care that is important for the prevention/management of anxiety, pain and facilitates labour progress.

9.1 Supportive Care In Labour

Ensure that the woman has a companion of her choice and, where possible, the same health care provider throughout labour and childbirth:

— Encourage the woman to have support from a person of her choice throughout labour and childbirth.

— Supportive companionship can enable a woman to face fear and pain, while reducing loneliness and distress, and can promote positive physiologic birth outcomes.

— Where possible, encourage companions to take an active role in her care. - Encourage the companion to give support to the woman during labour and childbirth (e.g. by rubbing her back, wiping her brow with a wet cloth, helping her move about).

— Arrange seating for the companion next to the woman.

— During the second stage, position the companion at the top of the bed to allow the companion to focus on caring
for the woman's emotional needs.

Ensure good communication and support by staff:

— Explain all procedures, seek permission and discuss findings with the woman. Provide a supportive, encouraging atmosphere for birth that is respectful of the woman's wishes.

— Ensure privacy and confidentiality.

Maintain cleanliness of the woman and her environment:

— Encourage the woman to wash herself or bathe or shower at the onset of labour.

— Wash the vulval and perineal areas before each examination.

— Wash your hands with soap before and after each examination.

— Ensure the cleanliness of the labouring and birthing area(s).

— Clean up all spills immediately.

Ensure mobility:

— Encourage the woman to move about freely, especially to be in an upright position.

— Support the woman's choice of position during labour and birth

Failure to progress in labour may be because of problems with the:

Powers: Contractions inadequate (dysfunctionallabour)

Passage: Pelvis too small for baby (cephalopelvic disproportion, obstructed labour)

Passenger: Position wrong or baby too large for pelvis (cephalopelvic disproportion, obstructed labour or malposition)

Psyche: Lack support is associated with increased risk of interventions. Anxiety can decrease endogenous oxytocin production.

[!] It is very important to decide which of the four causes contribute to failure to progress so that appropriate action is taken.

Dysfunctional labour is said to occur when contractions are inadequate, either due to reduced frequency, strength or co-ordination. Dysfunctional labour rarely occurs in multiparous women as the multiparous uterus is more sensitive to oxytocin

Cephalopelvic disproportion occurs when the presenting part is too large or the passage (pelvis) is too small. This may be due to a malposition or presentation, for example, a deflexed occipito- posterior position or a brow presentation, when the diameter of the presenting part is unable to fit through the dimensions of the maternal pelvis In true obstructed labour, contractions may diminish in frequency or strength, progress will cease and signs of obstructed

labour will eventually develop. In some settings, a caesarean section may be conducted even in the presence of an intrauterine death and/or because an alternative mode of delivery is not possible and/or because delivery must be expedited for the mother's benefit. The decision to deliver by caesarean section or not in case of intrauterine death is a difficult one and it is prudent to seek senior advice whenever possible.

First stage of labour

Findings suggestive of unsatisfactory progress in the first phase include:

- Irregular and infrequent contractions
  AND/OR
- Cervical dilatation slower than 0.5-1 cm/hour during the active phase of labour (cervical dilatation to the right of the alert line)
  AND/OR
- Cervix poorly applied to the presenting part

Lack of progressive descent despite good uterine contractions

Management

- If uterine contractions are infrequent and/or irregular:
  - Encourage mobility and oral hydration.
- If there are no signs of cephalopelvic disproportion (obstructed labour):
  - Rupture the membranes with amniotic hook or a Kocher clamp
  - Consider augmentation of labour
  - Augment labour using oxytocin in primigravid cases only, provided the fetal heart rate and pattern is reassuring and a midwife is available to check the fetal heart and contraction frequency every 15 minutes
  - Reassess progress by vaginal examination 2-4 hours after a good contraction pattern with strong contractions has been established.
- If no progress between examinations, deliver by caesarean section.

Note: Oxytocin should not be used in a multigravida due to the risk of uterine hyperstimulation and rupture, except in cases of membrane rupture without spontaneous contractions.

Failure to progress in second stage of labour

Findings suggestive of unsatisfactory progress:

- Lack of descent of fetus through the birth canal
- Failure of expulsion

Management

- Support spontaneous pushing.
- Encourage change of maternal position/mobility.
- If malpresentation and obvious obstruction have been excluded, and contractions are inadequate, consider whether to augment labour with oxytocin in primigravid women

only.

If no descent after augmentation:

- If the fetal head is not more than one-fifths palpable above the symphysis pubis or the fetal head is at the spines or lower, deliver by vacuum extraction (see Module 8). If inexperienced in conducting an assisted delivery (vacuum), call for senior help.
- If the fetal head is more than two-fifths palpable above the symphysis pubis, deliver by caesarean section.

Other Findings associated with unsatisfactory progress

Fetal condition

Fetal heart rate abnormalities (pathological if baseline of less than 100 beats/minute or more than 180 beats/minute or persistent late decelerations). If pathological, arrange to deliver within 30 minutes by the most appropriate means.

- Change the maternal position
- Assess the state of cervical dilatation
- Check for presentation other than occiput anterior with a well-flexed vertex
- Closely monitor the progress of labour with the use of partograph

Maternal condition

- An increase in pulse rate. The woman may be dehydrated or in pain:
  - Ensure adequate hydration via oral or IV routes and provide adequate support/analgesia.
  - Check temperature for fever manage and treat where necessary with paracetamol and broad spectrum antibiotics
- Hypotension:
  - Change maternal position to lateral position.
  - If associated with haemorrhage: refer to the management of obstetric haemorrhage
- Acetone in urine (ketosis): the woman may be dehydrated: correct the hydration orally or IV.

Deciding whether a woman is in labour or not

It is very important to be able to diagnose the onset of labour (first or active stage) correctly (see definition above). If a woman is not yet in labour, continue to monitor her (routine vital signs, fetal heart rate and check contractions).

If after 12-24 hours a woman is still not in active labour this is sometimes called "false or spurious labour". Some practitioners also call this a "prolonged latent phase". Unless there are reasons to induce labour, it is advisable to await the onset of spontaneous labour.

Spurious labour

- Examine for:
  - Urinary tract infection
  - Rupture of membranes
  - Vaginal infections such as Bacterial vaginosis (fishy smell, greenish frothy discharge)

- Treat accordingly
- If none of these is present, discharge the woman with advice to return as soon as contractions increase (regular strong contractions) or membranes rupture or she experiences any problems.

Table 9.1: Diagnosis of unsatisfactory progress of labour

Findings	Diagnosis	Management
Cervix not dilated No palpable contractions/ infrequent contractions	Spurious labour	
Cervix not dilated beyond 4cm after 8 hours of regular contractions	Prolonged latent phase	
Cervical dilatation to the right of the alert line on the partograph	Prolonged active or first phase of labour	
- Secondary arrest of cervical dilatation and descent of presenting part in presence of good contractions; presenting part with large caput, - third-degree moulding, - cervix poorly applied to presenting part, - oedematous cervix, - ballooning of lower uterine segment, formation of retraction band over the uterus (Bandl's ring), - maternal and fetal distress	Cephalopelvic disproportion or obstructed labour	
Less than three contractions in 10 minutes, each lasting 40 seconds or less in active phase of labour	Inadequate uterine activity or dysfunctional labour	
Presentation other than cephalic with occiput anterior	Malpresentation or malposition	

Cervix fully dilated and woman has urge to push but there is no descent after pushing Delivery after 60 minutes active pushing in a multiparous woman and after 120 minutes active pushing in a primiparous woman	Prolonged second stage

Surgical Procedures: How to perform a Caesarean Section

Doctors, midwives and theatre staff work together as a team to carry out this procedure.

[!] Review indications. Ensure that vaginal delivery is not possible.

Preparation: midwife

1. Discuss with the woman (and her birth companion/support person) what is going to be done, listen to her, respond attentively to her questions and concerns and obtain informed consent.
2. Examine the woman, assess her condition and examine the medical record (including the partograph) for information and completeness.
3. Check the fetal heart.
4. Obtain blood for haemoglobin and blood type and crossmatch 2 units of blood.
5. Set up an IV line and infuse 500ml of IV fluids (normal saline or Ringers lactate).
6. Give premedication including:
   - □ Atropine 0.6mg IM (or IV if in theatre)
   - □ Magnesium trisilicate 300mg
7. Help the woman to put on a gown and cap.

Preparation: scrub nurse

1. Prepare the necessary equipment.
2. Put on theatre clothes, protective footwear, cap, facemask, protective eyeglasses and a plastic apron.
3. Perform a surgical hand scrub for 3–5 minutes and dry each hand on a separate sterile towel.
4. Put on a sterile gown and put sterile surgical gloves on both hands.
5. Ensure that the instruments and supplies are available and arrange them on a sterile tray or in a high-level disinfected container.
6. Conduct an instrument and swab count and ask an assistant to note on board.

Preparation: doctor

1. Examine the woman, assess her condition and examine the medical record for information and completeness.
2. Check the fetal heart.

3. Explain to the woman (and her support person) what is going to be done, listen to her, respond attentively to her questions and concerns. Obtain informed consent if not already done so.
4. Evaluate anaesthetic options:
   - □ General anaesthesia
   - □ Local anaesthesia
   - □ Spinal anaesthesia

Pre-procedure tasks

1. Put on theatre clothes, protective footwear, cap, facemask, protective eyeglasses and a plastic apron.
2. Perform a surgical hand scrub for 3–5 minutes and dry each hand on a separate sterile towel.
3. Put on a sterile gown and put high-level disinfected or sterile surgical gloves on both hands (double glove).
4. Ensure that an assistant is scrubbed and dressed and that there is a midwife to receive the baby.

Preparing the woman

1. Tilt operating table to the left by 15-30 degrees or place a pillow under the woman's right lower back to prevent .
2. Ensure that the woman has been anaesthetised and that the anaesthetic has taken full effect.
3. Catheterise the bladder.
4. Clean the vagina with swabs soaked in antiseptic solution (not alcohol based)
5. Apply antiseptic solution to the incision site and surrounding area three times. Allow to dry.
6. Drape the abdomen, leaving the surgical area exposed and then drape the woman
7. Ask an assistant to give a single dose of prophylactic antibiotics, for example:
   - □ Ampicillin 2g IV with or without Metronidazole 1g IV
     OR Cefazolin 1g IV

Procedure

1. Ask the instrument nurse to stand with the instrument tray on the side opposite to you toward the foot of the woman.
2. If you are right-handed, stand on the right side of the woman and ask the assistant to stand on the left side of the woman. If you are left-handed, it is easier to deliver the baby if you stand on the left side of the woman and the assistant on the right side.
3. Make a transverse straight skin incision, 3cm above the public symphysis. Subsequent layers of the anterior abdominal wall are opened bluntly. In difficult caesarean sections, a midline sub umbilical/vertical incision may be the skin incision of choice.

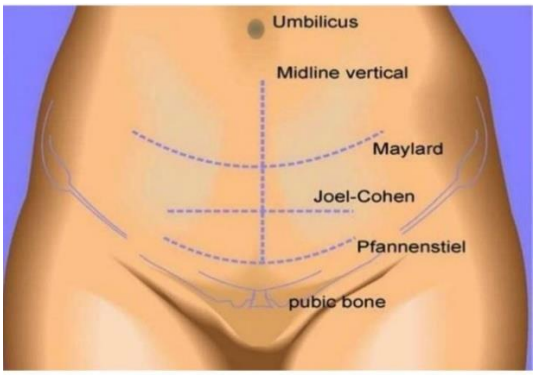


Figure 9.1: Types of Incisions

4. Clamp any significant bleeding points in the subcutaneous adipose tissue with artery forceps and tie off the vessels with plain 0 catgut or polyglycolic (Vicryl® 2-0) or cauterise the tissue.
5. Make a 2–3cm vertical incision in the rectus sheath (or transverse incision if using Pfannenstiel's incision).
6. Hold the edge of the rectus sheath with forceps and lengthen the incision up and down (or left and right for Pfannenstiel) using scissors.
7. Use scissors to separate the rectus muscle from the sheath in the midline.
8. Use fingers (or lift with forceps and open with scissors after checking no abdominal content in fold) to make an opening in the peritoneum near the umbilicus.
9. Place a bladder retractor over the pubic bone.
10. Use forceps to pick up the loose visceral peritoneum covering the anterior surface of the lower uterine segment and incise with scissors at the vesico-uterine fold.
11. Extend the incision by placing the scissors between the uterus and the loose serosa and cutting about 3cm on each side in a transverse fashion. Deflect the bladder downwards carefully using fingers or a swab.
12. Replace the bladder retractor over the pubic bone to retract the bladder downward. Determine if a high vertical incision in the uterus is indicated rather than a lower uterine incision:
    - □ An inaccessible lower segment due to dense adhesions from the previous section
    - □ Transverse lie (with baby's back down) for which a lower uterine segment incision cannot be safely performed
    - □ Large fibroids over the lower segment
    - □ Carcinoma of the cervix
    - □ Prematurity where the lower segment is not yet big enough

NB this should normally have been determined prior to opening the abdomen as a midline sub- umbilical vertical skin incision should be employed in cases where a classical caesarean incision is likely.

For cases where the cervix is fully dilated, a transverse uterine incision should be made slightly higher than is usual as the cervico-uterine junction will be higher in this circumstance

13. Use a scalpel to make a 3cm transverse incision in the lower segment of the uterus, taking care to avoid the bladder. Open the uterus carefully to avoid cutting the fetal presenting part.
14. Widen the incision to approximately 12 cms by placing a finger at each edge and gently pulling upward and laterally at the same time.

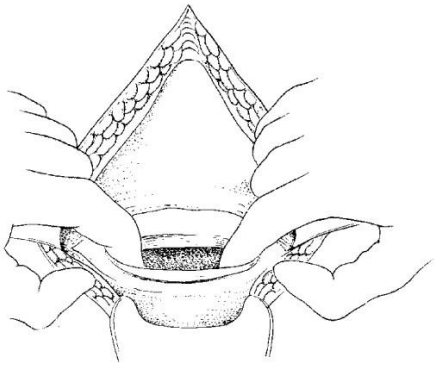


Figure 9.2: Opening the uterus

15. If it is necessary to extend the incision, do so using scissors instead of fingers to avoid extension into the uterine vessels. Make a crescent-shaped incision.
16. If the membranes are intact, rupture them. Ask the assistant to suction the liquid.

Delivering the newborn

1. Place one hand inside the uterine cavity between the uterus and the fetal head.
2. With your fingers, grasp and flex the head.
3. Gently lift the fetal head through the incision, taking care not to extend the incision down toward the cervix.
4. With the other hand, gently press on the abdomen over the top of the uterus to help deliver the head (and/or ask the assistant to give fundal pressure).

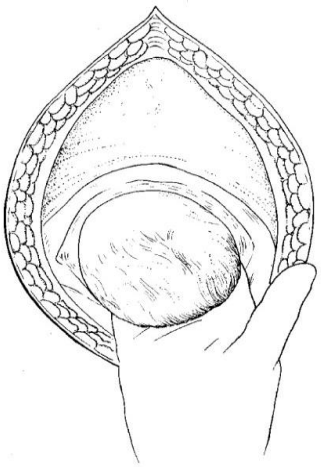


Figure 9.3: Delivering the head

5. If the fetal head is deep in the pelvis or vagina, ask an assistant (not the scrubbed nurse) to put on sterile gloves to push the head up through the vagina from below. Then lift and deliver the head.
6. Ask the anaesthetist or assistant to check the blood pressure and give oxytocin 10IU IV/IM. Oxytocin 30 units in 500 mls IV at 30 drops/minute for 2 hours can also be given.

Figure 9.4: Dis-impacting the head from the vagina

7. Deliver the shoulders and body.
8. Lay the baby between the mother's legs and cover with a warm towel. If the baby is breathing, delay cord clamping for 1 minute. Place Green-Armytage clamps on either end of the uterine incision to minimize blood loss while waiting for delayed clamping and placental delivery
9. Clamp the cord at two points and cut it.
10. Hand the newborn to midwife or assistant for drying, keeping the baby warm, resuscitation and then hand baby to mother if conscious or birth companion/family member.
11. Deliver the placenta by cord traction or manually.
12. Quickly inspect the placenta for completeness and abnormalities. Dilate cervix from above if necessary.
13. Swab out the uterus with a sterile swab to ensure no remnants of membranes and/or placental tissue.

Closing the uterine incision and abdomen

1. Make sure that you have clearly identified the corners of the uterine incision.
2. Identify again the corners and suture and tie them separately using 0 chromic catgut or polyglycolic so they are secure. Place a clamp on the end of the suture for easy reference.

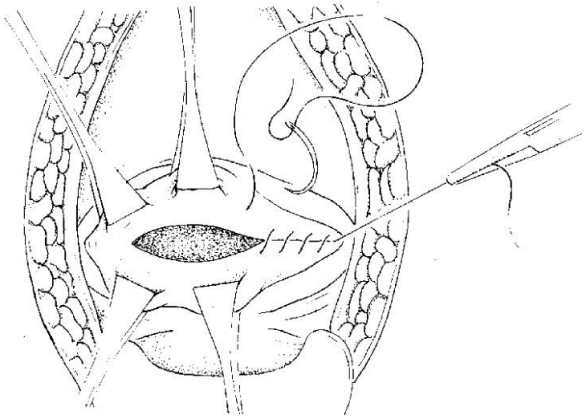


Figure 9.5: Closing the uterus

3. Repair the rest of the uterine incision, starting at the corner furthest away from you using a continuous stitch of 0 chromic catgut or polyglycolic suture. For a two layer closure (recommended unless the uterine incision is very thin), leave an upper layer of myometrium to close in the second layer. Take care not to touch the needle with fingers and use toothedforceps.
4. Secure haemostasis with a second layer of continuous Ensure haemostasis is complete. If there is any further bleeding from the incision site, close with individual figure-of-eight sutures.
5. Ensure the uterus is well contracted. If uterus not well contracted ask for a continuous infusion of 30 units oxytocin in 500 mls of saline or Ringer lactate to be given over the next 4–6 hours.
6. Ask the assistant to conduct an instrument and swab count and report back.
7. Before closing the abdomen, check for injury to the bladder. Identify the extent of the injury and repairit.
8. Identify the end of the rectus sheath at the upper and lower ends of the incision using Kocher's forceps. Place a clamp midway on either side of the incision. Close thesheath using a continuous 0 chromic catgut or polyglycolic suture
9. If the adipose layer is >2 cms thick, close at the level of scarpa's fascia with a continuous
   2.0 suture
10. Close the skin with a subcuticular suture, preferably absorbable if available to avoid having to remove sutures later
11. Ensure there is no bleeding, clean the wound with gauze moistened in antiseptic solution and apply a sterile dressing.
12. Evacuate clots from vagina using forceps and swab and put on a sterile pad and check the uterus is contracted.
13. Assist in moving the woman off the operating table onto the observation post-operation bed.

Midwife's role in receiving the baby

1. Check resuscitation equipment Is in working order and ensure radiant warmer is

switched on and a good light is available
2. Hold sterile cloth to receive the baby.
3. Carry the baby to the resuscitation area and rapidly dry him or her, if resuscitation is needed. If not rapidly dry the baby (jeep baby warm) and give to the mother if on spinal anaesthesia or her birth companion/family member.
4. Wrap the baby in a clean dry cloth; simultaneously assess the Apgar score at 1 minute.
5. Respond to the need for resuscitation, as assessed.
6. Apply cord clamp and shorten cord stump using sterile equipment.
7. Label the baby. Record time of birth.
8. Inform parents of baby's condition: keep mother and baby together.
9. Complete documentation

Post-procedure tasks: doctor

1. Write notes of the operation, postoperative observations and management instructions.
2. Assess the woman before she is transferred out of the recovery area.
3. Check the woman on the ward daily or as frequently as necessary.
4. Discuss the reasons for the caesarean section, family planning and future pregnancies before discharge.

Post-procedure tasks: scrub-nurse

1. Use antiseptic hand rub or wash hands thoroughly with soap and water and dry with a clean, dry cloth or air dry.
2. Dispose of needles and syringes: flush needle and syringe with 0.5% chlorine solution three times, then place in a puncture-proof container.
3. Remove gown and then immerse both gloved hands in 0.5% chlorine solution.
4. Remove gloves by turning them inside out. Dispose of gloves by placing them in a leak-proof container or plastic bag.

Postoperative care: midwife

1. Immediate postoperative care: position in left lateral 'recovery position'; maintain a clear airway.
2. Observations:
   - □ Pulse: every 15 minutes initially
   - □ Blood pressure: every 15 minutes initially
   - □ Respiration rate: every 15 minutes initially
   - □ Check bleeding:
     - From the wound every 30 minutes
     - Vaginally every 30 minutes
   - □ Check uterus is contracted: every 30 minutes.
3. Maintain prescribed IV infusion.
4. Assess level of pain and provide adequate pain relief.
5. Assist mother to place baby at breast if mother is breastfeeding.

Care in the postnatal ward

- Observations: continue 4-hourly temperature, pulse and respiration rate and BP for first 48 hours.
- Ensure adequate pain relief.
- Monitor urinary output.
- Ensure good hydration:
  - Ensure adequate IV infusion in first 24 hours
  - Start taking sips of water within 24 hours
  - Gradually increase to food, if no nausea, over the next 24 hours as long as the mother can tolerate it
- Encourage the mother to take deep breaths and move her legs while in bed.
- Help the mother to get out of bed as soon as possible to aid circulation.
- Manage wound care as local protocol.
- Assist with maintaining good hygiene practices and regular changing of sanitary pads.
- Keep mother and baby together.
- Support breastfeeding.

Encourage early mobilisation. Remove the bladder catheter once the woman can walk unless otherwise instructed by the surgeon

Prior to going home

- Discuss reasons for caesarean section, family planning and future pregnancies and delivery before discharge.
- Discuss need for rest, nutrition and hygiene for mother.
- Discuss newborn care and good feeding practices.
- Schedule appointment for postpartum care.

How to do a Laparotomy for ruptured uterus

Preparation and pre-procedure tasks: as for **caesarean section**. Ensure that a **laparotomy tray** is used.

Delivery procedure

1. Open the abdomen as for caesarean section but use a midline abdominal incision.
2. Deliver the fetus and placenta.
3. Lift the uterus out of the pelvis and examine the front, back and sides of the uterus.
4. Consider repair of the uterus if:
   - There is a wish for future pregnancy
   - The woman will have access to emergency obstetric care for her next pregnancy
   - It is surgically feasible to conduct repair without damage to the bladder or ureter
   - The edges of the tear are clearly identified and not necrotic

Post-procedure care

1. Transfer the woman to the recovery area. Do not leave the woman unattended until the effects of the anaesthesia have worn off.
2. Write notes of the operation, postoperative observations and management

instructions.

3. Assess the woman before she is transferred out of the recovery area. Use an Early warning scoring system
4. Once the woman has woken fully from the anaesthesia, explain what was found at surgery and what procedures have been done.
5. Ensure that the woman has written postoperative instructions (such as awareness of complications and warning signs, when to return to work) and necessary medications before discharge.
6. Tell her when to return if follow up is needed and that she can return anytime she has concerns.
7. If tubal ligation was not performed, discuss reproductive goals, provide counselling on prognosis for fertility and, if appropriate, provide family planning. If the woman wishes to have more children, advise her to have an elective caesarean section for future pregnancies.

How to do a Subtotal (supracervical) hysterectomy

1. Lift the uterus out of the abdomen and gently pull to maintain traction.
2. Doubly clamp and cut the round ligaments with scissors. Clamp and cut the pedicles, but ligate after the uterine arteries are secured to save time.
3. From the edge of the cut round ligament, open the anterior leaf of the broad ligament.
4. Incise to:
   - □ The point where the bladder peritoneum is reflected onto the lower uterine surface in the midline
     OR
   - □ The incised peritoneum at a caesarean section

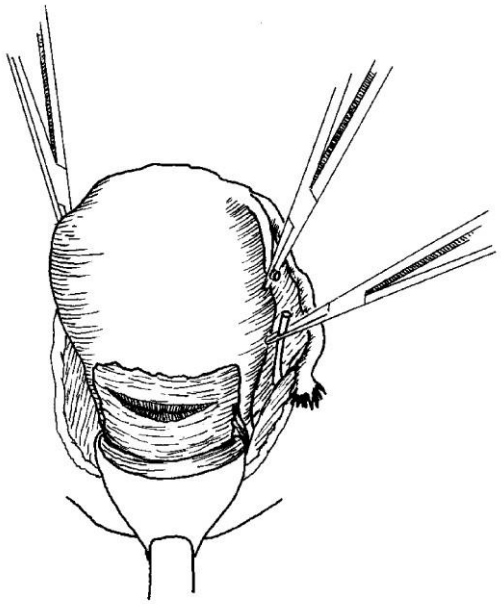


Figure 9.6: Cutting the round ligament

5. Use two fingers to push the posterior leaf of the broad ligament forward, just under the tube and ovary, near the uterine edge. Make a hole the size of a finger in the broad

ligament, using scissors. Doubly clamp and cut the tube, the ovarian ligament and the broad ligament through the hole in the broad ligament.

[!] The ureters are close to the uterine vessels. The ureter should be identified and exposed to avoid injuring it during surgery or including it in a stitch.

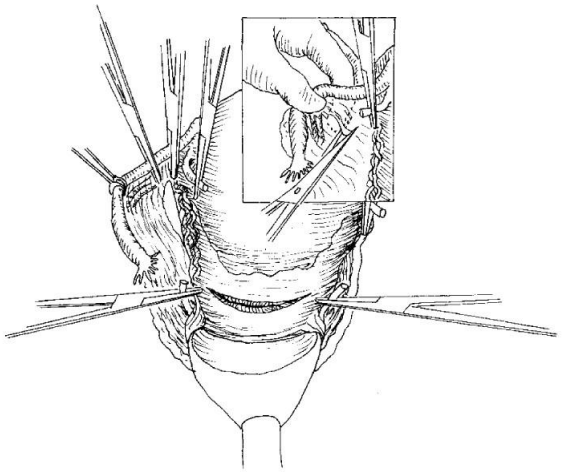


Figure 9.7: Opening the broad ligament

6. Divide the posterior leaf of the broad ligament downwards towards the uterosacral ligaments, using scissors.
7. Grasp the edge of the bladder flap with forceps or a small clamp. Using fingers or scissors, dissect the bladder downwards off the lower uterine segment. Direct the pressure downwards but inwards toward the cervix and the lower uterine segment.
8. Locate the uterine artery and vein on each side of the uterus. Feel for the junction of the uterus and cervix.
9. Doubly clamp across the uterine vessels at a 90-degree angle on each side of the cervix. Cut and doubly ligate with 0 chromic catgut (or polyglycolic) suture.

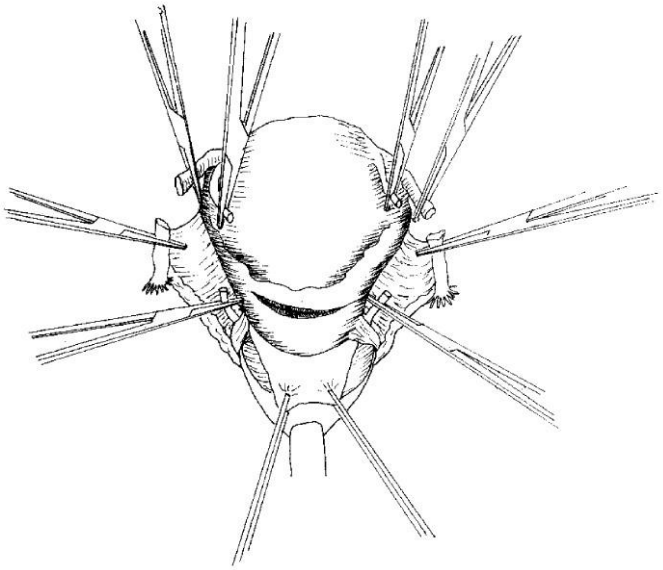


Figure 9.8: Pedicles in subtotal hysterectomy

10. Observe carefully for any further bleeding. **If the uterine arteries are ligated correctly,** bleeding should stop and the uterus should look pale.
11. Return to the clamped pedicles of the round ligaments and tubo-ovarian ligaments and ligate them with 0 chromic catgut (or polyglycolic) suture.
12. Amputate the uterus above the level where the uterine arteries are ligated, using scissors.
13. Close the cervical stump with interrupted 2-0 or 3-0 chromic catgut (or polyglycolic) sutures.
14. Carefully inspect the cervical stump, leaves of the broad ligament and other pelvic floor structures for anybleeding.
15. **If slight bleeding persists or a clotting disorder is suspected**, place a drain through the abdominal wall. Do not place a drain through the cervical stump as this can cause postoperative infection.

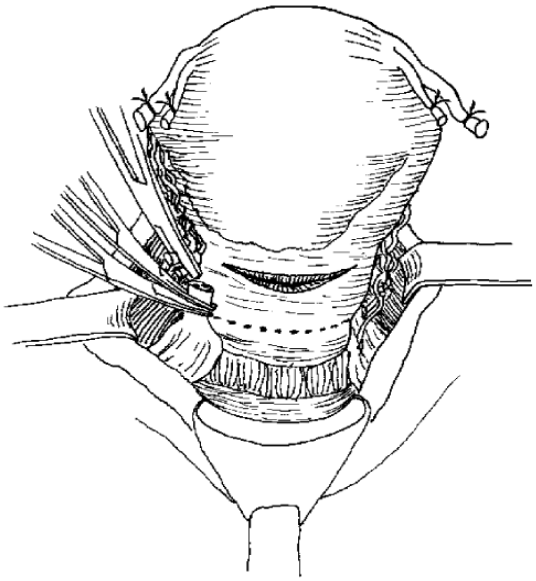


Figure 9.9: Incision line in subtotal hysterectomy

16. Ensure that there is no bleeding. Remove clots using a sponge.
17. In all cases, check for injury to the bladder. If a bladder injury is identified, repair the injury.
18. Close the fascia with continuous 0 chromic catgut (or polyglycolic) suture.

[!] There is no need to close the bladder peritoneum or the abdominal peritoneum.

19. If there are signs of infection, pack the subcutaneous tissue with gauze and place loose 0 catgut (or polyglycolic) sutures. Close the skin with a delayed closure after the infection has cleared.
20. If there are no signs of infection, close the skin with vertical mattress sutures of 3-0 nylon (or silk) and apply a sterile dressing.

Total hysterectomy

The following additional steps are required for total hysterectomy:

1. Push the bladder down to free the top 2cm of the vagina.
2. Open the posterior leaf of the broad ligament.
3. Clamp, cut and ligate the uterosacral ligaments.
4. Clamp, cut and ligate the cardinal ligaments, which contain the descending branches of the uterine vessels. This is the critical step in the operation:
   - □ Grasp the ligament vertically with a large-toothed clamp (such as Kocher).
   - □ Place the clamp 5mm lateral to the cervix and cut the ligament close to the cervix, leaving a stump medial to the clamp for safety.
   - □ If the cervix is long, repeat the step two or three times as needed.
5. The upper 2cm of the vagina should now be free of attachments.

6. Circumcise the vagina as near to the cervix as possible, clamping bleeding points as they appear.
7. Place haemostatic angle sutures, which include round, cardinal and uterosacral ligaments.
8. Place continuous sutures on the vaginal cuff to stop haemorrhage.
9. Close the abdomen (as above) after placing a drain in the extraperitoneal space near the stump of the cervix.

Postoperative care

- Review postoperative care principles.
- If there are signs of infection or the woman currently has fever, give a combination of antibiotics until she is fever-free for 48 hours:
  - Ampicillin 2g IV every 6 hours
    PLUS
  - Gentamicin 5mg/kg body weight IV every 24 hours
    PLUS
  - Metronidazole 500mg IV every 8 hours
- Give appropriate analgesic drugs.
- If there are no signs of infection, remove the abdominal drain after 48 hours.
- Note that, especially with late presentation or diagnosis of ruptured uterus, abdominal distension can occur postoperatively with ileus, which may require nasogastric tube.

How to do a Craniotomy

In certain cases of obstructed labour with fetal death, reduction in the size of the fetal head by craniotomy makes a vaginal delivery possible and avoids the risks associated with caesarean delivery. This procedure is no longer commonly performed and should only be undertaken if absolutely necessary by an experienced clinician or when there are no other options for delivery of the fetus.

Preparation

1. Provide emotional support and encouragement.
2. If necessary, give diazepam IV slowly or use a pudendal block.
3. Apply antiseptic solution to the vagina.
4. Perform an episiotomy, if required.

Procedure

Cephalic presentation

1. Make a cruciate (cross-shaped) incision on the scalp.

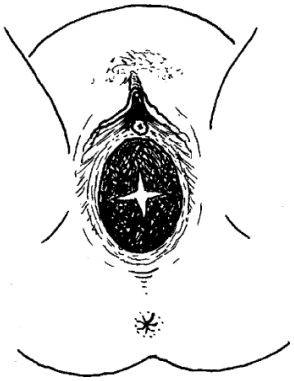


Figure 9.10: Cruciate incision on the fetal scalp

2. Open the cranial vault at the lowest and most central bony point with a craniotome (or large-pointed scissors or a heavy scalpel). In face presentation, perforate the orbits.
3. Insert the craniotome into the fetal cranium and fragment the intracranial contents.
4. Grasp the edges of the skull with several heavy-toothed forceps (such as Kocher) and apply traction in the axis of the birth canal.

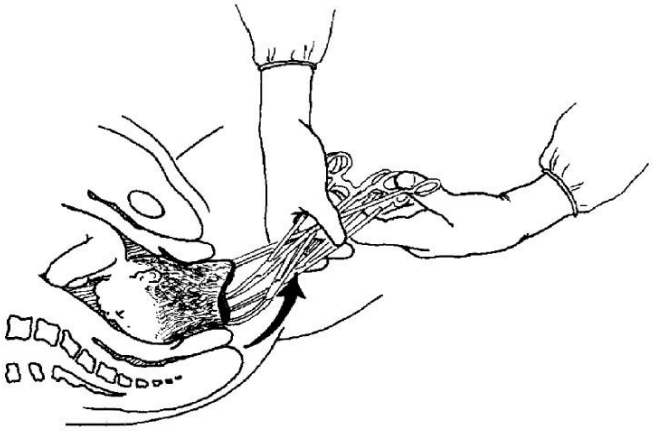


Figure 9.11: Traction on the fetal head using kocher

5. As the head descends, pressure from the bony pelvis will cause the skull to collapse, decreasing the cranial diameter.
6. After delivery, examine the woman carefully and repair any tears to the cervix and vagina and repair the episiotomy.
7. Leave a self-retaining catheter in place until it is confirmed that there is no bladder injury.
8. Ensure adequate fluid intake and urinary output.

Breech presentation with entrapped head

1. Make an incision through the skin at the base of the neck.
2. Insert a craniotome (or large-pointed scissors or a heavy scalpel) through the incision and tunnel subcutaneously to reach the occiput.
3. Perforate the occiput and open the gap as widely as possible.
4. Apply traction on the trunk to collapse the skull as the head descends.

MODULE 10: ASSISTED VAGINAL DELIVERY

Key learning points

- To learn the indications for assisted vaginal delivery using vacuum extraction.
- To understand the principles of the use of vacuum extraction.
- To understand the basic principles of simple forceps delivery (additional objective in countries where obstetric forceps may be used)

10.1 Vacuum extraction

The indications for vacuum extraction include:

- Fetal indications:
  - Fetal distress in second stage
  - cord prolapse (although rare for presenting part to be sufficiently descended in cases of cord prolapse)
- Maternal indications:
  - Prolonged second stage
  - maternal exhaustion
  - to shorten second stage: medical conditions e.g. cardiac disease
  - placentalabruptionatfulldilation

Conditions necessary for vacuum extraction

- Fetal head not more than one-fifth palpable abdominally above the symphysis pubis
- Cephalic (vertex) presentation
- Cervix fully dilated
- Fetal head at least at 0 station (at spines) or lower
- Adequate pelvis (severe moulding may suggest cephalo-pelvic disproportion)
- Ruptured membranes
- Position of the head must be known with certainty
- Adequate analgesia: pudendal block is recommended if possible. Perineal infiltration is recommended whether or not an episiotomy is required to counteract the severe pain of the accelerated perineal stretching with a vacuum delivery and enable the mother to co-operate.
- Empty maternal bladder and deflate the bulb of any urethral catheter insitu
- For occipito-transverse and occipito-posterior positions or if uncertain of success, alert more a more experienced health provider and consider performing the AVD in the operating theatre(incaseoffailurethisminimisesthedelayinrevertingtocaesarean section).

Preparation

1. Prepare and test the necessary equipment.
2. Obtain informed consent for the procedure from the woman.
3. Provide continual explanation and support throughout the procedure

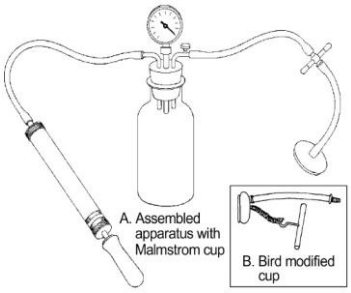


Figure 10.1: Vacuum equipment

Pre-procedure tasks

1. Use antiseptic hand rub or wash hands thoroughly with soap and water and dry with a sterile cloth or air dry and put on gloves.
2. Clean the vulva with antiseptic solution.
3. Empty the bladder
4. Check all connections on the vacuum extractor and test the vacuum on a gloved hand.
5. If possible, use a pudendal block.

Procedure

1. Assess the position of the fetal head by feeling the sagittal suture line and the fontanelles. It may be difficult to determine position in cases where there is significant caput. If so, try to run a finger up under the symphysis pubis and if the position is transverse, an ear will be felt. If posterior, the bridge of the nose or the orbital sockets may be palpated. This will assist in determining the position.

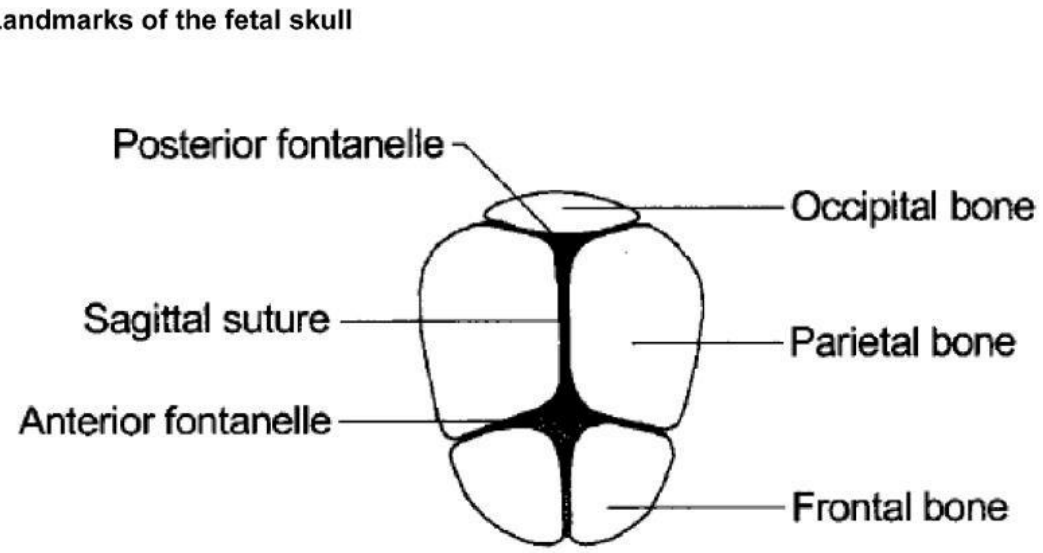


Figure 10.2: Fetal skull land mark

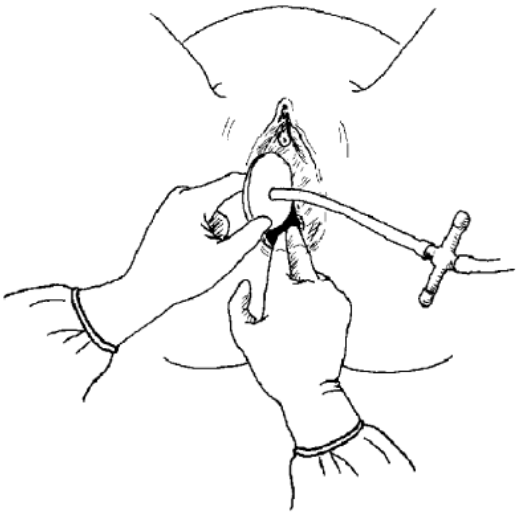


Figure 10.3: Inserting the vacuumm cup

2. Identify the posterior fontanelle.
3. Between contractions (i.e. at the time when there is no contraction), apply the largest cup available that will fit, with the centre of the cup 3 cms anterior to the posterior fontanelle (see diagram below). Use two fingers to depress the posterior introitus, enlarging the entrance and helping to avoid scraping the cup over the clitoris and urethral orifice.

[!] Note the correct placement of the cup is over the flexion point. The flexion point is 3 cm in front of the posterior fontanelle along the sagittal suture. The flexion point (median flexion application) is also about 6cm from the anterior fontanelle. A perpendicular steady traction at the flexion point, increases the flexion of the fetal head and presents the smallest diameter to the pelvic outlet– Keeping the traction perpendicular to the cup and in the midline of the mother, ensures that the axis of traction is along the pelvic curve.

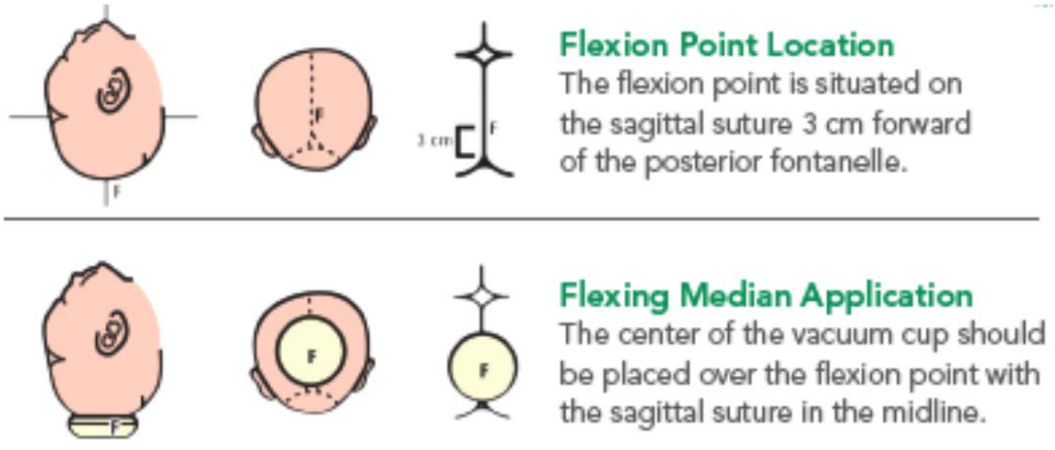


Figure 10.4: Flexion point

4. Check the application of the cup and ensure that there is no maternal soft tissue (cervix or vagina) within the rim of the cup.
5. Create a vacuum of 0.2kg/cm2 (yellow colour on Kiwi vacuum) negative pressure with the pump and check the application of the cup. If necessary, release pressure and reapply cup.
6. Increase the vacuum to 0.8kg/cm^2 or 600mmHg (top of the green colour on a Kiwi vacuum device) negative pressure and check the application of the cup, ensuring no maternal tissue has become trapped between the cup and fetal head.
7. After maximum negative pressure has been applied and place the index finger of your non pulling hand on the fetal head and the thumb on the cup, in order to detect any cup slippage as you apply traction.
8. With the next contraction, start traction in the line of the pelvic axis and perpendicular to the cup.

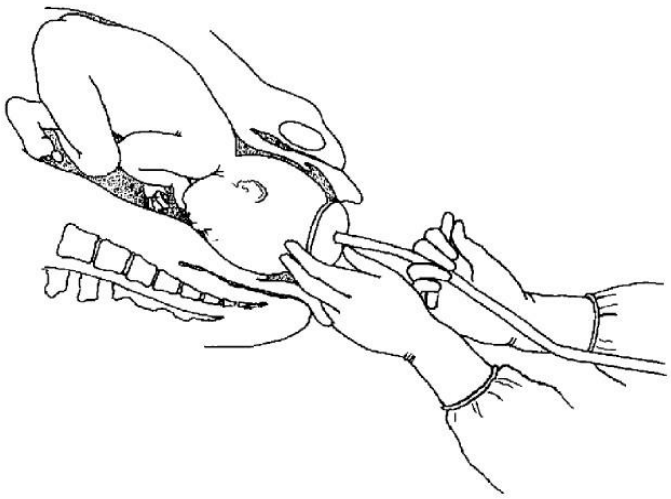


Figure 10.5: Delivering the baby

9. With each contraction, ask the mother to push, and, apply traction in a line perpendicular to the plane of the cup rim.
   - □ Place a gloved finger on the scalp next to the cup during traction to assess potential slippage and descent of the vertex.

[!] Between each contraction check:

- □ Fetal heart rate
- □ Application of the cup

[!] Do not continue to pull if there is no contraction.

10. With progress, and in the absence of fetal distress, continue the 'guiding' pulls for a maximum of 15 minutes or 3 contractions (if the head is crowning but not yet delivered, traction for a fourth contraction is permitted). If the permitted number of contractions

have taken place in less than 15 minutes, desist earlier.

11. If an episiotomy is needed, delay cutting the episiotomy until the head stretches the perineum or the perineum interferes with the axis of traction.
12. When the head has been delivered, release the vacuum, remove the cup and complete the birth of the newborn.
13. Perform active management of the third stage of labour to deliver the placenta:
14. Check the birth canal for tears following childbirth and repair the episiotomy if this was required.

Post-procedure tasks

1. Before removing gloves, dispose of waste materials in a leakproof container or plastic bag.
2. Use antiseptic hand rub or wash hands thoroughly with soap and water and dry with a clean, dry cloth or air dry.
3. Record the procedure and findings on woman's record and debrief the woman.

Failed vacuum extraction

- Classify a failed vacuum extraction if:
  - Fetal head does not advance with each pull
  - Fetus is undelivered after three pulls (3 contractions)
  - Cup slips off the head twice at the proper direction of pull with a maximum negative pressure
- Every application should be considered a trial of vacuum extraction. Do not persist if there is no descent with every pull
- If vacuum extraction fails, perform a caesarean section. It will usually be necessary to have an assistant pushing the fetal head back up from within the vagina until the uterus is opened and the surgeon reaches under the fetal head in this circumstance)

NB

- In the event that the fetal head is in a transverse, oblique or posterior position, an attempt to rotate to occipito-anterior can be made using either manual or digital rotation.
- For manual rotation, the fetal head is cupped in the fingers of the accoucheur and rotated in between contractions flowing slight upwards decompression to elevate the head from the point at which it has become stuck in the pelvis.
- For digital rotation, two fingers are used. Employ a ridge created by overlapping of sutures due to moulding and aim to steer the head around with the fingers in the ridge while the mother pushes during a contraction.
- Either of these techniques are safe and acceptable and may even result in the avoidance of the need to perform an assisted vaginal delivery as the head may descend spontaneously once rotated to occipito-anterior. If not, an assisted vaginal delivery will be easier to perform once the head is occipito-anterior.

10.2 Forceps delivery

The indications for forceps delivery include:

- After-coming head of a breech (see also section on breech delivery)
- To help with delivery of the head during a difficult caesarean section
- Preference over vacuum extraction by attending doctor
- Lack of availability of a functioning vacuum device

Preparation

1. Prepare the necessaryequipment
2. Obtain informed consent from the woman
3. Provide continual emotional support and reassurance, as feasible

Conditions necessary for forceps delivery

- Vertex presentation
- Face presentation with chin-anterior
- Entrapped after-coming head in breech delivery
- Cervix fully dilated
- Fetal head below the level of the ischial spines during vaginal examination (i.e. below the spines)
- and/ or 0/5 (that is, not palpable) above the symphysis pubis on abdominal examination (skilled users may also consider vacuum extraction when the head is 1/5 palpable abdominally) Ensure that the position of the fetal head is known. If not in the occipito-anterior position, consider manual or digital rotation or revert to a vacuum delivery. Rotational forceps using Kiellands forceps is an advanced skill and should never be undertaken without advanced training

- Ruptured membranes
- Adequate analgesia: pudendal block if possible and perineal infiltration

Pre-procedure tasks

1. Use antiseptic hand rub or wash hands thoroughly with soap and water and dry with a sterile cloth or air dry
2. Put on sterile surgical gloves and drape the woman
3. Clean the vulva with antiseptic solution
4. Catheterise the bladder
5. Ensure the position of the fetal head is ascertained correctly
6. Assemble the forceps before application. Ensure that the parts fit together and lock well.
7. Lubricate the blades of the forceps with antiseptic gel
8. If possible, use a pudendal block

Procedure

1. Insert two fingers of the right hand into the vagina on the side of the fetal head. Hold the left blade in the line of the inguinal ligament and slide the blade gently between the head and fingers to rest on the side of the head.

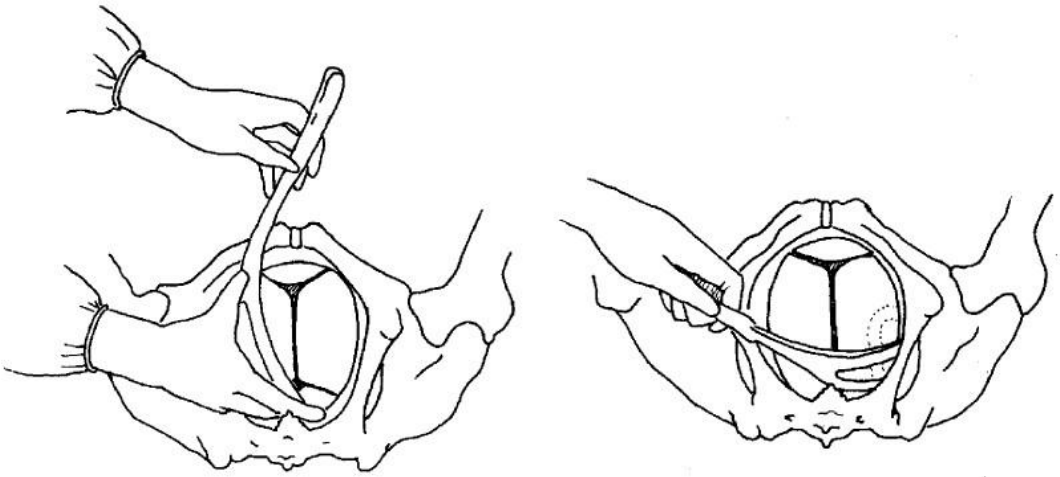


Figure 10.6: Inserting the first blade of the forceps

2. Repeat the same manoeuvre on the other side, using the left hand and the right blade of the forceps.

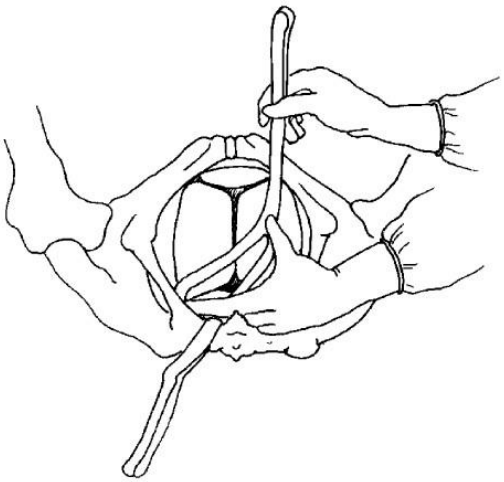


Figure 10.6: Inserting the second blade of the forceps

3. Depress the handles and lock the forceps.
4. **Difficulty in locking** usually indicates that the **application is incorrect**. In this case, remove the blades and recheck position of the head. Re-apply only if this is **easily** possible.

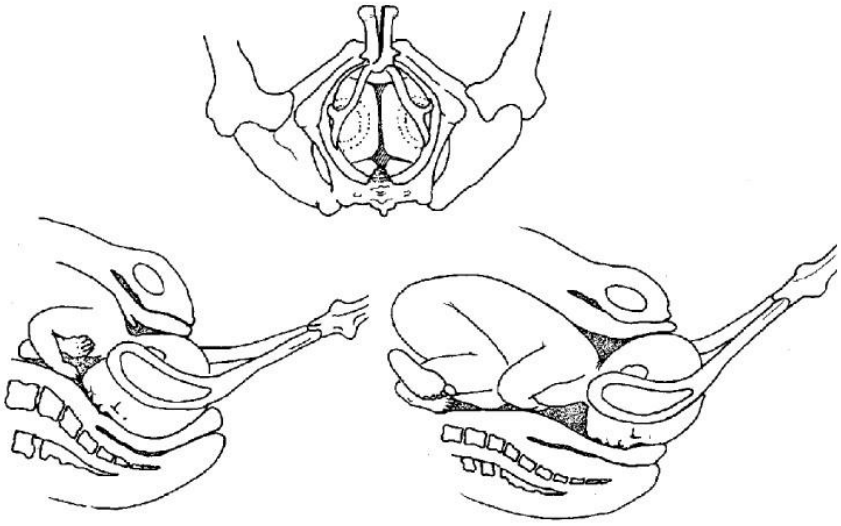


Figure 10.7: Delivery with forceps

5. After locking, apply **steady traction with each contraction** Ask the mother to push with each contraction.

[!] The head should descend with each pull. Only two or three pulls should be necessary.

6. Between contractions check:
   - □ Fetal heart rate
   - □ Application of forceps
7. When the head crowns, make an adequate episiotomy. An episiotomy is almost always needed with forceps delivery.
8. Perform active management of the third stage of labour to deliver the placenta:
   - □ 10 units oxytocin IM
   - □ controlled cord traction
9. Check the birth canal for tears following childbirth and repair, if necessary.
10. Repair the episiotomy.

Post-procedure tasks

1. Before removing gloves, dispose of waste materials in a leakproof container or plastic bag.
2. Use antiseptic hand rub or wash hands thoroughly with soap and water and dry with a clean, dry cloth or air dry.
3. Record the procedure and findings on woman's record.

Failed forceps

- ■ Classify as failed forceps, if:
  - □ The fetal head does not advance with each pull
  - □ The fetus is undelivered after three pulls or after 20 minutes

- Every application should be considered a trial of forceps. **Do not persist if the head does not descend.**
- If forceps delivery fails, perform a caesarean section.

MODULE 11: COMMON OBSTETRIC EMERGENCIES

Key learning points

- To learn to recognise obstetric emergencies or complications at time of birth including cord prolapse, shoulder dystocia, breech and twin delivery
- To appreciate the effective management pathways for cord prolapse, shoulder dystocia, breech and twin delivery

Cord Prolapse and Shoulder dystocia are emergencies that are largely unpredictable. and may arise unexpectedly during labour and delivery. Both require a healthcare provider to react quickly and competently if the baby's life is to be saved.

Breech and twin delivery are relatively more common occurrences. They require additional care and skill to ensure a safe delivery for both the mother and baby. In case of twin delivery, there is an increased risk of postpartum haemorrhage.

Obstetric emergencies and complications at the time of birth can lead to anxiety and panic in the healthcare provider, the mother and her family. Healthcare providers should ensure they can recognize complications early, are competent to manage these problems and should seek help and support from colleagues. Explaining to the mothers and her family what is happening and providing support is very important and will help the mother follow and instructions from healthcare providers
e.g. when to push (or not).

11.1 Cord Prolapse

Recognising a cord presentation and a cord prolapse

With a cord presentation, the membranes remain intact but the cord is felt through the membranes below the presenting part on vaginal examination through the partially dilated cervix. The cord will feel soft and will usually be pulsating. A cord presentation in labour should be managed by urgent caesarean section, with the aim of delivery before the membranes rupture if at all possible.

With cord prolapse, the umbilical cord is either visible at the vulva or is palpable on vaginal examination below the presenting part when the membranes have already ruptured. It may or may not be pulsating.

Management of Cord Prolapse

- Check if there are pulsations – feel cord gently
- If the cord is pulsating, the fetus is alive

- Determine lie of baby and presenting part

  [!] The baby could be in transverse lie. If the baby is in transverse lie, the mother will need a caesarean section. Caesarean section in cases of transverse lie with ruptured membranes is a difficult procedure and should be performed by the most experienced surgeon available.

- If the baby is in longitudinal lie, perform a vaginal examination to determine the stage of labour.

  [!] Your next action will depend upon the findings at vaginal examination.

There are three main possibilities:

1. The cord is pulsating and cord prolapse occurs during the first stage of labour with the cervix not yet fully dilated
2. The cord is pulsating and the cord prolapse occurs during the second stage of labour with the cervix fully dilated
3. No pulsations can be felt in the umbilical cord

Cord pulsating – first stage of labour

[!] Take immediate action to stop the presenting part pressing on the umbilical cord.

There are three possible ways to do this:

1. **Ask the mother to adopt the knee-elbow position** (that is, to turn over to face the bed and crouch on all fours raising her buttocks in the air above her shoulders). An alternative position is to lie the mother on her side with her buttocks raised by a cushion.

Figure 11.1:Knee chest position

[!] The mother can stay in this position during transfer if option 3 below is not available.

!] It is usually only possible to maintain this position for a short time only, such as when preparing the mother on the operating table prior to caesarean section or while inserting a catheter.

2. Manually keep the presenting part out of the pelvis:

- **Wearing sterile gloves, insert a hand into the vagina and push the presenting part up to decrease pressure on the cord and dislodge the presenting part from the pelvis.**
- Place the other hand on the abdomen in the suprapubic position and keep the presenting part out of the pelvis.
- Once the presenting part is firmly held above the pelvic brim, remove the other hand from the vagina. Keep the hand on the abdomen until the time that the caesarean section is performed.

3. Fill the bladder:

- Insert a Foley catheter (with a balloon), drain the urine present and then fill the bladder through the catheter with 500 normal saline then blow up the balloon and clamp the catheter.
- Attach catheter bag as normal but keep catheter clamped and fluid in the catheter balloon until babydelivered.
- At caesarean section, release catheter clamp before opening the uterus to empty balloon. Take care not to damage the bladder when opening the abdomen.

[!] This is a very good method of keeping the presenting part away from the prolapsed cord. The woman can easily be transferred in this position. If the transfer takes more than two hours, drain 100 mls as urine produced will be added to the volume during the transfer. It is important not to over-fill the bladder as overdistension can result in permanent damage to the nerve innervation of the bladder wall.

After you have acted to stop the presenting part pressing on the cord:

Prepare for immediate caesarean section or REFER to a higher-level health facility if caesarean section is not available at your health facility:

- If available, give salbutamol 0.5mg IV slowly over 2 minutes to reduce contractions
- Prepare for resuscitation of the newborn

Cord pulsating and cervix fully dilated with the presenting part no more than 1/5 palpable in the abdomen (rare combination)

- Expedite delivery vacuum extraction or forceps performing an episiotomy only if necessary
- If the baby is breech presentation, perform a breech extraction
- Prepare for resuscitation of the newborn

Cord not pulsating

- If the cord is not pulsating, the fetus is dead
- Deliver in the manner that is safest for the woman

11.2 Shoulder dystocia

[!] Be prepared for shoulder dystocia at all deliveries: shoulder dystocia cannot be predicted.

Recognising shoulder dystocia

- The fetal head has been delivered but the shoulders have not been delivered with the next contraction despite the application of the usual gentle axial traction
- The fetal head is delivered but remains tightly applied to the vulva.
- The chin retracts and depresses the perineum (turtle sign).
- There is incomplete restitution (external rotation) following delivery of the head.
- Gentle traction on the head fails to deliver the shoulder, which is caught behind the symphysis pubis.

Management of shoulder dystocia

Principles of management:

The anterior shoulder is impacted above the pubic symphysis. Management is aimed at opening the pelvis (McRoberts position) and also rotating the fetal shoulders from the anterior-posterior to the wider oblique diameter of the pelvic outlet. Maternal pushing will only add to the impaction of the shoulder and the mother must be strongly encouraged not to push throughout the procedure. Adopt a structured approach, applying each manoeuvre for up to 30 seconds whilst applying gentle axial traction to the fetal head before moving on to the next manoeuvre. If it is apparent that there is no movement with a manoeuvre it is not necessary to persist for the entire 30 seconds.

1. **Call for help**!

2. Change labour bed to a half-bed or move the woman to lie with her buttocks over the side of the bed.

3. With the woman on her back, flex and abduct both thighs, bringing her knees as far up as possible towards her shoulders, (McRoberts position). Apply gentle traction to the fetal head for up to 30 seconds. If no movement maintains the legs in McRoberts and move on to the next manoeuvre.

[!] Legs should NOT be in lithotomy poles.

4. Apply suprapubic pressure: ask the assistant to use the heel of the hands to push shoulder from the side of the fetal back, aiming to achieve external rotation. Constant pressure should be applied for 30 seconds whilst applying gentle traction to the fetal head. If no movement, try rocking pressure to the fetal shoulder from the same position for 30 seconds whilst applying gentle traction. Approximately 90% of cases of shoulder dystocia will have been resolved by this point.

[!] Do not apply fundal pressure and ask the mother not to push. This will further impact the shoulder and can result in uterine rupture.

5. If external manoeuvres fail, prepare for internal manoeuvres. Evaluate the posterior perineum to determine if there is room to accommodate the entry of a hand into the vagina for internal manoeuvres. If necessary, make an adequate episiotomy to reduce soft tissue obstruction and to allow space for manipulation.

[!] Avoid excessive traction on the head as this may result in brachial plexus injury.

6. If the shoulder still is not delivered a choice should be made as to whether to try to deliver the posterior arm or to perform internal rotation of the shoulders:

If aiming to perform internal rotation of the shoulders:

- □ insert a hand into the vagina via the sacral hollow and reach one or two fingers up around the fetal back to the back of the anterior shoulder
- □ apply pressure to the anterior shoulder in the direction of the baby's chest (sternum) to rotate the shoulder and decrease the shoulder diameter
- □ Simultaneously with two fingers of your other hand apply pressure to the anterior side of the posterior shoulder to aid rotation. The aim is to rotate the shoulders internally into the oblique diameter of the outlet. Once rotated, apply gentle axial traction to the fetal head, whilst maintaining the legs in McRobert's position. If rotation in one direction is unsuccessful, try to rotate into the opposite oblique diameter.

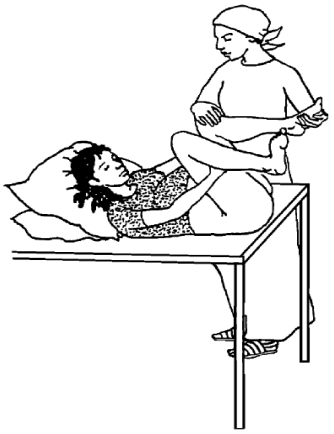


Figure 11.2: Mc-Roberts manoeuvre

8. If the shoulder still is not delivered despite the above measures, try to deliver the posterior arm:

- □ **If the elbow is flexed, you should be able to reach the posterior hand. Grasp the hand**

and draw out the posterior arm. If the elbow is not flexed, delivery of the posterior arm is more difficult. If you can reach the antecubital fossa, push backwards to encourage flexion and try to reach the fetal hand. Once the posterior arm is delivered, this will provide room for the shoulder that is anterior to move under the symphysis pubis.

NB There is no evidence as to whether it is preferable to reach for a posterior hand first or to try internal rotational procedures.

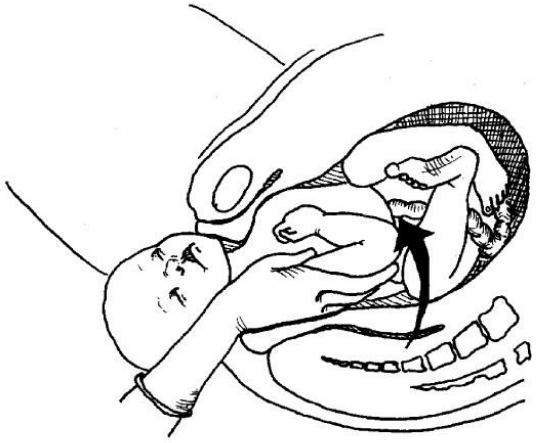


Figure 11.3: Delivery of posterior arm

9. If all of the above measures fail to deliver the shoulder, other options include:
   - □ **turning the woman on all fours (knee-elbow position). This position allows for easier delivery of the posterior arm. If you are on your own the all fours position should be adopted earlier in the process. Fracturing the clavicle to decrease the width of the shoulders and freeing the shoulder that is anterior**
   - □ **applying traction with a sling (made from a catheter) in the axilla to extract the arm that is posterior.**

10. When the baby is delivered, wipe baby dry, wrap in warm cloth and put in skin-to-skin contact with the mother.

11. Perform active management of the third stage of labour to deliver the placenta:
    - □ **10 units oxytocin IM**
    - □ **controlled cord traction**

12. Check the birth canal for tears and repair episiotomy.

11.3 Breech delivery

■ Recognising a breechpresentation

A breech presentation may be recognised during abdominal palpation and/or may be confirmed by an Ultrasound Scan.

It is also possible that a breech presentation may be first noted at vaginal examination at the onset of labour, or later during labour.

■ Conditions necessary for a safe breech delivery

■ Complete or frank breech (flexed or extended fetal legs)

■ Fetus is not too large (estimated fetal weight 3.5 kgs or less)

■ No previous caesarean section for cephalo-pelvic disproportion

■ Labour should not be augmented with oxytocin, if progress is poor, deliver by caesarean section

[!] Breech plus any other complication = Caesarean Section

Preparation for a breech delivery

1. Prepare the necessary equipment for delivery and resuscitation of the newborn
2. Explain to the woman (and her support person) what needs to be done, listen to her and answer any questions. Obtain informed consent.
3. Provide continual support and reassurance with explanations as to what is happening.
5. Start an IVinfusion
6. If necessary, use a pudendal block
7. Ensure that the cervix is fully dilated and that contractions are regular and strong

Pre-procedure tasks

1. Use antiseptic hand rub or wash hands thoroughly with soap and water and dry with a sterile cloth or air dry and put on sterile gloves
2. Clean the vulva with antiseptic solution
3. Drape the mother
4. Catheterize the bladder

Conducting a Breech Delivery

□ The mother should be encouraged not to push actively until the breech has descended almost to the perineum.

□ Have an oxytocin infusion ready to use if the contractions space out once the buttocks are delivered.

- It is important that the delivery takes no longer than **5 minutes** from the emergence of the buttocks below the perineum to completion to avoid birth asphyxia.

Delivery of the buttocks and legs

1. Allow delivery to proceed without any interference until the buttocks are visible.
2. As the buttocks become visible: **WATCH**.
3. As the perineum distends, decide whether an episiotomy is necessary. If needed, provide perineal infiltration with lignocaine and perform an episiotomy.
4. Let the buttocks deliver spontaneously with maternal effort during contractions, followed by the body until the shoulder blades (scapulae) become visible. The fetal back should remain uppermost and if it is tending to rotate, hold the fetus gently by the pelvis and rotate so the fetal back is uppermost.

[!] DO NOT PULL OR INTERFERE IN ANY WAY

6. In cases where the fetal legs are extended they may become splinted behind the fetal body. In this case, if the legs do not deliver spontaneously, deliver one leg at a time:
   - **push from behind the knee to flex and abduct the leg**
   - **grasp the ankle when it becomes visible and deliver the foot and leg**
   - **repeat for the other leg**

7. Hold the newborn by the hips, just to ensure that the back is uppermost, but **do not pull (see diagram below**

8. Ask the mother to continue pushing with contractions.

Figure 11.4: Holding the baby by the hip

Delivery of the arms and body

9. If the arms are felt on the chest, allow them to disengage spontaneously (that is, without interference), one by one:

□ **after spontaneous delivery of the first arm, lift the buttocks toward the mother's abdomen to enable the second arm to deliver spontaneously**

□ **if the arm does not deliver spontaneously, place one or two fingers in the elbow and bend the arm, bringing the hand down over the newborn's face and chest.**

10. If the arms are stretched above the head or folded around the neck, use Lovset's manoeuvre:

Lovset's manoeuvre (see diagram below):

- Hold the newborn by the boney pelvis with your thumbs on the sacrum and fore fingers along the iliac crests and turn a quarter of a circle, rotating with the back uppermost. The back will be lateral by the end of this rotation. The shoulder should appear under the pubic symphysis. Run a finger up over the shoulder from behind and down to the fetal antecubital fossa, flex and deliver the arm by sweeping over the fetal face and chest.
- To deliver the second arm, turn the fetus back half a circle, rotating with the back uppermost and deliver the second arm in the same way under the pubic arch.
- If one rotation is insufficient to achieve delivery of the shoulders and arms, repeat the rotational manoeuvres and try again.

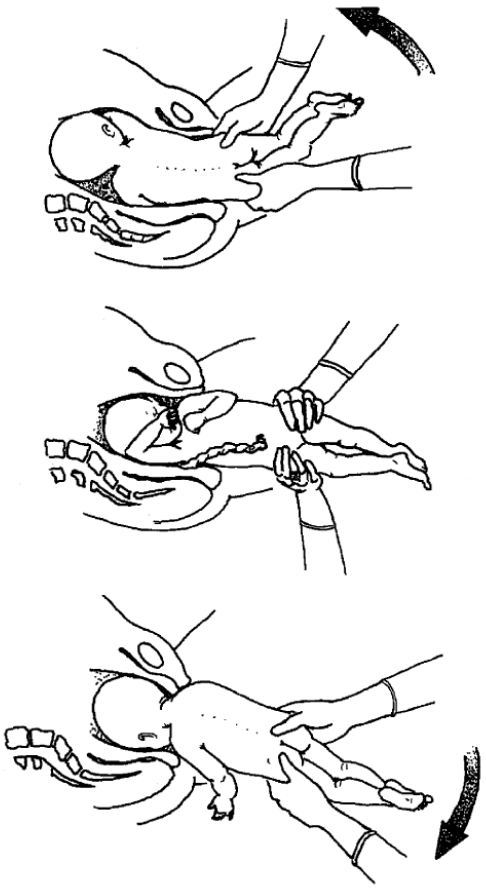


Figure 11.5: Lovset's manoeuvre

11. Alternatively, if the baby's body cannot be turned to deliver the arm that is anterior

first,
deliver the arm that is posterior (see diagram below):

- □ **hold and lift the newborn up by the ankles**
- □ **move the baby's chest toward the woman's inner leg to deliver the posterior shoulder**
- □ **deliver the arm and hand**
- □ **move the baby down by the ankles to deliver the anterior shoulder**
- □ **deliver the arm and hand**

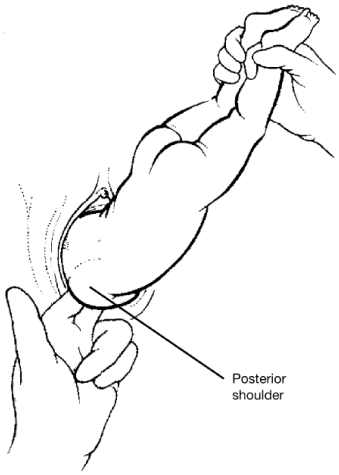


Figure 11.6: Delivering the posterior arm

Delivery of the head

12. After the arms and body are delivered, let the baby hang unsupported and allow the head to descend until the hairline is visible then deliver the head by the **Mauriceau-Smellie-Veit Manoeuvre** (see diagram below):

    - □ **Lay baby face down with the length of its body over your hand and arm.**
    - □ **Place first and second fingers of this hand on the baby's cheekbones.**
    - □ **Use the first and third fingers of your other hand to grasp the baby's shoulders.**
    - □ **place your second finger of this hand on the fetal occiput and flex the baby's head toward the chest.**
    - □ **Pull gently to deliver the head.**
    - □ **Ask an assistant to apply supra-pubic pressure if necessary as the head delivers.**
    - □ **Raise the baby (still astride the arm) until the mouth and nose are free.**

13. As soon as the baby is delivered, wipe dry, wrap in a warm cloth and put in skin-to-skin contact with the mother.

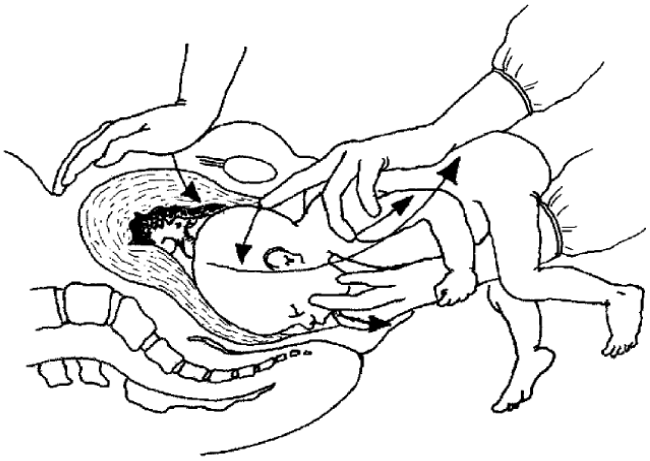


Figure 11.7: Mauriceau-Smellie-Veit Manoeuvre

Entrapped (stuck) head

Apply firm pressure above the mother's pubic bone to flex the baby's head and push it through the

pelvis. If available, you can use forceps to try to deliver the head:

- Wrap the baby's body in a cloth or towel and hold the baby horizontally. Ask an assistant to hold the baby while you apply the forceps blades.
- Place the left blade of the forceps over the baby's head as for forceps delivery working **under** the body of the baby.
- Place the right blade and lock handles.
- Use the forceps to flex and deliver the baby's head.

After delivery

14. Perform active management of the third stage of labour to deliver the placenta:

    - □ **10 units oxytocin IM**
    - □ **controlled cord traction**

15. Check the birth canal for tears following childbirth and repair episiotomy if necessary.

Footling breech

Because of the risk of cord prolapse, a footling breech should usually be delivered by caesarean section unless:

- Advanced labour with fully dilated cervix and referral for caesarean section not possible before birth
- Preterm baby that is not likely to survive after delivery
- You are delivering a second baby (for example in twins or triplets).

To deliver the baby vaginally

1. Grasp the baby's ankles with one hand.
2. If only one-foot presents, insert a hand into the vagina and gently pull the baby downwards by the ankles.

3. Deliver the baby until the back and shoulder blades are seen.
4. Proceed with the delivery of the arms.

Figure 11.8: Footling breech

Breech extraction

This is carried out rarely and usually if the second twin has been turned from transverse by internal podalic version or in case of a cord prolapse at full dilation

- Wearing sterile gloves, insert a hand into the uterus and grasp the baby's foot by holding it around the ankle with the knuckles of your first and second fingers.
- Exert traction on the foot until the buttocks are seen.
- Proceed with delivery of the arms. Lovset's manoeuvre is very likely to be necessary
- Give a single dose of prophylactic antibiotics after breech extraction
  - **ampicillin 2g IV PLUS metronidazole 500mg IV**
    OR
  - **cefazolin 1g IV PLUS metronidazole 500mg IV**

11.4 Twin delivery

- Recognising a twin presentation

A twin presentation may be discovered by abdominal palpation (more than two fetal poles identified and two fetal heart beats auscultated) and confirmed by ultrasound scan or by abdominal palpation and/or vaginal examination after delivery of the first baby.

Preparation

1. Prepare the necessary equipment for delivery and resuscitation of two babies.

2. Explain to the woman (and her support person) what needs to be done, listen to her and answer to her questions.
3. Monitor both fetuses by intermittent auscultation of the fetal heart rates.
4. Monitor progress in labour using a partograph as normal.

First baby

1. Start an IV infusion. Prepare an oxytocin infusion incase it will be needed after the first twin is delivered.

2. Check presentation of the first baby:

   - □ **if a vertex presentation, allow labour to progress as for a single vertex presentation**
   - □ **if a breech presentation, apply the same guidelines as for a singleton breech presentation. However, beware of the risks of interlocked twins if the first fetus is breech and the second cephalic. In this case, a caesarean delivery is safer.**
   - □ **if a transverse lie, deliver by caesarean section**

   [!] After delivery of the first baby, leave a clamp on the maternal end of the umbilical cord and do not attempt to deliver the placenta until the last baby is delivered.

Second baby

3. Immediately after the first baby is delivered, perform a vaginal examination to determine:

   - □ if the cord has prolapsed
   - □ whether the membranes are intact or ruptured
   - □ presentation of the second baby: vertex or breech, transverse lie.

4. Palpate the abdomen to determine lie of the second baby.

5. Correct to longitudinal lie by external version if possible, whether breech or cephalic if transverse on palpation. Rotate the baby in whichever direction it is easiest.

6. Check fetal heart rate.

Vertex presentation:

- ■ If the membranes are intact, carry out controlled rupture of the membranes only after the fetal head or breech has descended into the pelvis
- ■ Continue to check fetal heart rate between contractions.
- ■ If contractions are inadequate after the birth of the first baby, augment labour with an oxytocin infusion using a rapid escalation to produce good contractions (three contractions in 10 minutes, each lasting more than 40 seconds).
- ■ Ideally, the second twin should be delivered within 30 -60 minutes after the first twin in order to minimise risks of fetal distress and placental separation.
- ■ If spontaneous delivery does not occur within 1 hour of good contractions or if there are fetal heart rate abnormalities (less than 100 beats/minute or more than 180

beats/minute) or persistent late decelerations, deliver by assisted delivery (vacuum extraction) or caesarean section. NB with a second twin it is acceptable to apply a vacuumcupatahigherlevelinthepelvisthanusual,althoughthefetalheadshouldstill be engaged in the maternal pelvis

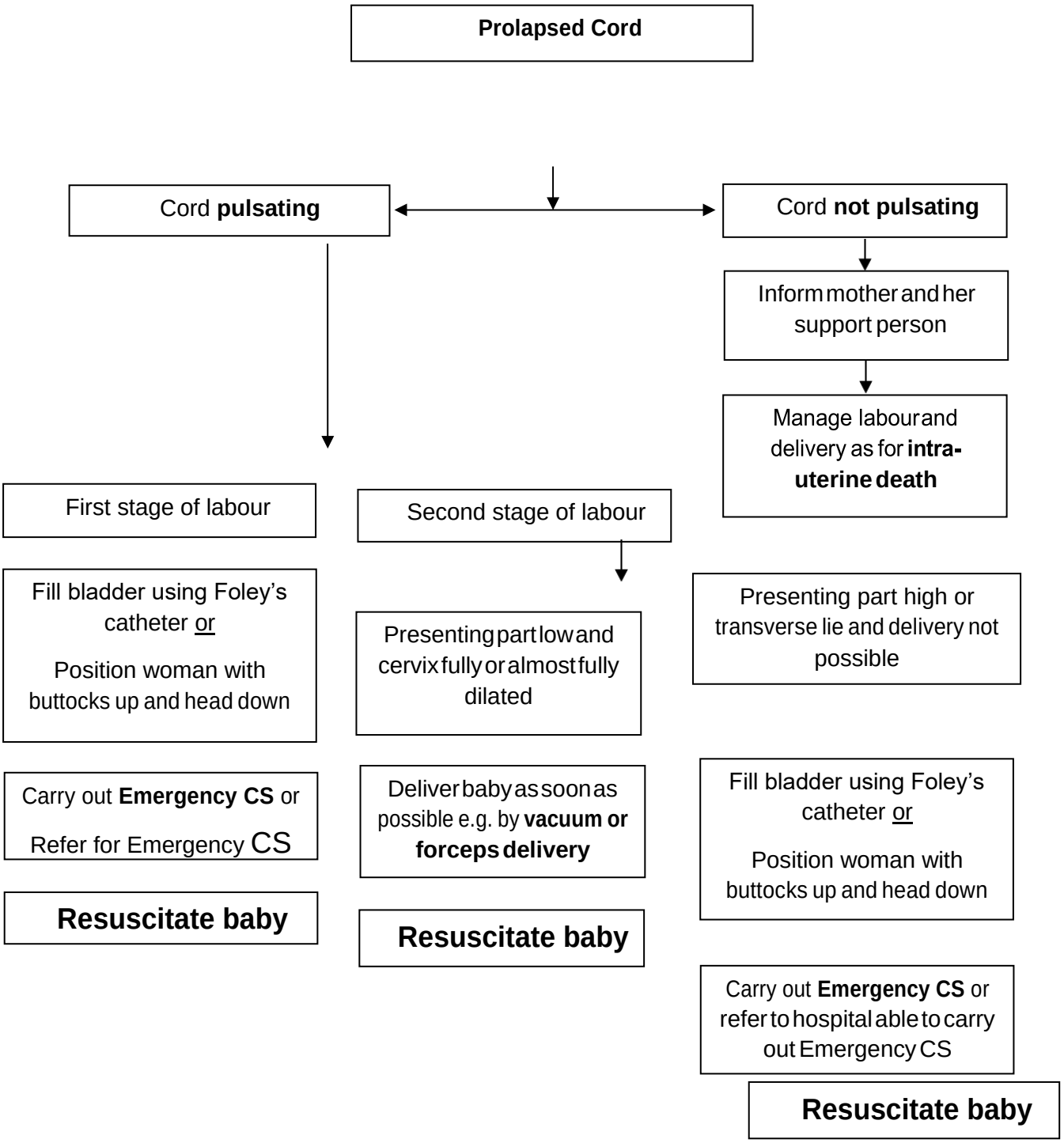
Breech presentation:

- If the baby is estimated to be no larger than the first baby and if the cervix has not contracted, prepare for breech delivery.
- If there are inadequate or no contractions after the birth of the first baby, augment the labour by escalating an oxytocin infusion at a rapid but controlled rate to produce good contractions (three contractions in 10 minutes, each lasting more than 40 seconds).
- If the membranes are intact, rupture them only once the breech has descended into the maternal pelvis.
- Check fetal heart rate between contractions. If there are fetal heart rate abnormalities (less than 100 beats/minutes or more than 180 beats/minute), deliver by breech extraction.
- If vaginal delivery is not possible, deliver by caesarean section.

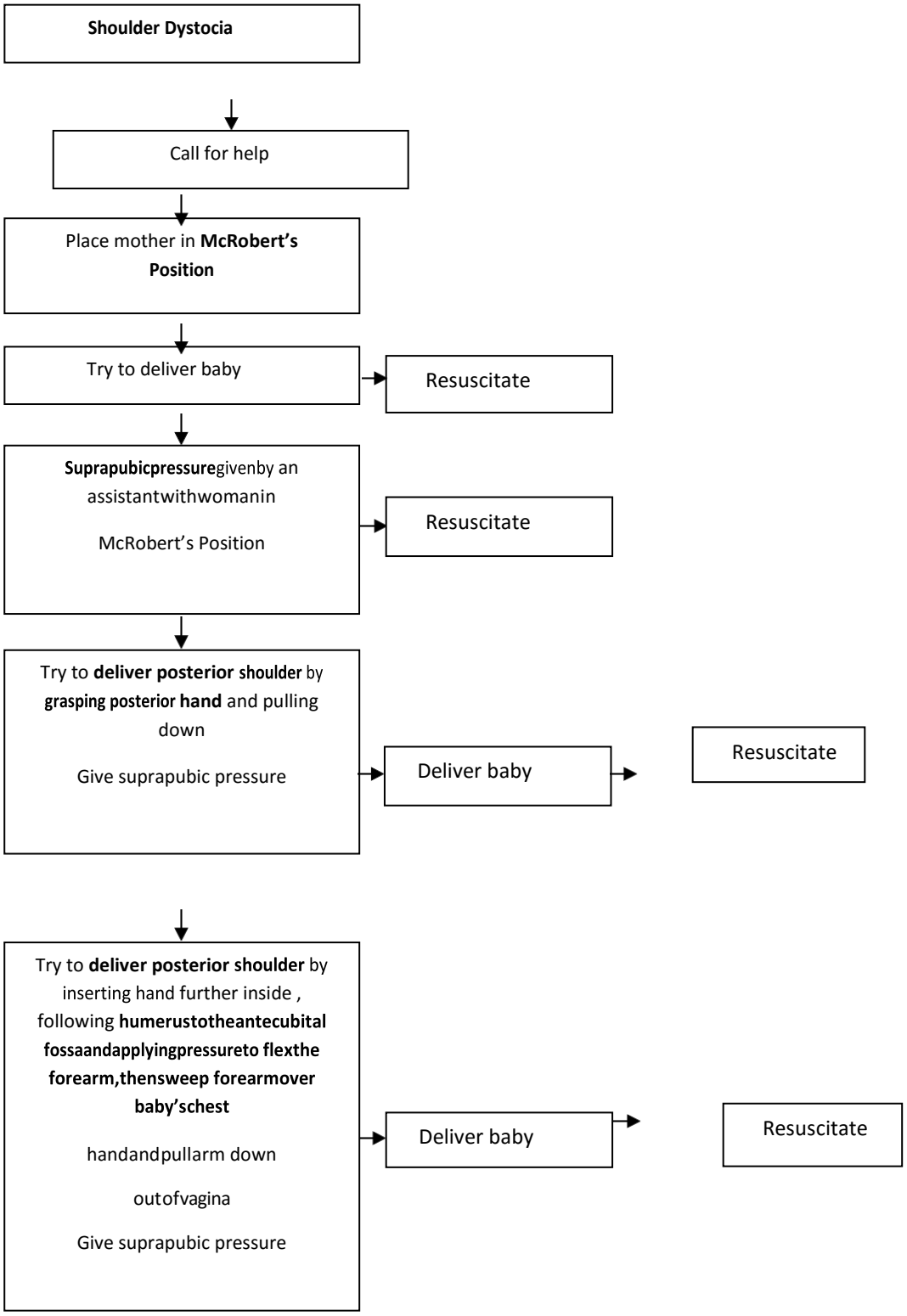
Non-longitudinal presentation:

- Correct the lie of the baby to longitudinal by external cephalic version if possible.
- If external cephalic version is not possible and the fetal membranes remain intact, attempt an internal podalic version. Feel for a fetal foot (identify by palpating a heel) and grasp the heel firmly between the knuckles of your first and second fingers. Draw the fetal leg down into the vagina as far as possible before rupturing the fetal membranes and continue as a breech extraction.
- If the fetus is in a transverse lie with membranes already ruptured, a caesarean section will be necessary.
- Check the birth canal for tears following childbirth and repair episiotomy, if one was performed.

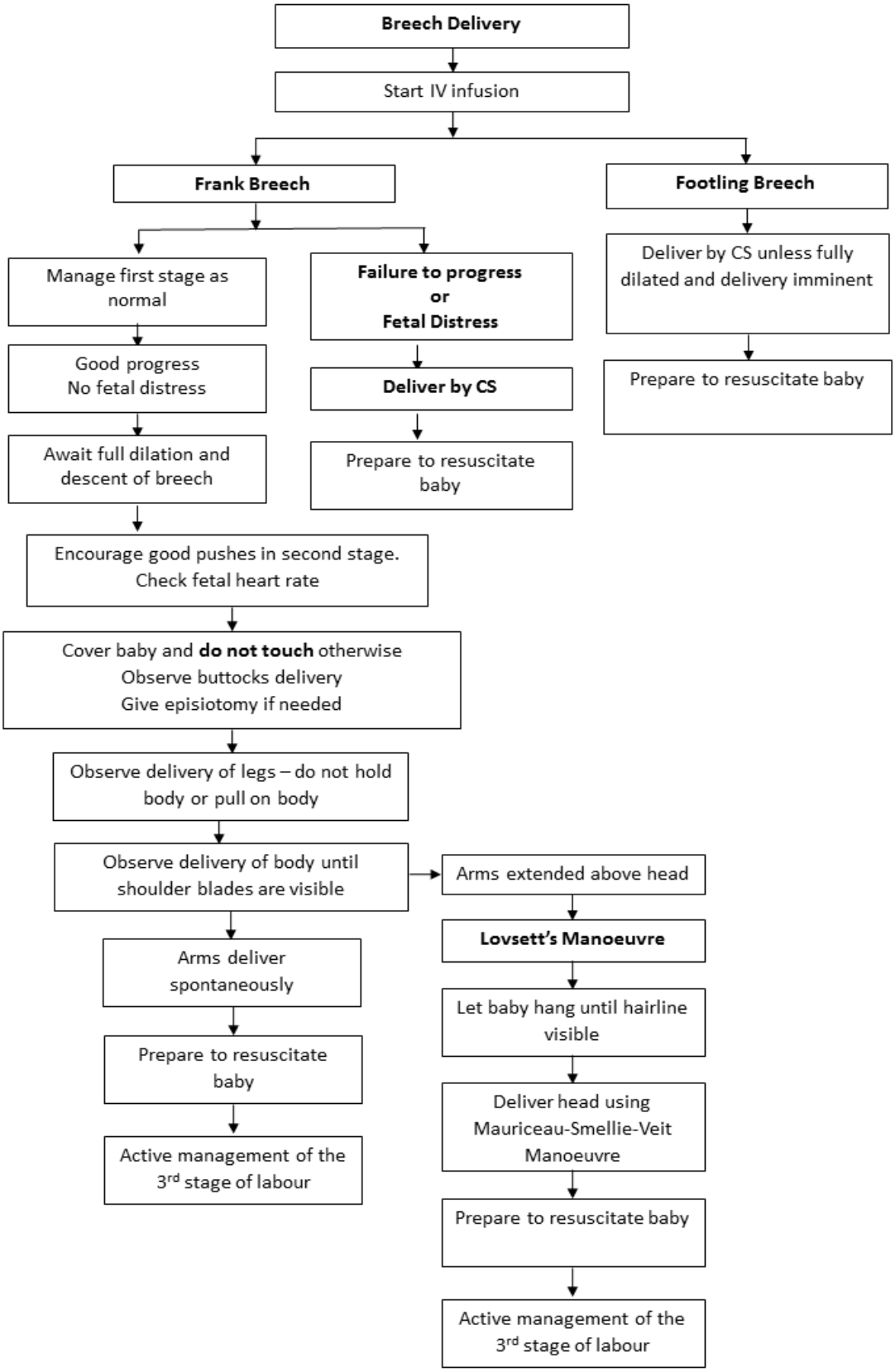
Flow Chart for Cord Prolapse



Flow Chart for Shoulder Dystocia



Flow Chart for Breech Delivery



MODULE 12: MANAGING COMPLICATIONS OF ABORTION

Key learning points

- To recognise the presentation of complications of abortion
- To learn effective management of the complications of abortion, including the use of manual vacuum aspiration

Fact box: Recognising complications of abortion

Spontaneous abortion is defined as the loss of a pregnancy before fetal viability (22 weeks gestation). The stages of spontaneous abortion may include:

- threatened abortion (pregnancy may continue)
- inevitable abortion (pregnancy will not continue and will proceed to incomplete/complete abortion);
- incomplete abortion (products of conception are partially expelled);
- complete abortion (products of conception are completely expelled).

Induced abortion is defined as a process by which pregnancy is terminated before fetal viability.

Unsafe abortion is defined as a procedure performed either by persons lacking necessary skills or in an environment lacking minimal medical standards, or both. **Septic abortion** is defined as abortion complicated by infection. Sepsis may result from infection if organisms ascend into the uterus from the lower genital tract following either spontaneous or unsafe abortion. Sepsis is more likely to occur if there are retained products of conception and evacuation has been delayed. Sepsis is a frequent complication of unsafe abortion involving instrumentation.

Table 12.1: Diagnosis and management of complications of abortion

Symptoms and signs	Complications	Management
Lower abdominal pain Rebound tenderness Tender uterus Prolonged bleeding Malaise Fever Foul-smelling vaginal discharge Purulent cervical discharge Cervical motion tenderness	Infection/sepsis	Begin antibiotics as soon as possible before attempting manual vacuum aspiration
Cramping/abdominal pain Rebound tenderness Abdominal distension Rigid (tense and hard) abdomen Shoulder pain Nausea/vomiting Fever	Uterine, vaginal or bowel injuries	Perform a laparotomy to repair the injury and perform manual vacuum aspiration simultaneously. Seek further assistance if required

Initial assessment

1. Greet the woman respectfully and with kindness.
2. Assess patient for shock and sepsis using the ABCDE structured approach

Medical evaluation

1. Take a history and perform physical (heart, lungs and abdomen) and pelvic examinations.
2. Perform laboratory tests if possible: haemoglobin, thick slide for malaria parasites, urine microscopy and dipstick.
3. Give the woman information about her condition and what to expect.
4. Discuss her need for family planning, and screening and treatment for STIs as appropriate. In cases of spontaneous abortion following a planned pregnancy, discuss when it would be safe to conceive again (usually a three month gap is recommended to reduce the risk of a further abortion)

12.1 Manual vacuum aspiration(MVA)

Preparation

1. Obtain informed consent from the woman before all examinations or procedures
2. Tell her that she may feel discomfort during some of the steps of the procedure but you will tell her in advance when this is likely to happen.
3. Give paracetamol 1g orally or Diclofenac 50 mg IM or 75 mg orally to the woman 30-60 minutes before the procedure.
4. Ask about allergies to antiseptics and anaesthetics.
5. Determine that the necessary equipment and supplies are present:
   - □ make sure that the required sterile instruments are present
   - □ make sure that the different sizes of cannula and adapters are available including a uterine sound
   - □ A good source of light or an examination lamp.
6. Check the MVA syringe and charge it (establish vacuum). Assemble the syringe; close the pinch valve; pull back on the plunger until the plunger arms lock.

[!] For molar pregnancy, when the uterine contents are likely to be copious, have three syringes ready for use.

7. Check that the woman has recently emptied her bladder.
8. Check that she has thoroughly washed and rinsed her perineal area.
9. Wash hands thoroughly with soap and water and dry with a sterile cloth or air dry. Put on personal protective equipment and gloves.

Pre-procedure tasks

1. Explain each step of the procedure to the woman prior to performing it.
2. Perform bimanual pelvic examination, checking the size and position of uterus and degree of cervical dilatation.
3. Give paracervical block if the cervix is closed. In most cases where the cervix is open this may not be needed
4. Prepare 20ml 0.5% lignocaine solution without adrenaline.
5. Draw 10ml 0.5% lignocaine solution into a syringe.
6. If using a single-toothed tenaculum, inject 1ml lignocaine solution into the anterior or

posterior
lip of the cervix (the 10 o'clock or 12 o'clock position is usually used).

7. Gently grasp anterior or posterior lip of the cervix with a single-toothed tenaculum or vulsellum (preferably use ring or sponge forceps if incomplete abortion).
9. With tenaculum or vulsellum attached to the cervix, use slight traction and movement to help identify the area between the smooth cervical epithelium and the vaginal tissue.
10. Insert the needle just under the epithelium and aspirate by drawing the plunger back slightly to make sure the needle is not penetrating a blood vessel.
11. Inject about 2ml 0.5% lignocaine solution just under the epithelium, not deeper than 3mm, at
3, 5, 7 and 9 o'clock.
12. Wait 2 minutes and then pinch the cervix with the forceps (if the patient feels the pinch, wait 2 more minutes and then retest).

Procedure

1. Insert the speculum and remove blood or tissue from vagina using sponge forceps and gauze.
2. Apply antiseptic solution to cervix and vagina three times using gauze or cotton sponge.
3. Remove any products of conception from the external os and check cervix for tears.

[!] With incomplete abortion, a ring or sponge forceps is preferable, as it is less likely than the tenaculum to tear the cervix with traction and does not require the use of lignocaine for placement.

4. Gently apply traction on the cervix to straighten the cervical canal and uterine cavity.
5. If necessary, dilate the cervix using progressively larger cannula.

[!] Dilatation is needed only in cases of missed abortion or when products of conception have remained in the uterus for several days. Alternatively, Misoprostol 200 – 400 micrograms given orally or vaginally (if no active bleeding) 8 to 12 hours before the procedure.

6. Insert the cannula. Slowly push the cannula into the uterine cavity until it touches the fundus, but not more than 10cm. Measure the depth of the uterus by dots visible on the cannula and then withdraw the cannula slightly.
7. Attach the prepared MVA syringe to the cannula by holding the vulsella (or tenaculum) and the end of the cannula in one hand and the syringe in the other. Release the pinch valve(s) on the syringe to transfer the vacuum through the cannula to the uterine cavity.

8. Evacuate remaining contents by gently rotating the syringe from side to side (10 to 12 o'clock)
   and then moving the cannula gently and slowly back and forth within the uterine cavity.

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

9. Evacuate any remaining contents of the uterine cavity by rotating the cannula and syringe from 10 o'clock to 2 o'clock and moving the cannula gently and slowly back and forth within the uterus:

   - □ If the syringe becomes half full before the procedure is complete, detach the cannula from the syringe. Remove only the syringe, leaving the cannula in place.
   - □ Push the plunger to empty the contents into the strainer.
   - □ Recharge syringe, attach to cannula and release pinch valve(s).
   - □ Check for signs of completion (red or pink foam, no more tissue in cannula, a 'gritty' sensation and uterus contracts around the cannula). Withdraw the cannula and MVA syringe gently.

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

10. Remove cannula from the MVA syringe and push the plunger to empty contents into the strainer.

[!] Place the empty syringe on a high-level disinfected tray or container until you are certain the procedure is complete.

11. Remove tenaculum or forceps from the cervix before removing the speculum.

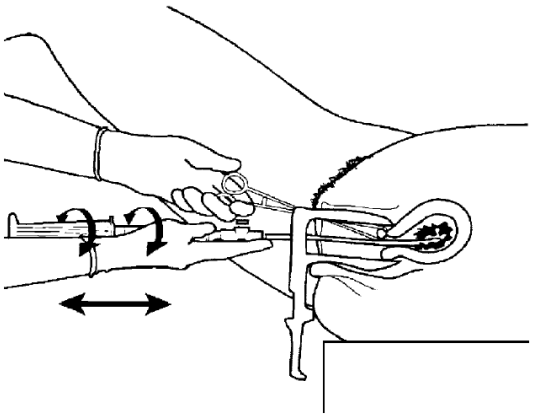


Figure 12.2: Manual vacuum aspiration

12. Perform bimanual examination to check size and firmness of uterus.
13. Rinse the tissue with water or saline, if necessary.
14. Quickly inspect the tissue removed from the uterus to be sure the uterus is completely evacuated.
15. If no products of conception are seen:
    - □ All of the products of conception may have been passed before the MVA was performed (complete abortion).
    - □ The uterine cavity may appear to be empty but may not have been emptied completely. Repeat the evacuation.
    - □ The vaginal bleeding may not have been caused by an incomplete abortion (for instance, it may have been breakthrough bleeding, as may be seen with hormonal contraceptives or uterine fibroids).
    - □ The uterus may be abnormal (that is, the cannula may have been inserted in the non-pregnant side of a double uterus).

[!] Absence of products of conception in a woman with symptoms of pregnancy raises the strong possibility of ectopic pregnancy.

16. Gently insert a speculum into the vagina and examine for bleeding. If the uterus is still soft and not smaller or if there is persistent, brisk bleeding, repeat the evacuation.

Post-procedure tasks

1. Before removing gloves, dispose of waste materials in a leakproof container or plastic bag.
2. Place all instruments in 0.5% chlorine solution for 10 minutes for decontamination.
3. Dispose of needle or syringe, flush needles and syringes with 0.5% chlorine solution three times, then place in a puncture-proof container.
4. Attach used cannula to MVA syringe and flush both with 0.5% chlorine solution.
5. Detach cannula from syringe and soak them in 0.5% chlorine solution for 10 minutes for decontamination.
6. Empty products of conception and dispose of these in a respectful and safe manner.
7. Wash hands thoroughly with soap and water and dry with a clean, dry cloth or air dry.
8. Allow the patient to rest comfortably for at least 60 minutes, where her recovery can be monitored.
9. Check for bleeding and ensure that cramping has decreased before discharge.
10. Explain to the woman post-abortion care and warning signs:

- □ prolonged cramping (more than a few days)
- □ prolonged bleeding (more than 2 weeks)
- □ bleeding more than normal menstrual bleeding
- □ severe or increased pain
- □ fever, chills or malaise
- □ fainting

11. Tell her when to return if follow up is needed and that she can return anytime she has concerns.
12. Encourage the woman to eat, drink and walk about as she wishes.
14. Discharge women with uncomplicated cases in 1–2 hours.
15. Counselling should be given before discharge. Acknowledge that for some women a spontaneous abortion in early pregnancy is deeply distressing and provide appropriate comfort and support. Reassure the woman that the chances for a subsequent successful pregnancy, should she wish to try again, are good. Advise her to wait 3 months prior to trying to conceive again as this may give her a better chance of success.
16. Discuss reproductive goals and, as appropriate, provide family planning. Family planning is an essential component of post-abortion/termination care. Some women may want to become pregnant soon after having an abortion. They should be encouraged to delay the next pregnancy until they have completely recovered.

Fact Box: Essential elements of post abortion care	
Community and service provider partnerships	□ Prevent unwanted pregnancies and unsafe □ termination of pregnancy □ Mobilise resources to help women receive appropriate and timely care for complications from termination of pregnancy □ Ensure that health services reflect and meet community expectations and needs
Counselling	□ Identify and respond to women's emotional and physical health needs and other concerns
Treatment	□ Treat incomplete and unsafe termination of pregnancy and potentially life-threatening complications
Contraceptive and family planning services	□ Help women prevent unwanted pregnancy or practice birth spacing
Reproductive and other health services	□ Preferably provide onsite or via referrals to other accessible facilities in providers' networks

As part of counselling for family planning, women should be assessed for medical eligibility (WHO, Medical Eligibility Criteria for Contraceptive use)

Table 12.1: Types of contraceptives

Type of Contraceptive	Advise to start
Hormonal (pills, ring, injections, implants)	□ Immediately □ No additionalcontraceptive protection is needed
Condom	□ Immediately
Diaphragm, cap	□ Unsuitable untilsix weeksaftersecond-trimester abortion
Intrauterine device	□ Immediately □ Ifinfectionispresentorsuspected, delay insertion until cleared □ Ifhaemoglobinislessthan7g/dL, delay until anaemia improves □ Provide an interim method (e.g. condom)
Voluntary tubal ligation	□ Immediately □ Ifinfectionispresentorsuspected, delay surgery until cleared □ Ifhaemoglobinislessthan7g/dL, delay until anaemia improves □ Provide an interim method (e.g. condom)

17. Other reproductive health services that may be required include, tetanus prophylaxis or tetanus booster, treatment for sexually transmitted infections and cervical cancer screening.

References

World Health Organization 2017: Managing complications in pregnancy and childbirth: a guide for midwives and doctors – 2nd ed.

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MODULE 13: RESUSCITATION AND CARE OF THE NEWBORN

Key learning objectives

- To recognise the newborn requiring resuscitation
- To understand resuscitation of the newborn

13.1 Physiology of birth and neonatal resuscitation

Healthy babies are born with lungs full of amniotic fluid and a circulation designed to receive oxygenated blood from the mother via the placenta. In order to survive at birth, the baby must now expand the lungs, fill them with air, forcing lung fluid into the surrounding tissues. In this way, the baby alters their circulation so that it can deliver blood to be oxygenated in the lungs and then delivered to the tissues.
A healthy baby is primed for this all to happen automatically.

Some babies may not cry vigorously and will need help in expanding their lungs with air. Some will start vigorous crying in response to the initial stimulation of drying and warming. Some will need inflation breaths in order to aerate their collapsed lungs and expel the fluid filling them into the interstitial tissues. For this reason, **inflation** breaths that are given are to be different from **normal ventilation breaths**.

The majority of newborn babies that fail to cry and breathe initially are otherwise healthy but due to a lack of oxygen to the brain during labour and birth they have reduced or no crying or breathing reflexes. These reflexes will often return once oxygen starts to reach the brain again. This usually happens as a response to effective inflation breaths.

Occasionally, if the hypoxia was prolonged, even after effective inflations have been given it will be necessary to give further ventilation breaths. The heart rate is usually low (<100 bpm) in these situations but this corrects itself once the heart receives adequate oxygen and there will have been no need for further intervention.

In a small number of cases where the hypoxic insult has been very severe the heart itself will have suffered and circulation requires support in the form of chest compressions in order to deliver oxygenated blood to the heart and other vital organs. The prognosis for a baby who needs chest compressions is less good than for a baby who does not receive this. In some very rare cases there is an underlying congenital abnormality that is preventing the normal transition to an independent circulation and this too is associated with a poor chance of survival.

The majority of babies are born healthy. They will either be pink and crying with good tone and just need drying and warming or will simply require this initial stimulation to cry and

breathe for themselves. These babies can be wrapped and handed to their mother.

A smaller proportion of newborn babies will be blue and have less good tone. These will, in addition to drying and warming, require inflation breaths delivered through an open airway.

An even smaller proportion will be born blue and floppy and require repeated inflation breaths possibly followed by some assisted ventilation breaths before they start to breathe on their own.

A small minority of sick babies will require chest compressions in addition to all the above resuscitative measures.

It is important to make a rapid assessment at the time of birth and be prepared to institute each of the sequential interventions. Using this structured approach, the majority of newborn babies will be effectively resuscitated in a timely manner.

A healthy baby has good colour, is breathing regularly, has a good heart rate and good tone.

How to prepare for delivery:

- Ensure the room is warm. Close windows and doors to prevent drafts, and switch on your radiant heater or equivalent
- Identify a skilled helper who will be readily available
- Prepare a warm, dry, flat and well-lit safe space for the baby to receive ventilation if required.
- Check that the ambubag and masks are ready, clean and in working order
- Aim to have different sized masks available (size 0 and size 1)
- Ensure that you have a suitable suction device present
- Place a clean dry cloth or towel on the mother's chest ready to dry the baby and have a second available to wrap the baby after drying
- Have a hat ready to put on the baby's head
- Wash your hands

The steps in newborn resuscitation:

- Note time of birth, start the clock if using a stop clock
- Dry and warm the baby. Use the cloth placed on the mother's chest to dry the baby thoroughly, rubbing the body, head, arms and legs. Drying the back helps to stimulate breathing
- Remove the wet cloth and if the baby is crying place skin to skin with the mother, covering the baby with the dry cloth and putting on the hat. Delay cord clamping for 1 to 3 minutes
- As you dry the baby, evaluate his or her condition: Is the baby crying?
- Babies who do not cry may not be breathing. A baby not breathing is limp and does not

move. The skin may be pale or blueish.

- A baby who is gasping or not breathing at all needs immediate help
- Keep the baby warm, either keep on the mother's chest or abdomen or on a warm blanket beside the mother
- Position the head with the neck slightly extended to open the airway
- If secretions or meconium are obviously blocking the airway use the bulb sucker briefly and under direct vision only, squeezing the bulb before placing in the baby's mouth and releasing the squeeze before withdrawing
- Rub the baby's back 2 or 3 times to stimulate breathing
- All of the above should take place within the first minute (The Golden Minute)
- If still not breathing or gasping is present:
- Clamp and cut the cord and take the baby quickly to the resuscitation area, or resuscitate beside the mother with the cord intact if possible
- Quickly position the baby in the neutral position with the head slightly extended. It mayhelptoplacea2cmthickrollofclothunderthebaby'sshoulderstocompensate for a prominent occiput. and commence bag and mask ventilation using the correct size of mask for the baby (Most term babies require a size 1 mask, whilst size 0 is more appropriate for premature or small babies) A mask that is too large will not seal well on the face and air will leak whilst a mask that is too small will not cover both the nose and mouth. An appropriately sized mask should cover the nose and mouth and sit in the grove of the chin.

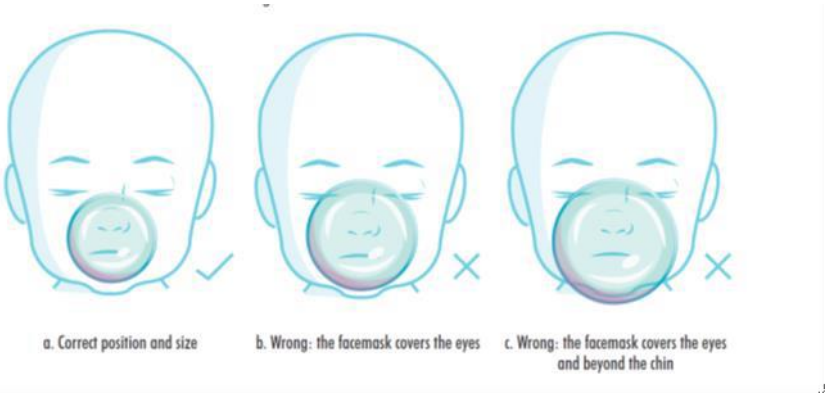

Figure 13.1 Positioning facemask in newborn

- It is best to stand behind the baby's head to obtain a good position for ventilation
- Demonstrate correct application of the mask, holding it in place whist maintaining an open airway. Use the thumb and forefinger to make a "C" shape and hold the mask on the face, using the middle finger to lift the chin up towards the mask. The fourth and fifth finger can be used along the jaw to lift it forwards and help maintain an open airway. Be careful to avoid compressing the trachea with these fingers. Make a tight seal by pressing lightly on the top of the mask and gently holding the chin up towards the mask. Avoid pushing the mask down onto the face as this may change the head position and block the airway.
- Squeeze the bag smoothly between the thumb and two fingers of the other hand. AS you squeeze count 1, then 2,3 as you release the bag. Ventilate at a rate of 40 breaths per

minute

- **NB THE CHEST MUST MOVE!!** If the chest is not seen to be moving with ventilations, air is not entering the lungs
- If you don't see the chest move, reapply the mask to make a better seal at the same time as repositioning the head to open the airway. Note that if the neck is extended to far the airway will block
- Keep ventilating with good chest movement until the baby begins to breathe
- If the baby does not start to breathe, call for help
- Check the mouth for any obstructions
- Reposition and reapply the mask. If available, a neonatal oropharyngeal airway may be of help. Demonstrate how this is inserted in a baby (different from adult)
- Try squeezing the bag a bit harder to give a larger breath
- If the baby does not begin to breathe after 1 minute of ventilation with chest movement, evaluate the heart rate. Good quality ventilation should lead to improved oxygenation and a normal heart rate. In babies, a healthy, well oxygenated heart should be 100/minute or more. If there is a stethoscope available, listen over the left chest, pausing ventilations for several seconds to hear the heart beat. Otherwise, feel for the pulse at the base of the cord, or the brachial pulse. Listen to the heart rate for just long enough to establish whether it is normal or slow, then recommence ventilations
- If the heart rate is normal >100/minute), continue ventilations until the baby is breathing
- If the heart rate is slow, make sure you have taken all the steps to improve ventilation and re-evaluate breathing and heart rate, if possible using a skilled helper
- If the baby continues to need ventilation will need advanced care. If this is not available, discuss with the parents and consider stopping ventilation after 20 minutes if the heart rate is slow or the baby does not breathe.
- If there is no heart rate at all and no breathing after giving ventilation for 10 minutes stop resuscitation, the baby is dead
- Whether resuscitation has been successful or not, always explain to the mother and her companion what has happened

13.2: Essential newborn care

Key learning objectives
■ To understand the context of newborn health in low resource settings ■ To recognise newborns who require extra care i.e. premature, low birth weight ■ To be able to provide essential newborn care at birth and the immediate postnatal period ■ To recognise and respond to danger signs in the newborn.

The key components of Essential Newborn Care:

- Delayed cord clamping (1 – 3 minutes after birth). Early clamping is only recommended if the baby is asphyxiated and requires moving for immediate resuscitation
- Skin to skin care
- Early initiation of breast feeding (within one hour of birth). Put the baby to the breast as soon as possible after birth
- Give Vitamin K, 1mg IM between 60-90 minutes of birth (may be deferred until later in the first 24 hours if necessary). High risk babies (those with birth trauma, preterm infants, those exposed to maternal medication known to interfere with Vitamin K and those requiring surgery) MUST be given Vitamin K
- Complete newborn examination within 90 minutes of birth
- Cord care: keep the cord exposed and dry. Do not apply anything to the cord unless in local policy guidelines (Daily chlorhexidine (4%) application to the cord stump is recommended for newborns who are born at home in settings with neonatal mortality rates >30/1,000. Chlorhexidine should be considered only to replace application of a harmful traditional substance (WHO 2017))
- Eye care: Apply antiseptic eye drops or ointment once to both eyes in accordance with national guidance. (Options include: Tetracycline 1% eye ointment, erythromycin 0.5% eye ointment, povidone iodine 2.5% solution (water based NOT alcohol based), silver nitrate 1% solution or chloramphenicol 1% eye ointment)
- Delay bathing until after 24 hours of birth to avoid hypothermia

■ Keep the baby warm

Forms of care that are beneficial

- Sucrose for analgesia in newborn infants undergoing painful procedures
- Breastfeeding or breast milk for procedural pain in neonates
- Kangaroo mother care to reduce morbidity and mortality in low-birth-weight infants
- Vaccines for women to prevent neonatal tetanus

Forms of care likely to be beneficial

- Air versus oxygen for resuscitation of infants at birth
- Continuous positive airways pressure for respiratory distress in preterm infants
- Cup-feeding versus other forms of supplemental enteral feeding for newborn infants unable to fully breastfeed
- Devices and pressure sources for administration of nasal continuous positive airway pressure in preterm neonates
- Early skin-to-skin contact for mothers and their healthy newborn infants
- Interventions to prevent hypothermia at birth in preterm and/or low-birth-weight infants

Forms of care with a trade off

- Avoidance of bottles during the establishment of breast feeds in preterm infants
- Radiant warmers versus incubators for regulating body temperature in newborn infants

Forms of care of unknown effectiveness

- Ad libitum or demand/semi-demand feeding versus scheduled interval feeding for preterm infants
- Anticonvulsants for preventing mortality and morbidity in full term newborns with perinatal asphyxia
- Enteral iron supplementation in preterm and low-birth-weight infants
- Higher versus lower protein intake in formula-fed low birth weight infants
- One dose per day compared to multiple doses per day of gentamicin for treatment of suspected or proven sepsis in neonates
- Restricted versus liberal water intake for preventing morbidity and mortality in preterm infants
- Sodium bicarbonate infusion during resuscitation of infants at birth

Other important aspects of care of the newborn

The three main causes of neonatal mortality are prematurity, sepsis and birth asphyxia.

Danger signs in the newborn include:

- Breathing difficulties
- Respiratory rate >60/minute
- Intercostal recession
- Nasal Flaring
- Grunting
- Cyanosis

These may be a sign of early onset neonatal pneumonia, respiratory distress of prematurity, transient tachpnoea of the newborn or meconium aspiration

Other danger signs:

- Central cyanosis may be a sign of congenital heart disease
- Hypothermia
- Tone floppy
- Convulsions NB convulsions in the newborn may be very subtle repetitive abnormal movements. They may be a sign of hypoglycaemia, sepsis or hypoxic ischaemic encephalopathy
- Early onset jaundice, especially in babies <1 day old and preterm babies

Risk factors for neonatal sepsis include:

- Membranes ruptured for >18 hours prior to delivery
- Mother had a fever >38C prior to delivery or during labour
- Prolonged labour
- Maternal Group B streptococcus carriage
- Foul smelling amnioticfluid

If risk factors are present the baby should be treated with prophylactic antibiotics (ampicillin and gentamycin) for 48 hours. Reassess after 2 days and discontinue unless signs of sepsis or a positive blood culture. All babies with suspected sepsis should be referred to a higher facility.

Hypothermia

Hypothermia (temperature less than 36.5°C) must be prevented routinely by handing baby to mother (encouraging skin-to-skin contact) and starting to suckle) as soon as possible, ensuring a warm environment, avoiding early bathing, wet covers, clothes or nappies. Avoid medical examinations at this stage if possible, as this will cause hypothermia.

Note,

— Exclusive breastfeeding for all babies of HIV positive mothers All babies whose mothers are HIV positive should be provided with prophylactic ART.

— Post-delivery: warm mother = warm baby – provide blankets and warm fluids (porridge or tea) for mother.

If the newborn becomes hypothermic, place on mother's bare chest or abdomen and cover both mother and child, place a hat on the baby's head. Give the mother a hot drink to increase her skin blood flow. Promote 'kangaroo care'.[3] Immediately treat the newborn for hypoglycaemia, as below. Monitor rectal temperature every hour until normal. Discuss local practice/participants' experience.

Hypoglycaemia

The main symptoms of hypoglycaemia (blood glucose less than 2.6 mmol/l [1] are:

- Lethargy
- Drowsiness or unconsciousness
- Convulsions
- Eyelids partly open or retracted
- and/or hypothermia (temperature less than 36.5°C).

Stress that mostly blood glucose cannot be measured on the spot, so go by the clinical diagnosis.

Hypoglycaemia should be routinely prevented by frequent small feeds (breastfeeding preferred) and treatment of suspected intercurrent infection.

If hypoglycaemia is suspected, and the baby is conscious and stable, continue to breastfeed or give breast milk via a nasogastric tube and recheck glucose in three hours or before the next feed.

If baby is not conscious give 2 ml/kg 10% Dextrose intravenously or 2 ml/kg 10% Dextrose via nasogastric tube if intravenous access cannot be obtained. Infuse 10% glucose at the daily maintenance volume according to the baby's age (via NGT if no iv access). Measure blood glucose 30 minutes after the bolus of glucose and then every three hours. Once the blood glucose is 2.6 mmol/l or more for two consecutive measurements, allow the baby to begin breastfeeding. If the baby cannot be breastfed, give expressed breast milk using an alternative feeding method. Gradually reduce the 10% Dextrose infusion as feeding is established.

It is **very important** to stress the importance of breastfeeding. This is for all mothers including those who are HIV positive.

If convulsions occur, exclude other causes such as malaria, meningitis, thiamine deficiency, hypo/hypernatraemia. Tetanus could be a cause of convulsions, mainly at the end of the first week.

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1 Note some countries use less than 2.6 mmol/l. There is no real evidence for an exact value to be used. The main learning point is to recognise hypoglycaemia.

13.3: Examination of the newborn baby

Key learning outcomes
■ Follow a structured concise approach to the examination of a newborn baby after delivery and prior to discharge. ■ Learn to recognise any signs of severe illness that require immediate intervention or any congenital abnormalities.

Prior to performing the examination:

1. Identification of the baby
2. Situational awareness - is the mother alive, very ill or has she been transferred?
3. Explain to mother and/or father and/or guardian what you are going to do.
4. Ask the mother and/or father and/or guardian:
   - □ Do you have concerns?
   - □ How is the baby feeding?
   - □ Has the baby passed meconium or urine?

Examination of the newborn

The requirements for a good environment for examination: warm room (at least 25°C and free from draught) and well-lit. The mother or another carer can be present. It is important to maintain good communication with mother/carer before, during and after the examination. Findings can be discussed with mother/father/guardian.

Head-to-toe examination:

Assess	Normal and abnormal findings
■ Assess for posture and spontaneous movements	■ Flexed posture with spontaneous movements
■ Feel for warmth (take temperature)	■ Temperature 36.5°C and 37.5°C
■ Look for any significant bruising particularly at presenting part (implications for development of significant jaundice requiring treatment or possibility of adverse intrapartum event)	■ Little or no bruising
■ Fontanelles	■ They are easily felt above the forehead and towards the back of the head. Check fontanelles (i.e. open, closed, full, tense, soft, depressed). If bulging upwards, tense or depressed need to seek senior support. Depressed fontanelles can be a sign of dehydration
■ Eyes (check for discharge)	■ No discharge ■ Normal structure
■ Ears	■ Both present and of normally formed
■ Mouth for cleft lip and or palate	■ Intact hard and soft palate
■ Clavicles for fracture	■ No deformity

Assess	Normal and abnormal findings
■ Symmetrical movement of arms, newborn reflexes	■ Rooting reflex ■ Moro reflex ■ Stepping reflex
■ Count fingers	■ 8 fingers, 2 thumbs
■ Look at palm (e.g. for features of trisomy 21 associated with single palmar crease)	■ Normal palm creases
■ Assess breathing	■ 40-60 breaths per minute is normal ■ Check for any additional effort of breathing, i.e. intercostal recession, nasal flaring, grunting
■ Cardiovascular	■ Check for any central cyanosis, refer if present. HR should be <160/minute
■ Abdomen	■ The skin should be intact and not be distended (looking for congenital abnormalities e.g. bowel obstruction due to duodenal atresia.
■ Cord	■ Check cord is tied, dry and clean
■ Anus	■ Normal position and patent
■ Male newborn: Check descent of testicles, look at penis for location of urethral orifice.	■ Bilateral testes palpable in the scrotum (soft and mobile) ■ Urethral orifice at the tip of the penis
■ Female newborn: check appearance of the genitalia if it is not normal refer to paediatrician.	■ If possibility of ambiguous genitalia i.e. cannot tell whether male or female refer to paediatrician.
■ Feet	■ Check and count toes. ■ Check for talipies
■ Turn baby and check spine for spina bifida (occulta)	■ Intact skin and no 'holes' visible over the spine.
■ Measurements (length, head circumference)	■ Detect abnormal brain or skull growth (e.g. hydrocephalus,). ■ Head circumference ranges at birth for well term babies: Boys: 32cm to 37cm Girls: 31.5cm to 36cm ■ Normal length ranges at birth for well term babies: Length 45 -55cm

Reference:

WHO recommendations on Newborn Health, Guidelines approved by the WHO Guidelines Review Committee, updated May 2017

13.4: Kangaroo Mother Care for premature and low birth weight babies

Definitions:

Preterm infant

Infants are born preterm at less than 37 weeks' gestational age after:

- spontaneous labour with intact membranes
- prelabour premature rupture of the membranes (PPROM)
- labour induction or caesarean delivery for maternal or fetal indications

Low birth weight infant

- Low birth weight: < 2500g
- Very low birth weight:< 1500g
- Extremely low birth weight: < 1000g

Small for gestational age

Weight for gestational age below 10th percentile

Risks associated with prematurity

- Hypothermia
- Breathing difficulties
- Infections
- Impaired development

Approximately 75% of these deaths can be prevented with low-cost, effective and high-quality supportive care and neonatal intensive care.

Interventions that may reduce the risk of premature birth:

- Antenatalcare
- Good nutrition
- Screening and management of maternal infections, diabetes and hypertension
- Smoking cessation
- Family planning
- Prenatal care foradolescents
- Cervical cerclage in carefully selected cases

When to use corticosteroids to improve preterm birth outcomes:

Administration of antenatal corticosteroids from 24 to 34 weeks of gestation when:

- Gestational age is accurately assessed
- Preterm birth is anticipated imminently
- No clinical evidence of maternal infection
- Skilled birth attendance and safe management of preterm birth
- Neonatal intensive care available (resuscitation, thermal care, feeding, infection management and safe oxygen use

When preterm birth is imminent

- Dexamethasone (IM or oral) or Betamethasone IM
- Total 24 mg in two divided doses 12 hours apart
- Steroids work best if doses are completed 24 hours prior to delivery. However delivery should not be delayed if mother or baby are in imminent danger

Other interventions possible:

Tocolytic treatments (not for imminent preterm birth)

Nifedipine (Adalat)

Loading dose: 20 mg PO in one dose.

Do not administer sublingually. Do not allow crushing or chewing.

If contractions continue after 20 minutes, give 10 mg PO every 20 mins for a maximum of 2 doses.

Maximum initial dose: 40 mg in the first 40-60 minutes.

Contra-indications: intra-uterine infection, intrauterine fetal death, lethal fetal malformation, In Eclampsia or severe pre-eclampsia, **concurrent use of magnesium sulphate** (due to risk of cardiovascular collapse), concurrent use of anti-arrhythmic medications, fetal or maternal arrhythmia (e.g. Wolf- Parkinson-White), maternal heart failure, symptomatic maternal hypotension, allergy to calcium-channel blockers, current antepartum haemorrhage, urgent fetal or maternal indication to deliver.

- Administer magnesium sulphate if gestation less than 32 weeks for prevention of cerebral palsy. Give a 4 g intravenous bolus of magnesium sulphate over 15 minutes, followed by an intravenous infusion of 1 g per hour until the birth or for 24 hours (whichever is sooner).
- Antibiotics for preterm prelabour rupture of membranes (amoxycillin 500mg TDS). If proven Group B strep colonisation give penicillin 500 mg QDS.
- Kangaroo mother care for babies weighing 2000g or less at birth

Following birth

- Initiate skin-to-skin contact and keep baby warm following birth. Dry, discard wet towel and cover with dry towel or blanket, cover head with hat.
- Delayed cord clamping.
- Check baby's breathing. If problems identified, follow guidelines for resuscitation.
- Explain to parents the needs of a premature baby and why KMC is important. Expect participants to discuss: warmth/continuous skin-to-skin contact, exclusive breastfeeding, reduction in apnoeic episodes and parental bonding.
- Informedconsent.

Kangaroo mother care is recommended for:

- Routine care of stable newborns weighing 2000g or less at birth

Kangaroo care should be:

- Initiated in healthcare facilities as soon as the newborns are clinically stable
- As continuous aspossible
- Used as intermittent kangaroo mother care if continuous KMC not possible

The principles of kangaroo mother care

- Early, continuous and prolonged skin-to-skin contact between the mother and the baby
- Exclusive breastfeeding (ideally)
- Initiated in hospital and can be continued at home
- Small babies can be discharged early
- Mothers at home require adequate support and follow-up

How to place a baby in KMC

- Place baby between the mother's breast in an upright position.
- Turn head to one side and in a slightly extended position allowing the airway to remain open and eye to eye contact between the mother and her baby.
- The baby's hip should be flexed and abducted in a frog position, the arms also to be flexed.
- The baby's abdomen should be at the level of the mother's epigastrium.
- Mother's breathing stimulates the baby, thus reducing the occurrence of apnoea.

How long should KMC be provided?

- The kangaroo position is maintained until the baby no longer tolerates it (wriggling or refusing to stay in KMC position, sweating).
- When continuous care is not possible, the kangaroo position can be used intermittently thereby providing the proven emotional and breastfeeding promotion benefits
- The kangaroo position must be offered for as long as possible (but at least 1-2 hr/sitting), provided the infant tolerates it well.
- Either parent or another family member can provide KMC.

The benefits of KMC are:

For the neonate

- Improved weight gain
- Improved temperature control
- Improved neurological development
- More effective sleeping

For the mother

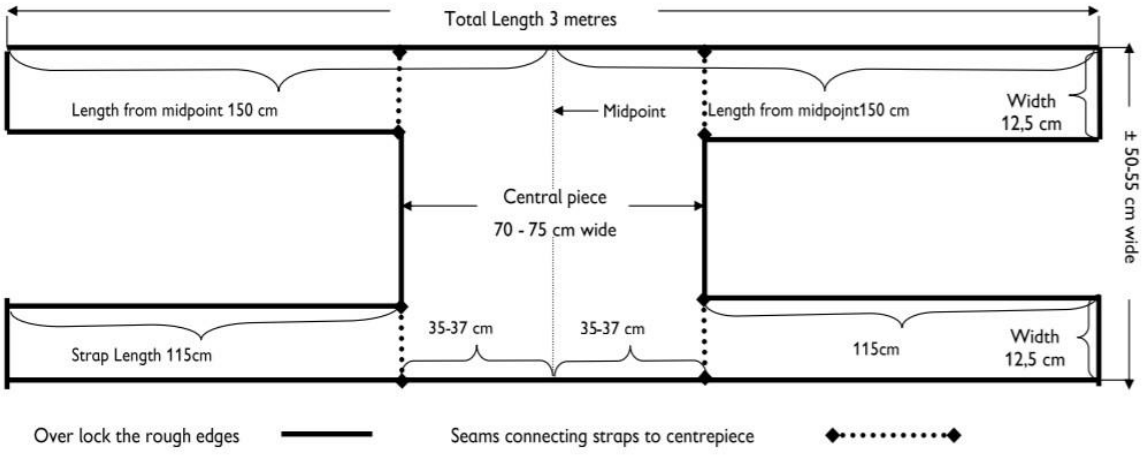
- Strengthened mother-baby bond
- Increased milk production
- Sense of empowerment and responsibility

For the institution

- Resource allocation

Summary

- 75% newborn deaths can be prevented with high-quality care
- Preterm babies are at increased risk of hypothermia, breathing difficulties, infection and impaired development
- KMC meets the basic survival needs and includes: warmth through skin-to-skin contact, breast milk, simulation, love and protection.



Choices of material from which to make the Thari

Polyester Cotton: It works well and is cheap. The material tears easily and it is not necessary to cut the material with a pair of scissors. Poly cottons are usually 110 cm wide and 2 wraps can be made from 2 metres of material.

Cotton knit (t-shirt material): T-shirt material stretches a lot. It would be better to use a material that contains lycra, but lycra is very expensive.

A thin Denim material also works well, it lasts very long especially if you use it over and over in the ward, but unfortunately denim is quite expensive.

Wraps can be made from old sheets, if funds are not available to buy new material.

Figure 13.1 : The Kangaroo Mother Care Thari Pattern[2]

[2] Pattern designed by Dr Elise van Rooyen, Department of Paediatrics, Kalafong Hospital, South Africa

13.4: Newborn sepsis

Key Learning Objectives

- To learn to recognise sepsis in the Newborn
- To identify appropriate responses to a neonate with sepsis in different settings

Recognition in the community setting (age 1 week to 2 months)

Identification of Bacterial infection in infant < 2 months old

Signs	Classify as:	Treatment
■ Convulsions ■ Not able to feed ■ Vomit everything ■ Fast breathing (60 breaths per minute or more) ■ Severe chest indrawing ■ Nasal flaring ■ Grunting ■ Wheeze ■ Bulging fontanelle ■ Pus draining from ear ■ Umbilical redness extending to skin ■ Tachycardia >150 bpm. ■ Fever (37.5C* or above or feels hot) or low body temperature (less than 35.5C* or feels cold) ■ Many or severe skin pustules ■ Lethargic or unconscious ■ Less than normal movement	**Possible Serious Bacterial Infection**	■ Treat current convulsion with ▪ IM phenobarbital (1 dose of 20 mg/kg). ■ Give first dose of intramuscular ampicillin & gentamicin. ■ Treat to prevent low blood sugar (oral or cup feeds if baby conscious) ■ If vomiting everything, give nothing by mouth ■ Advise mother how to keep the infant warm on the way to the hospital. ■ **Refer/admit URGENTLY to hospital.**
■ Red umbilicus or draining pus ■ Skin pustules ■ Pus draining from eyes	**Local Bacterial Infection**	■ Give appropriate parental antibiotics ■ Admit
in a baby with none of the above signs of Possible Serious Bacterial Infection.		■ Advise mother to give ■ home care for the young infant ■ Follow up in 2 days

Signs	Classify as:	Treatment
■ None of the above signs	**Bacterial infection unlikely**	■ Advise mother to give home care for the young infant ■ Follow up in 2 days

* based on axillary temperature, thresholds for rectal temperature are approx. 0.5 C higher (38°C)

A young infant with any sign of possible serious bacterial infection needs urgent referral to hospital. Before referral, give a first dose of intramuscular antibiotics and treat to prevent low blood sugar. Malaria is unusual in infants of this age (location dependent, not uncommon in West Africa). Advise the mother to keep her sick young infant warm as young infants have difficulty maintaining their body temperature i.e. KMC or wrap warmly and wear hat. Low temperature alone can kill young infants. (1)

Give first dose of both ampicillin and gentamicin intramuscularly. If referral is not possible, give ampicillin and gentamicin intramuscularly every 8 hours for at least 5 days or IM Gentamicin with oral amoxycillin). (1) (see appendix for dosages).

Example:

A baby born 36 hours ago in your CEmOC hospital is brought back into your facility with a history of not feeding, irritable when handled, bulging fontanelle and pyrexia of 39°C.

Consider a likely diagnosis of meningitis:
Suspect meningitis if signs of serious bacterial infection are present, particularly if any of the following is present:

The infant is:

- Drowsy, lethargic or unconscious
- Convulsing
- Has a bulging fontanelle
- Irritable
- Has a high-pitched cry

It is important to attempt lumbar puncture once the infant has been stabilized,

Ideally within 2 hours of initiating antibiotic treatment, because it serves to confirm

WHO Advised Management (1)

The first-line antibiotics are ampicillin and gentamicin for 3 weeks
Alternatively, give a third-generation cephalosporin, such as ceftriaxone (50 mg/kg every 12 h if < 7 days of age and 75 mg/kg after 1 week) or Cefotaxime (50 mg/kg every 12 h if < 7 days or every 6–8 h if > 7 days of age), and gentamicin for 3 weeks.

If there are signs of hypoxaemia, give oxygen

- If the infant is drowsy or unconscious, ensure that hypoglycaemia is not present. If present, give 2 ml/kg 10% glucose IV.
- Treat convulsions (after ensuring they are not due to hypoglycaemia or hypoxaemia) with phenobarbital
- Make regular checks for hypoglycaemia.
- Establish an IV line and give only IV fluid at maintenance volume according to baby's age for the first 12 hours. (see chart below)

Day of life	**1**	**2**	**3**	**4**	**5**	**6**	**7+**
ml/kg body weight of feeds and or fluid	**60**	**80**	**100**	**120**	140	150	160+

Please note: avoid giving more than 120ml/kg/day in iv fluids. The remaining fluids should be made up of feeds.

- Take blood sample and send to labs for Culture and Sensitivity, and Hb, white cell count and differentiation if possible.
- Lumbar puncture (for meningitis)
  - Send sample of CSF for cell count, Gram stain, culture and sensitivity
- Give ampicillin and gentamicin IV as below:

  Gentamicin – Use 10mg/ml, 2ml vial = 10mg/ml

- Confirm the diagnosis of meningitis if the:
  - White blood cell count in the CSF is 20/mm^3 or more if the baby is <7 days old, or 10/mm^3 or more if the baby is 7 days or older
  - Or Culture or Gram stain of the CSF is positive

However, when tests are unavailable, treatment should be initiated on high index of suspicion due to rapid progress of illness. After 12 hours of treatment with antibiotics or when the baby's condition begins to improve, allow the baby to begin breastfeeding. If the baby cannot be breastfed, give expressed breast milk using an alternative feeding method such as cup feeding.

- If the baby's condition is improving after 48 hours of treatment with antibiotics, continue antibiotics for 14 days or for 7 days after signs of improvement are first noted, whichever is longer?

Example 2:

A 2-day old baby who was delivered at home, is brought in to your BEmOC by his grandmother with a history or reluctance to feed, blistering rash on his palms and soles of his feet, pyrexia. On examination you notice a watery discharge from his nose and abdominal distension (due to enlargement of the spleen and liver). The mother is generally unwell, with sore throat, fever and similar rash on hands and feet.

Consider the diagnosis of this baby and possible risk factors that could have contributed to this clinical situation?

A likely diagnosis is that of **congenital syphilis Clinical signs**

■ Often low birth weight

■ Palms and soles: red rash, grey patches, blisters or skin peeling

■ 'Snuffle': highly infectious rhinitis with nasal obstruction

■ Abdominal distension due to enlarged liver and spleen

■ Jaundice

■ Anaemia

Some very-low-birth-weight infants with syphilis have signs of severe sepsis With lethargy, respiratory distress, skin petechia or other bleeding.

If you suspect syphilis, do a VDRL test if possible.

Treatment

- If possible, establish an IV line and give only IV fluid at maintenance volume according to baby's age for the first 12 hours (See chart above).
- Asymptomatic neonates born to women with a positive VDRL or rapid plasma reagin test should receive 37.5 mg/kg (50 000 U/kg) of benzathine benzyl penicillin in a single IM dose.
- Symptomatic infants should be treated with:
- Procaine benzyl penicillin at 50 mg/kg as a single dose by deep IM injection daily for 10 days

Or

- Benzyl penicillin at 30 mg/kg every 12 h IV for the first 7 days of life and then 30 mg/kg every 8 h for a further 3 days.
- **Treat the mother and her partner for syphilis and check for other sexually transmitted infections.If a serologic test is not possible, the mother was treated inadequately**

before delivery or her treatment status is unknown, treat for congenital syphilis.

- Perform a lumbar puncture and examine CSF for white cell count indicating CNS involvement (white cell count >25/mm^3)
- Observe the baby for 24 hours after discontinuing antibiotics.
- If the baby remains well, is feeding well, and there are no other problems requiring hospitalization, discharge the baby. Follow up in four weeks and report the case to authorities if required.

References

1. World Health Organization (2013). Pocket Book of Hospital Care for Children. Second Ed. Geneva

3.14 Doses of common drugs for neonates and low-birth-weight infants

Drug	Dosage	Form	Weight of infant in kg						
			1–< 1.5	1.5–< 2	2–2.5	2.5–< 3	3–3.5	3.5–< 4	4–< 4.5
Aminophylline to prevent apnoea	Calculate the **exact** oral maintenance dose								
	Loading dose: Oral or IV over 30 minutes 6 mg/kg, then	250 mg/10 ml vial. Dilute loading dose to 5 ml with sterile water, give slowly over 15–30 min	0.6 ml	0.8 ml	1.0 ml	Aminophylline is not usually used for term infants.			
	Maintenance dose: First week of life: Oral: 2.5 mg/kg every 12 h		0.1–0.15 ml	0.15–0.20 ml	0.20–0.25 ml				
	Weeks 2–4 of life: Oral: 4 mg/kg every 12 h		0.15–0.2 ml	0.25–0.3 ml	0.30–0.4 ml				
Ampicillin	IM/IV: 50 mg/kg First week of life: every 12 h Weeks 2–4 of life: every 8 h	Vial of 250 mg mixed with 1.3 ml sterile water to 250 mg/1.5 ml	0.3–0.6 ml	0.6–0.9 ml	0.9–1.2 ml	1.2–1.5 ml	1.5–2.0 ml	2.0–2.5 ml	2.5–3.0 ml
Caffeine citrate	Calculate the **exact** oral maintenance dose								
	Loading dose: Oral: 20 mg/kg (or IV over 30 min)		20–30 mg	30–40 mg	40–50 mg	50–60 mg	60–70 mg	70–80 mg	80–90 mg
	Maintenance dose: 5 mg/kg daily oral (or IV over 30 min)		5–7.5 mg	7.5–10 mg	10–12.5 mg	12.5–15 mg	15–17.5 mg	17.5–20 mg	20–22.5 mg

DOSES OF COMMON DRUGS FOR NEONATES AND LOW-BIRTH-WEIGHT INFANTS

Drug	Dosage	Form	Weight of infant in kg						
			1–< 1.5	1.5–< 2	2–2.5	2.5–< 3	3–3.5	3.5–< 4	4–< 4.5
Gentamicin	Preferably calculate exact dose based on the infant's weight								
	First week of life: Low-birth-weight infants: IM/IV: 3 mg/kg once a day Normal birth weight: IM/IV: 5 mg/kg per dose once a day	Vial 20 mg/2 ml Vial 80 mg/2 ml Dilute to 8 ml with sterile water to 10 mg/ml	0.3–0.5 ml	0.5–0.6 ml	0.6–0.75 ml	1.25–1.5 ml	1.5–1.75 ml	1.75–2 ml	2–2.25 ml
	Weeks 2–4 of life: IM/IV: 7.5 mg/kg once a day		0.75–1.1 ml	1.1–1.5 ml	1.5–1.8 ml	1.8–2.2 ml	2.2–2.6 ml	2.6–3.0 ml	3.0–3.3 ml
Note: *To use a vial of 80 mg/2 ml, dilute to 8 ml with sterile water to 10 mg/ml, then use exactly the same dose as in the table above.*									
Kanamycin	IM/IV: 20 mg/kg (one dose for pus draining from eyes)	2-ml vial to make 125 mg/ml	0.2–0.3 ml	0.3–0.4 ml	0.4–0.5 ml	0.5–0.6 ml	0.6–0.7 ml	0.7–0.8 ml	0.8–1.0 ml
Naloxone	0.1 mg/kg	Vial 0.4 mg/ml	0.25 ml	0.25 ml	0.5 ml	0.5 ml	0.75 ml	0.75 ml	1 ml
PENICILLIN									
Benzylpenicillin	50 000 U/kg per dose **First week of life:** every 12 h **Weeks 2–4 and older:** every 6 h	Vial of 600 mg (1 000 000 U) dilute with 1.6 ml sterile water to 500 000 U/ml	0.2 ml	0.2 ml	0.3 ml	0.5 ml	0.5 ml	0.6 ml	0.7 ml

3. YOUNG INFANTS

Drug	Dosage	Form	Weight of infant in kg						
			1–< 1.5	1.5–< 2	2–2.5	2.5–< 3	3–3.5	3.5–< 4	4–< 4.5
Benzathine benzylpenicillin	50 000 U/kg once a day	IM: vial of 1 200 000 U mixed with 4 ml sterile water	0.2 ml	0.3 ml	0.4 ml	0.5 ml	0.6 ml	0.7 ml	0.8 ml
Procaine benzylpenicillin	IM: 50 000 U/kg once a day	3-g vial (3 000 000 U) mixed with 4 ml sterile water	0.1 ml	0.15 ml	0.2 ml	0.25 ml	0.3 ml	0.3 ml	0.35 ml
Phenobarbital	**Loading dose:** IM/IV or oral: 20 mg/kg	Vial 200 mg/ml diluted with 4 ml sterile water	Calculate the **exact** dose						
		30-mg tablets	½	¾	1	1¼	1½	1¾	2
	Maintenance dose: Oral: 5 mg/kg per day	30-mg tablets	¼	¼	½	½	½	¾	¾

13.5: Elimination of Mother to child transmission of HIV

Key learning objectives

- To describe HIV transmission from mother to the fetus and newborn
- To be aware of the WHO Option B+ guidelines
- To apply K&S of EMTCT to facilitate decision making in care provided to pregnant women and mothers

The 4 pillars of HIV prevention and treatment are:

1. Primary prevention
2. Contraception for HIV positive women to optimise timing of pregnancy
3. Treatment with option B+
4. Care and treatment for all HIV positive people

Discuss each case as time allows

Intrapartum Care

Initiation of ARV treatment in labour:
If an untreated woman presents in labour, it is recommended that the following treatment is offered to minimize MTCT:

1. Nevirapine 200 mgs stat oral dose
2. Initiate oral Zidovudine 300 mg BD, Lamivudine 150 mg BD and Dolutegravir 50 mg BD
3. Intravenous Zidovudine infusion, commenced at 2 mg/kg for the first hour, to be followed by 1 mg/kg/hour for the duration of the labour until the cord is clamped and cut.

- NB The regime for treatment in labour for a previously untreated HIV positive pregnant woman may vary from country to country, so be sure to use the local protocol. (The above regime is recommended by the British HIV Association)

Some practices may increase the risk of HIV transmission while having little or no proven obstetric value. Routine management should be modified for all women whether known to be positive or not. Use universal precautions as for all patients. These include protective gear, safe use and disposal of sharps, sterilization of equipment and safe disposal of contaminated materials

— Minimize vaginal examinations by performing them only when necessary and recording all vaginal examinations performed

— Use of the partograph: Proper and consistent use of the partograph in the monitoring progress of labour will improve the management and reduce the risk of prolonged labour in all women.

— Avoid artificial rupture of membranes unless strictly necessary. Aim to deliver within 4

hours of membrane rupture to reduce the risk of transmission

Aim to:

- Avoid invasive procedures, such as using scalp electrodes or scalp sampling (unlikely to be an issue in low resource settings)
- Avoid routine episiotomy
- Minimise the use of forceps or vacuum extractors, to avoid the risk of scalp trauma. However, these instruments should be used if clinically indicated.

Elective Caesarean section performed **before the onset** of labour or membrane rupture has been associated with reduced MTCT. Broad-spectrum antibiotics should be used routinely after caesarean section. The decision to undertake caesarean section delivery to prevent MTCT should be balanced against the immediate and long-term risks to the mother, and is ultimately the decison of the mother herself based upon providing her with sufficient information to enable informed consent.

Indications for elective CS

Although elective CS will not be available in most health facilities for EMTCT, there may be some cases that merit consideration for CS. These include pregnancies where the mother has not been treated with ARVs or medication has been started very late in the pregnancy, with insufficient time for suppresion of viral load, where labour is expected to be prolonged or where other obstetric complications may be associated with increased risk of transmission.

NB: If the mother has been on ARVs throughout pregnancy or from around 14 weeks with good compliance, then she should be treated in the same manner as an HIV negative mother, and caesarean should be offered on obstetric grounds only.

When performing caesarean delivery in cases of intact membranes, try if possible to open the uterus whilst keeping the membranes intact. Insert the delivering hand gently between the uterine wall and the membranes, gradually separating the membranes from the wall of the uterus. Bring the fetal head out thorough the uterine incision still within the membranes. Once the entire head is delivered, the membranes should be ruptured. Deliver the baby onto a clean towel on the mother's abdomen and immediately wipe off any maternal blood, paying particular attention to the baby's hands and mucus membranes.

General considerations:

Neonatal care

- There is no need to avoid delayed cord clamping, and this should be practiced. Avoid suctioning unless there is a meconium or excess secretions and the baby fails to breathe. If you must suction, use low pressure or bulb suction. If the baby is breathing spontaneously do not use any suction.
- Wipe baby dry with particular attention to the mucous membranes and hands. Wiping should be done carefully to avoid trauma to the skin. The preterm infant's skin bruises more easily.
- Umbilical cord requires good hygiene; the mother should be instructed on how to

clean the cord as per the recommended guidelines

Risks of HIV transmission with or without breastfeeding

- Four out of 20 babies born to known HIV-infected mothers will be infected during pregnancy and delivery without ART
- Three more may be infected by breastfeeding without ART
- Infant risk greatly reduced with maternal ART in pregnancy, childbirth and breastfeeding. All mothers are now recommended to adhere to option B+, commencing ART as soon as a diagnosis of HIV positivity is made, and remaining on ART for life. With good adherence, the viral load should remain suppressed and the risk of transmission is low.
- Risk may be reduced if baby is breastfed exclusively using good technique

Risk of not breastfeeding may be much higher because replacement feeding carries risks too:

- Diarrhoea because of contamination from unclean water, unclean utensils or because the milk is left out too long

- Malnutrition because of insufficient quantity given to the baby, the milk is too watery, or because of recurrent episodes of diarrhoea

Mixed feeding increases the risk of diarrhoea. It may also increase the risk of HIV transmission (WHO 2015).

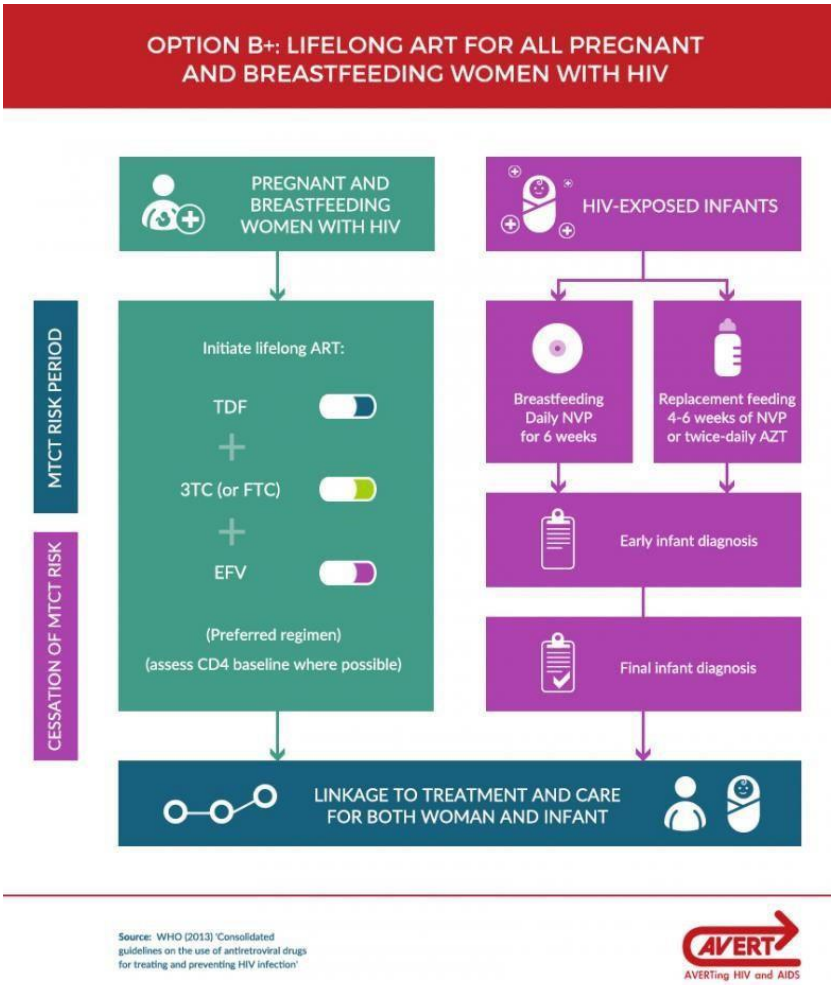


Figure 13.2: Option B+ (WHO 2015 recommendation)

NB: Since July 2019, WHO has stated that Dolutegravir is now considered to be safe in pregnancy and may be used instead of Efavirenz (4)

Mother	Infant	Recommendation
• Living with HIV • On ART	Un-infected or unknown status	Exclusive breastfeeding for first 6-months Then introduce appropriate complementary feeds Continue breastfeeding (no restriction on duration)
• Living with HIV • On ART • Mixed feeding	Un-infected or unknown status	Mixed feeding is not a reason to stop breastfeeding in the presence of ARV drugs
• Living with HIV • On ART • Planning to breastfeed for less than 12 months	Un-infected or unknown status	A shorter duration of breastfeeding of less than 12-months is better than never initiating breastfeeding

Infant feeding in the context of HIV Follow National Guidelines

Counsel/support mothers with HIV to breastfeed and receive ARVs **OR** avoid breastfeeding

When choice is breastfeeding:

Exclusive breastfeeding for the first 6 months, introduce appropriate complementary foods then continue breastfeeding for another 6 months

Stop breastfeeding when nutritionally adequate and safe diet can be provided

Infants at high risk	Infants at low risk
Born to mothers: • With HIV, on ART for < 4weeks at delivery • With HIV viral load >1000copies/mL • Incident HIV infection during pregnancy or breastfeeding • Identified for the first time during the Postpartum period	• None of the high-risk factors applicable
RECOMMENDATION	**RECOMMENDATION**
Whether breastfed or formula fed **<u>Dual prophylaxis:</u>** AZT – twice daily and NVP once daily Duration: first 6 weeks	Formula fed (replacement feeding) 4-6 weeks of NVP once daily or AZT twice daily for 4 to 6 weeks
Breastfed only Continue prophylaxis for additional 6 weeks with above regimen or with NVP alone	Breastfed NVP single dose daily for 6 weeks

Read sections

2.5.1 from p28 regarding diagnosis and treatment of infants

4.3.2 on when to start treatment in pregnancy and breastfeeding women

4.4 on which Antiretroviral drugs to use

4.4.7 Infant prophylaxis

4.4.8 Infant feeding

4.7 Antiretroviral drug interactions

5.2 Use of co-trimoxazole

5.2.2 Co-infection with TB

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Appendix 1: Supporting Normal Birth

Key Learning Points

- To understand the process of normal labour and learn how to support this.
- To understand and have competence in evidence-based practices to be followed in labour, delivery and the immediate postpartum period.
- To understand Active Management of the Third Stage of Labour (AMTSL) and its importance in preventing postpartum haemorrhage (PPH).
- To appreciate in the skills required to perform AMTSL: administering uterotonic drugs, CCT and uterine massage.
- To know the components of immediate postnatal care (PNC) of mother and newborn.

Providing high quality evidence-based care during the antenatal period, labour, delivery and the postpartum period are key functions of a skilled birth attendant. The guidelines below are in accordance with global evidence-based practices. Although there has been increased emphasis on the use of evidence-based medicine, many providers continue to use untimely, inappropriate and/or unnecessary or unsafe interventions, often leading to serious and potentially life-threatening complications for mothers and their newborn.

Quality care of women during labour and delivery

The following practices are recommended and evidence shows they are beneficial to both the woman and her baby.

- Support from a birth partner or companion.
- Supportive care during labour is very important to give women confidence and help them cope with labour pains. There is evidence that having a birth companion, improves women's satisfaction with the care they receive, reduces the duration of labour, may facilitate the progress of labour and reduce the need for an assisted delivery or caesarean section. In addition babies of women given continuous support in labour may be less likely have low five minute APGAR scores. Postnatal depression may have a lower incidence in these women.
- A birth environment to make the mother feel comfortable, and one which offers privacy and space for movement
- Women should be encouraged to choose any position they wish during labour and delivery and that which feels most comfortable at the time. Positions may include the left lateral position, squatting, kneeling, or even standing (supported by the birth companion).

  Women often want to change positions during labour as no position is comfortable for a long period of time.
- Encouragement to walk around (ambulatory labour) and change positions frequently
- Encouragement to take appropriate food and drinks

- Good communication and building trust with staff
- Giving vaginal exams only at appropriate intervals and when indicated
- Monitoring of maternal and fetal wellbeing using the partograph (See Module 6, Obstructed Labour)

Activities that are of no benefit or positively harmful and should be abandoned

- Shaving the pubicarea
- Giving an enema
- Lying supine during labour and delivery
- Routinely cutting an episiotomy for delivery in all women
- Routine catheterisation
- Application of fundal pressure
- Withholding fluids or food during labour

Onset of labour and stages of labour

A woman is said to be in active labour if there are regular painful contractions lasting about 40 seconds or more with 3 or more contractions in 10 minutes and with progressive effacement and dilatation of the cervix.

Labour and delivery is traditionally divided into stages:

- First stage – onset of labour until full cervical dilatation. At the beginning of the first stage or active stage of labour the cervix is usually 3-5cm dilated. In both nulliparous and multiparous women, dilatation of the cervix takes place at about 0.5 -1cm/hr so the first stage takes about 6-12 hours.
- Second stage – full dilatation until delivery of the baby. The Second stage takes up to 2 hours minutes in multiparous women and up to 3 hours in nulliparous women.
- Third stage – This is the time between delivery of the baby and the delivery of the placenta. The placenta usually separates within 3 minutes and is delivered within 5 minutes after birth.

Progress in the first stage of labour

Findings suggestive of satisfactory progress in the active phase of labour are:

- Contractions increasing in frequency and duration to three contractions in 10 minutes each lasting 40 seconds or more
- Rate of cervical dilatation of at least 0.5-1 cm/hour: cervical dilatation on or to the left of alert line of the partograph
- Cervix thin and well applied to the presenting part
- Descent of the presenting part into the pelvis

Normal progress in the second stage of labour

Findings suggestive of satisfactory progress in the second stage of labour are:

- Steady descent of presenting part through the pelvis

- Onset of expulsive (pushing) phase
- Vertex descends onto the perineum, causing progressive thinning and stretching

Management of second stage:

- Once the cervix is fully dilated and the woman is in the expulsive phase of the second stage, encourage her to push with every contraction.
- Listen to the fetal heart every 5 mins, starting towards the end of a contraction and continuing until the uterus is relaxed. This is important to detect fetal distress
- If the fetus becomes distressed, delivery must be expedited in the most appropriate way

Delivery of the head:

- Ask the woman to pant or give only small pushes with contractions as the baby's head crowns and is born.
- To control the birth of the head, place the fingers of one hand against the baby's head to keep it flexed.
- Continue to gently support the perineum with the other hand
- Once the baby's head delivers, ask the woman not to push.
- Feel around the baby's neck for the umbilical cord:
  - If the cord is around the neck but is loose, slip it over the baby's head
  - If the cord is tight around the neck, doubly clamp and cut it before unwinding it from around the neck.

Routine episiotomy is not evidence-based practice and is not recommended. A normal tear generally heals better than an episiotomy. However, if one becomes necessary, local anaesthetic should be infiltrated and the episiotomy cut during a contraction when the perineum is stretched and thin at an angle of 60 degrees to the vertical to avoid extensions into the anal sphincter.

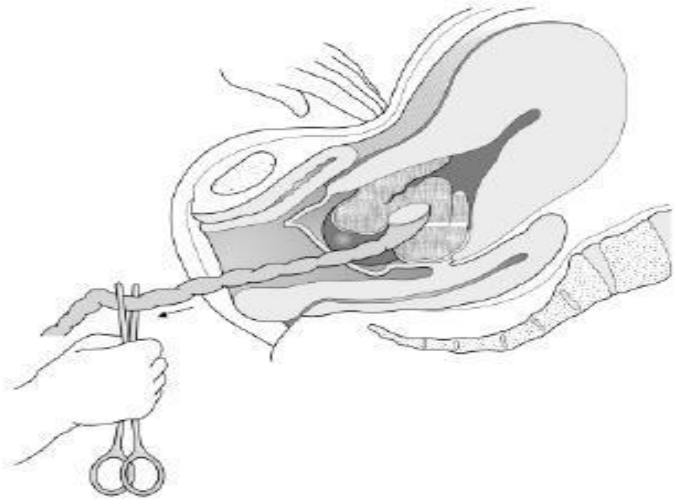
An episiotomy or tear should be sutured as soon as possible after delivery, always using local anaesthesia. Letting the mother breastfeed or cuddle the baby at this time helps to distract her from the discomfort caused by the suturing.

Completion of delivery:

- Allow the baby's head to turn spontaneously.
- After the head turns, place a hand on each side of the baby's head. Tell the woman to push gently with the next contraction.
- Gently move the baby's head downwards to deliver the anterior shoulder.
- Lift the baby's head upwards to deliver the shoulder that is posterior, letting it glide gently over the perineum to minimise the risk of tears.
  - Support the rest of the baby's body as it slides out.
  - Let the baby lie over the mother's upper abdomen, dry and cover with a warm clean towel.
  - Proceed to active management of the third stage:

Active management of the Third Stage of Labour (AMTSL)

1. Immediately after delivery of the baby palpate the uterus to exclude another baby, then give oxytocin 10 units IM.
2. After a minimum of 1 minute, (or wait for cord pulsations to stop if the baby is in good condition), clamp the cord close to the perineum using two sponge forceps, and cut the cord between the clamps.
3. Controlled cord traction:
   a. Holding the clamped cord and forceps with one hand, place the other hand just above the woman's pubic bone, palm upwards, so cupping the uterus to stabilise it, and await a contraction (usually 2–3 minutes).
   b. When the uterus becomes firm and is seen to rise, pull gently downwards on the cord held in the forceps while at the same time using your other hand to push the uterus upwards. This prevents the uterus from becoming inverted, and the procedure is called **'controlled cord traction'.**
   c. If the placenta does not descend during 30–40 seconds of controlled cord traction, do not continue to pull.
   d. Stop and wait until the uterus contracts again.
   e. If necessary release the sponge forceps and clamp the cord closer to the perineum as it lengthens. **Never apply cord traction (pull) without applying counter traction (push) above the pubic bone with the other hand**
   f. As the placenta delivers, the thin membranes can tear off. Hold the placenta in two hands and gently turn it round and around to twist the membranes and complete the delivery



4. Massage the uterus to expel any clots and make sure it feels firm and well contracted.

The most important intervention to reduce postpartum hemorrhage is the immediate postpartum administration of a uterotonic within one minute of birth. Controlled cord

traction is optional and should only be performed by a skilled provider.

- If the membranes tear, gently examine the upper vagina and cervix wearing sterile gloves and use a sponge forceps to remove any pieces of membrane that are present.
- Inspect the placenta carefully by laying it out flat to be sure no placental tissue is missing (i.e. retained).
- If a portion of the maternal surface is missing or there are torn membranes with vessels, suspect retained placental fragments.

Note:

- Oxytocin is preferred because it is effective 2–3 minutes after injection, has minimal adverse effects and can be used in all women. If oxytocin is not available, give either ergometrine 0.2 mg IM (if no contraindication, see below) or misoprostol 600µgm orally (there are no contraindications to misoprostol used in this situation). Make sure there is no additional baby(s) (i.e. multiple pregnancy – twin or triplet pregnancy) before giving these medications.
- Ergometrine can cause a rise in blood pressure. Do not give ergometrine to women with pre-eclampsia, eclampsia or hypertension because this may increase the risk of a cerebrovascular accident.

Active Management of the Third Stage

- Administer a uterotonic, preferably oxytocin 10 IU IM within 1 minute of birth.
- Clamp and cut the umbilical cord
- Cut the cord after it stops pulsating or 1-3 minutes after delivery of baby. This will help provide additional blood to the baby.
- Use controlled cord traction to deliver the placenta
- Uterine massage

Examination for tears

Examine the vulva carefully and repair any significant tears to the perineum or vagina. Small tears involving only skin or mucosa that are not bleeding do not need to be sutured.

Suturing an episiotomy

Note: Routine examination of the cervix or packing of the vagina is not needed.

Care of the Baby

If the baby cries after birth and breathing is established, there is no need to "suck the baby out".

- Using cord clamp or tie, shorten the cord. Make sure it isn't bleeding.
- Check the baby's breathing and colour every 15 minutes for the first half hour. Look for chest indrawing and rapid breathing (>60 breaths per minute), (WHO Pregnancy Childbirth Postpartum and Newborn Care 2009) or grunting.
- Check baby's warmth by feeling the feet.

- □ If the feet feel cold, ensure skin to skin contact with mother, cover baby with dry towel/cloth and blanket, put on baby hat and give mother a hot drink. Ensure room is warm. Re-check after 1 hour. If still has cold feet, check axillary temperature.
- □ If the baby's temperature is below 36.5°C, re-warm the baby

- Check the cord again for bleeding. If the cord is bleeding, re-tie cord more tightly.
- Encourage breastfeeding when the baby appears ready. The baby's suckling reflex is usually strongest within the first half hour so the sooner the baby can latch on, the better. Do not force the baby to the breast. A tired baby may simply prefer to lie on the mother's chest, with skin-to-skin contact. The mother should be in a comfortable position, not flat on her back. This is all important to establish bonding between mother and infant – the best foundation for successful breastfeeding.

Note: Avoid separating mother from baby whenever possible. Do not leave mother and baby unattended at any time.

Check baby within 15 minutes of birth for:

- Colour (lips should be pink)
- Respiratory rate (should be between 30–60 breaths per minute) with no chest in-drawing or grunting
- Feel temperature of feet
- Check umbilical cord for bleeding

Postpartum Care

A new mother needs both emotional support and practical help.

A woman who gives birth in unfamiliar surroundings attended by people she does not know (for example, in a health facility) may feel inhibited and unable to look after her newborn baby as she would do at home. Rules and policies in the health facility may also not help with regard to setting immediate postnatal social interaction or accepted cultural practices in the local setting.

Think carefully about how you can make your facility more client friendly in this respect.

The first 2 hours postpartum are extremely important:

- Keep mother and baby in delivery room or room adjacent to the delivery room for a minimum of one hour after delivery of the placenta.
- Check uterus is well contracted and bleeding is not heavy every 5 minutes for the first 15 minutes then every 15 minutes for the first hour.
- Check BP, pulse and respiratory rate within the first 15 minutes after birth. Repeat after 30 minutes and again before transfer to post natal ward.
- Encourage mother to breast feed within the first hour. Give the mother X as much support as needed to ensure the baby latches on especially if she is a first time mother If this does not happen easily, reassure the mother that this can be normal and learning to breastfeed might

take a few days. If the baby is of low birth weight and therefore more vulnerable, Kangaroo Mother Care (KMC) is recommended. The mother keeps the baby next to her breasts, secured with a blanket. The proximity to the mother's heart stimulates the growth of the baby and the production of breast milk and the skin to skin contact keeps the baby's temperature even and prevents hypothermia. This method is better than an incubator and costs nothing!

Transfer to postnatal ward after minimum of 1 hour if everything is normal.

- Ask mother to report if her bleeding becomes heavy or she feels unwell.
- Measurement of temperature 4–6 hourly, at least once before discharge if woman is discharged within 8 hours.
- Regular measurement of BP and pulse 4–6 hourly during the first 24 hours, then twice a day.
- Regular check for vaginal blood loss and fundal height 4 hourly during the first 24 hours, then twice a day.
- Pain relief: pain in perineum and breasts is common and women often count these as unpleasant memories of childbirth.

If there are signs of haemorrhage, eclampsia or infection, refer to the relevant modules for management.

Length of stay in health facility

The first 48 hours after delivery are the most critical for both the mother and her newborn baby in the entire postpartum period. In most countries, mothers return home soon after delivery so are not close to the health facility when major postpartum complications such as PPH and eclampsia can occur. All women need to be closely monitored and supported during this potentially risky period.

Ideally, there should be a referral link with the community health worker who can provide home- based monitoring and support.

The first 48 hours is also the time when most newborn deaths occur. A 48 hour stay at the health facility will allow for timely identification of complications such as difficult breathing, chest in- drawing, temperature, jaundice, convulsions**,** etc.

During this period, mothers need clear and appropriate advice on a number of important issues: establishing breastfeeding and care of breasts and where to find information and support; care of the cord; managing colic and unsettled baby; maternal diet to maintain good nutrition for breastfeeding and family planning, etc. This will help in provision of essential newborn care and also timely management of any neonatal complications.

It is important to explain to the woman and her family that staying at the health facility for 48 hours is a good idea, to ensure that proper care is provided to her and baby. Maternity Waiting Homes can also provide postpartum care to the new mother where they are available and well supported.

Cultural practices

In many countries, there are cultural traditions related to childbirth that are important for families to follow. These may include burying the placenta at home, having a coffee ceremony, bathing the mother, etc. If the facility can allow these (provided they are not harmful) this will likely encourage more women to use the facility for childbirth in future. Often there are no medical reasons why such cultural practices cannot be permitted. Try to find out what is practiced in the area in which you work and work with colleagues to provide support for those in your health facility.

Most mothers understand the importance of the first immunisation for the baby and uptake is generally good. Mothers can be encouraged to have a 6 week postpartum check-up at this time to ensure that exclusive breastfeeding is being maintained, that maternal nutrition is appropriate and that family planning advice and methods are offered.

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