ESSENTIAL OBSTETRIC AND NEWBORN CARE

Practical guide for midwives, doctors with obstetrics training and health care personnel who deal with obstetric emergencies

2015 edition

MEDECINS SANS FRONTIERES

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Introduction

According to the World Health Organization, an estimated 800 women die each day from preventable pregnancy- and delivery-related causes. Ninety-nine percent of maternal deaths occur in developing countries. There are a number of factors limiting access to the high quality care that would reduce this mortality to a more acceptable level; these include limited family resources, living far from a health care facility, and the lack of a reliable system of transportation.

Essential obstetric and newborn care is designed as a tool to help protect mothers and their children in adverse environments. It is intended for midwives, doctors with obstetrics training, and health care personnel who deal with obstetric emergencies.

This guide is not intended as a treatise on obstetrics, or as a replacement for years of specialised training and experience. The goal here is to describe the essentials needed to manage the most common illnesses and problems encountered during pregnancy, in order to save the life of the mother, protect her from the sequelae of a difficult pregnancy or delivery, and deliver the infant in the best possible conditions.

Not all the procedures described in this guide are within reach of all medical staff. For example, while many obstetrical procedures fall within a midwife's scope of practice, she is not qualified to perform a caesarean – though she usually helps determine that one is indicated. On the other hand, a nurse may be permitted to perform antenatal consultations, with appropriate training. The medical demography of low-income countries often requires the decentralisation of competencies. Similarly, it is important to take the paucity of obstetricians in developing countries into account, and recognise that in some countries, general practitioners in remote areas are trained to do difficult and caesarean deliveries. Hence this guide aims to serve all of these variously-qualified personnel, by describing basic technical procedures and general management of obstetric emergencies. It can also be used as a reference tool for training.

While some of the methods in this guide, such as symphysiotomy and embryotomy, may appear obsolete, they have purposely been included for situations in which there is limited or no access to caesarean sections.

Broadly speaking, there are two types of medical facilities that provide care for mothers and newborns: BEmONCs, which dispense Basic Emergency Obstetric and Newborn Care, and CEmONCs, which offer Comprehensive Emergency Obstetric and Newborn Care. The geographic distribution of these facilities permits proximity to care, in the case of the BEmONCs, with the CEmONCs serving as reference facilities for more complicated deliveries. The different procedures and techniques described in this guide are to be performed in the relevant medical facility.

Despite all efforts, it is possible that certain errors may have been overlooked in this manual. Please inform the authors of any errors detected. It is important to remember, that if in doubt, it is the responsibility of the prescribing medical professional to ensure that the doses indicated in this manual conform to the manufacturer's specifications.

The authors would be grateful for any comments or criticisms to ensure that this manual continues to evolve and remains adapted to the reality of the field.

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This manual is also available on the internet at **www.msf.org**. As protocols are constantly changing, medical staff are encouraged to check this website for updates of this edition.

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Abbreviations and acronyms

ACT	artemisinin-based combination therapy
AL	artemether/lumefantrine (coartemether)
AQ	amodiaquine
AS	artesunate
BCG	bacillus Calmette-Guérin
BEmONC	basic emergency obstetric and newborn care
BP	blood pressure
C°	degree Celsius
CEmONC	complete emergency obstetric and newborn care
dl	decilitre
g	gram
HBV	hepatitis B virus
HIV	human immunodeficiency virus
IM	intramuscular administration
IU	international unit
IV	intravenous administration
kg	kilogram
LMP	last menstrual period
M	million
µg	microgram
mg	milligram
MgSO4	magnesium sulfate
ml	millilitre
mmHg	millimetre of mercury
mmol	millimole
MQ	mefloquine
MVA	manual vacuum aspiration
PIH	pregnancy-induced hypertension
PMTCT	prevention of mother-to-child transmission
PO	per os – oral administration
RF	risk factor(s)
SC	subcutaneous administration
SP	sulfadoxine/pyrimethamine
tab	tablet
TB	tuberculosis
TT	tetanus toxoid
UNICEF	United Nations Children's Fund
WHO	World Health Organization

Chapter 1:
Diagnosing and monitoring pregnancy

1.1 Diagnosing pregnancy

1.1.1 Signs and symptoms of pregnancy

The first sign of pregnancy is amenorrhea[a] combined with a progressive increase in the size of the uterus starting 7 to 8 weeks after the last menstrual period.

During the first trimester, breast changes (increased size, tenderness, vascularisation and swollen areolas), pollakiuria (frequent need to urinate) and transitory nausea/vomiting are common.

In the second trimester the mother begins to feel foetal movement and, in some cases, uterine contractions. Foetal heart tone can be heard.

Signs and symptoms of pregnancy by gestational age are presented in the Table 1.1, on following page.

1.1.2 History and clinical examination

See Section 1.2.

1.1.3 Other investigations

Pregnancy test

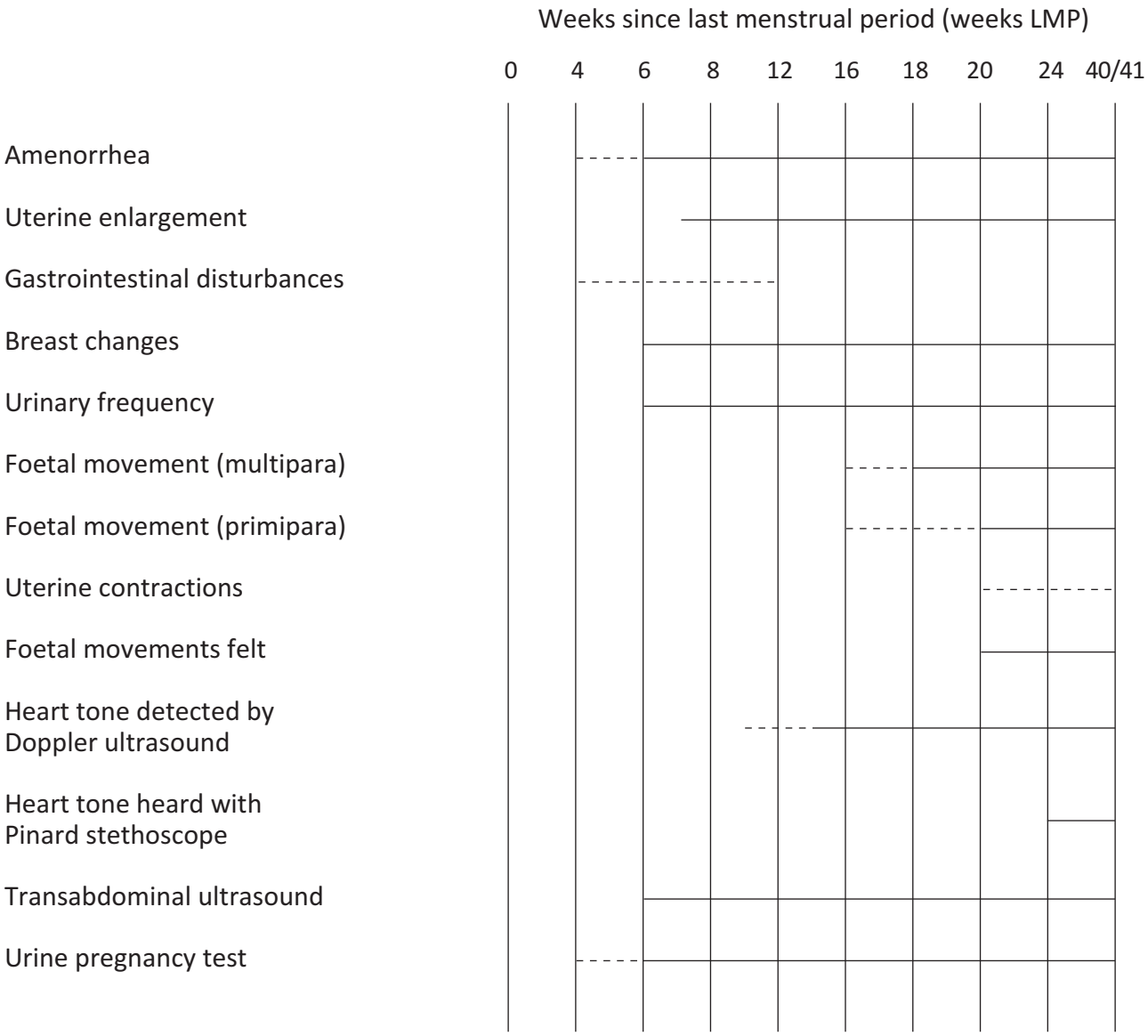
While a pregnancy test is not routinely necessary, it is always indicated for suspected ectopic pregnancy or early diagnosis of a pregnancy to be terminated.

Ultrasound

Ultrasound is not routinely necessary.

[a] For amenorrhoea (absence of menstrual periods) without other signs of pregnancy, rule out other causes: physiological (breastfeeding), drug-related (e.g., contraceptives up to 3 months after stopping, antipsychotics and corticosteroids), endocrine (e.g., thyroid disorder), psychological, nutritional, etc.

Table 1.1 - Signs and symptoms of pregnancy by gestational age



- - - - - - - - - period during which these signs/symptoms are variably present.

———— period during which these signs/symptoms are present.

1.2 Antenatal consultations

1.2.1 Aims of antenatal monitoring

- Screening for and management of pathologies: hypertension, anaemia, malaria, syphilis, urinary tract infection, HIV infection, malnutrition, vitamin and micronutrient deficiencies, etc.
- Screening for and management of obstetric complications: uterine scar, abnormal presentation, premature rupture of membranes, multiple pregnancy, metrorrhagia, etc.
- Routine prevention of maternal and neonatal tetanus, anaemia, mother-to-child HIV transmission, malaria (in endemic areas), etc.
- Devising a birth plan; counselling; preparation for the birth.

1.2.2 Timing of antenatal consultations

Four antenatal consultations are recommended for uncomplicated pregnancies[1].

If the patient does not come in until the sixth month or later, try to have at least two consultations before the birth.

Table 1.2 - Schedule of antenatal consultations

Trimester	Month	Weeks LMP*	Consultation schedule
First	1 2 3	2-5 6-9 10-13	 ⇐ Consultation 1
Second	4 5 6	14-17 18-21 22-26	⇐ Consultation 2
Third	7 8 9	27-30 31-35 36-40/41	⇐ Consultation 3 ⇐ Consultation 4

* *The gestational age is expressed in weeks since last menstrual period (LMP) or, less precisely, in weeks of pregnancy. Pregnancy lasts 9 months or 40 or 41 weeks LMP, depending on the country.*

Closer monitoring may be needed, depending on the problems detected and the patient's history (Section 1.3).

1.2.3 First consultation

A. Interview

- General feeling about the pregnancy (problems/concerns).
- Social context: living conditions, family situation, activity.
- Date of last menstrual period.

– Obstetric and surgical history:
  • Number of prior pregnancies;
  • Complications with prior pregnancies/deliveries (haemorrhage, infection, prematurity, etc.);
  • Spontaneous or induced abortion(s);
  • Children, alive and deceased;
  • Caesarean section (find out why) or any other uterine surgery;
  • Instrumental delivery;
  • Vesicovaginal or rectovaginal fistula.
– Medical history and ongoing treatments: hypertension, diabetes, asthma, epilepsy, heart disease, HIV infection, psychiatric disorder, etc.
– Immunisation status (tetanus).
– Current problems: pelvic pain, contractions, fever, urinary symptoms, vaginal bleeding, etc. If there are signs of a sexually transmitted infection (STI) – e.g., abnormal vaginal discharge or urethral discharge – always look for other concurrent STIs.

B. Estimating the gestational age and due date

The gestational age is estimated by counting the number of weeks since the last menstrual period (weeks LMP) using a calendar or pregnancy wheel.
For example, if the last menstrual period was on 15 December 2014 and the woman is seen on 27 January 2015, the estimated gestational age is 6 weeks LMP.
Always verify that this estimate tallies with the data from the clinical examination (estimate of uterine size) or the ultrasound.

The due date is estimated by counting 40 or 41 weeks from the first day of the last menstrual period.
For example, if the date of the last menstrual period was 15 December 2014, the due date is between 22 and 29 September 2015.

The due date can also be estimated by counting 9 months plus 7 to 14 days from the first day of the last menstrual period.
If the woman does not know the date of her last menstrual period, the presumed gestational age and due date is determined based on clinical examination or ultrasound[b].

C. Clinical examination

In all cases:
– Weight; blood pressure (patient seated and resting).
– Height (only for women < 1.40 m).
– Look for abdominal scar.
– Look for anaemia, oedema, etc.
– Look for foetal heart tone starting at the end of the first trimester.
– Estimate the size of the uterus (gives an estimate of gestational age):
  • During the first trimester, the size of the uterus is estimated by bimanual examination. At 7 weeks the uterus is the size of a chicken egg, at 10 weeks the size of an orange, and at 12 weeks the uterine fundus extends beyond the symphysis pubis.
  • Starting in the second trimester, the uterus can be felt by abdominal palpation alone; measure the fundal height, which is the distance between the upper edge of the symphysis pubis and the fundus (Figure 1.1).

[b] Ultrasound allows accurate estimation of gestational age in the first trimester, with a margin of error of approximately 7 days. The margin of error is larger in the second and third trimesters (about 15 and 20 days, respectively).

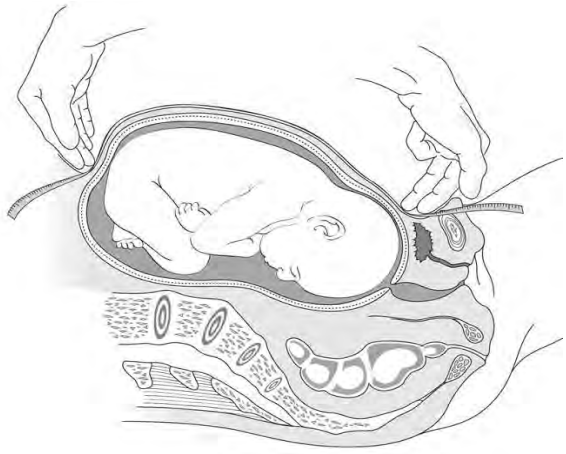


Figure 1.1
Measuring the fundal height

The estimate of the gestational age becomes increasingly approximate as the pregnancy advances. As a rough guide:

Table 1.3 - Fundal height according to gestational age

Fundal height	Weeks since last menstrual period
20 cm	18 - 22 weeks LMP
24 cm	22 - 26 weeks LMP
28 cm	26 - 30 weeks LMP
32 cm	30 - 34 weeks LMP
34 cm	33 weeks LMP to term

Note: fundal height and uterine growth may vary with ethnicity. Use the national curves from the Ministry of Health, if they exist.

Only if indicated:
– Genital examination (e.g., to look for mutilation, if complaint of abnormal discharge, etc.).
– Vaginal examination (e.g., if there is doubt about the pregnancy diagnosis).

D. Laboratory tests

Table 1.4 - Recommended screening tests

Tests	Comments
Syphilis	Syphilis screening should be done at the first consultation, as early as possible in pregnancy . If it was not done at an antenatal consultation, it should be done at delivery. Use a Treponema-specific rapid test (e.g., SD Bioline®).
Malaria	In endemic areas, perform a rapid test even if there are no symptoms.
HIV infection	Offer a test to all women who do not know their HIV status. Perform rapid tests according to the standard algorithm. Testing cannot be done without the patient's consent. Evaluate the immunological status (CD4 count): as soon as possible after seropositivity is detected, or at the first antenatal consultation for women who already know that they are HIV positive.

Table 1.4 - Recommended screening tests (*contnued*)

Tests	Remarques
Anaemia	Measure haemoglobin (HemoCue).
Urinary tract infection	Test for asymptomatic bacteriuria, even if there are no symptoms (urinalysis with reagent test strips).

E. Antenatal care card

Fill an individual card containing information for monitoring the pregnancy (Appendix 1).

1.2.4 Subsequent consultations

A. Interview

– Foetal movement felt by the mother.
– Current problems: pelvic pain, contractions, fever, urinary symptoms, abnormal vaginal discharge, metrorrhagia, etc.

B. Clinical examination

Be careful when examining a woman lying on her back; the weight of the uterus compresses the inferior vena cava, which can cause her to feel faint (easily remedied by placing the patient on her left side).

In all cases:

– Blood pressure, weight, oedema, fundal height.
– Foetal heart tone: should be regular, rapid (120-160/minute), and out of sync with the mother's pulse.
– Foetal presentation (third trimester):
  Palpation:
  • Cephalic pole: round, hard and regular; there should be a feeling of ballottement between examiner's hands; separated from the rest of the body by the indentation of the neck, beyond which the projection of the shoulder can be palpated.
  • Pelvic pole: soft; bulkier and less regular than the cephalic pole; no neck indentation.
  Types of presentation:
  • Cephalic: the cephalic pole points towards the mother's pelvis.
  • Breech: the cephalic pole is in the uterine fundus.
  • Transverse: the poles lie in each of the mother's sides.
– Exploring the foetal back:
  Press the uterine fundus downward to bend the foetal spine and explore the lateral surfaces of the uterus. The back is felt as a hard plane, the limbs as small, irregular projections. The back is described with reference to the mother's right or left.
– In the third trimester, the foetal heart tone is auscultated in the umbilical region along the foetus' back, at shoulder level.

Only if indicated:

– Genital examination (e.g., if mother complains of abnormal discharge).
– Vaginal examination (e.g., if mother complains of recurring uterine contractions).

Note: the vaginal examination is sometimes used to evaluate the pelvic dimensions in small primiparas. A small pelvis[c] is not necessarily predictive for foeto-pelvic disproportion (FPD) and does not justify scheduling a caesarean section. Moreover, FPD can occur with a normal-appearing pelvis. In practice, FPD can only be established during labour.

C. Laboratory tests

Table 1.5 - Recommended screening tests

Tests	Comments
Urinary tract infection	Look for asymptomatic bacteriuria at each consultation.
Malaria	In endemic areas, perform a rapid test at each consultation, unless the woman was tested in the past 4 weeks, the test was positive, and the woman received curative antimalarial treatment as a result.
HIV infection	Offer patients who tested negative during the 1st trimester a new test in the third trimester. There is increased risk of transmission when seroconversion occurs during pregnancy.

1.2.5 Preventive treatments

Maternal and neonatal tetanus

– Pregnant women not vaccinated against tetanus in childhood or adolescence should receive at least 2 doses of tetanus vaccine (TT) before giving birth:
  • the first dose should be administered at the first consultation;
  • the second dose should be administered at least 4 weeks after the first dose and ideally at least 2 weeks before the due date to maximize the maternal antibody response and passive antibody transfer to the infant.
– After the birth, continue to a total of 5 doses, according to the schedule below. Once administered, these 5 doses confer lifelong protection.

Table 1.6 - Vaccination schedule for women who are pregnant or of child-bearing age[3]

Dose	When to give	Level of protection
TT1	At the first contact with medical services *or as early as possible during pregnancy*	0%
TT2	At least 4 weeks after TT1 *and at least 2 weeks before the delivery due date*	80%
TT3	At least 6 months after TT2 *or during the next pregnancy*	95%
TT4	At least 1 year after TT3 *or during another pregnancy*	99%
TT5	At least 1 year after TT4 *or during another pregnancy*	99%

[c] The pelvis is considered small if the top of the sacrum (promontory) can be reached with the fingers and/or the lateral edges of the pelvis can be felt along their entire length.

Anaemia

– If there are no clinical signs of anaemia and no abnormal haemoglobin values:
  1) Administer iron and folic acid supplementation, starting as soon as possible after gestation starts and continuing for the rest of the pregnancy. Give either:
  ferrous sulfate/folic acid[d] (tablet containing 200 mg of ferrous sulfate, 65 mg of elemental iron + 400 micrograms of folic acid) PO: 1 tablet/day
  or
  multiple micronutrients[e] (tablet containing 93.75 mg of ferrous sulfate, equivalent to 30 mg of elemental iron + 400 micrograms of folic acid + other nutrients) PO: 1 tablet/day
  Note: the World Health Organization recommends 30 to 60 mg of elemental iron daily however, a dose of 60 mg of elemental iron daily is preferred over a dose of 30 mg daily in settings where prevalence of anaemia in pregnant women is high (≥ 40%)[f,4].
  2) In areas where hookworm is endemic, administer also an antihelminthic treatment as of the second trimester:
  albendazole PO: 400 mg as a single dose (or **mebendazole** PO: 500 mg as a single dose)
  3) In areas where malaria is endemic, administer also an intermittent preventive antimalarial treatment or an antimalarial curative treatment, depending on the results of malaria screening test (see below).

– If there is clinical evidence of anaemia (pallor of the palms, conjunctivae or tongue) or if haemoglobin is < 11 g/dl: see Chapter 4, Section 4.1.

Malaria

In areas with moderate to high *falciparum* malaria transmission[g] in Africa, prevention consists of:

1) The use of insecticide-treated mosquito nets (2 bed nets should be provided);
2) Malaria testing at each antenatal consultation:
  – If the test is negative, as of the second trimester:
  Administer an intermittent preventive treatment with **sulfadoxine-pyrimethamine** (**SP**)[5]. Allow an interval of at least one month between two treatments.
  This treatment helps reduce the effects of malaria (maternal anaemia and low birth weight). The SP dose for each treatment is 3 tablets as a single dose.
  Do not administer intermittent treatment with SP to HIV-infected women receiving cotrimoxazole prophylaxis.
  – If the test is positive, throughout pregnancy:
  Administer curative malaria treatment (Chapter 4, Section 4.3.1).
  Wait one month after curative treatment before screening for malaria again.

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[d] 200 mg ferrous sulfate (65 mg elemental iron) + 400 micrograms folic acid tablets may be replaced by 185 mg ferrous fumarate (60 mg elemental iron) + 400 micrograms folic acid tablets.

[e] If using multiple micronutrients, make sure that the amount of iron salts (sulfate or fumarate) is equivalent to 30 mg of elemental iron per tablet and the amount of folic acid is 400 micrograms per tablet (UNU/UNICEF/WHO formulation). For the complete composition of these tablets, see *Medical catalogue*, MSF.

[f] According to the World Health Organization (1993-2005), the prevalence of anaemia in pregnant women is 57.1% for Africa, 48.2% for South-East Asia, 44.2% for the Eastern Mediterranean region, 30.7% for the Western Pacific region, 25% for the European region and 24.1% for the Americas.

[g] "Moderate transmission" areas: zones where prevalence rate of malaria is 11–50% during most of the year among children 2–9 years. "High transmission" areas: zones where prevalence rate of malaria is over 50% during most of the year among children 2–9 years.

Urinary tract infection

Treat asymptomatic bacteriuria to reduce the risk of pyelonephritis[6] (Chapter 4, Section 4.2.6).

HIV infection

To prevent mother-to-child transmission, administer antiretroviral therapy to the mother (Chapter 4, Section 4.4.4).

Vitamin and micronutrient deficiencies

– Vitamin K_1
  For women being treated with an enzyme inductor (e.g. rifampicin, rifabutin; carbamazepine, phenobarbital, phenytoin), administer **phytomenadione** PO: 10 mg/day in the 15 days preceding the due date.

– Calcium
  Supplementation is recommended for[7]:
  • All pregnant adolescents (less than 20 years);
  • All pregnant women with low calcium intake AND at high risk of pre-eclampsia (history of pre-eclampsia or eclampsia, twin pregnancy, chronic hypertension).
  Start supplementation before 20 weeks LMP and continue throughout the pregnancy:
  calcium carbonate PO: one 1.25 g tablet (equivalent to 500 mg of calcium element) 3 times per day (= 1500 mg calcium element daily in 3 divided doses).
  Wait two hours between the administration of calcium and ferrous salts.

– Vitamin D
  Some national protocols may include vitamin D to prevent neonatal hypocalcaemia:
  ergocalciferol (vitamin D_2) or **colecalciferol** (vitamin D_3) PO: 100 000 IU as a single dose in the sixth or seventh month of pregnancy.

– Iodine
  Iodine deficiency during pregnancy increases the risk of miscarriage, prematurity, severe mental and growth retardation in the child, and neonatal or infant death. In areas where iodine deficiency is endemic, iodine supplementation is necessary. Follow national protocol.

Malnutrition

– Even in absence of signs of malnutrition, food supplementation is recommended:
  • For all pregnant women throughout their pregnancy in situations where food is scarce;
  • For all pregnant adolescents (less than 20 years).
– If there are clinical signs of malnutrition, place the woman into a therapeutic feeding programme.

Others

The above measures apply to most contexts. Other tests and preventive measures relevant in a specific context or included in the national protocol (e.g. Rhesus factor testing and allo-immunization prophylaxis, screening for cervical cancer) should be taken into account.

1.2.6 Preparation for the birth

Group sessions

Group sessions (10 to 15 women) should be organized to encourage information sharing between patients, promote the use of available services and weigh upon:
– Importance of skilled birth assistance.
– The purpose of antenatal consultations.
– The recommended tests and treatments during pregnancy (screening tests, tetanus vaccination and prevention of mother-to-child HIV transmission, etc.).
– Danger signs during pregnancy and delivery, and the importance of quickly seeking medical care.
– The use of insecticide-treated mosquito nets.
– The use of the "birth kit"[h], depending on the context.
– The purpose of the postnatal consultation.

Individual sessions

Individual sessions are an opportunity to revisit the subjects discussed in the group sessions and offer advice tailored to the individual's medical and social situation.

The choice of topics depends on the stage of pregnancy and the woman's specific circumstances:
– Birth plan (see below).
– Danger signs during pregnancy and delivery, and the importance of quickly seeking medical care.
– Contraception, especially for grand multiparas and women at high obstetrical risk.

Birth plan

With the patient, work out a personalised plan appropriate to her medical and social situation:
– Preferred site for birth: CEmONC or BEmONC facility, depending on the course of the pregnancy and the history;
– Any necessary arrangements: transportation, family arrangements, etc.

Table 1.7 - Obstetric care facilities

Facility	Minimum package
BEmONC **B**asic **Em**ergency **O**bstetric and **N**ewborn **C**are	• Open 24/7 • Skilled birth attendant(s) • Possibility of: - parenteral antibiotics - uterotonics - anticonvulsants if pre-eclampsia or eclampsia • Possibility of: - manual removal of the placenta - uterine evacuation (vacuum aspiration) - instrumental delivery (vacuum extraction) - basic neonatal resuscitation
CEmONC **C**omplete **Em**ergency **O**bstetric and **N**ewborn **C**are	• Same as BEmONC facility PLUS • Possibility of: - surgical management (caesarean section, hysterectomy, etc.) - blood transfusion

[h] Individual kit given to women that might deliver at home due to limited travel possibility (remote or insecure situations). It contains a plastic-coated cloth to be spread out on the floor (for cleaning the woman's genitals and washing the midwife's hands), a string and a razor blade for tying and cutting the cord and, in some cases, a cloth for drying the infant.

1.3 Monitoring complicated pregnancies

The term "complicated" refers to pregnancies in which the mother or infant is at increased risk due to a particular obstetric or medical pathology or history.

Complicated pregnancies may require higher level monitoring and/or special arrangements for delivery in a medical/surgical setting.

1.3.1 Situations requiring higher level monitoring

In the following situations, the increased risk exists mainly during pregnancy itself rather than delivery:

- History of preterm delivery or multiple miscarriages (risk of recurrence).
- History of unexplained ante-partum intrauterine foetal death.
- Progressive associated pathology such as upper urinary tract infection (risk of preterm delivery), anaemia (possible exacerbation), hypertension, pre-eclampsia, etc.

1.3.2 Situations requiring special precautions for delivery

In the following situations, the increased risk exists mainly during delivery rather than during pregnancy.

Arrange for delivery in a BEmONC facility:

- History of intra-partum intrauterine foetal death or death in the first day of life (risk of recurrence).
- History of haemorrhage during a prior delivery (risk of recurrence and maternal death).
- History of forceps or vacuum delivery (risk of recurrence).
- Height less than 1.40 m (risk of foeto-pelvic disproportion).
- Primiparity (risk of obstructed labour).
- Limp, hip dislocation, polio sequelae with frank pelvic asymmetry (risk of obstructed labour).
- Grand multiparity (risk of uterine rupture, uterine atony, uterine atony-related haemorrhage).

Note: it is essential that all maternity hospitals without an operating room have an effective system for referring patients to a CEmONC facility.

Arrange for delivery in a CEmONC facility:

- In situations that routinely require caesarean section:
  - History of uterine rupture.
  - History of caesarean with vertical (classical) incision or more than two caesarean births.
  - Transverse lie.

  A planned caesarean should be done at 39 weeks LMP or later. Before 39 weeks LMP, caesarean births without labour – even when not premature (37-38 weeks LMP) – are associated with a high risk of neonatal respiratory distress. That risk exists regardless of the estimated foetal weight.

When the due date is uncertain:

- If there is a very high risk of uterine rupture (e.g., history of severe uterine rupture or more than three prior caesarean sections), consider scheduling a caesarean section prior to labour during the ninth month, with preparation for managing neonatal respiratory distress.
- In other cases it is better to wait until the woman goes into labour to do the caesarean section. Under those circumstances, if the patient lives far away, suggest that she move near the facility where she will deliver during her ninth month, either with family or at a residential facility (maternity waiting home).

– In situations where there is a high risk that emergency caesarean or complex obstetrical manoeuvres will be needed:
  - History of low uterine segment transverse incision;
  - History of uterine scar (perforated uterus or myomectomy);
  - History of vesico-vaginal fistula;
  - History of symphysiotomy;
  - History of third or fourth degree tear;
  - Breech presentation.

1.3.3 Situations requiring higher level monitoring during pregnancy AND special precautions for delivery (CEmONC)

– History of abruptio placentae, severe pre-eclampsia or eclampsia (for secondary prophylaxis with aspirin, Chapter 4, Section 4.5.6).

– Pre-eclampsia (risk of eclampsia, coagulopathy, maternal death, abruptio placentae, intrauterine growth retardation, intrauterine foetal death) or eclampsia.

– Bleeding (risk of preterm delivery, foetal distress, intrauterine foetal death, anaemia, maternal death).

– Severe anaemia (risk of small foetus, prematurity, neonatal anaemia, increased vulnerability in case of haemorrhage). Transfusion should be available in case of severe anaemia during the third trimester.

– Multiple pregnancy (risk of obstructed labour, preterm delivery, hypertension, diabetes, intrauterine growth retardation and postpartum haemorrhage). Advise rest.

– Premature rupture of membranes (risk of infection, preterm delivery and intrauterine foetal death).

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Chapter 2:
Bleeding during the first half of pregnancy

2.1 Abortion

Spontaneous or induced interruption of pregnancy before 22 weeks LMP.

In countries where voluntary termination of pregnancy is legally restricted, induced abortions are often performed under poor conditions (inappropriate substances, non-sterile equipment, without qualified health care personnel, etc.). Complications from such abortions (trauma, bleeding and severe infection) are common and may be life-threatening.
For safe abortion care, see Chapter 12.

2.1.1 Diagnosis

Signs and symptoms

- Threatened abortion or missed abortion: light bleeding, abdominal pain, closed cervix.
- Incomplete abortion: more or less severe bleeding, abdominal pain, uterine contractions, expulsion of products of conception, open cervix.
- Trauma to the vagina or cervix or the presence of a foreign body are strongly suggestive of unsafe abortion. Look for complications, especially infection.

Additional tests

- A pregnancy test is useful if the history and clinical examination are inconclusive.
- Ultrasound is useful for confirming pregnancy termination or the presence of retained products of conception after incomplete abortion.

2.1.2 Differential diagnosis

The main differential diagnoses are: ectopic pregnancy, cervicitis, cervical ectropion (eversion of the cervical mucosa, which is more fragile and may bleed easily on contact, especially after a vaginal examination or sexual relations), cervical polyp, and functional uterine bleeding.

2.1.3 Management

Threatened abortion

- Advise the patient to reduce activity. Either the threat of abortion recedes, or abortion is inevitable.
- Look for a possible infectious cause (malaria or sexually transmitted infections) and treat it.
- Treat pain according to severity.

Ongoing or incomplete abortion

– Measure pulse, blood pressure, temperature; assess severity of bleeding.
– Treat pain according to severity.
– Remove any visible products of conception from the vagina and cervix.
– Remove foreign bodies, if present, clean the wound, and check and/or update tetanus immunisation (Table 2.1).

Table 2.1 - Tetanus prophylaxis

Immunisation status	Spontaneous abortion	Unsafe abortion, with wound or foreign body
Not immunised **or** **Immunisation status unknown**	Begin immunisation against tetanus	Begin immunisation against tetanus + Human tetanus immunoglobulin
Incompletely immunised	Tetanus booster	Tetanus booster + Human tetanus immunoglobulin
Fully immunised ***Last booster dose:***		
< 5 years	No prophylaxis	No prophylaxis
5 to 10 years	No prophylaxis	Tetanus booster
> 10 years	Tetanus booster	Tetanus booster + Human tetanus immunoglobulin

– For septic abortion (fever, abdominal pain, tender uterus, foul-smelling discharge), add:
amoxicillin/clavulanic acid IV (dose expressed in amoxicillin): 3 g/day in 3 divided doses administered 8 hours apart + **gentamicin** IM: 3 to 5 mg/kg once daily
or
ampicillin IV: 6 g/day in 3 divided doses administered 8 hours apart + **metronidazole** IV: 1.5 g/day in 3 divided doses administered 8 hours apart + **gentamicin** IM: 3 to 5 mg/kg once daily
Continue for 48 hours (until the fever disappears), then change to:
amoxicillin/clavulanic acid PO (dose expressed in amoxicillin): 3 g/day in 2 to 3 divided doses[a] to complete 5 days of treatment
or
amoxicillin PO: 3 g/day in 3 divided doses + **metronidazole** PO: 1.5 g/day in 3 divided doses to complete 5 days of treatment
For very severe infection (infected perforated uterus or peritonitis), treat for 10 days.

[a] The daily dose should be given in 2 divided doses if using the 8:1 or 7:1 formulation, and in 3 divided doses if using the 4:1 formulation.

– If bleeding is heavy:
  • Insert an IV line (16-18G catheter) and administer Ringer lactate;
  • Closely monitor pulse, blood pressure, bleeding;
  • To prepare for a possible transfusion, determine the patient's blood type and select potential donors or make sure that blood is available. If transfusion is necessary, only use blood that has been screened (HIV-1, HIV-2, hepatitis B, hepatitis C and syphilis).

– Uterine evacuation:

  Before 10 weeks LMP:
  Expulsion is often complete; uterine evacuation is usually not necessary.
  Monitor blood loss; do not evacuate the uterus unless bleeding is heavy.

  Between 10 and 12 to 14 weeks LMP[b]*:*
  Uterine evacuation is usually required due to retained products of conception, which can cause bleeding and infection. If uterine evacuation is necessary, there are three options:
  • Instrumental methods:
    - manual vacuum aspiration (Chapter 9, Section 9.5)
    or
    - instrumental curettage (Chapter 9, Section 9.6).

    Aspiration under local anaesthesia is the method of choice[1]. It is technically easier to perform, less traumatic and less painful than curettage.
  • Medical method:
    The use of **misoprostol** as a single dose (400 micrograms sublingually or 600 micrograms PO)[2,3] may avoid surgical intervention.
    There is, however, a risk of failure that increases as the pregnancy progresses. Treatment success (that is, an empty uterus) must be verified in the days after the drug is taken. If the medical method fails, the use of an instrumental method is unavoidable.

  Beyond 12 to 14 weeks LMP:
  Be patient; leave the amniotic sac intact and allow labour to take its course. The placenta is usually expelled with the foetus. Part of the placenta may be retained. If examination of the placenta leaves any doubt, or in the event of haemorrhage, rapidly perform digital curettage after the expulsion. If delayed, this procedure becomes impossible due to retraction of the cervix. At that point, instrumental curettage –with its significant risk of uterine perforation– may become necessary (Chapter 9, Section 9.6).

– Afterward, provide iron + folic acid supplementation or, in case of severe anaemia, a blood transfusion.

– Look for a possible infectious cause (malaria or sexually transmitted infections) and treat it.

[b] The gestational age is based on the date of last menstrual period and uterine size. Uterine evacuation, using aspiration or misoprostol are usually recommended up to 12 weeks. The estimation of gestational age is often approximative. Thus, these methods can be used up to an estimated gestational age of 14 weeks.

2.2 Ectopic pregnancy

Implantation of the fertilized egg outside of the uterine cavity, usually in the distal two thirds of the Fallopian tube. Other locations are rarer. Predisposing factors are history of peritonitis or pelvic infection.

2.2.1 Diagnosis

Signs and symptoms

Symptoms that are the same regardless of the location of the ectopic pregnancy:
– History: recent history of intermittent abdominal pain, a few weeks of amenorrhea, then vaginal bleeding or menstrual irregularity, nausea and vomiting, occasional dizziness or faintness.
– Examination: abdominal tenderness of varying severity, guarding, occasional adnexal mass, cervical and posterior fornix tenderness.

In the event of tubal pregnancy:
– Blood may collect in the Fallopian tube (haematosalpinx). The symptoms above may then be more severe and prolonged, with a painful adnexal mass.
– Bleeding may gradually seep into the abdominal cavity over several days or weeks. The blood accumulates in the Pouch of Douglas and form a haematoma (haematocele). If a haematocele forms – especially if it is large – there may be other signs and symptoms:
  • irritation of the bladder or rectum with pollakiuria, dysuria, rectal cramps and low grade fever;
  • bulging and increased pain in the posterior fornix, with a pelvic mass with poorly-defined borders and uneven consistency that pushes the uterus forward;
  • anaemia.

In the event of sudden Fallopian tube rupture, the tube's blood vessels are often damaged. A haemoperitoneum (bloody effusion into the peritoneal cavity) develops quickly.
On examination:
– distended, tender abdomen, shifting dullness;
– exquisite pain in the Pouch of Douglas;
– scapular pain;
– hypovolaemic shock due to bleeding (rapid, weak or unmeasurable pulse, very low or unmeasurable blood pressure, tachypnoea, pallor, cold sensation, damp skin, agitation and anxiety).

In general, a cervical pregnancy (very rare) most closely resembles an incomplete abortion. It is often discovered due to massive bleeding during vacuum aspiration or curettage to evacuate the uterus.

Additional tests

– Pregnancy test: the test is usually positive in ectopic pregnancy; in case of haematocele, however, it may be negative.

– In all cases, ultrasound shows an empty uterus, and in some cases an adnexal mass (haematosalpinx or haematocele) or fluid/blood in the abdominal cavity (haemoperitoneum).
  If ultrasound is unavailable and there is still some doubt, culdocentesis (Pouch of Douglas puncture) may be useful to look for a haemoperitoneum. The procedure is pointless when laparotomy is clearly indicated.

– Culdocentesis:
  • General (ketamine) or local (1% lidocaine) anaesthesia.
  • Swab the perineum, vagina and cervix with 10% polyvidone iodine.
  • Pouch the posterior vaginal wall down using a speculum. Grasp the posterior lip of the cervix with Pozzi forceps and lift the cervix upward.
  • Puncture the posterior fornix using a large calibre needle held as close to horizontal as possible, and aspirate with a 20-ml syringe.
  • An aspirate containing non-clotting blood is indicative of intra-peritoneal bleeding.

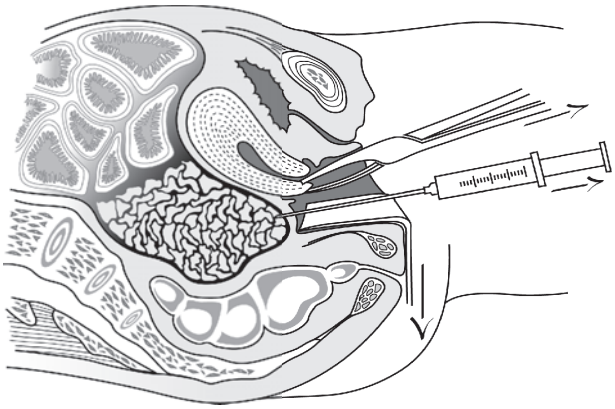

Figure 2.1
Puncture of the posterior fornix

2.2.2 Differential diagnosis

The main differential diagnoses for ectopic pregnancies are abortion, salpingitis, ovarian abscess, appendicitis and diverticulitis.
When haematocele is suspected, also consider pyosalpinx, fibroma, or pelvic abscess from another cause.
When haemoperitoneum is suspected, also consider gastric or duodenal perforation, ovarian cyst rupture or ovarian torsion.

2.2.3 Management

When the diagnosis of ectopic pregnancy is highly likely:
– Prepare for laparotomy or refer urgently to a CEmONC facility.
– Insert an IV line (16-18G catheter) and administer Ringer lactate.
– Closely monitor pulse, blood pressure and bleeding.
– To prepare for a possible transfusion, determine the patient's blood type and select potential donors or make sure that blood is available. If transfusion is necessary, only use blood that has been screened (HIV-1, HIV-2, hepatitis B, hepatitis C and syphilis).

Special cases:
– In the event of massive bleeding during vacuum aspiration or curettage for what turns out to be a cervical pregnancy, temporarily stop the bleeding, if possible, using intracervical Foley catheter compression or cerclage before considering total hysterectomy.
– Abdominal pregnancy is treated by laparotomy. Depending on its location, removing the placenta may be very difficult and cause severe bleeding; in that case, leave the placenta in place.

2.3 Molar pregnancy (hydatidiform mole)

Pathological pregnancy due to cystic degeneration of the placenta (abnormal proliferation of the chorionic villi). The mole presents in the form of translucent vesicles, 1 to 2 cm in diameter, connected by filaments like a cluster of grapes. In most cases there is neither foetus nor amniotic sac.

2.3.1 Diagnosis

Signs and symptoms

– Spontaneous bleeding of variable severity.

– Uterus larger and softer than expected for gestational age.

– No foetal heart tone, movements, or poles at five months.

– Nausea and vomiting that is more frequent and lasts longer than in a normal pregnancy.

– Occasionally:
  - Oedema, proteinuria, or hypertension if the pregnancy is advanced;
  - Enlarged ovaries, weight loss, mild jaundice;
  - Slow, fragmentary, incomplete abortion, and occasionally accompanied by heavy bleeding with expulsion of vesicles.

Additional tests

– The pregnancy test is always positive.

– Ultrasound shows a heterogeneous, vesicular placenta filling the entire uterine cavity.

2.3.2 Management

– Refer to a CEmONC facility: risk of bleeding and complicated uterine evacuation.

– Insert an IV line (16-18G catheter) and administer Ringer lactate.

– Closely monitor pulse, blood pressure and bleeding.

– To prepare for a possible transfusion, determine the patient's blood type and select potential donors or make sure that blood is available. If transfusion is necessary, only use blood that has been screened (HIV-1, HIV-2, hepatitis B, hepatitis C and syphilis).

– Evacuate the mole using suction, digital curettage, or careful instrumental curettage (Chapter 9). The evacuation should be done under **oxytocin**, 20 IU in 1 litre of Ringer lactate or 0.9% sodium chloride administered over 2 hours (160 drops/minute) to prevent bleeding and reduce the risk of perforation (the uterine wall is thin and weakened). No debris should remain after uterine evacuation. If possible, perform an ultrasound to make sure the uterus is empty.

– Contraceptives, preferably hormonal, for at least one year, or tubal ligation if desired.

2.3.3 Follow-up

In approximately 10 to 15% of patients, the mole develops into persistent trophoblastic disease or choriocarcinoma.

See the patient:

- 2 weeks after the evacuation, if possible, perform an ultrasound to make sure the uterus is empty. If ultrasound is unavailable and bleeding persists, consider a second aspiration (even when done correctly, retention of molar debris is not uncommon).
- 8 weeks after the evacuation: perform the first follow-up pregnancy test. The pregnancy test does not become negative immediately after the evacuation, but it should be negative within 8 weeks.
  If the test is negative, perform a pregnancy test every 4 to 8 weeks for 1 year.
  If it is positive after 8 weeks or becomes positive during subsequent follow-up despite effective contraception, refer the patient to rule out or treat persistent trophoblastic disease or choriocarcinoma.

2.4 Cervicitis

Inflammation of the cervix caused by a number of infectious agents – *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in more than 40% of cases.

2.4.1 Diagnosis

- Light bleeding.
- Cervix red, inflamed, infected (purulent discharge).
- Possible associated vaginitis (foul-smelling vaginal discharge).

2.4.2 Management

Antibiotics active against chlamydia and gonococcus for the patient and her partner (Chapter 4, Section 4.2.5).

A red, inflammatory and deformed cervix may indicate a more serious lesion (dysplasia or cancer). Do not, however, jump to the conclusion that it is a malignant lesion, because the appearance of the cervix can change during pregnancy (as with a severe ectropion). If in doubt, see the patient again 3 months after delivery to re-examine the cervix.

2.5 Functional bleeding

Bleeding that is usually light, endometrial in origin, with no apparent cause. This is a diagnosis of exclusion, after the other causes of bleeding discussed in this chapter have been ruled out.

2.5.1 Diagnosis

– Light bleeding.
– Normal size uterus; long, closed posterior cervix; no adnexal mass.

2.5.2 Management

Rest; no medication indicated.

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Chapter 3:
Bleeding during the second half of pregnancy

3.1 Placenta praevia

Abnormal implantation of the placenta in the lower uterine segment, rather than in the uterine fundus.

The primary risk factors for placenta praevia are multiparity and a history of caesarean section.

Even under good circumstances (possibility of blood transfusion, high quality surgical setting), maternal and foetal mortality and the risk of postpartum haemorrhage are high.

3.1.1 Different types of placenta praevia

There are four types of placenta praevia:

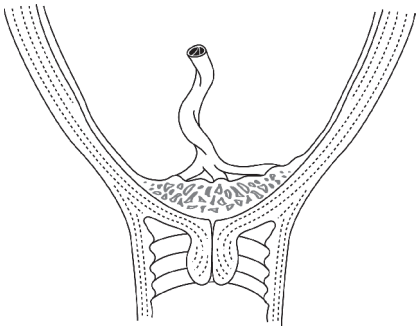
– *Complete* placenta praevia (Figure 3.1a), in which the placenta completely blocks the internal cervical os;

– *Partial* placenta praevia, in which the placenta partially blocks the internal cervical os;

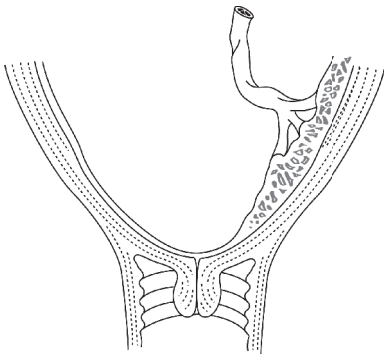
In either of these cases, vaginal delivery is not possible.

– *Marginal* placenta praevia (Figure 3.1b), in which the placenta touches, but does not overlap, the internal os;

– *Lateral* placenta praevia, in which the placenta is inserted in the lower segment, but more than 2 cm from the internal cervical os.



3.1a – Complete



3.1b – Marginal

Figures 3.1
Placenta praevia

3.1.2 Diagnosis

Signs and symptoms

In a woman more than 5 months pregnant:

– Sudden, bright red bleeding associated with uterine contractions (not always felt by the patient).
– The foetus often presents high, pushed up by the placenta; the uterus is soft.
– Foetal heart tone usually heard.
– Examination with a speculum shows blood flowing from the cervical os.

– Vaginal examination may trigger massive haemorrhage and should be avoided (or should be done in the operating room, where an emergency caesarean section can be done, if necessary).
  Vaginal examination, if performed, may reveal displacement of the cervix and deformation of the lower uterine segment by the placenta praevia. Rather than the hard foetal presentation, one feels a spongy mass. If possible, try to determine whether the placenta covers the entire cervix, or only part.
  Once the diagnosis is established, do not perform another vaginal examination.

Ultrasound

Ultrasound is the method of choice for diagnosing placenta praevia.
It makes it possible:
– to avoid a vaginal examination;
– to determine whether or not the placenta is covering the cervix, and thus the preferred route of delivery.

3.1.3 Management

– Insert an IV line (16-18G catheter) and administer Ringer lactate.
– Take pulse and blood pressure; assess the severity of the bleeding.
– Depending on the severity of bleeding, prepare for a possible transfusion:
  • Determine the patient's blood type;
  • Select potential donors or verify that blood is available;
  • In the event of a transfer, the woman should be accompanied by family members who are potential blood donors;
  • If transfusion is necessary, only use blood that has been screened (HIV-1, HIV-2, hepatitis B, hepatitis C and syphilis).
– If the uterus is scarred or there is a history of placenta praevia, consider the possibility of placenta accreta and prepare to perform a hysterectomy.

If labour has not yet started and bleeding is minor to moderate

– Rest and monitoring: a sudden, massive haemorrhage is always possible, even if bleeding has completely stopped.
– In cases of complete or partial placenta praevia:
  • The patient should remain hospitalised or close to a CEmONC facility.
  • Prolong the pregnancy, if possible, up to at least 34 weeks LMP (before 34 weeks LMP, consider foetal lung maturation with dexamethasone, Chapter 4, Section 4.10.2).
  • Perform a caesarean section:
    - between 34 and 37 weeks LMP, despite prematurity, if the situation is unstable (recurrent bleeding);
    - after 37 weeks LMP after a single episode of bleeding that has stopped.

If labour has not yet started and bleeding is heavy

– Try a tocolytic agent to reduce contractions and bleeding (Chapter 4, Section 4.10.2).
– At the same time, prepare for caesarean section (regardless of the placenta's position or foetal viability), in case the bleeding persists or there is massive, uncontrolled bleeding (caesarean section to save the life of the mother).
– In remote areas, arrange a transfer to a CemONC facility. Be careful of the risk of exacerbating the bleeding if transport conditions are difficult.

If labour has started

– Complete placenta praevia and/or heavy bleeding: caesarean section.
– Placenta praevia not complete and minor bleeding: attempt vaginal delivery; rupture the membranes as soon as they are accessible, in such a way that the foetal head compresses the placental vessels and cuts off the bleeding.
  Be careful of postpartum haemorrhage, which is common with all forms of low-lying placenta, due to the weaker retraction of the lower uterine segment. Do not hesitate to remove the placenta manually and explore the uterine cavity. Administer oxytocin routinely (Chapter 8, Section 8.1).

3.2 Abruptio placentae

Premature separation of the normally implanted placenta, prior to foetal expulsion with formation of a haematoma between the placenta and the uterine wall. The haematoma completely or partially separates the placenta from the uterine wall.

Abruptio placentae (or placental abruption) often occurs with trauma or in cases of hypertension or pre-eclampsia.

This can trigger a clotting disorder in the mother, with a risk of severe secondary haemorrhage (disseminated intravascular coagulation).
Emergency uterine evacuation (vaginal or caesarean) is needed to save the lives of the mother and foetus, no matter what the stage of pregnancy.

3.2.1 Diagnosis

Abruptio placentae is diagnosed clinically. It should be suspected when one or more of the following signs are present:
- Sudden, severe, continuous abdominal pain;
- Uterus in spasm, feels hard, “woody”;
- Sudden, light, blackish bleeding; the bleeding may be heavy if there is an associated clotting disorder;
- Shock, out of proportion to the severity of the external bleeding (intra-uterine bleeding): rapid or weak or undetectable pulse, very low or undetectable blood pressure; tachypnoea, pallor, sensation of cold, damp skin, agitation and anxiety.
- Foetal hypoxia, depending on the size of the placental abruption: foetal heart rate slows or foetal heart tone disappear.
- When the membranes rupture, the fluid is uniformly red.

Sometimes the picture is incomplete: there may be no vaginal bleeding or uterine spasm, or no foetal distress.

Ultrasound, when available, is useful for verifying foetal vitality.

3.2.2 Management (see also algorithm, following page)

- Insert an IV line (16-18G catheter) and administer Ringer lactate.
- Take pulse and blood pressure; assess the severity of the bleeding. If there are no clots, consider the possibility of a clotting disorder.
- In remote areas, arrange a transfer to a CEmONC facility, if possible, in anticipation of the need to transfuse, perform a caesarean section or hysterectomy, and manage postpartum haemorrhage.

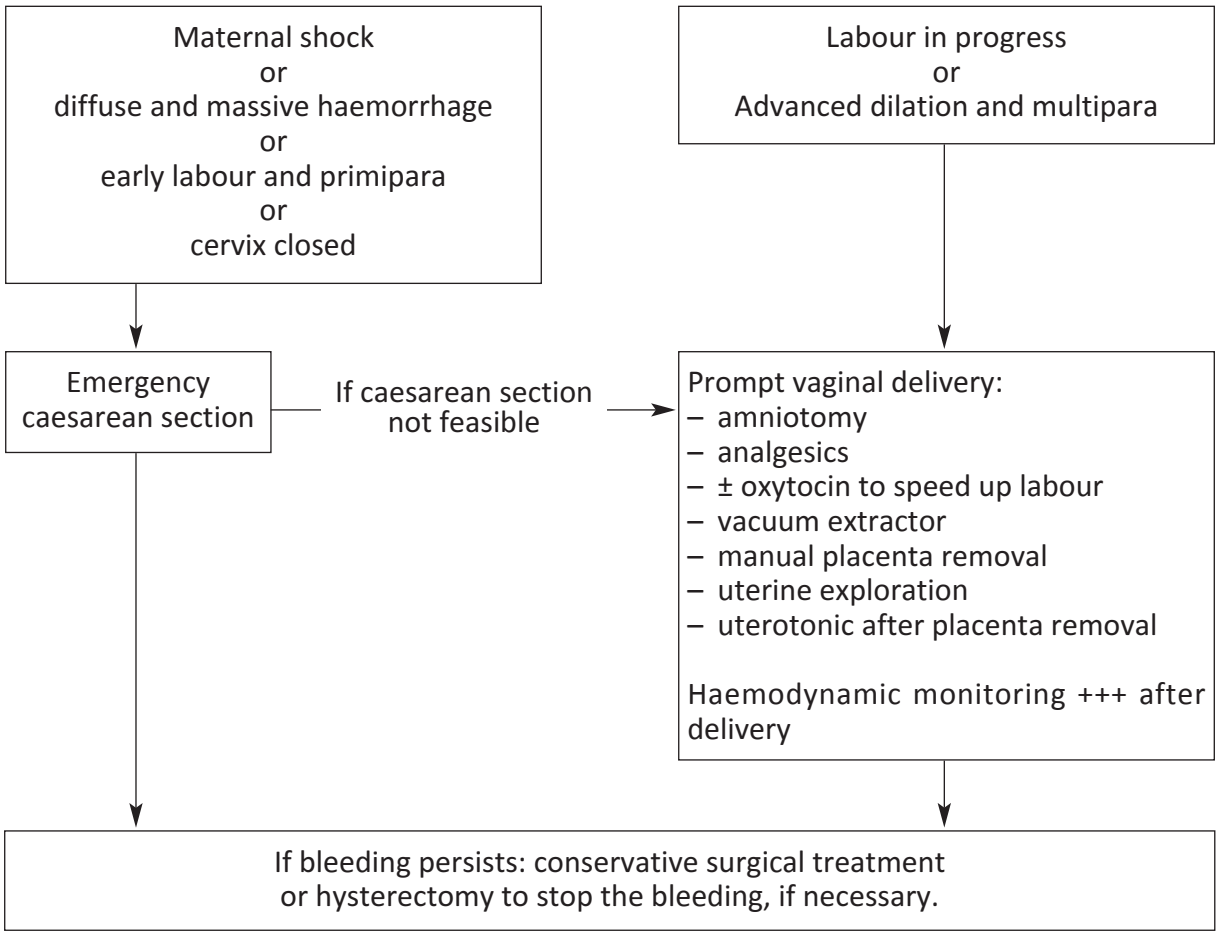
To assess clotting disorders[1]:
- Take 2 ml of blood into a dry, clean, glass tube (approximately 10 mm x 75 mm).
- Hold the tube in a closed fist to keep it warm (± 37°C).
- After 4 minutes, tip the tube slowly to see if a clot is forming then, tip it again every minute until the blood clots and the tube can be turned upside down.
- Failure of a clot to form after 7 minutes or a soft clot that breaks down easily suggests coagulopathy.

For blood transfusion:
- Determine the patient's blood type.
- Select potential donors for possible transfusion of fresh whole blood.
- If transferred, the woman should be accompanied by family members who are potential blood donors.
- If there is moderate bleeding and no clotting disorder, transfuse packed red blood cells or whole blood.
- If there is massive bleeding and/or a clotting disorder, transfuse fresh whole blood (drawn less than 4 hours and unrefrigerated) or packed red blood cells or whole blood combined with fresh frozen plasma.
- Blood or other blood products must have been screened (HIV-1, HIV-2, hepatitis B, hepatitis C and syphilis).

Delivery should be done quickly, ideally before the onset of clotting disorders. When not indicated initially, caesarean section becomes imperative if labour progresses too slowly – even in the event of intrauterine foetal death.

⚠ *Do not prescribe salbutamol to relax the uterine spasm.*

Management of abruptio placentae



3.3 Uterine rupture

Tear in the uterine wall, in most cases during labour.

In a CEmONC or BEmONC facility, uterine rupture can most often be avoided by monitoring the progress of labour with partograph, and vigilant, rational use of oxytocin.

3.3.1 Circumstances in which uterine rupture occurs

- After prolonged labour, especially with dystocia in primiparas.
- Grand multiparas (more than 6 deliveries).
- When excessive amounts of uterotonic (oxytocin or misoprostol) are used.
- Prior history of uterine surgery: caesarean section, especially classical (Figure 3.2); uterine perforation; myomectomy.

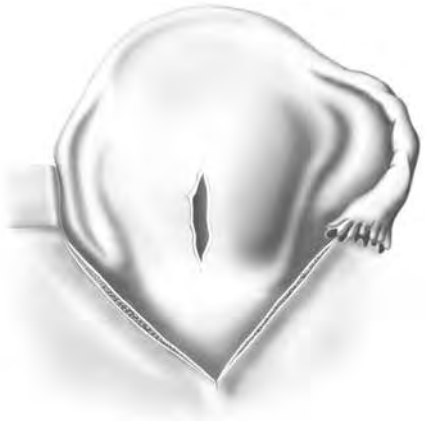


Figure 3.2
Uterine rupture on a classical caesarean section scar

3.3.2 Diagnosis

Diagnosis is clinical. A rupture may be diagnosed during labour or after delivery. Though the initial symptoms may be subtle – particularly in cases of scarred uterus – the signs are usually obvious.

During labour

- Impending rupture:
  - Maternal agitation;
  - Increasingly severe abdominal pain that persists between contractions; abdominal guarding;
  - This picture is often accompanied by a Bandl's ring (Figures 3.3 and 3.4), a sign of obstructed labour. At first glance the Bandl's ring may look like a distended bladder.

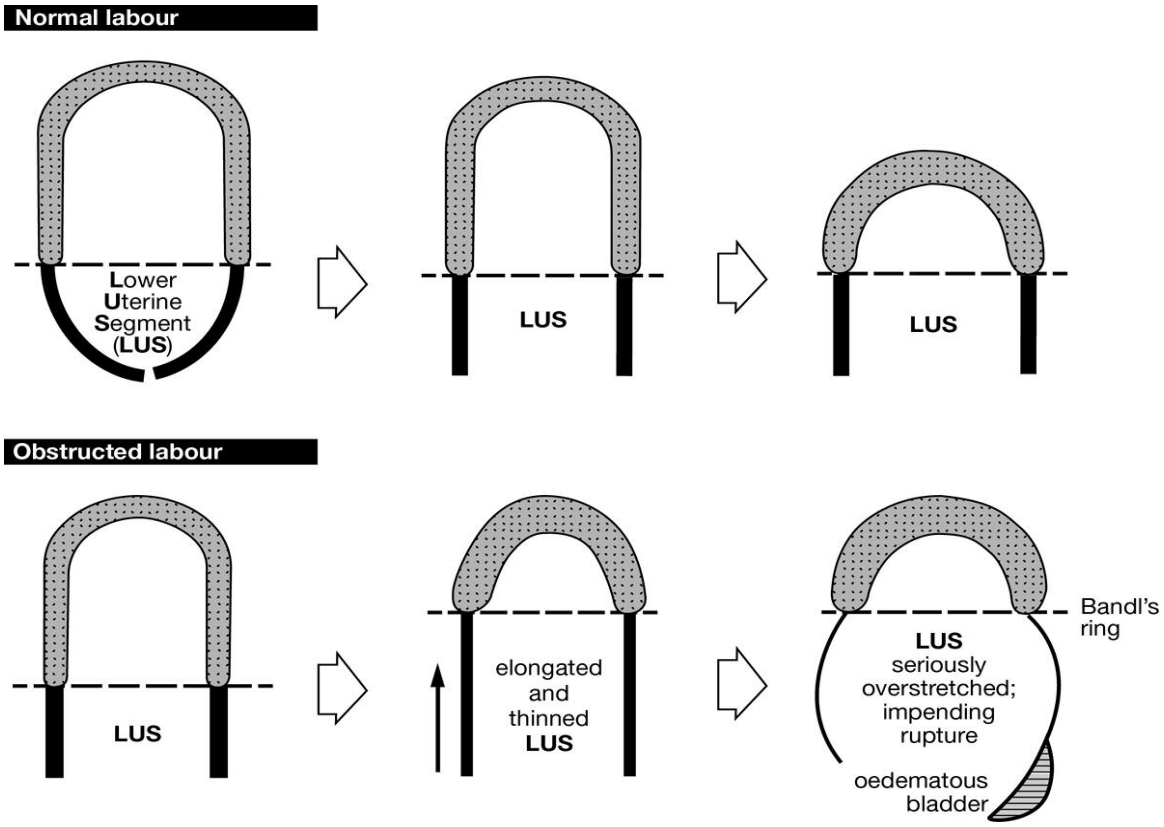


Figure 3.3
Mechanism of Bandl's ring formation[a]

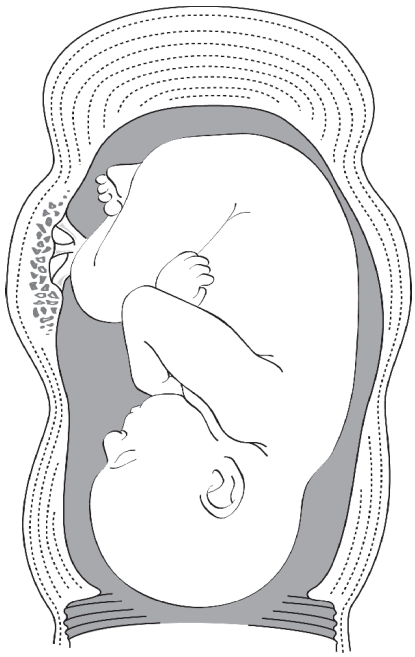


Figure 3.4
Impending rupture: hourglass uterus "Bandl's ring"

[a] Adapted from *Primary Surgery Vol.1 – Non-Trauma : The surgery of labour*. German Society of Tropical Surgery. http://www.primary-surgery.org/ps/vol1/html/sect0016.html

– Rupture:
  • Shoulder-tip pain or increased pain on inspiration, a sign of haemoperitoneum. Sometimes the pain is sudden, during a contraction, and the patient describes a "tearing" sensation. The pain may be less obvious in cases of posterior uterine rupture.
  • Hypovolaemic shock due to bleeding (rapid or weak or unmeasurable pulse, very low or undetectable blood pressure, tachypnoea, cold sensation, damp skin, agitation or anxiety).
  • Contractions stop.
  • Slow foetal heart rate or no heart tone.
  • Sometimes feels like foetus can be palpated just below the skin if large, complete rupture. Foetus is usually dead.

After delivery

A rupture may be discovered during a haemorrhage: uterine exploration after delivery of the placenta reveals the rupture.

3.3.3 Management (see also algorithm, following page)

– Insert an IV line (16-18G catheter) and administer Ringer lactate.
– Take pulse and blood pressure; assess the severity of the bleeding.
– Insert a Foley urinary catheter.
– Emergency laparotomy with rapid caesarean section, fluid replacement and, in most cases, blood transfusion.
– Depending on the type of rupture, the patient's condition, the time between rupture and laparotomy and whether there are signs of infection, suture the uterus or perform hysterectomy.

Keep the surgery as brief as possible, as these patients are often in poor general condition (anaemic, in particular).

A sub-umbilical midline incision is preferable (better exposure), sometimes with peri-umbilical extension.

The tear is usually in the lower segment, anterior and low. Enlarge the tear to allow extraction of the child.

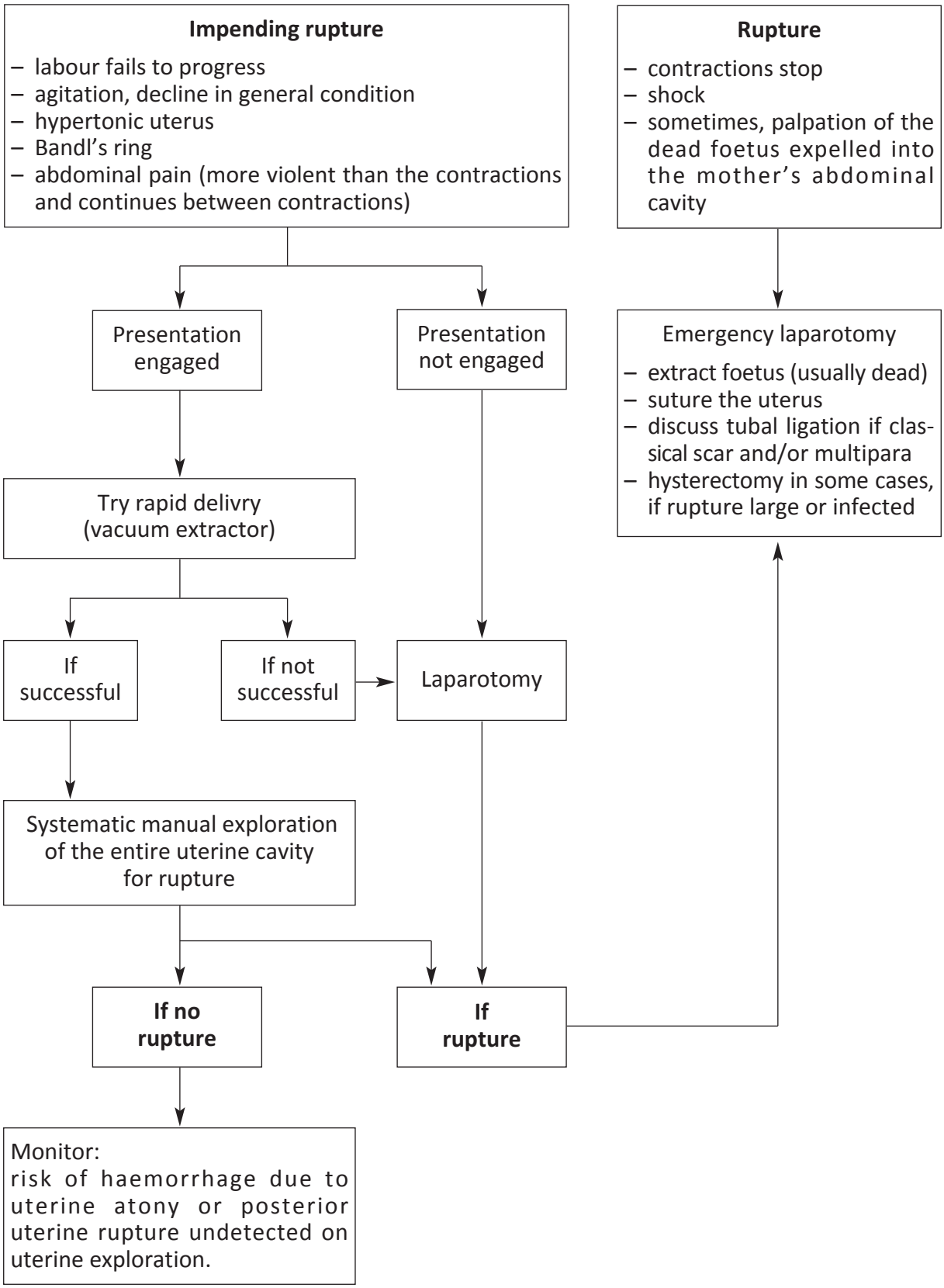
Check the integrity of the bladder, which may have been injured if it is very adherent to the lower uterine segment (continuous suture in one or two planes and urinary catheterisation for at least 7 days).

Attempt repair whenever possible. Before suturing the uterine muscle, trim ragged, bruised edges.

Perform a interadnexal subtotal hysterectomy only when there are signs of uterine infection or extensive rupture with severe bruising around the wound.

Given the risk of another uterine rupture during subsequent pregnancies, bilateral tubal ligation may be advised or indicated. This is best discussed before surgery. The patient's consent is required.

Management of uterine rupture



3.4 Diagnosis of bleeding during the second half of pregnancy (summary)

Table 3.1 - Aetiological diagnosis

	Placenta praevia	Abruptio placenta	Uterine rupture
History			
	• Twin pregnancy • Caesarean section • Bleeding during a previous pregnancy	• Pre-eclampsia • Primipara • Trauma	• Long labour • Primipara • Dystocia • Grand multipara (> 6) • Caesarean section • Overuse of uterotonic
Clinical signs			
Bleeding	• Bright red blood • Painless bleeding, spontaneous or after vaginal exam or sexual intercourse	• Bleeding without warning sign • Light flow of blackish blood, or sudden bright red bleeding • Bleeding with severe, constant uterine and lower back pain	Variable
Haemorrhagic shock	• Blood loss visible • Shock proportional to amount of bleeding	• Blood loss not always visible • Shock out of proportion to the amount of visible bleeding (intra-abdominal or retroplacental bleeding) • Diffuse haemorrhage	• Blood loss not always visible • Shock out of proportion to the amount of visible bleeding (intra-abdominal bleeding)
Uterus	• Soft uterus • Contractions, if present, are intermittent • Foetus high and mobile	• Painful, continuous contraction ("woody" uterus) • Foetal position hard to determine (hard uterus and haematoma)	Foetus sometimes expelled into the abdominal cavity: uterus is retracted into a ball, the foetus felt under the skin
Vaginal exam	Soft, spongy placenta Perform only one, very cautious, vaginal exam if ultrasound is not available.	Cervix often closed Vaginal exam not helpful in diagnosis of abruptio placenta.	
Foetal heart tone	Normal in the absence of maternal shock	Absent or weak	Absent or weak

References

1 World Health Organization. Managing complications in pregnancy and childbirth. A guide for midwives and doctors. Geneva 2003.
http://whqlibdoc.who.int/publications/2007/9241545879_eng.pdf?ua=1

Chapter 4:
Pathologies during pregnancy and pregnancy-related disorders

4.1 Iron deficiency anaemia

Anaemia is defined as a haemoglobin level below 11 g/dl during the first and third trimester and below 10.5 g/dl during the second trimester.

Pregnancy aggravates pre-existing anaemia due, for example, to nutritional deficiency or malaria.

Anaemia increases the risk of intrauterine growth retardation and preterm birth. It increases vulnerability in the event of haemorrhage, particularly postpartum haemorrhage.

4.1.1 Diagnosis

- Pallor of the conjunctivae, mucous membranes, palms, and the soles of the feet; fatigue, dizziness, tachycardia, heart murmur.
- Signs of serious illness: intense pallor, lethargy, dyspnoea, haemoglobin below 7 g/dl.
- Measure haemoglobin level using HemoCue.

4.1.2 Treatment

ferrous sulfate/folic acid (co-formulated tablet containing 200 mg ferrous sulfate equivalent to 65 mg elemental iron + 400 micrograms folic acid[a]) PO: 2 to 3 tablets/day in 2 or 3 divided doses until haemoglobin level rises to normal, then change to preventive treatment[1] (Chapter 1, Section 1.2.5).
Addition of **vitamin C** PO (500 mg/day) improves iron absorption.

In areas where hookworm is endemic, add a single dose anthelmintic treatment as of the second trimester (Chapter 1, Section 1.2.5).

In areas where malaria is endemic, add intermittent preventive (Chapter 1, Section 1.2.5) or curative (Section 4.3.1) antimalarial treatment, depending on the malaria test result.

For severe anaemia in the third trimester:

Arrange for delivery in a CEmONC facility.
Ensure active management of third stage of labour and if required, uterine exploration/manual removal in case of postpartum haemorrhage, or possible transfusion.

Given the risk of haemorrhage and rapid decompensation during delivery, be prepared for transfusion for any woman whose haemoglobin is below 7 g/dl, even if anaemia is relatively well-tolerated.

[a] 200 mg ferrous sulfate (65 mg elemental iron) + 400 micrograms folic acid tablets may be replaced by 185 mg ferrous fumarate (60 mg elemental iron) + 400 micrograms folic acid tablets.

4.2 Bacterial infections

For clinical signs and diagnosis, refer to the MSF handbook *Clinical guidelines*.

Fever above 38.5°C, no matter what its cause, should be treated with **paracetamol** PO: 3 g/day in 3 divided doses.

4.2.1 Meningitis

– Admit to inpatient department; perform lumbar puncture if possible.

– Start antibiotic therapy while waiting for the results:
ceftriaxone IM: 2 g once daily

or, if not available:
ampicillin IV: 12 g/day divided in 3 doses administered 8 hours apart, then **amoxicillin** PO: 6 g/day in 2 or 3 divided doses

Duration of therapy depends on the causative organism (10 to 14 days for *S. pneumoniae*; 7 to 10 days for *H. influenzae*; 5 to 7 days for *N. meningitidis*; 10 days if the pathogen is unknown).

– Simultaneously start a short-course of corticosteroids:
dexamethasone IV: 10 mg every 6 hours for 2 days

– In a context of meningococcal meningitis epidemic:
ceftriaxone IM: 2 g once daily for 5 days

4.2.2 Typhoid fever

Typhoid fever can cause major complications both for the mother (gastrointestinal perforation, peritonitis, septicaemia) and the foetus (spontaneous abortion, preterm birth, intrauterine death).

– Admit to inpatient department.

– In the absence of drug resistance, **amoxicillin** PO: 3 g/day in 3 divided doses for 14 days

– In cases of drug resistance or severe infection, **ceftriaxone** IM or IV[b]: 2 to 4 g once daily for 10 to 14 days

Fever persists 4 to 5 days after starting treatment, even when treatment is effective. It is essential to treat the fever and to monitor for maternal and foetal complications.

4.2.3 Shigellosis

Admit to inpatient department; **ceftriaxone** IM: 1 g once daily for 3 to 5 days

[b] The diluent used to prepare ceftriaxone for IM injection contains lidocaine. Do not administer ceftriaxone reconstituted with this diluent intravenously. For IV administration, use water for injection only.

4.2.4 Syphilis

Syphilis can cause spontaneous abortion, intrauterine death, foetal growth retardation, preterm birth, polyhydramnios, and congenital syphilis.

– For the mother:

benzathine benzylpenicillin IM[c]: 2.4 MIU/injection (half-dose in each buttock)
In early syphilis (less than 2 years): single dose.
In late syphilis (more than 2 years) or if the duration of infection is unknown: one injection per week for 3 weeks[2].
Administer the same treatment to the sexual partner(s).

Note: a Jarisch-Herxheimer reaction may occur after the first dose of penicillin, especially in patients with early syphilis. The patient presents with some of the following symptoms: abrupt onset of fever, chills, muscle pain, tachycardia, flushing, exacerbated skin rash or mild hypotension, usually within 2 to 5 hours. The treatment is symptomatic (**paracetamol** PO, 1 g every 6 hours). The reaction is most often moderate, however severe reactions may occur[3].

For penicillin-allergic patients only, **erythromycin** PO: 2 g/day in 4 divided doses for 14 days. The effectiveness of erythromycin in all stages of syphilis and its ability to prevent the stigmata of congenital syphilis are both highly questionable, and many failures have been reported.

– For the treatment of the newborn, see Chapter 10, Section 10.4.1.

4.2.5 Gonorrhoea

Gonorrhoea can cause premature rupture of membranes, preterm delivery, and severe neonatal conjunctivitis.
Gonorrhoea is often associated with chlamydial infection.

– For the mother:
Treat simultaneously for gonorrhoea and chlamydia[4]:
ceftriaxone IM: 250 mg as a single dose
(or, if not available, **cefixime** PO: 400 mg as a single dose)
+
azithromycin PO: 1 g as a single dose
Give the same treatment to the sexual partner(s).

– For the treatment of the newborn, see Chapter 10, Section 10.4.2.

4.2.6 Cystitis and asymptomatic bacteriuria

Cystitis is defined by functional urinary symptoms (frequent, painful urination) and leukocytes and/or nitrites in urine on dipstick.

Asymptomatic bacteriuria is defined by leukocytes and nitrites in urine on dipstick.
If only leukocytes are detected in urine, repeat the test after vulval toilet with soap and water.
If still leukocytes only are detected, treat an asymptomatic bacteriuria.

[c] Only the intramuscular route may be used. To reduce the pain during the injection, the powder can be reconstituted with 8 ml of 1% lidocaine (without epinephrine).

– Increase fluid intake: at least 1.5 litres per day.

– Antibiotic therapy for cystitis or asymptomatic bacteriuria:
fosfomycin-tromethamine PO: 3 g as a single dose
or
cefixime PO: 400 mg/day in 2 divided doses for 5 days
or
nitrofurantoin PO (except during the last month of pregnancy): 300 mg/day in 3 divided doses for 5 to 7 days

Inform the patient that cystitis symptoms should disappear within 2 to 3 days. If not, she should consult again.

4.2.7 Pyelonephritis

– Admit to inpatient department; bed rest (risk of preterm delivery).

– Increase fluid intake: at least 1.5 litres per day.

– Antibiotic therapy:
  • *In uncomplicated pyelonephritis:*
  ceftriaxone IM: 1 g once daily for at least 3 days, then **cefixime** PO: 400 mg/day in 2 divided doses to complete 14 days of treatment
  • *In complicated pyelonephritis (e.g. patient in an advanced stage of infection, with sepsis or in poor clinical condition, vomiting) or treatment failure after 48 hours:*
  ceftriaxone[d] IM or slow IV injection (over 3 minutes) or infusion (over 30 minutes): 1 g once daily then **cefixime** PO as above
  + **gentamicin** IM or slow IV (over 3 minutes) or infusion: 3 to 5 mg/kg once daily for the first 3 days of treatment

– In the event of uterine contractions before 37 weeks LMP:
nifedipine or, if not available, **salbutamol** for 48 hours (Section 4.10)

[d] The diluent used to prepare ceftriaxone for IM injection contains lidocaine. Do not administer ceftriaxone reconstituted with this diluent intravenously. For IV administration, use water for injection only.

4.3 Parasitic infections

For clinical signs and diagnosis, refer to the MSF handbook *Clinical guidelines*.

4.3.1 Malaria[5]

Malaria in pregnancy is associated with low birth weight, increased anaemia and, in low-transmission areas, an increased risk of severe malaria and death.
The diagnosis should, if possible, be confirmed by rapid test or microscopic examination (thick or thin smear).

Uncomplicated falciparum malaria

The treatment of choice is an artemisinin-based combination therapy (ACT) for 3 days.

Table 4.1 - Dosage of ACT

ACT	Formulation	Dosage
artemether/lumefantrine (AL or co-artemether)	Co-formulated tablets, 20 mg artemether/120 mg lumefantrine per tab, blister of 24 tab	4 tab twice daily on D1, D2, D3
artemether/lumefantrine (AL or co-artemether)	Co-formulated tablets, 80 mg artemether/480 mg lumefantrine per tab, blister of 6 tab	1 tab twice daily on D1, D2, D3
artesunate (AS) + sulfadoxine/ pyrimethamine (SP)	Co-blister containing: 6 tab 100 mg AS + 3 tab 500/25 mg SP	2 tab AS once daily on D1, D2, D3 + 3 tab SP as a single dose on D1
artesunate (AS) + amodiaquine (AQ)	Co-formulated tablets, 100 mg AS/270 mg AQ base per tab, blister of 6 tab	2 tab once daily on D1, D2, D3
	Co-blister containing: 12 tab 50 mg AS + 12 tab 153 mg AQ base	4 tab AS + 4 tab AQ once daily on D1, D2, D3
artesunate/mefloquine (AS/MQ)	Co-formulated tablets, 100 mg AS/220 mg MQ per tab, blister of 6 tab	2 tab once daily on D1, D2, D3
dihydroartemisine/ piperaquine (DHA/PPQ)	Coformulated tablets, 40 mg DHA/320 mg PPQ Blister of 9 tab	Women 36 to < 60 kg 3 tab once daily on D1, D2, D3
	Coformulated tablets, 40 mg DHA/320 mg PPQ Blister of 12 tab	Women 60 to < 80 kg 4 tab once daily on D1, D2, D3

Note:
The combination AS/SP is contra-indicated in HIV-infected women taking cotrimoxazole preventive therapy.

Quinine is an alternative:

quinine PO: 30 mg/kg/day in 3 divided doses for 7 days

Reduced susceptibility to quinine has been observed in South-East Asia and Amazon region. In these areas, quinine is given in combination with **clindamycin** PO: 20 mg/kg/day in 2 divided doses for 5 days.

Doxycycline is contra-indicated.

Severe malaria

artesunate slow IV (or, if not feasible, IM into the anterior thigh):
2.4 mg/kg on admission then 12 hours and 24 hours after admission (H0, H12, H24), then once daily
Note: dilution of the artesunate solution depends on the route of administration (10 mg/ml for IV route, 20 mg/ml for IM route), refer to the MSF handbook *Essential drugs*.
or
artemether IM (into the anterior thigh):
3.2 mg/kg on admission then 1.6 mg/kg once daily

As soon as the patient can tolerate oral treatment (but after at least 24 hours of parenteral treatment), administer a 3-day course of ACT (Table 4.1).
Do not use the combination AS/MQ if the patient developed neurological signs during the acute phase.

IV quinine (± clindamycin) is an alternative.
quinine IV infusion (dosage is expressed in quinine dihydrochloride):
Loading dose: 20 mg/kg diluted in glucose solution, administered over 4 hours.
Then 5% glucose to keep the vein open over the next 4 hours.
Then maintenance dose: 10 mg/kg over 8 hours, every 8 hours (or, better, alternate 4 hours of quinine diluted in 5% glucose and 4 hours of 5% glucose).
Do not administer loading dose to patients who have received oral quinine or mefloquine within the previous 24 hours. In these cases, start with the maintenance dose.
Monitor the patient closely (risk of pulmonary oedema and hypoglycaemia).
As soon as the patient has received at least 3 doses of parenteral quinine and can tolerate oral treatment, change to **quinine** PO to complete 7 days of treatment or administer a 3-day course of ACT (Table 4.1).
If the combination AS/MQ is used as oral completion treatment following IV quinine, start AS/MQ 12 hours after the last dose of quinine.

Malaria due to P. vivax, P. malariae, P. ovale (irrespective of the age of the pregnancy)

chloroquine PO:
D1, D2: 10 mg base/kg
D3: 5 mg base/kg

Although *P. vivax* is considered benign, severe cases have been reported. The treatment of severe malaria should be the same whatever the species.

4.3.2 Amoebiasis

Pregnant women appear to have an increased risk of severe disease and death[6].

The diagnosis is established by microscopic examination of fresh stools. If the result is positive:
tinidazole PO: 2 g/day in 2 divided doses for 3 days
or **metronidazole** PO: 1.5 g/day in 3 divided doses for 5 days

4.3.3 Ascariasis and ancylostomiasis (hookworms)

For symptomatic infection or infection proven by faecal exam:
albendazole PO: 400 mg as a single dose

Do not administer during the first trimester of pregnancy.

In the event of ancylostomiasis, treat the associated anaemia (Section 4.1).

4.4 Viral infections

For clinical signs and diagnosis, refer to the MSF handbook *Clinical guidelines*.

4.4.1 Genital herpes

If the mother has visible herpetic lesions at time of childbirth:

– Limit vaginal exams; no artificial rupture of membranes.
– Discuss caesarean section on a case-by-case basis.
– For the mother:
  • Pain management: **paracetamol** PO,1 g 3 times per day
  • Antiviral treatment: **aciclovir** PO, 400 mg 3 times per day for 7 days
    In immunocompromised patients, continue the treatment until symptoms resolve.
  • Oral aciclovir prophylaxis (**aciclovir** PO: 400 mg 4 times per day from 36 weeks LMP and until delivery) can be proposed to reduce the risk of recurrent herpes at delivery.
– For the treatment of the newborn, see Chapter 10, Section 10.4.3.

4.4.2 Varicella (chickenpox)

There is a risk of severe maternal varicella pneumonia and severe neonatal varicella.

Aciclovir PO as soon as possible after the onset of rash (800 mg 5 times per day for 7 days) may reduce these risks[7].

4.4.3 Hepatitis

Hepatitis B

Without intervention, mother-to-child transmission of the hepatitis B virus (HBV) is high (up to 90%).

– For the mother: no specific treatment; no special obstetric measures.
– For the newborn: hepatitis vaccination within hours after birth has been demonstrated to prevent 70 to 95% of infections. All infants should be vaccinated (Chapter 10, Section 10.1.8) regardless of the mother's HBV status. In infants born to HBV-positive mothers, vaccination AND administration of hepatitis B immune globulin, if available (within 12 hours after birth), has been demonstrated to prevent 85% to 95% of infections[8].

Hepatitis E

Hepatitis E carries a very high mortality rate for pregnant women (20% during the third trimester). It can cause spontaneous abortion, preterm delivery, and intrauterine foetal death.

The virus is acquired by fecal-oral route (primarily by drinking contaminated water). The virus can cause outbreaks, especially in situations where large numbers of people are gathered (refugees, displaced persons), when hygiene and sanitation are poor.

Management is focused on supportive care (good hydration, avoidance of hepatotoxic medications). Prevention (water, hygiene, sanitation) is the only protection against the disease.

4.4.4 HIV infection

Mother-to-child HIV transmission may occur at any time during pregnancy, labour, delivery and the breastfeeding period. With no intervention, the risk of transmission is approximately 15 to 25% and 20 to 45% if the child is breastfed[9]. This risk may be reduced to less than 5%.

Ante-natal care

HIV-infected pregnant women need antiretroviral therapy regardless of their CD4 count and clinical stage. The treatment should start as soon as possible, regardless of gestational age and should be taken during all the pregnancy.

Intra-partum care

- Offer voluntary counselling and testing on admission if HIV status is unknown.
- Administer antiretroviral therapy at onset of labour and during delivery, as indicated in specialized Prevention of Mother-To-Child Transmission (PMTCT) guidelines.
- Observe standard precautions to avoid contact with blood and body fluids.
- Avoid:
  - prolonged labour;
  - prolonged rupture of membranes;
  - early artificial rupture of membranes;
  - invasive procedures such as episiotomy or instrumental delivery. However, they must be performed if they are necessary for delivering the child.
- The criteria for induction of labour are the same as for non HIV-infected women.
- Clamp umbilical cord immediately.
- Administer antiretroviral prophylaxis to the newborn immediately after birth.
- Prevention and treatment of postpartum haemorrhage: as for non HIV-infected women. However ergometrine or methylergometrine should not be used in women taking antiretrovirals unless alternative treatments (oxytocin or misoprostol) are not available. In this case and if the need for pharmacologic treatment outweighs the risks, ergometrine/methylergometrine should be used in low a dosage and the duration of treatment should be as short as possible.

A planned caesarean section can be beneficial if the viral load is detectable. However, given the risks associated with the intervention (surgical, anaesthetic and infectious) and the risk of uterine rupture during subsequent pregnancies, caesarean section is not recommended routinely.

Post-partum care

- Offer voluntary counselling and testing if HIV status has not been determined before.
- Continuation of antiretroviral therapy for the mother, at least during breast-feeding, or for life, depending on the situation.
- For the newborn: antiretroviral prophylaxis to the newborn as indicated in PMTCT guidelines.

4.5 Pregnancy-induced hypertension and pre-eclampsia

Normally, blood pressure (BP) slightly decreases during pregnancy. In a pregnant woman, hypertension is defined as BP ≥ 140/90 mmHg. To confirm hypertension, check BP several times, with the woman seated and at rest.

Chronic hypertension is defined as hypertension predating the pregnancy or appearing before 20 weeks LMP.

Pregnancy-induced hypertension (PIH) is defined as isolated hypertension, without proteinuria, that appears after 20 weeks LMP.

Pre-eclampsia refers to pregnancy-induced hypertension accompanied by proteinuria. Pre-eclampsia carries a significant risk of foetal growth retardation, foetal distress, foetal death, placental abruption and eclampsia.
High BP is the most visible sign of pre-eclampsia. However, pre-eclampsia is a complex disease affecting multiple organs, including liver and kidneys.

The goal of antihypertensive treatment is to prevent the maternal complications of severe hypertension. Treatment is administered if systolic BP is ≥ 160 mmHg or if diastolic BP is ≥ 110 mmHg. The objective is to lower BP to about 140/90 mmHg. Antihypertensive treatment does not improve the foetal prognosis.

Hypertensive treatment in pregnant women should be carried out with caution. It is essential to preserve placental perfusion and to avoid excessive fall in maternal BP.

4.5.1 Diagnosis of pre-eclampsia

- BP ≥ 140/90 mmHg AND proteinuria (1+ or more on dipstick test).
- Other signs may be present: dark urine, low urine output, and oedemas (legs, hands) that appear suddenly or worsen rapidly.

Note: in women with proteinuria and no hypertension, consider urinary tract infection, contamination of urine with blood or vaginal secretions, genito-urinary schistosomiasis in endemic areas, or renal disease. In these cases, monitor continuously, to ensure early detection of pre-eclampsia.

4.5.2 Diagnosis of severe pre-eclampsia

- Systolic BP ≥ 160 mmHg or diastolic BP ≥ 110 mmHg, persistently elevated in spite of treatment.
- Proteinuria (3+ or more on dipstick test or more than 5 g/day).
- Oliguria (urine output < 400 ml/day or < 30 ml/hour).
- Hyperreflexia (overactive knee-jerk response, twitching and spasms).
- Epigastric pain, nausea, vomiting.
- Facial oedema, pulmonary oedema.
- Intense headaches not relieved by paracetamol.
- Buzzing in the ears, visual disturbances.

When feasible, measure platelets and liver enzymes to assess the severity of the disease. The HELLP syndrome (haemolysis, elevated liver enzymes, low platelets) is a potential life-threatening complication for both the mother and foetus).

4.5.3 Management of isolated hypertension

- Rest and monitoring: BP, weight; look for oedema and proteinuria.
- Measure the fundal height (risk of foetal growth retardation).
- Normal sodium and caloric intake.
- In the event of proteinuria developing, treat as for pre-eclampsia.
- If systolic BP is ≥ 160 mmHg or diastolic BP is ≥ 110 mmHg, give an antihypertensive treatment:

  labetalol PO: 200 mg/day in 2 divided doses then increase if necessary, in 100 to 200 mg increments until an effective dose is reached, usually 400 to 800 mg/day in 2 divided doses. If higher doses are required, give in 3 divided doses. Do not exceed 2.4 g/day.
  If the mother is taking labetalol, monitor the newborn for at least 72 hours after birth (risk of hypoglycaemia, bradycardia and respiratory distress).

  or

  methyldopa PO: 500 to 750 mg/day in 2 or 3 divided doses for 2 days, then increase if necessary, in 250 mg increments every 2 to 3 days, until an effective dose is reached, usually around 1.5 g/day. Do not exceed 3 g/day.

  In case of treatment failure, these drugs can be associated. Do not stop treatment abruptly.

  Diuretics and angiotensin-converting-enzyme inhibitors (captopril, enalapril, etc.) are contra-indicated.

4.5.4 Management of mild pre-eclampsia

Before 37 weeks LMP

- Rest and monitoring: BP, weight, oedema, proteinuria at least once a week.
- Measure the fundal height (risk of foetal growth retardation).
- Normal sodium and caloric intake.
- Do not stop uterine contractions if they occur; let the woman deliver.
- If systolic BP is ≥ 160 mmHg or diastolic BP is ≥ 110 mmHg: labetalol or methyldopa (Section 4.5.3).

Pre-eclampsia is an evolving condition, always deteriorating. As soon as even a single sign of severe pre-eclampsia appears, transfer to a CEmONC facility.

After 37 weeks LMP

- Same monitoring and antihypertensive treatment.
- If there is true intrauterine growth retardation, induce labour for vaginal delivery, or perform a caesarean section.
- If there is no growth retardation, continue to monitor and induce labour as soon as the cervix is favourable.

4.5.5 Management of severe pre-eclampsia

Care is best organized with a multi-disciplinary team comprising obstetrician, anaesthesiologist and midwife.

Delivery

Delivery is imperative within 24 hours, either vaginally or by caesarean section, depending on the state of the cervix, gestational age and condition of the foetus.

Magnesium sulfate treatment

To reduce the risk of eclampsia, administer magnesium sulfate (MgSO4). One of the following regimens may be used:

MgSO4 5 g ampoule (500 mg/ml, 10 ml) **IV/IM protocol**	Loading dose: 4 g by IV infusion in 100 ml of 0.9% sodium chloride over 15 to 20 minutes. Then Maintenance dose: 10 g IM (5 g in each buttock), followed by 5 g IM every 4 hours (change sides with each injection). Continue this treatment for 24 hours after delivery.
or	
MgSO4 5 g ampoule (500 mg/ml, 10 ml) **IV protocol**	Loading dose: 4 g by IV infusion in 100 ml of 0.9% sodium chloride over 15 to 20 minutes. Then Maintenance dose: 1 g/hour by continuous infusion. Continue this treatment for 24 hours after delivery.

- Verify the dosage written on the MgSO4 ampoules (there are different dosages).
- There is a risk of potentially lethal overdose of MgSO4. Have calcium gluconate, the antidote of MgSO4, immediately available (1 g ampoule).

During administration, monitor:

– Patellar reflex (knee-jerk), BP, pulse and respiratory rate every 15 minutes for the first hour of treatment. If there are no signs of overdose, continue monitoring every hour.
– Urine output every hour (insert Foley catheter).

Manifestations of MgSO4 overdose start with disappearance of the patellar reflex then hypotension, arrhythmia, respiratory depression (< 12 breaths/minute). If the patellar reflex disappears, stop MgSO4 immediately and administer **calcium gluconate** (1 g IV).

If urine output drops (< 30 ml/hour or 100 ml/4 hours): stop MgSO4 and deliver as quickly as possible.

Antihypertensive treatment

If systolic BP is ≥ 160 mmHg or diastolic BP is ≥ 110 mmHg: labetalol or methyldopa (Section 4.5.3).

If the oral route is impossible, use injectable labetalol or hydralazine. When administering, monitor the mother's BP and pulse and the foetal heart rate.

The dose is adjusted according to changes in BP. Hypertension is controlled when diastolic BP is between 90 and 100 mmHg and systolic BP between 130 and 150 mmHg.

⚠ Respect dosage and administration rate. Administering too much of the drug, or administering it too quickly, can provoke a sudden, excessive fall in maternal BP, with placental hypoperfusion and foetal death. **Diastolic BP should not go below 90 mmHg**. In the event of hypotension, use Ringer lactate solution to bring the diastolic BP back up to ≥ 90 mmHg.

One of the following regimens may be used:

labetalol slow IV (ampoule of 100 mg in 20 ml, 5 mg/ml)	One dose of 20 mg (4 ml) over at least one minute. Check BP 5 and 10 minutes after injection. If hypertension remains uncontrolled, administer another dose of 20 mg and check BP. Administer additional doses, of 40 mg then 80 mg with 10 minutes between each dose as long as hypertension is not controlled. Do not exceed a cumulative dose of 300 mg.
or	
hydralazine slow IV (20 mg/1 ml vial)	Dilute 20 mg (1 vial of hydralazine reconstituted in 1 ml of water for injection) in 9 ml of 0.9% sodium chloride to obtain 10 ml of solution containing 2 mg hydralazine/ml. Administer 5 mg (2.5 ml of the diluted solution) over 2 to 4 minutes. Monitor BP for 20 minutes. If hypertension remains uncontrolled, repeat injection. Continue repeating if necessary, waiting 20 minutes between each injection. Do not exceed a cumulative dose of 20 mg.
or	
hydralazine IV infusion (20 mg/1 ml vial)	Dilute 100 mg (5 vials of reconstituted hydralazine) in 500 ml of 0.9% sodium chloride or Ringer lactate to obtain a 200 micrograms/ml solution. The initial dose is 200 to 300 micrograms/minute; the maintenance dose is 50 to 150 micrograms/minute. Administer by increasing the rate up to 20 drops/minute (maximum 30 drops/minute), monitoring the BP every 5 minutes. As soon as the hypertension is controlled, gradually reduce the rate (15 drops/minute, then 10, then 5) until stopping infusion. Stopping abruptly can trigger a hypertensive crisis.

Notes:
- If the mother receives labetalol, monitor the newborn for at least 72 hours after birth (risk of hypoglycaemia, bradycardia and respiratory distress).
- If anaesthesia is necessary, avoid ketamine. Whenever possible, use spinal anaesthesia.
- Oxytocin may be used in pre-eclampsia, but requires BP monitoring: drops and elevations in BP have been described in rare cases.
- Ergometrine and methylergometrine are contraindicated.
- Pre-eclampsia can appear up to 48 hours after delivery, and on rare occasions even later.

4.5.6 Secondary prophylaxis for severe pre-eclampsia

Acetylsalicylic acid PO: 75 mg/day starting at 12 weeks LMP and continuing until 36 weeks LMP reduces the risk of recurrence during the next pregnancy. If this prophylactic treatment is feasible, recommend that the woman comes for consultation as soon as she knows she is pregnant. There is no point in starting this treatment after 20 weeks LMP[10].

During the next pregnancy, calcium supplementation is recommended[11] in women with low calcium intake (see Chapter 1, Section 1.2.5).

4.6 Eclampsia

4.6.1 Diagnosis

Convulsions during the third trimester of pregnancy, most commonly in a context of pre-eclampsia. Eclampsia can also occur within 48 hours after delivery.

Consider other causes of convulsions, such as meningitis and cerebral malaria (their incidence is increased in pregnant women).

4.6.2 Management

- Protect against injury, maintain airway, place in recovery position.
- Seizures: **magnesium sulfate**[e] as for severe pre-eclampsia (Section 4.5.5). Continue treatment for 24 hours after delivery or 24 hours after the last seizure, whichever was more recent.
- Nursing care, hydration, urinary catheter insertion; monitoring as for severe pre-eclampsia (Section 4.5.5).
- Oxygen: 4 to 6 litres/minute.
- If systolic BP is ≥ 160 mmHg or diastolic BP is ≥ 110 mmHg: antihypertensive treatment as for severe pre-eclampsia (Section 4.5.5).
- Delivery imperative within 12 hours, either vaginally or by caesarean section, depending on the state of the cervix, gestational age and the condition of the foetus.

4.6.3 Secondary prophylaxis

Acetylsalicylic acid PO, as for pre-eclampsia (Section 4.5.6).

[e] If magnesium sulfate is not available, use **diazepam**: 10 mg by slow IV (or by rectal route), then 40 mg in a 500 ml of 5% glucose administered over 24 hours. Ventilation equipment must be immediately available.

4.7 Abnormally large uterus

4.7.1 Diagnosis

Fundal height greater than the presumed gestational age.

The possible causes are:
- Incorrect due date;
- Multiple pregnancy, polyhydramnios, molar pregnancy;
- A large-for-gestational-age foetus (macrosomia).

4.7.2 Management

- Verify the due date (date of last menstrual period).
- Perform ultrasound, if possible.
- Twin pregnancy (Chapter 6, Section 6.2), polyhydramnios (Section 4.8), molar pregnancy (Chapter 2, Section 2.3).
- Macrosomia:
  Access to CEmoNC facilities need to be ensured due to the increased risk of foeto-pelvic disproportion and need for caesarean section. If referral of the patient during labour is likely to be difficult (distance, security), refer patient prior to onset of labour if feasible.
  The risk of post-partum haemorrhage is increased: routinely insert an IV line.
  Other risks associated with macrosomia include dynamic dystocia, prolonged labour, shoulder dystocia and perineal tear at delivery.

4.8 Polyhydramnios

Excess amniotic fluid (more than 2 litres at term), commonly due to foetal anomalies. There are two clinical situations:
– In the second trimester: acute polyhydramnios;
– In the third trimester: chronic polyhydramnios.

4.8.1 Acute polyhydramnios (rare but serious)

Diagnosis

– Rapid increase in the size of the uterus
– Painful abdomen, abdominal pressure, dyspnoea
– Distended, hard uterus, foetus cannot be palpated

Usually associated with foetal malformation, sometimes a complicated twin pregnancy.

Management

Do not intervene; let the patient abort or deliver spontaneously.

4.8.2 Chronic polyhydramnios

Diagnosis

– More moderate increase in the size of the uterus, occurring in spurts
– Foetus cannot be palpated
– Receding head on vaginal examination, fluid wave
– Foetal heartbeat muffled

Management

– Monitor.
– Look for diabetes and treat if found.
– Examine the newborn for malformation.
– Risk of neonatal hypoglycaemia: Chapter 10, Section 10.3.4.

Notes:
In acute and chronic polyhydramnios:
– Do not puncture or drain amniotic fluid during pregnancy: risk of infection.
– Use of oxytocin during labour is dangerous and oxytocin should be administered with caution as the over-distended uterus may rupture.
– Amniotomy carries risk of cord prolapse: taking into account gestational age and potential presence of fœtal malformation, a caesarean section may be considered. In the event of acute polyhydramnios in the second trimester, vaginal delivery should be pursued.
– Risk of post-partum haemorrhage (insert routinely an IV line).

4.9 Premature rupture of membranes

4.9.1 Diagnosis

Discharge of amniotic fluid before the onset of labour, due to a leak or frank rupture of the amniotic sac.

Differential diagnosis: urinary incontinence, expulsion of the mucus plug, leucorrhoea.

4.9.2 Risks

- Intra-amniotic infection; suspect infection if there is maternal fever, persistent foetal tachycardia or loss of foetal heartbeat, or discoloured amniotic fluid.
  Never administer a tocolytic agent, no matter what the gestational age, when intra-amniotic infection is suspected.
- Pre-term birth, if the rupture occurs before 37 weeks LMP.

4.9.3 Management

- For confirmation in case of doubt, perform speculum examination: look for fluid pooling in the vagina or leaking from cervical os when patient coughs.
- Look for a prolapsed cord (Chapter 5, Section 5.4).
- Look for a maternal cause (e.g. urinary tract or vaginal infection) and treat accordingly.
- Admit to inpatient department; rest and monitoring: temperature, heart rate, blood pressure, uterine contractions, foetal heart tone, and abnormal amniotic fluid (discoloured, purulent).
- Vaginal examinations: as few as possible, always with sterile gloves and only if the woman is in labour or induction of labour is planned.
- Antibiotic therapy:
  - For the mother (routinely)

    No infection, no labour, and rupture ≥ 12 hours:
    amoxicillin PO[f]: 3 g/day in 3 divided doses for 5 to 7 days

    No infection, labour in progress, and rupture ≥ 12 hours:
    ampicillin IV: initially 2 g, then 1 g every 4 hours during labour until the child is born, whether the patient received antibiotics beforehand or not; do not continue antibiotics postpartum.

    If infection is present, with or without labour, regardless of the duration of the rupture:
    ampicillin IV: 2 g every 6 hours + **metronidazole** IV: 500 mg every 8 hours + **gentamicin** IM: 3 to 5 mg/kg once daily
    Continue IV administration for 48 hours after fever disappears then, change to amoxicillin + metronidazole PO to complete 10 days of treatment.
  - For the newborn: see Chapter 10, Sections 10.3.3 and 10.3.4.

[f] Do not use amoxicillin/clavulanic acid (increased incidence of necrotizing enterocolitis in neonates).

- If there are uterine contractions:
  - Before 34 weeks LMP: tocolytic agent, except if there are signs of amniotic infection.
  - After 34 weeks LMP, the risk of infection is greater than the risk of preterm birth: do not administer tocolytics.
- Induction of labour:
  - In case of infection, induce labour immediately (Chapter 7, Section 7.3).
  - If there is no infection, consider induction as of 34 weeks LMP if the due date is certain, better as of 37 weeks LMP.
- For ruptures occurring in the seventh and eighth month, transfer the mother, if possible, to a facility where the preterm infant can receive intensive care.
- Prepare the foetus for preterm birth:
  After 26 weeks LMP and before 34 weeks LMP, help lung maturation with **dexamethasone** IM: 6 mg every 12 hours for 48 hours. In case of severe maternal infection, start antibiotic therapy prior to dexamethasone.

4.10 Threatened preterm delivery

Regular uterine contractions and cervical changes before 37 weeks LMP.

4.10.1 Causative factors

– Premature rupture of membranes
– Infection, fever
– Pregnancy-related disorder: pre-eclampsia, polyhydramnios, placenta praevia
– Malnutrition
– Multiple pregnancy
– Cervical incompetence, immature uterus in the young primipara

4.10.2 Management

– Always look for malaria (rapid test) and urinary tract infection (dipstick test); treat the apparent causes.
– Let the woman deliver:
  • If she is > 34 weeks LMP and her waters have broken.
  • If labour is too advanced to be stopped (cervix effaced, 4 cm dilation), no matter what gestational age.
  • If the mother's life is threatened (very poor general condition, pre-eclampsia, eclampsia, abruptio placentae, etc.), no matter what gestational age.
  • If foetal death is confirmed (no foetal movements and no foetal heart tone at several checks or ultrasound confirmation of foetal death).
– Otherwise, try to stop the contractions:
  • Strict bed rest in a medical setting. Bed rest alone is enough in mild forms (contractions without cervical changes).
  • Tocolytic therapy:
    The main objective is to postpone delivery in order to administer corticosteroids for accelerating foetal lung maturation:

nifedipine PO (short-acting capsule 10 mg)	10 mg to be repeated every 15 minutes if uterine contractions persist (maximum 4 doses or 40 mg), then 20 mg every 6 hours Never administer sublingually (risk of placental hypoperfusion and foetal death); always use the oral route.
or, if not available	
salbutamol IV infusion (0.5 mg ampoule)	Salbutamol has numerous contra-indications (see the MSF handbook *Essential Drugs*). Dilute 5 mg (ten 0.5 mg ampoules) in 500 ml of 5% glucose or 0.9% sodium chloride, to obtain a 10 micrograms/ml solution. Start at a rate of 15 to 20 micrograms/minute (30 to 40 drops /minute). If contractions persist, increase the rate by 10 to 20 drops/minute every 30 minutes until contractions stop. Do not exceed 45 micrograms/minute (90 drops/minute). Maintain the effective rate for one hour after contractions stop then, reduce the rate by half every 6 hours. Monitor the mother's heart rate regularly, and reduce the rate in the event of maternal tachycardia (> 120 beats/minute).

Duration of the treatment is 48 hours, regardless of which drug is used.

Do not combine nifedipine and salbutamol.

Salbutamol IV administration requires the constant presence of qualified personnel capable of appropriate medical supervision. If the infusion cannot be properly monitored, administer the **salbutamol** by IM route: 0.5 mg every 6 hours for 48 hours.

– Prepare the foetus for preterm birth:
After 26 weeks LMP and before 34 weeks LMP, help lung maturation with **dexamethasone** IM: 6 mg every 12 hours for 48 hours. In case of severe maternal infection, start antibiotic therapy prior to dexamethasone.

4.10.3 Preterm delivery

– Delivery is usually rapid and often breech.
– Avoid aggressive treatment (drugs or procedures), but above all, avoid a long labour. Expulsion should be rapid: possible episiotomy, even if the child is small; vacuum extraction is contra-indicated—if possible, use forceps if instrumental extraction is required.
– Provide for a good warming control (kangourou mother care, cap) and newborn resuscitation. Monitor temperature (risk of hypothermia) and blood glucose (risk of hypoglycaemia).

4.10.4 Preventing preterm delivery

– Treatment of infections and other disorders during pregnancy.
– Bed rest for women with predisposing factors: multiple pregnancy, polyhydramnios, previous preterm delivery, tired grand multipara.

4.11 Intrauterine foetal death

Foetal death during the second or third trimester of pregnancy, prior to labour.

4.11.1 Diagnosis

– Absence or cessation of foetal movements—the usual reason for consultation.
– Fundal height too small for gestational age, or decrease in fundal height from a prior visit.
– Absence of foetal heart tone.
– Sometimes, breast engorgement indicating the end of the pregnancy.

None of these signs is sufficiently sensitive to justify a hasty, rash decision. Errors are common. Repeat the exam, do not rush. Diagnosis can be confirmed by ultrasound.

4.11.2 Management

– If the mother has no life-threatening disorder:
  • Treat any maternal disorders (anaemia, malaria, etc.).
  • If it is certain that the foetus is dead, induce labour.
  • If there is any uncertainty, see the woman again at regular intervals (e.g., once a week) and wait for labour to start spontaneously; this generally occurs within 15 to 20 days of foetal death.

– If the mother has a life-threatening disorder:
  Urgently induce labour in the event of eclampsia, placenta praevia, abruptio placentae, intra-amniotic infection, severe maternal disease (e.g., congestive heart failure).

– If the amniotic sac has been ruptured for more than 12 hours: antibiotic therapy (Section 4.9.3) and induction of labour.

– Induction of labour:
  • In the third trimester, if the cervix is favourable: administer oxytocin and rupture membranes.
  • If the cervix is not favourable or in the second trimester:
    Administer the combination mifepristone if available + a prostaglandin:
    mifepristone PO: 600 mg once daily for 2 days followed on the third day by a prostaglandin (see doses below).
    or a prostaglandin alone:
    misoprostol intravaginally into the posterior fornix, every 6 hours, until labour begins (max. 3 doses within 24 hours, to be repeated on the following day if required): 200 micrograms in the second trimester or 100 micrograms in the third trimester or 50 micrograms in the ninth month.
    or **dinoprostone** gel (1 mg in 3 g of gel): 1 mg intravaginally into the posterior fornix every 6 hours, maximum 3 within 24 hours.

- In case of prior caesarean section or grand multiparity, given increased risk of uterine rupture:
  The combination mifepristone + prostaglandin should be favoured to reduce the number prostaglandin doses required.
  Reduce by half the doses of oxytocin or misoprostol.
  Do not give more than 3 doses of misoprostol or dinoprostone.

– During labour, in cases of malpresentation or foetopelvic disproportion: try everything possible to avoid a caesarean section; accept a long labour, and perform destructive delivery. Caesarean section should only be performed as a last resort.
  Caesarean section is performed right away only in cases of complete placenta praevia and/or haemorrhage, where there is a risk of maternal death or uterine rupture.

– Carefully examine the placenta (possibility of retained fragments).

– Perform a manual exploration of the uterus if there is retained placenta or any sign of bleeding (coagulation disorders). Give routine antibiotic prophylaxis (**cefazolin** or **ampicillin** slow IV[g], 2 g as a single dose).

– After delivery:
  Mothers are at risk of psychological problems after a stillbirth; perinatal death is associated with increased rates of postpartum depression.
  Psychological support should be offered to all women at the maternity hospital and in post-partum period.
  Inhibition of lactation is of psychological importance for some women following intra uterine death (see Chapter 11, Section 11.2.1).
  Staff should avoid persuading parents to see and hold the infant but should strongly support such desires when expressed (however, this is discouraged if the infant has been mutilated in case of embryotomy or presents severe malformations). In this case, prepare the infant as usual, cleaned, wrapped. The body must be given to parents if they want to organize a funeral.

[g] For patients with a history of immediate hypersensitivity reaction to penicillin (urticaria, respiratory problems or oedema): **clindamycin** IV, 900 mg as a single dose.

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Chapter 5:
Normal delivery and procedures related to vaginal delivery

5.1 Normal delivery

5.1.1 General recommendations

During delivery, the risk of HIV transmission to personnel necessitates the wearing of gloves, mask, protective eyewear and gown for all procedures, no matter how simple—including normal deliveries, mothers who are not considered a risk, and emergencies.

Ensure a calm reassuring environment and provide the woman as much privacy as possible during examinations and delivery. Encourage her to be accompanied by a person of her choice.

5.1.2 Diagnosing the start of labour

– Onset of uterine contractions: intermittent, rhythmic pains accompanied by a hardening of the uterus, progressively increasing in strength and frequency;

And

– Cervical changes: progressive shortening (effacement) and dilation (Figure 5.1):
  - In a primipara, the cervix will first efface then, dilate;
  - In a multipara, effacement and dilatation occur simultaneously.

Repeated contractions without cervical changes should not be considered as the start of labour. Repeated contractions that are ineffective (unaccompanied by cervical changes) and irregular, which spontaneously stop and then possibly start up again, represent false labour. In this case, do not rupture the membranes, do not administer oxytocin.

5.1.3 Stages of labour

First stage: dilation and foetal descent, divided into 2 phases

1) Latent phase: from the start of labour to 4 cm of dilation. Its duration varies depending on the number of prior deliveries.
2) Active phase: from 4 cm to complete dilation. The cervix dilates at an average of one cm per hour. The time to dilate varies with the number of previous deliveries. As a rule, it does not last longer than 6 to 8 hours in a multipara and 12 hours in a primipara.

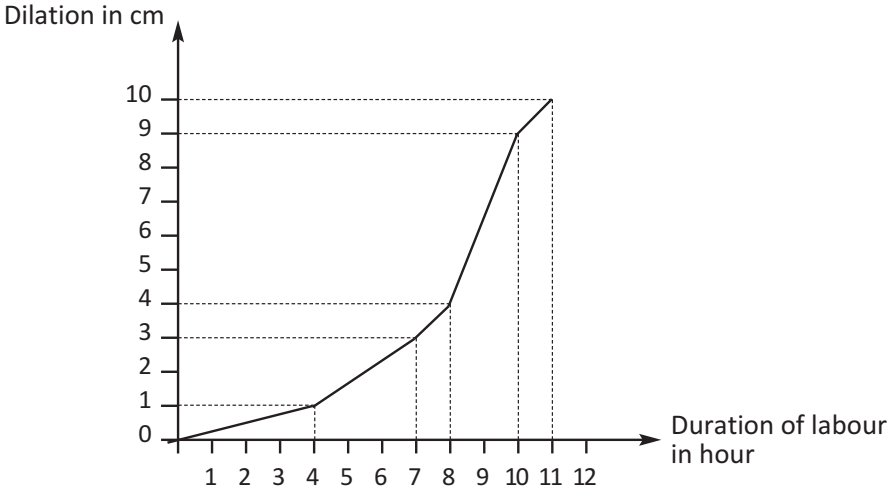


Figure 5.1
Dilation curve in the primipara
(in a multipara, the curve is shifted to the left)

Second stage: delivery of the infant

Begins after engagement, at full dilation.

Third stage: delivery of the placenta

See Chapter 8.

5.1.4 First stage: dilation and descent of the foetus

The indicators being monitored are noted on the partograph (Section 5.2).

Uterine contractions

- Contractions progressively increase in strength and frequency: sometimes 30 minutes apart early in labour; closer together (every 2 to 3 minutes) at the end of labour.
- A contraction can last up to a minute.
- The uterus should relax between contractions.
- Watch the shape of the uterus in order to spot a Bandl's ring (Chapter 3, Section 3.3.2).

General condition of the patient

- Monitor the pulse, blood pressure and temperature every 4 hours or more often in case of abnormality.
- Ask the patient to empty her bladder regularly (e.g. every 2 hours).
- Keep the patient hydrated (offer her water).
- Encourage the patient to move about freely during labour. Position changes and walking around help relieve the pain and favour foetal descent. Pain can also be relieved by massage or hot or cold compresses. Midwife support helps manage pain.
- Routinely insert an IV line in the following situations: excessively large uterus (macrosomia, multiple pregnancy or polyhydramnios), known anaemia and hypertension.

Foetal heart rate

Foetal heart rate monitoring

Use a Pinard stethoscope or foetal Doppler, every 30 minutes during the active phase and every 5 minutes during active second stage, or as often as possible. Listen to and count for at least one whole minute immediately after the contraction. Normal foetal heart rate is 120 to 160 beats per minute.

The foetal heart rate may slow during a contraction. If it becomes completely normal again as soon as the uterus relaxes, there is no foetal distress.

If the foetal heart rate heard immediately after the end of a contraction is abnormal (less than 100 beats per minute or more than 180 beats per minute), continue foetal heart rate monitoring for the next 3 contractions to confirm the abnormality.

Management of abnormal foetal heart rate

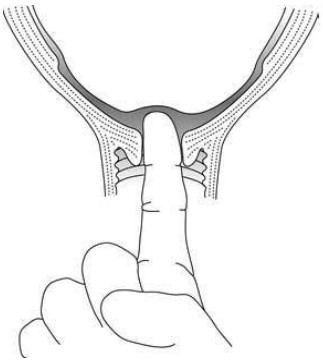
- In all cases:
  - Insert an IV line.
  - Check vital signs: pulse, blood pressure and temperature.
  - Check the uterine tonus. If hypertonic, the problem might be a placental abruption or excessive administration of oxytocin, which should therefore be stopped.
  - Check the colour of the amniotic fluid: meconium-stained (greenish) amniotic fluid combined with foetal heart rate abnormalities is suggestive of true foetal distress.

- If the foetal heart rate is less than 100/minute:
  - Stop administering oxytocin if an infusion is in progress.
  - Check for vaginal bleeding: bleeding may suggest placental abruption or uterine rupture.
  - Raise the patient or place her on her left side. Laying on her back the uterus creates pressure on the vena cava, which may be the cause of low foetal heart rate.
  - Correct possible hypotension by fluid replacement (Ringer lactate) to bring the diastolic blood pressure to ≥ 90 mmHg.
  - Perform a vaginal examination to look for cord prolapse.
- If the foetal heart rate is more than 180/minute:
  The most common cause is maternal febrile infection.
  - Treat the fever responsible for the foetal heart rate problems (paracetamol).
  - Look for the cause of the infection (pyelonephritis, malaria, etc.) and treat.
  - In case of fever of unknown origin, administer antibiotics as for a prolonged rupture of membranes (Chapter 4, Section 4.9).

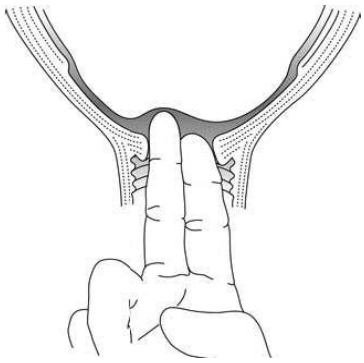
If the abnormal foetal heart rate persists or the amniotic fluid becomes stained with meconium, deliver quickly. If the cervix is fully dilated and the head engaged, perform instrumental delivery (vacuum extractor or forceps, depending on the operator's skill and experience); otherwise consider caesarean section.

Dilation

- The cervix should remain soft, and dilate progressively. Dilation progresses at an average rate of one cm per hour, and should be checked by vaginal examination every 2 to 4 hours (Figures 5.2).
- No progress in cervical dilation between two vaginal examinations is a warning sign.
- Action may be taken when dilatation has not progressed for 2 hours, and must always be taken if it has not progressed for 4 hours: artificial rupture of the membranes, oxytocin infusion, caesarean section, depending on the circumstances.



5.2a: 1 finger = 1.5 cm



5.2b: 2 fingers = 3 to 3.5 cm

Figures 5.2
Estimating cervical dilation

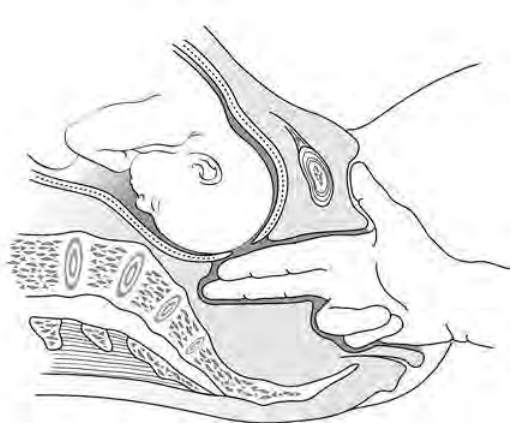
Amniotic sac

- The amniotic sac bulges during contractions and usually breaks spontaneously after 5 cm of dilation or at full dilation during delivery. Immediately after rupture, check the foetal heart rate and if necessary perform a vaginal examination in order to identify a potential prolapse of the umbilical cord (Section 5.4). Once the membranes are ruptured, always use sterile gloves for vaginal examination.

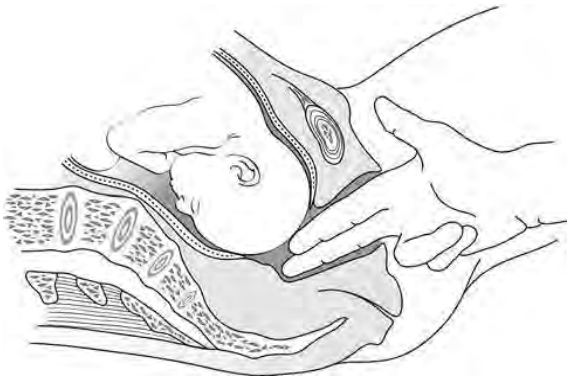
– Note the colour of the amniotic fluid: clear, blood-stained, or meconium-stained.
  Meconium staining by itself, without abnormal foetal heart rate, is not diagnostic of foetal distress, but does require closer monitoring—in particular, a vaginal examination every 2 hours. Action must be taken if dilation fails to progress after 2 hours.

Foetal progress

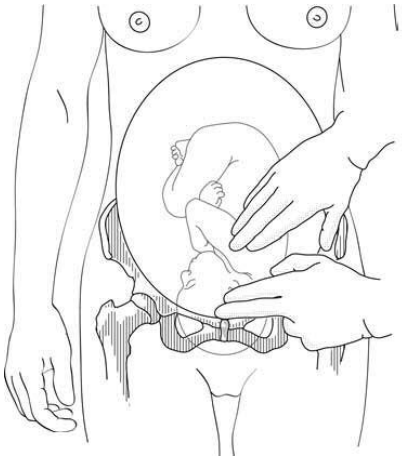
– Assess foetal descent by palpating the abdomen (portion of the foetal head felt above the symphysis pubis) before performing the vaginal examination.
– At each vaginal examination, in addition to dilation, check the presentation, the position and the degree of foetal descent.
– Look for signs that the foetal head is engaged:
  On vaginal examination, the presenting part prevents the examiner's fingers from reaching the sacral concavity (Figures 5.3a and 5.3b). The presence of caput (benign diffuse swelling of the foetal head) can lead to the mistaken conclusion that the foetal head is engaged.
  The distance between the foetal shoulder and the upper edge of the symphysis pubis is less than 2 finger widths (Figures 5.3c and 5.3d).



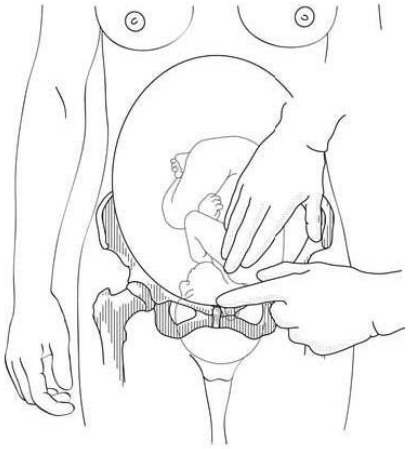
5.3a: Presenting part not engaged:
fingers in the vagina can reach the sacral concavity



5.3b: Presenting part engaged:
fingers in the vagina cannot reach the sacral concavity
(if caput absent)



5.3c: Head not engaged: the shoulder is more than 2 finger widths above the symphysis



5.3d: Head engaged: the shoulder is less than 2 finger widths above the symphysis

Figures 5.3
Diagnosing engagement

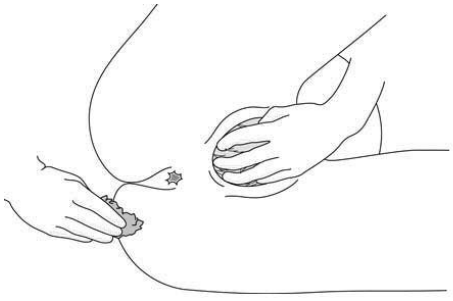
– Use reference points on the foetal skull to determine the position of the head in the mother's pelvis. It is easier to determine the position of the head after the membranes have ruptured, and the cervix is more than 5 cm dilated. When the head is well flexed, the anterior (diamond-shaped) fontanelle is not palpable; only the sagittal suture and the posterior (triangular) fontanelle are. The posterior fontanelle is the landmark for the foetal occiput, and thus helps give the foetal position. In most cases, once the head is engaged, rotation of the head within the pelvis brings the foetal occiput under the mother's symphysis, with the posterior fontanelle along the anterior midline.

5.1.5 Second stage: delivery of the foetus

⚠ Fundal pressure is always contra-indicated.

This stage is often rapid in a multipara, and slower in a primipara. It should not, however, take longer than one hour of pushing.
It is an active phase for the birth attendant, who should wear sterile gloves to monitor the head's progress and guide the delivery.

If there is a traditional delivery position and no specific risk for the mother or child has been established, it is possible to assist a delivery in a woman on her back, on her left side, squatting or suspended (Figures 5.4).



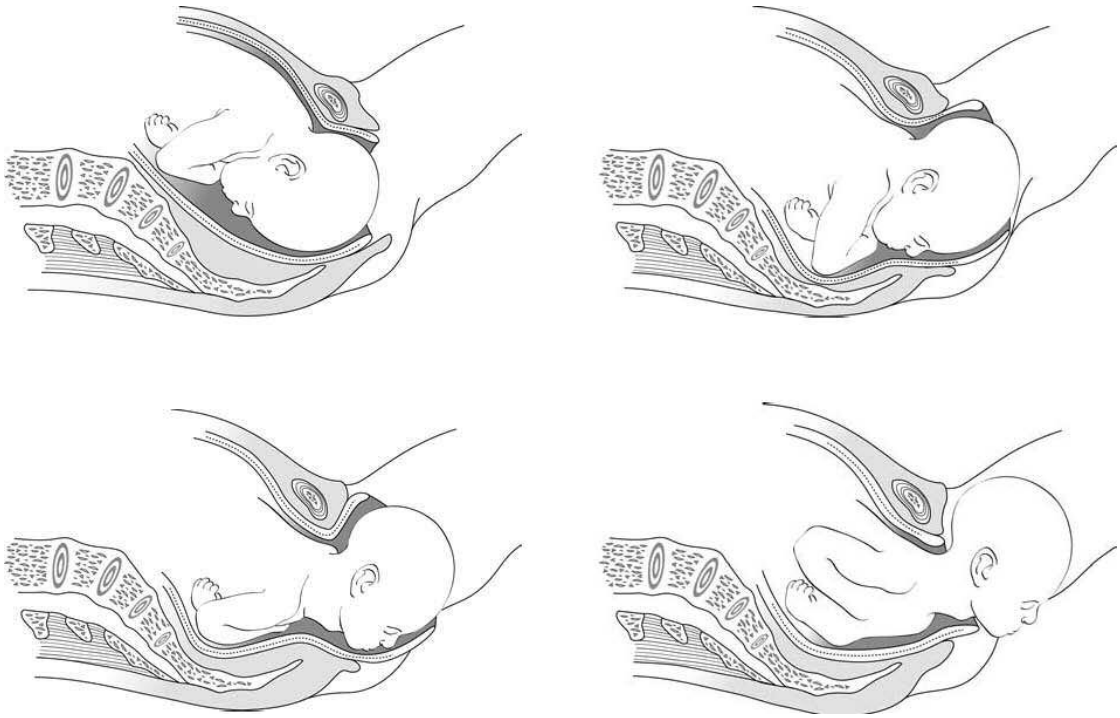
5.4a: Lying on left side

5.4b: Lying on back

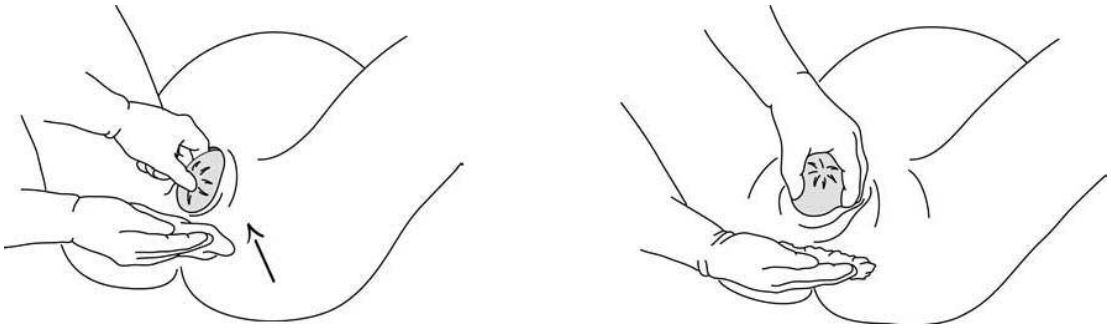
Figures 5.4
Delivery positions

- Rinse the vulva and perineum with clean water.
- The bladder should be emptied, naturally if possible. In cases of urinary retention only, insert a urinary catheter using sterile technique (sterile gloves; sterile, single use catheter).
- Expulsive effort should be directed, and started when the patient is fully dilated and feels the urge to push. She should push during the uterine contraction. Pushing may be done either with held breath (after a deep inhalation, glottis closed, abdominal muscles and diaphragm contracted, directed toward the perineum) or with exhalation. Expulsive effort is maintained for long as possible: in general, 2 to 3 pushes per contraction.
- Between contractions, the woman should rest and breathe deeply. The birth attendant should monitor the foetal heart rate.
- The head begins to stretch the perineum, which becomes progressively thinner; the vaginal opening distends, the labia spread apart, and the occiput appears. In a cephalic presentation, the head usually emerges occiput anterior: the infant is born looking down, the occiput pivoting against the symphysis (Figures 5.5). The head goes into slight extension. The birth attendant must guide this motion and prevent any abrupt expulsive movement, with one hand supporting the occiput. The other hand can support the chin through the perineum. Cover the anal area with a compress (Figures 5.6).

During this final phase—an active one for the birth attendant—the woman should stop all expulsive efforts and breathe deeply. With one hand, the birth attendant controls the extension of the head and moves it slightly side-to-side, in order to gradually free the parietal protuberances; if necessary, the chin can be lifted with the right (Figure 5.7).



Figures 5.5
The different stages of occiput-anterior delivery



Figures 5.6
Progressive delivery of the head

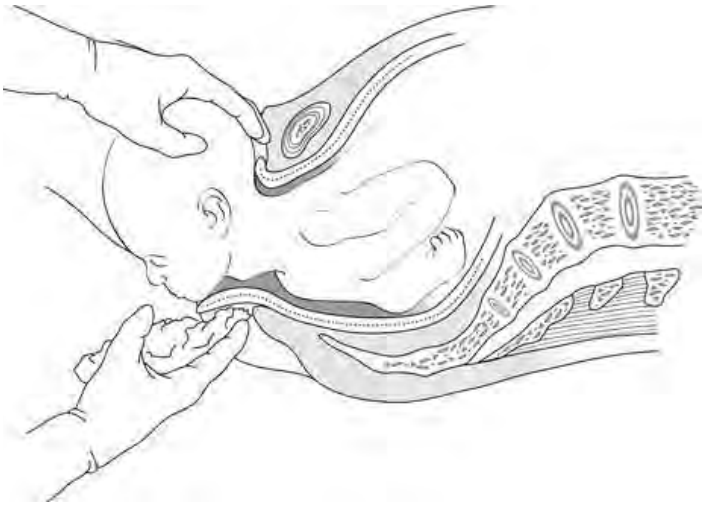


Figure 5.7
Bringing the perineum under the chin

At the moment of delivery, the perineum is extremely distended. Controlling the expulsion can help reduce the risk of a tear. Episiotomy (Section 5.8) is not routinely indicated. In an occiput-posterior delivery (Figure 5.8), where perineal distension is at a maximum, episiotomy may be helpful.

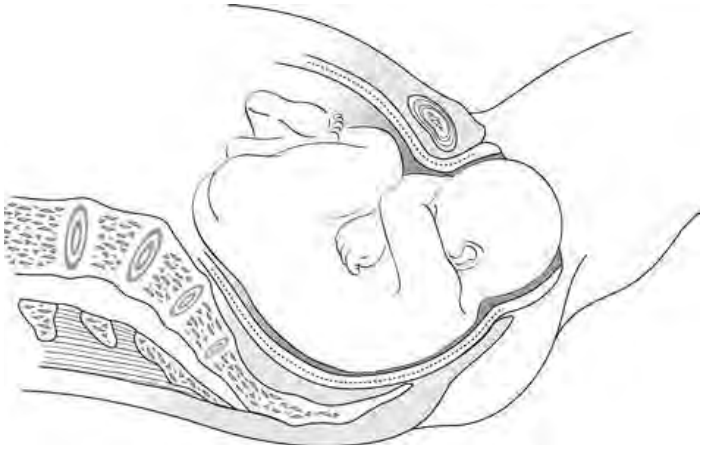
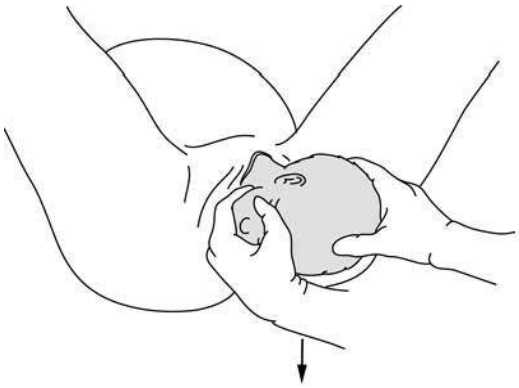


Figure 5.8
Occiput-posterior delivery

The head, once delivered, rotates spontaneously by at least 90°. The birth attendant helps this movement by grasping the head in both hands and exerting gentle downward traction to bring the anterior shoulder under the symphysis and then deliver it then, smooth upward traction to deliver the posterior shoulder (Figures 5.9).
To reduce the risk of perineal tears, control the delivery of the posterior shoulder.



5.9a: Delivery of the anterior shoulder: exert downward traction until the shoulder appears

5.9b: Delivery of the posterior shoulder: smooth upward traction

Figures 5.9
Delivery of shoulders

The newborn normally cries immediately (within a minute of delivery). Place it on mother's chest.

5.1.6 Oxytocin administration

Administer oxytocin to the mother immediately and then deliver the placenta (Chapter 8, Section 8.1.2).

5.1.7 Umbilical cord clamping

- Delay clamping the cord (2 minutes), in all newborn crying vigorously, especially if weigh is less than 2500 g, to reduce the risk of neonatal anaemia.
- Clamp the cord with two Kocher forceps 10 cm from the umbilicus and cut between the 2 forceps. Use sterile blade or scissors – a different pair than were used for episiotomy, if performed.
- Tie off the cord with a Barr clamp or sterile thread (double ligature), leaving a 2- to 3-cm stump.
- If neonatal resuscitation is needed, clamp and cut the cord immediately.

For newborn care, see Chapter 10.

5.2 Monitoring labour and delivery

5.2.1 Partograph

The partograph is a tool for monitoring maternal and foetal wellbeing during labour, and a decision-making aid when abnormalities are detected. It is designed to be used at any level of care.

The partograph begins with the active phase of labour, starting at 4 cm of dilation, and 3 contractions every 10 minutes. It should be filled in regularly during labour.

Its central feature is a graph used to record the progress of cervical dilation, as determined by vaginal examination.

The partograph also includes other indicators to be entered on the graph each time they are checked:

– Maternal indicators:
  - Vital signs (heart rate, blood pressure and temperature)
  - Time of spontaneous or artificial rupture of the membranes
  - Uterine contractions (number per 10 minutes and duration)
  - Urine output
  - Administration of any drugs (oxytocin, antibacterial, etc.)
– Foetal indicators:
  - Foetal heart rate
  - Amniotic fluid (colour, odour and quantity)
  - Descent of the foetal head and head moulding

Interpreting the partograph

The WHO partograph (see following page) has two diagonal lines: an alert line and an action line.

The **alert line** goes from 4 to 10 cm and corresponds to an average dilation rate of 1 cm per hour. If the labour curve crosses to the right of this line, this means that the dilation is slow (less than 1 cm/hour).
The **action line** is located 4 hours to the right of the alert line. If the dilatation curve crosses this line, action must be taken.

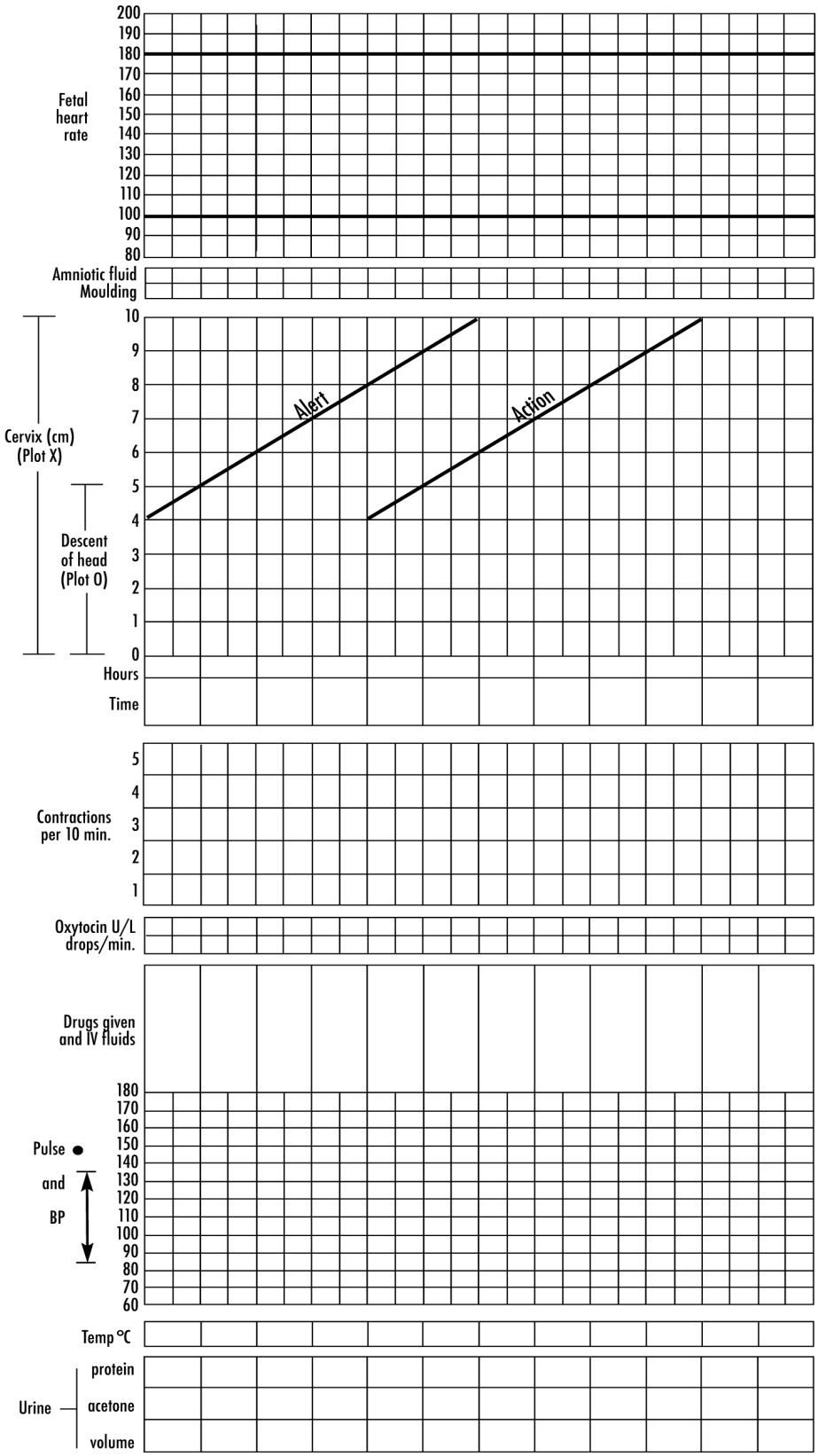
If the alert line is crossed, transfer to the hospital must be considered if the woman is at an outpatient clinic or a BEmONC facility. If the woman is at a CEmONC facility, either immediate intervention or, at a minimum, closer monitoring is required.

If the action line is crossed, decisions (augmentation of labour, artificial rupture of membranes, caesarean section, etc.) must be made. See Chapter 7.

The WHO partograph

Name | Gravida | Para | Hospital number

Date of admission | Time of admission | Ruptured membranes | hours



5.2.2 Postpartum maternal monitoring in the delivery room

– Vital signs (pulse, blood pressure, temperature and respiratory rate), blood loss and uterine retraction:
  • Between Hour 0 and Hour 2: every 15 to 30 minutes,
  • Between Hour 2 and Hour 4: every hour.
– Verify that the patient drinks and urinates.
– Check if there are other treatment indications, e.g., antibiotic therapy for prolonged rupture of membranes (Chapter 4, Section 4.9.3), treatment of anaemia (Chapter 4, Section 4.1), etc.
– In case of caesarean section, see Chapter 6, Section 6.4.

For monitoring and care following the immediate postpartum, see Chapter 11, Section 11.2 and 11.4.

5.3 Artificial rupture of the membranes (amniotomy)

Rupture of the amniotic sac using an amnihook (or, if not available, the claw from half of a Kocher forceps).

5.3.1 Indications

- To speed up dilation.
- To speed up delivery once the cervix is fully dilated.
- As an adjunct to oxytocin for induction of labour (Chapter 7, Section 7.3.2).
- To try to stop the bleeding during labour in case of partial placenta praevia (be careful not perforate the placenta).

5.3.2 Precautions

- Polyhydramnios (risk of cord prolapse): re-examine immediately after rupture to make sure that the cord did not end up below the head.
- Use sterile technique (infection risk as a result of opening the amniotic cavity to pathogens).
- In case of prolonged rupture of membranes: antibiotic prophylaxis (Chapter 4, Section 4.9).

5.3.3 Contra-indications

Absolute

- Complete placenta praevia
- Transverse lie

Relative

- Dilation less than 4 cm, irregular contractions (false labour).
- Breech presentation prior to full dilation (keep the amniotic sac intact as long as possible).
- HIV or hepatitis B infection (or context of high-prevalence) prior to full dilation: keep the amniotic sac intact as long as possible to reduce the risk of mother-to-child transmission.
- Presenting part not engaged: risk of cord prolapse.

5.3.4 Technique

(Figure 5.10)

- Place the woman on her back with knees bent and thighs apart.
- Wear sterile gloves.
- Swab the perineum and the vagina with 10% polyvidone iodine.
- With one hand, prepare access to the sac (hand well into the cervix). With the other hand, slide the amnihook between the fingers of the first hand—which spreads the vagina and the cervix and guides the tip—and make a small cut in the sac as it bulges during a contraction. Let the fluid drain slowly then, use a finger to enlarge the opening.

- Note the colour of the amniotic fluid (clear, greenish, or blood-stained). Isolated meconial staining, in the absence of an abnormal foetal heart rate, is not diagnostic of foetal distress, but requires closer monitoring—in particular, vaginal examination every 2 hours. If there is thick meconium-stained fluid, there is a risk of aspiration at birth; be prepared to suction the infant.
- Make sure the cord has not prolapsed.
- Check the foetal heart rate before and after amniotomy.

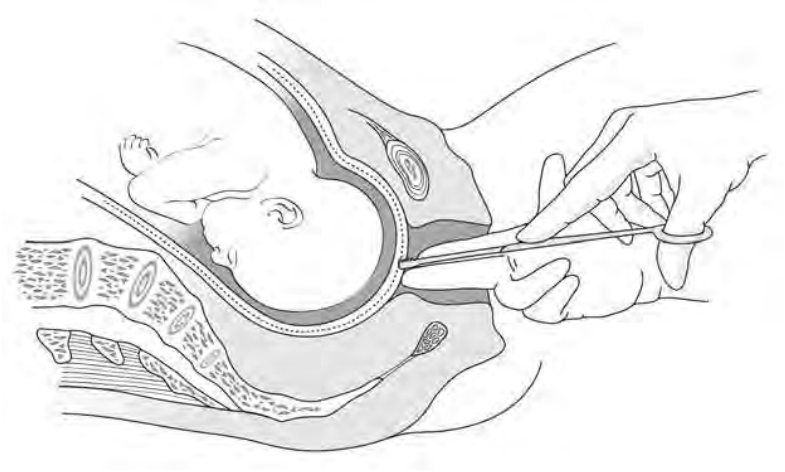


Figure 5.10
Artificial rupture of membranes

5.4 Prolapsed cord

The umbilical cord drops in front of the presenting part, usually when the membranes rupture (due to low insertion or excessive length, transverse or breech presentation, sudden rupture of the amniotic sac, excess amniotic fluid, twin pregnancy).

Compression of the cord between maternal tissues and the foetus (Figures 5.11 and 5.12) during contractions causes foetal distress and rapid foetal death.

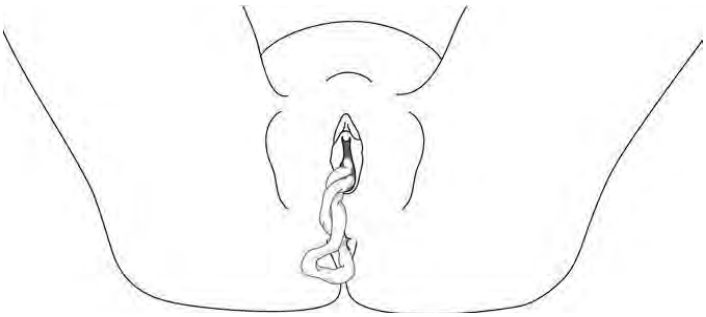


Figure 5.11
Cord coming out of the vaginal opening

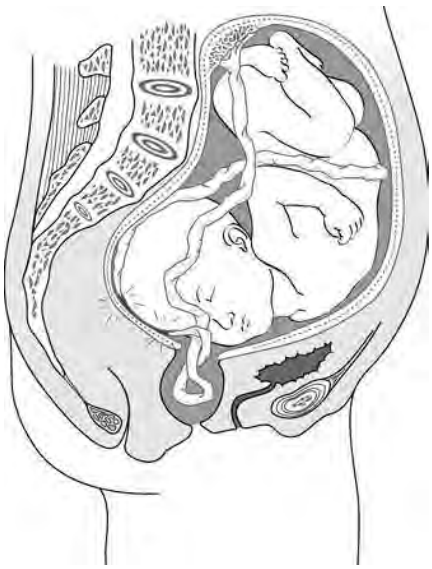


Figure 5.12
Compression of the cord by the presenting part

5.4.1 Diagnosis

- Amniotic sac has ruptured: cord can be felt between the fingers and, if the foetus is still alive, pulsations can be felt.
- Foetal distress: foetal heart rate is slow and irregular.

5.4.2 Management

Foetus dead or nonviable (extremely premature)

No specific intervention, vaginal delivery, no caesarean section.

Foetus alive

This is an obstetric emergency, deliver immediately:

- The woman in knee-chest (Figure 5.13) or Trendelenburg (dorsal decubitus, head down) position to take the pressure off the cord.
- With one hand inserted into the vagina, push the presenting part toward the uterine fundus to relieve pressure on the cord, and hold until caesarean section.
- Caesarean section, holding the presenting part off of the cord via the vagina until extraction. Check for a foetal heart rate right before the procedure. If foetal heart tone is no longer heard, it is better to let vaginal delivery proceed (the infant is already dead).
- If the presenting part is engaged and the cervix fully dilated, it will not be possible to push the presenting part back; perform vaginal extraction quickly: instrumental delivery (vacuum extractor or forceps, Section 5.6) or total breech extraction (Chapter 6, Section 6.3).

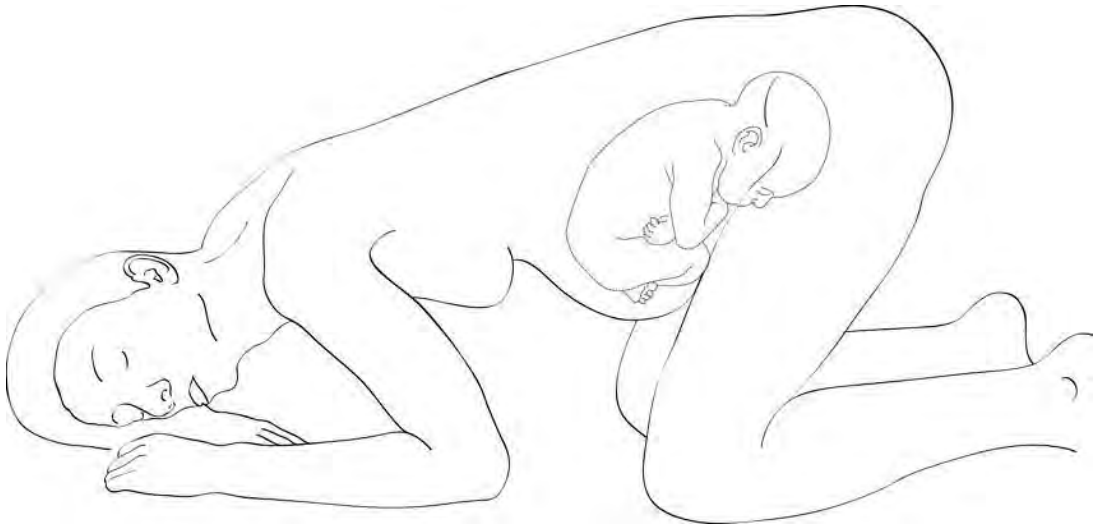


Figure 5.13
Knee-chest position

5.5 Nuchal cord

The umbilical cord is looped around the neck of the foetus; this can cause foetal distress and halt the progress of birth after delivery of the head.

Nuchal cord does not become visible until after the head is delivered.

If the loop is loose, slip it over the infant's head.

If the loop is tight and/or has several turns, clamp the cord with 2 Kocher forceps and cut between the 2 forceps (Figure 5.14). Unwind the cord, complete the delivery and resuscitate the newborn, if necessary.

Note: the possibility of a nuchal cord is the reason why 2 Kocher forceps and a pair of scissors must be ready at the time of delivery.

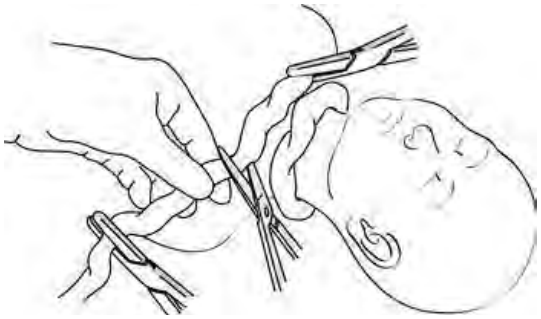


Figure 5.14
Cut between 2 forceps as soon as the head is delivered

5.6 Instrumental delivery

The choice of extraction instrument (vacuum extractor or forceps) depends on the experience and skill of the operator.

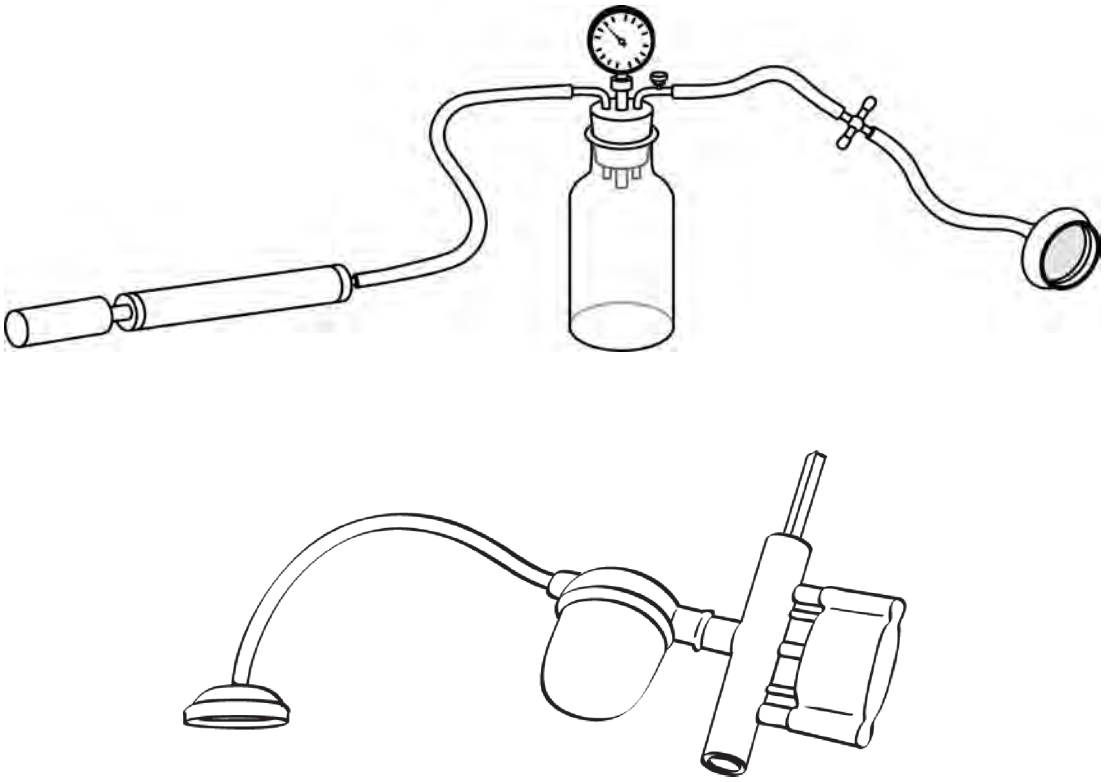
The conditions for use are the same for both instruments:
– Full dilation.
– Regular uterine contractions.
– Vertex presentation, head engaged.
– Accurate diagnosis of the head position.
– Amniotic sac ruptured.
– Bladder empty.

5.6.1 Vacuum extractor

(Figures 5.15)

Flexion and traction device for facilitating delivery of the foetus.

There are various models, but all have:
– A metal or plastic suction cup, which must be sterilized between each patient;
– A connection to a vacuum system controlled by a pressure gauge. The vacuum is produced by means of a manual pump or electrical device;
– A handle for applying traction.



Figures 5.15
Models of vacuum extractor

Indications

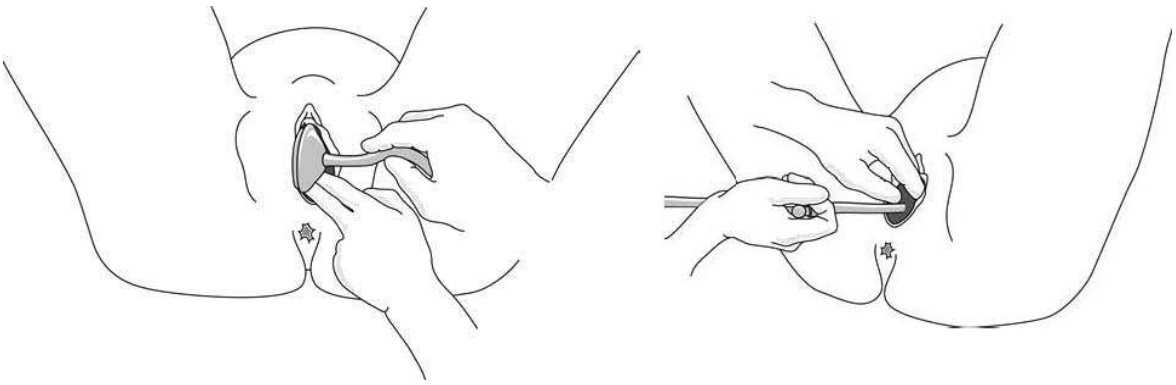
- Failure to progress due to insufficient or ineffective expulsive effort despite good uterine contractility (using oxytocin, if necessary) with overly long delivery (more than 30 to 45 minutes).
- Foetal distress (profound slowing in foetal heart rate) during delivery.
- Perineum unable to stretch enough (combine with episiotomy).
- Difficulty with extraction during caesarean section (if possible, use a Vacca Reusable OmniCup®-type vacuum extractor with built-in pump).

Contra-indications

- Breech, transverse, face or brow presentation.
- Preterm infant: the bones of the skull are too soft.
- Head not engaged.
- Cervix not fully dilated.

Technique

- Place the woman on her back with knees bent and thighs apart.
- Swab the perineum and the vagina with 10% polyvidone iodine.
- Empty the bladder (insert a sterile catheter).
- Prepare the sterile part of the instrument (the cup), using sterile gloves.
- Insert the cup into the vagina (Figures 5.16) and apply it to the scalp, as close as possible to the posterior fontanelle—that is, anteriorly for occiput anterior presentations.
- With one hand holding the cup, circle the cup with one finger of the other hand to make sure that no vaginal or cervical tissue is caught under it. Applying traction can tear the cervix or vagina if there is vacuum extractor suction on those tissues (risk of massive haemorrhage).



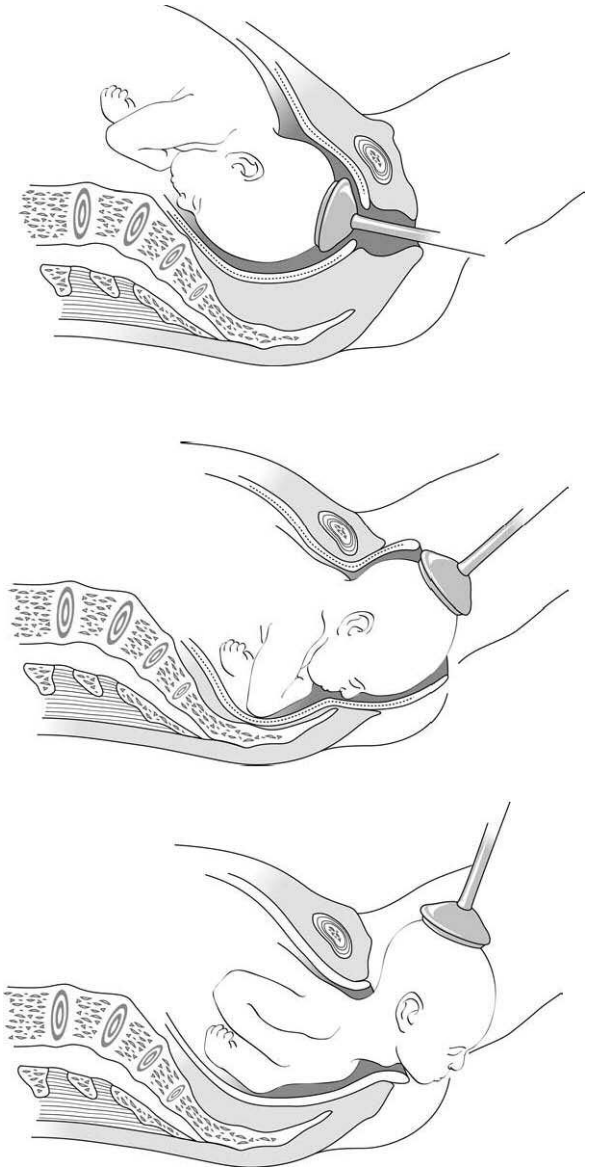
Figures 5.16
Inserting the cup into the vagina

- If required have an assistant connect the cup to the vacuum system.
- Hold the cup to the infant's head with one hand.
- Pump until the negative pressure reaches 0.2 kg/cm^2. Check again for trapped vaginal or cervical tissue, then pump to reach a negative pressure of at most 0.8 kg/cm^2.
  Sit on a small foot rest or kneel; this gives a good traction angle and helps to stay balanced. The traction, applied with the dominant hand, should be perpendicular to the plane of the cup.

– Traction should be applied in sync with the uterine contractions and the pushing, which the patient should continue. Stop pulling the moment the uterine contraction stops. The direction of traction varies according to the head's progress: first downward, then horizontal, then increasingly vertical (Figures 5.17).
– If the cup is positioned incorrectly or the traction too sudden, the cup can come loose. If this happens, re-apply it.
– When the one hand is able grasp the foetus' chin, turn off the suction, remove the vacuum extractor and finish the delivery in the normal fashion.
– While episiotomy is not routine, it can be useful, especially if the perineum is too resistant or too distended.

Note: when there is a significant pre-existing caput, application of the vacuum extractor can be ineffective and forceps may be necessary.

Do not apply suction for more than 30 minutes: the indication is probably incorrect, and there is a risk of scalp necrosis. Birth usually occurs in less than 15 minutes.
Make no more than 3 attempts at traction if there is no progress (the mother's pelvis is probably impassable).
In case of failure, perform a caesarean section.



Figures 5.17
Vacuum extractor traction: axis varies depending on the progress of the head

5.6.2 Forceps

The use of forceps requires special expertise, and forceps should be used by trained birth attendant only.

Forceps can be used even without the mother pushing; this is not possible with the vacuum extractor.

Indications

– As for vacuum extraction.
– Breech presentation with retention of the aftercoming head.

Contra-indications

– Transverse lie or brow presentation.
– Head not engaged.
– Cervix not fully dilated.

5.7 Symphysiotomy

Partial incision of the ligaments of the symphysis pubis such that the two pubic bones separate by about 2 cm, allowing enough room for passage of an entrapped, live foetus.

This procedure should be done in combination with episiotomy (Section 5.8) and instrumental delivery (Section 5.6).

5.7.1 Indications

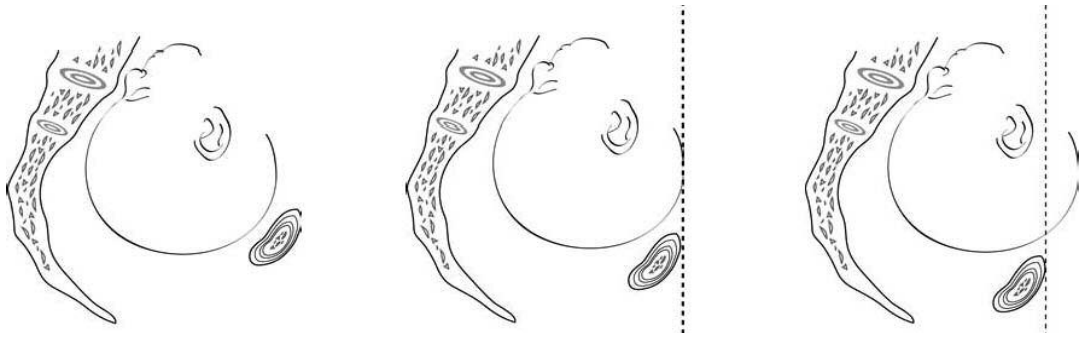
This life-saving technique may be useful as a procedure of last resort:
- In situations where caesarean section is indicated but not feasible[a]:
  - Head engaged and arrested for more than an hour, and vacuum extraction alone has already failed or is likely to do so.
  - Foeto-maternal disproportion due to a pelvis that is slightly too narrow: after the trial of labour has failed, and at least 3/5 of the head has descended into the pelvic cavity.
- In case of shoulder dystocia when other manoeuvres have failed.
- In case of entrapped aftercoming head in a breech when other manoeuvres have failed.

5.7.2 Conditions

- Membranes ruptured, full dilation (minimum 9 cm).
- The foetal head is not palpable above the symphysis pubis or by less than 2/5 (Figures 5.18).

5.7.3 Contra-indications

- Head not engaged.
- Brow presentation.
- Dead foetus (in this case, perform an embryotomy, Chapter 9, Section 9.7).
- Cervix not sufficiently dilated.
- Severe cephalopelvic disproportion, with head above the symphysis by more than 2/5 (Figures 5.18).



Head not above | Borderline superior to the symphysis | Frankly palpable above the symphysis: contraindication

Figures 5.18
Position of the foetal head

[a] Caesarean section is not feasible because: surgical conditions are inadequate or surgical intervention would take too long or there is a high risk of trauma to mother and foetus or the woman refuses caesarean section.

5.7.4 Equipment

- Scalpel, suturing equipment, delivery set with episiotomy scissors
- Vacuum extractor
- Foley catheter
- Sterile drape, compresses and gloves
- 10% polyvidone iodine
- Material for local anaesthesia (1% lidocaine)

5.7.5 Technique

- Patient in lithotomy position, abduction supported by two assistants who maintain an angle of less than 90° between the patient's thighs (Figure 5.19).
- Asepsis: shave the pubis; swab the pubic and perineal region with 10% polyvidone iodine.
- Place a sterile fenestrated drape over the symphysis.
- Insert the Foley catheter, which allows location of the urethra throughout the procedure.
- Local anaesthesia: 10 ml of **1% lidocaine**, infiltrating the skin and subcutaneous tissues superior, anterior, and inferior to the symphysis, along the midline, down to the ligament. Infiltrate the episiotomy region as well.
- With the index and middle fingers of the hand inserted into the vagina, push the urethra to the side (Figures 5.20 and 5.21). Place the index finger in the groove formed by the cartilage between the two pubic bones, in such a way that it can feel the scalpel's movements. The catheterized urethra must be pushed out of scalpel's reach.
- Incision:
  - Locate the upper edge of the symphysis.
  - Introduce the scalpel 1 cm below this point, perpendicular to the skin, exactly on the midline.
  - Cut down until the cartilage: it should feel elastic; if it feels bony, gently withdraw the blade and recheck the location.
  - First tilt the blade toward the top, use a small back-and-forth motion (Figure 5.22), always along the midline, and in that way section 2/3 of the cartilage to the upper edge of the symphysis, going slightly past it.
  - Then, turn the blade around toward the bottom, and repeat the sectioning manoeuvre down to the lower edge. The procedure is complete when the pubic bones move apart. The assistants continue to hold apart the thighs making sure they do not move further apart: the widening of the symphysis pubis must not exceed 2 to 2.5 cm (the width of a thumb).
- Do not cut the vagina.
- Perform an episiotomy; use a vacuum extractor to deliver the infant.
- One or two stitches suffice to close the wound after delivery.

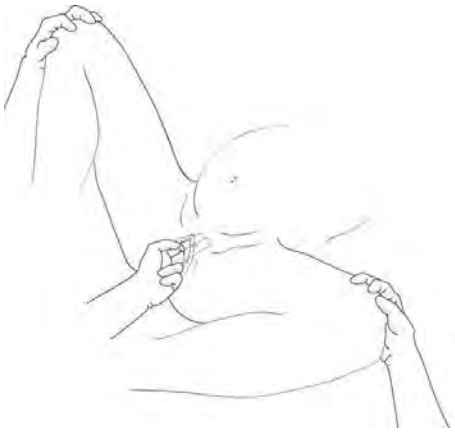


Figure 5.19
Supported lithotomy position

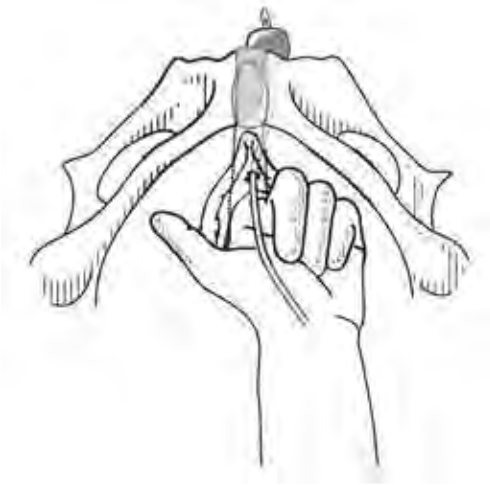


Figure 5.20
Finger pushing the urethra out of the way

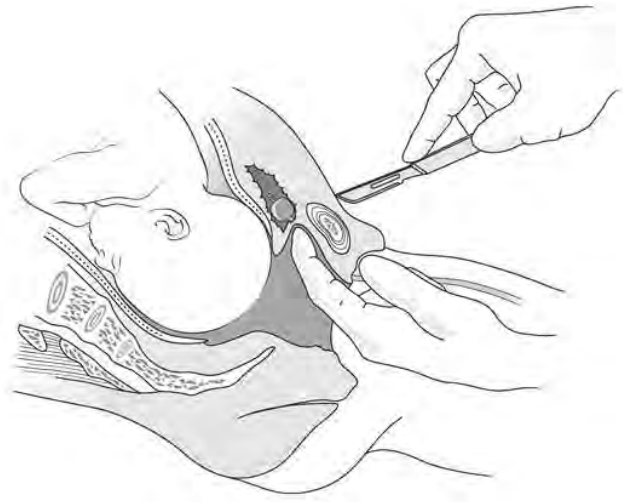


Figure 5.21
Finger pushing the head and urethra out of the way

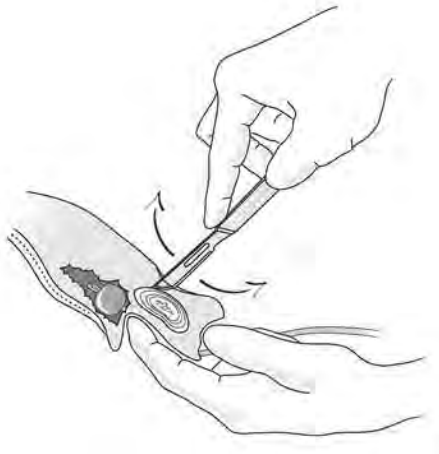


Figure 5.22
Scalpel moves back and forth

5.7.6 Post-operative care

- Have the mother rest on her side (avoid forced abduction of the thighs) for 7 to 10 days. Mobilization with aid is possible as of Day 3 if the woman can tolerate the discomfort. No heavy work for 3 months.
- If there was blood in the urine during catheterization, the foetal head probably compressed and injured the bladder wall: leave the catheter in place for 10 to 14 days after the haematuria resolves. Otherwise, remove it immediately.
- Routine treatment for pain as for caesarean section (Chapter 6, Section 6.4.5).

5.7.7 Complications

- Bleeding at the site of the wound: compression bandage.
- Local infection: daily dressings and antibiotics (**amoxicillin** PO: 3 g/day in 3 divided doses for 5 days).
- Stress incontinence: uncommon and temporary.
- Gait problems: prevented through bed rest.
- Injury to the urethra or bladder: leave the catheter in place for 10 to 14 days and consult a specialist.
- Osteitis: extremely rare if rigorous sterile technique has been used.

5.8 Episiotomy

Incision on the perineum

5.8.1 Indications

Episiotomy is a source of infection and/or haemorrhage and should not be done routinely. Simple first- and second-degree tears heal as well or better than an episiotomy.

Episiotomy should be routinely performed in the following situations:
– Symphysiotomy
– Occiput posterior, face, or breech delivery in a primipara

Episiotomy should be considered in the following situations:
– Delivery is taking more than 30 minutes, especially if foetal heart rate slows, when completion of the delivery is being obstructed by the perineum.
– Instrumental delivery (forceps or vacuum extraction).
– Shoulder dystocia.
– Occiput posterior, face, or breech delivery in a multipara.
– Oedematous or scarred perineum that does not stretch properly.
– History of third and fourth degree tears.
– Excision (clitoral circumcision with partial or total clitoridectomy, often with removal of the labia minora). Excision causes a loss of perineal elasticity, with a risk of a prolonged delivery and perineal tears. Episiotomy may be necessary but may not completely prevent tearing.

5.8.2 Equipment

– Delivery sets containing 2 pairs of scissors
– 10% polyvidone iodine, sterile compresses
– Material for local anaesthesia (1% lidocaine)

5.8.3 Technique

– Swab the perineum with 10% polyvidone iodine.
– Administer local anaesthesia by infiltration with 10 ml of **1% lidocaine**.
– Perform the episiotomy when the perineum is thinned and widened, distended by the foetus, which appears at the vaginal opening: during a push, make a straight 4 cm cut using sterile scissors, obliquely down and out at a 45% angle from the posterior vulvar commissure. Protect the foetus with the other hand (Figure 5.23).
– The episiotomy can be done to the right or the left, depending on whether the operator is right- or left-handed.
– The scissors used for the episiotomy, now contaminated, should be put aside immediately. They must not be used for other procedures, like cutting the cord (this is why all delivery sets must include 2 pairs of scissors).

Figure 5.23
Cutting the perineum

To suture the perineum, see Section 5.9.

5.9 Perineal repair

During delivery the perineum can tear causing different degrees of vulvovaginal lacerations: superficial (first-degree tear), or deeper, affecting the muscle tissue (second-degree tear, equivalent to an episiotomy).

All genital mutilations – that is, clitoral circumcision (Type I mutilation), clitoral circumcision with removal of the labia minora (Type II mutilation), and infibulation (Type III mutilation, Section 5.10) – are associated with a risk of perineal tears during expulsion.

Two adjacent tissues may also be damaged:
- The anal sphincter muscle, which is red and fleshy. A tear in this sphincter can be recognized by the loss of the anus' radial appearance (third-degree tear). Repair of the muscle is essential to prevent faecal incontinence.
- The rectal mucosa, which is smooth and whitish, extending from the anus. A tear in rectal mucosa (fourth-degree tear) must be sutured to prevent anal fistula with incontinence and infection.

5.9.1 Equipment

- Suture set containing sterile scissors, dissecting forceps and needle holder
- 10% polyvidone iodine
- Local anaesthesia (1% lidocaine)
- One or two Dec3 (2/0) absorbable sutures
- A rapidly absorbable suture for closing the skin or, if not available, a non-absorbable Dec3 (2/0) suture
- Sterile drape and gloves
- If needed, make a tampon from sterile compresses tied together with a thick thread; this is inserted into the vagina to absorb the endo-uterine bleeding (Figure 5.24). The pull string, visible at the vulva, prevents forgetting the tampon when the procedure is over. Ordinary compresses may be used in place of this tampon.
- Good lighting

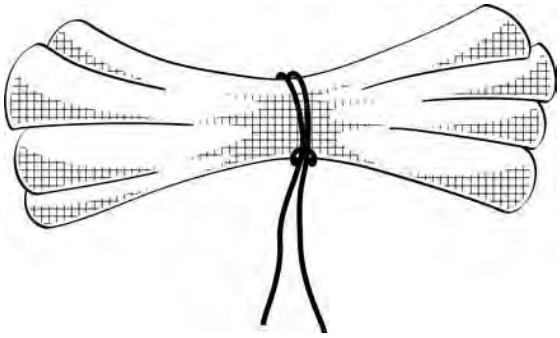


Figure 5.24
Tampon made of compresses tied together with a pull string

5.9.2 Technique

The perineum should not be sutured until after the placenta is delivered.

– Swab the perineum and vagina with polyvidone iodine 10%.
– Position a sterile aperture drape.
– Assess the size and number of tears. If episiotomy was performed, check to make sure it did not tear further, and look for other tears. If necessary, use vaginal retractors to expose the entire vaginal wall.
– Use local anaesthesia (lidocaine 1%) in all the involved tissues except the rectal mucosa. For complex and/or third- or fourth-degree tears, do not hesitate to do the suturing in the operating room under general or spinal anaesthesia.

Superficial vulvar tears (first-degree)

– If they are not bleeding and confined to the area near the vaginal opening: basic care, no suturing.
– If they are bleeding or deep: continuous simple or simple interrupted suture using absorbable suture material.

Episiotomy or simple second-degree perineal tears

– Locate the apex of the cut/tear and place a first stitch there if necessary.
– Suture the vaginal mucosa going from the inside out, to just behind the hymenal remnants, using a continuous or interrupted figure-of-eight absorbable suture; stitches should be close enough to prevent lodging of lochia in the following days, but not too deep, to avoid going into the rectum (Figure 5.25).
– Next, suture the muscle layer with two or three absorbable figure-of-eight sutures (Figure 5.26).
– Close the skin with rapidly absorbable or non-absorbable suture material, using interrupted (simple or vertical mattress) stitches; begin by placing the first stitch, without tying it, on the posterior commissure (Figure 5.27). Because the tissues will be oedematous in the days following the birth, avoid tying the knots too tight. Do a rectal examination to make sure that no stitches can be felt in the rectum. Remove compresses from inside the vagina.

Figure 5.25
Suturing the mucosa

Figure 5.26
Suturing the muscle

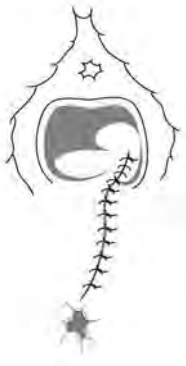


Figure 5.27
Suturing the skin

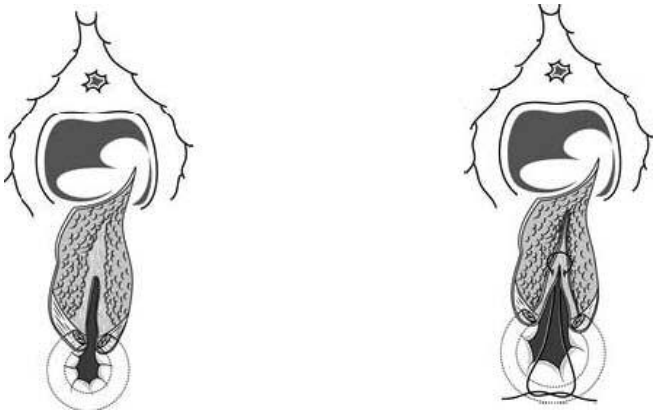
Rupture of the anal sphincter

– A tear in the muscular ring can result in retraction of the two torn ends of the muscle, now hidden in the tissues. Insert a finger into the rectum to locate the two ends.
– Suture the sphincter with two or three absorbable figure-of-eight or horizontal mattress sutures (Figure 5.28).
– Continue in the same sequence as in the preceding case.

Figure 5.28
Suturing the anal sphincter

Tear in the rectal mucosa

- Protect the wound from faecal material by placing a compress in the rectum (as with the vaginal tampon, do not forget to remove it).
- Swab with polyvidone iodine 10%.
- Suture the rectal mucosa, going from high to low, using absorbable, interrupted stitches knotted on the rectal surface (Figures 5.29).
- Continue in the same sequence as in the preceding case.



Figures 5.29
Suturing the rectal mucosa

5.9.3 Post-operative care

- In all cases, the vulva should be cleansed with soap and water and dried when the patient urinates or defecates, at least twice daily.
- For nonabsorbable sutures: remove the stitches between the 5th and 8th day.
- Routine analgesia: paracetamol and/or ibuprofen (especially if there is perineal oedema). A short course of ibuprofen can be prescribed in breastfeeding women (maximum 5 days).
- For third- and especially fourth-degree tears, recommend a fibre-free diet (no fruits or vegetables) for two weeks, if possible. If necessary, give a laxative to prevent passage of hard stools over the sutured rectal mucosa.

– No antibiotics are needed for an episiotomy or perineal tear. For fourth-degree tears, administer **metronidazole** PO: 1.5 g/day in 3 divided doses for 5 days.

5.9.4 Management of complications

Haematoma

– Remove the stitches and drain.
– If there are no signs of infection and the bleeding has stopped, re-suture the episiotomy either completely or partially (to allow spontaneous drainage), or leave a drain in place.

Infection

– Remove the stitches, drain and, if necessary, remove non-viable tissues
– Minor infection: no antibiotic; drainage is enough.
– Severe infection: antibiotic therapy for 5 days (**amoxicillin** PO: 3 g/day in 3 divided doses + **metronidazole** PO: 1.5 g/day in 3 divided doses).

5.10 Deinfibulation

Infibulation or Type III mutilation refers to clitoral circumcision with partial or complete removal of the clitoris, often combined with removal of the labia minora, in addition to vulvar occlusion with partial or complete removal of the labia majora, the edges of which are sealed together. All that is left is a residual opening at the base of the vulva for the passage of urine and menstrual blood.

Infibulation may interfere with the ability to monitor cervical dilation and with the normal childbirth process.
It can cause prolonged retention of the foetus against the perineum, increasing the risk of severe maternal tissue damage (tears and fistula) and the risk of foetal distress and death.

Deinfibulation, performed during pregnancy or labour, may be necessary for the birth of the child. Double episiotomy is not an acceptable substitute for deinfibulation.

5.10.1 Equipment

- Suture set containing: sterile scissors, dissecting forceps and needle holder
- Antiseptic (10% polyvidone iodine)
- Local anaesthesia (1% lidocaine)
- One or two Dec3 (2/0) absorbable sutures
- Sterile drape and gloves

5.10.2 Technique

- Ask the patient to urinate.
- Administer local anaesthesia.
- Swab the perineum and vagina with 10% polyvidone iodine.
- Insert one finger of one hand in the opening in the vulva to protect the urethra.
- With the other hand, use scissors to cut the midline anterior strip of scar tissue; this allows access to the vagina and urethra.
- Ensure haemostasis with a continuous suture along each edge.

After delivery, the opening of the vulva allows free passage of urines and lochias. Women should never be re-infibulated.

Postoperative care is identical to that for a perineal tear or episiotomy.

Chapter 6:
Special deliveries

6.1 Breech presentation

Presentation of the feet or buttocks of the foetus.

6.1.1 The different breech presentations

- In a *complete breech* presentation, the legs are tucked, and the foetus is in a crouching position (Figure 6.1a).
- In a *frank breech* presentation, the legs are extended, raised in front of the torso, with the feet near the head (Figure 6.1b).
- In a *footling breech* presentation (rare), one or both feet present first, with the buttocks higher up and the lower limbs extended or half-bent (Figure 6.1c).

6.1a
Complete breech

6.1b
Frank breech

6.1c
Footling breech

Figures 6.1
The different breech presentations

6.1.2 Diagnosis

- The cephalic pole is palpable in the uterine fundus; round, hard, and mobile; the indentation of the neck can be felt.
- The inferior pole is voluminous, irregular, less hard, and less mobile than the head.
- During labour, vaginal examination reveals a “soft mass” divided by the cleft between the buttocks, with a hard projection at end of the cleft (the coccyx and sacrum).
- After rupture of the membranes: the anus can be felt in the middle of the cleft; a foot may also be felt.
- This is sometimes a difficult diagnosis: a hand may be mistaken for a foot, a face for a breech.

6.1.3 Management

Route of delivery

Before labour, external version (Chapter 7, Section 7.7) may be attempted to avoid breech delivery.

If external version is contra-indicated or unsuccessful, the breech position alone – in the absence of any other anomaly – is not, strictly speaking, a dystocic presentation, and does not automatically require a caesarean section. Deliver vaginally, if possible – even if the woman is primiparous. The risks of caesarean section to the mother for both the current and future pregnancies are greater than the risk to the infant of foetal distress during a breech vaginal delivery.

Breech deliveries must be done in a CEmONC facility, especially for primiparous women.

Favourable factors for vaginal delivery are:
– frank breech presentation;
– a history of vaginal delivery (whatever the presentation);
– normally progressing dilation during labour (more than 1 cm/hour).

The *footling breech* presentation is a very unfavourable position for vaginal delivery (risk of foot or cord prolapse). In this situation, the route of delivery will be determined based on the number of previous births, the state of the membranes and how far advanced the labour is.

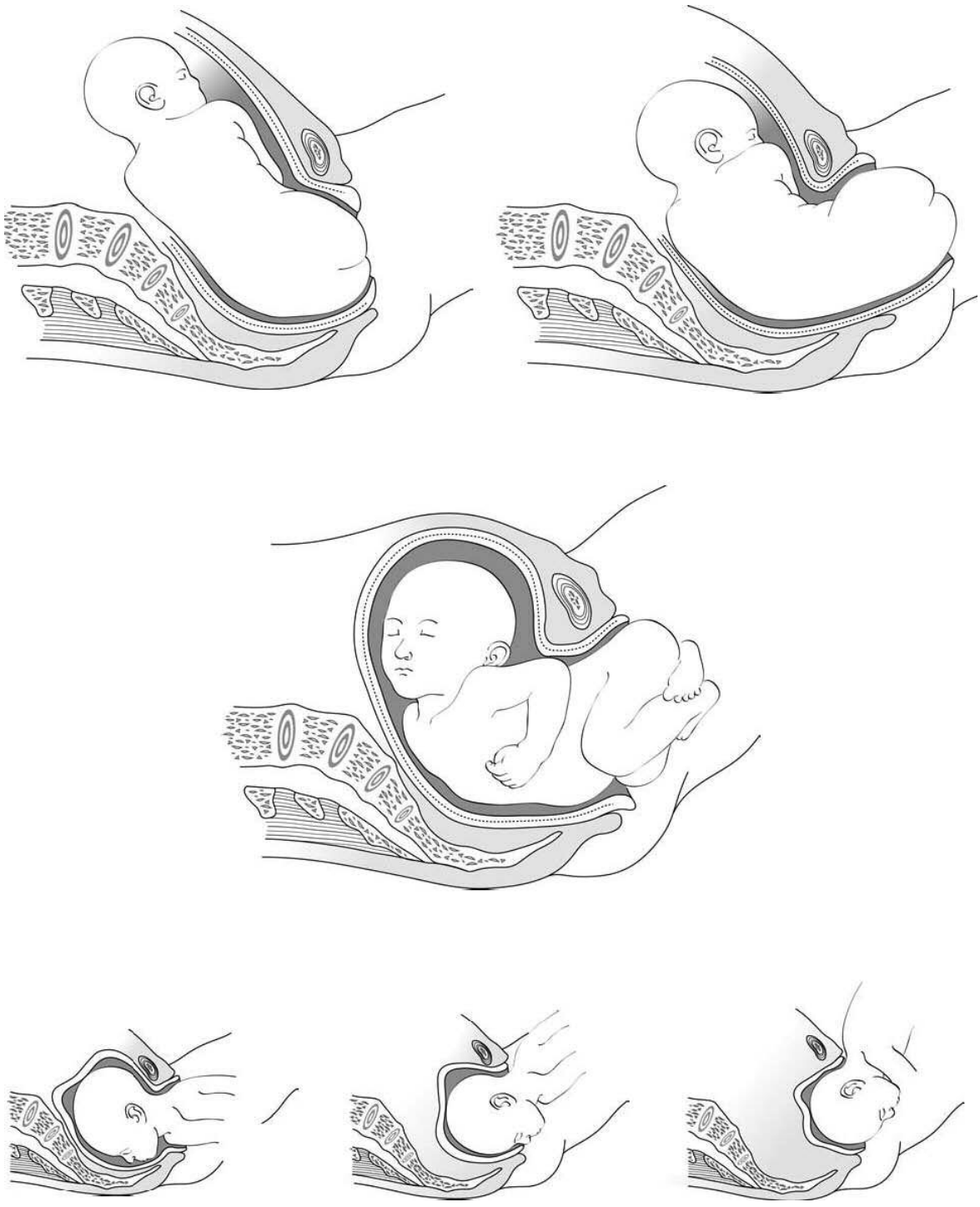
During labour

– Monitor labour every hour: the cervix must dilate steadily by 1 cm/hour.
– If contractions are of good quality, dilation is progressing, and the foetal heart rate is regular, an expectant approach is best. Do not rupture the membranes unless dilation stops.
– If the uterine contractions are inadequate, labour can be actively managed with oxytocin.

Note: if the dilation stales, transfer the mother to a CEmONC facility unless already done, to ensure access to surgical facility for potential caesarean section.

At delivery

– Insert an IV line before expulsion starts.
– Routinely perform episiotomy at expulsion for primiparous women, and when there is any concern in multiparous women. Episiotomy is performed when the perineum is sufficiently distended by the infant's buttocks.
– Presence of meconium or meconium-stained amniotic fluid is common during breech delivery and is not necessarily a sign of foetal distress.
– The infant delivers unaided, as a result of the mother's pushing, simply supported by the birth attendant's hands, with no traction. Do not pull on the legs.
  Once the umbilicus is out, the rest of the delivery must be completed within 3 minutes, otherwise compression of the cord will deprive the infant of oxygen.
  Do not touch the infant until the shoulder blades appear to avoid triggering the respiratory reflex before the head is delivered.
– Monitor the position of the infant's back; impede rotation into posterior position.



Figures 6.2
Breech delivery

6.1.4 Breech delivery problems

Posterior orientation

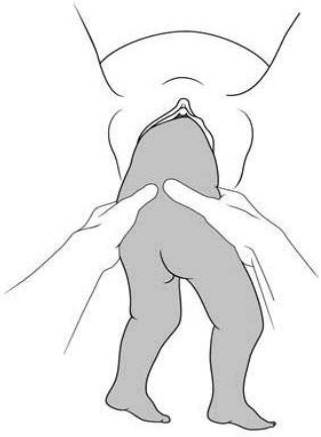
If the infant's back is posterior during expulsion, take hold of the hips and turn into an anterior position (this is a rare occurrence).

Obstructed shoulders

The shoulders can become stuck and hold back the infant's upper chest and head. This can occur when the arms are raised as the shoulders pass through the mother's pelvis. There are two methods for lowering the arms so that the shoulders can descend:

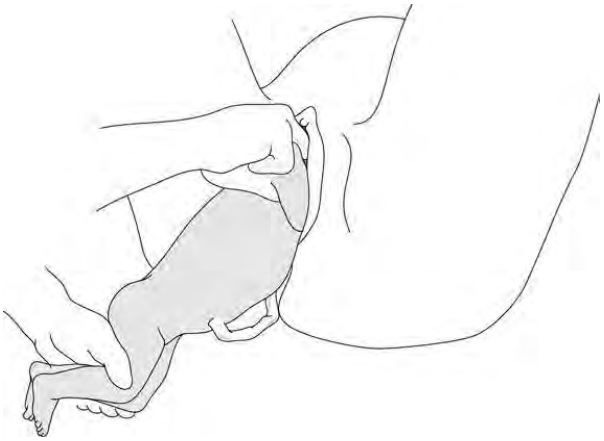
1 - Lovset's manoeuvre (Figures 6.3):

- With thumbs on the infant's sacrum, take hold of the hips and pelvis with the other fingers.
- Turn the infant 90° (back to the left or to the right), to bring the anterior shoulder underneath the symphysis and engage the arm. Deliver the anterior arm.
- Then do a 180° counter-rotation (back to the right or to the left); this engages the posterior arm, which is then delivered.



6.3a
Turning the infant to bring down the anterior shoulder

6.3b
Downward traction and descent of shoulders along the midline (sacral-pubic) axis



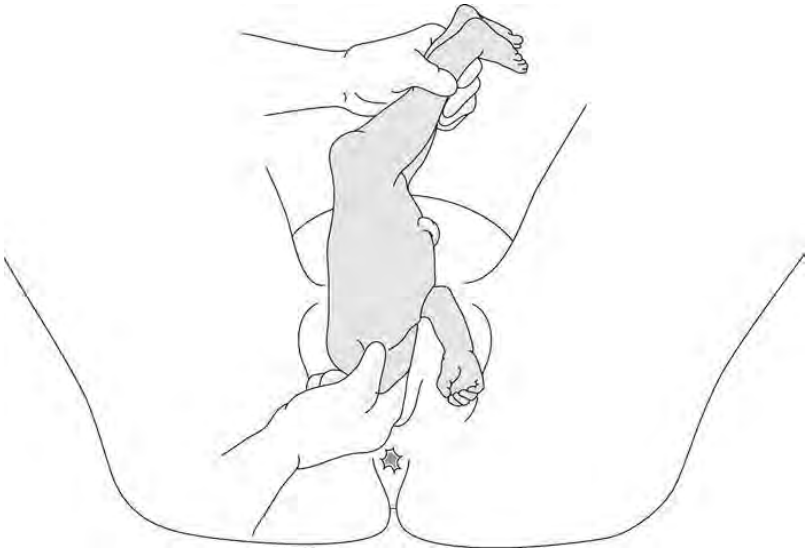
6.3c
Delivering the anterior arm and shoulder

Figures 6.3
Lovset's manoeuvre

2 - Suzor's manoeuvre (Figures 6.4), in case the previous method fails:

- Turn the infant 90° (its back to the right or to the left).
- Pull the infant downward: insert one hand along the back to look for the anterior arm. With the operator thumb in the infant armpit and middle finger along the arm, bring down the arm (Figure 6.4a).
- Lift infant upward by the feet in order to deliver the posterior shoulder (Figure 6.4b).

6.4a
Bringing down the anterior arm



6.4b
Delivering the posterior shoulder

Figures 6.4
Suzor's manoeuvre

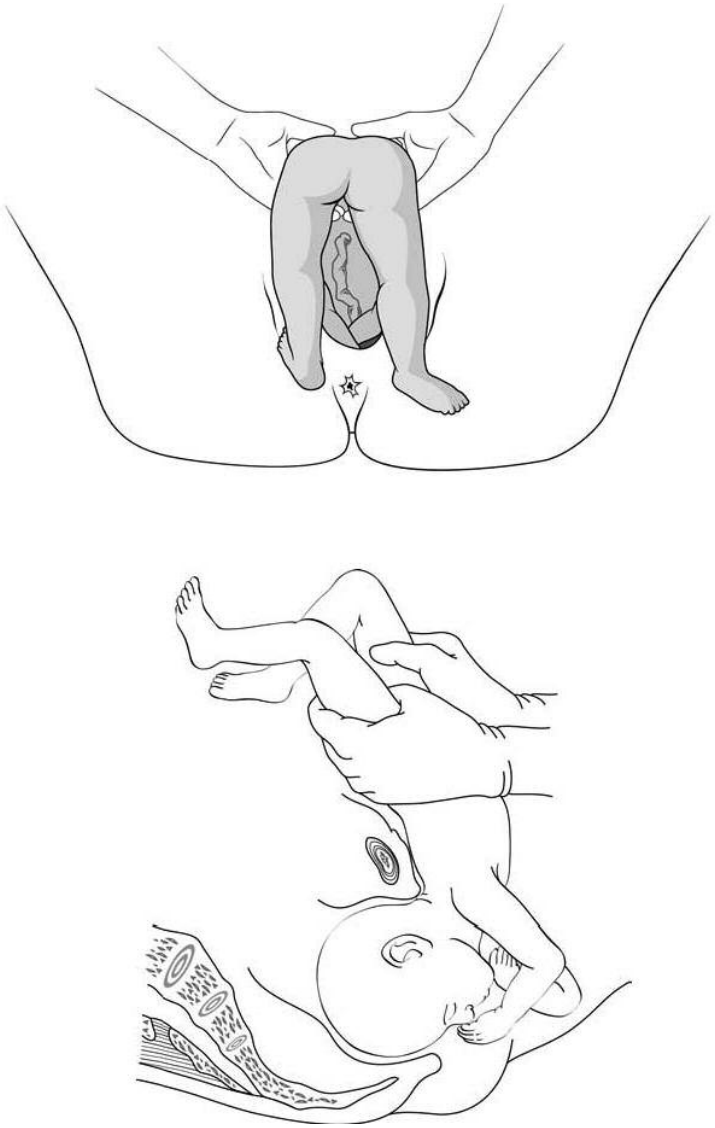
Head entrapment

The infant's head is bulkier than the body, and can get trapped in the mother's pelvis or soft tissue.

There are various manoeuvres for delivering the head by flexing it, so that it descends properly, and then pivoting it up and around the mother's symphysis. These manoeuvres must be done without delay, since the infant must be allowed to breathe as soon as possible.

1 - Bracht's manoeuvre (Figures 6.5):

- After the arms are delivered, the infant is grasped by the hips and lifted with two hands toward the mother's stomach, without any traction, the neck pivoting around the symphysis.
- Having an assistant apply suprapubic pressure facilitates delivery of the aftercoming head.



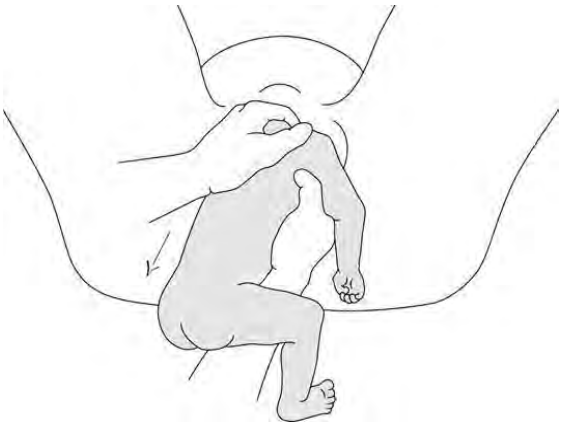
Figures 6.5
Bracht's manoeuvre

2 - Modified Mauriceau manoeuvre, in case the previous method fails (Figures 6.6):

- Infant's head occiput anterior.
- Kneel to get a good traction angle: 45° downward.
- Support the infant on the hand and forearm, then insert the index and middle fingers, placing them on the infant's maxilla. Placing the index and middle fingers into the infant's mouth is not recommended, as this can fracture the mandible.
- Place the index and middle fingers of the other hand on either side of the infant's neck and lower the infant's head to bring the sub-occiput under the symphysis (Figure 6.6a).
- Tip the infant's head and with a sweeping motion bring the back up toward the mother's abdomen, pivoting the occiput around her symphysis pubis (Figure 6.6b).

- Suprapubic pressure on the infant's head along the pelvic axis helps delivery of the head.
- As a last resort, symphysiotomy (Chapter 5, Section 5.7) can be combined with the Mauriceau manoeuvre.

All these manoeuvres must be performed smoothly, without traction on the infant.



6.6a – Step 1
Infant straddles the birth attendant's forearm; the head, occiput anterior, is lowered to bring the occiput in contact with the symphysis.

6.6b – Step 2
The infant's back is tipped up toward the mother's abdomen.

Figures 6.6
Modified Mauriceau manoeuvre

6.2 Twin pregnancy

Simultaneous development of two foetuses in the uterine cavity.

6.2.1 Diagnosis

- The diagnosis is suspected in the second half of pregnancy when the uterus is abnormally large.
- Two poles of the same type (e.g., two heads) or three poles are felt.
- Two distinct foetal heart beats are heard.
- The diagnosis can be confirmed by ultrasound.

6.2.2 Management during pregnancy

- Close monitoring, more frequent antenatal consultations, screening for and management of complications such as anaemia, placenta praevia, prematurity, and pre-eclampsia.
- Reduction in the mother's level of physical activity.

6.2.3 Management during delivery

Twin deliveries should take place in a CEmONC facility, if possible.

Delivering the first twin

- Insert an IV line before expulsion starts.
- Deliver in the same way as a singleton.
- When the cord is cut, leave a clamp on the placenta side, as there may be an anastomosis with the second twin's circulation.
- Never administer oxytocin for active management of the third stage of labour before the second twin is delivered.

Rest period

- Usually 15 minutes; should not exceed 30 minutes. Take advantage of the pause in contractions to study the presentation of the second twin.
- Immediately after delivery of the first twin, an assistant should hold the second twin in a vertical position by placing hands laterally on either side of the uterus. This is done to prevent the foetus from assuming a transverse lie, in the now loo large uterus.
- If the presentation is normal, await spontaneous delivery.
- If contractions have not resumed after 15 minutes, administer an escalating-dose oxytocin infusion (Chapter 7, Section 7.4) to speed up the birth of the second twin.

Delivering the second twin

- If presentation is longitudinal (vertex or breech): proceed as with a normal vertex or breech delivery. Delivery of the second twin is usually faster.

– For a transverse lie, attempt external version (Chapter 7, Section 7.7) or perform internal version (Chapter 7, Section 7.8) if conditions are favourable (full dilation, soft uterus) to bring the foetus to a breech position, then perform total breech extraction (Section 6.3).

Note: delivery is usually easier if the first twin is in vertex presentation. Vaginal delivery is still possible, however, when the first twin is breech. Twins who are locked at the chin is a rare complication, seen when the first twin is breech and the second vertex. If this occurs, attempt to continue the vaginal delivery. The mortality and morbidity among such twins is high.

Delivering the placenta

– After the second twin is born, administer:
  • **oxytocin** routinely: 5 to 10 IU by IM or slow IV injection;
  • **cefazolin** or **ampicillin** slow IV[a]: 2 g as a single dose if internal manoeuvres were performed.
– There is a significant risk of haemorrhage due to uterine atony. If there is any doubt, perform manual removal of placenta and/or uterine cavity exploration.

[a] For patients with a history of immediate hypersensitivity reaction to penicillin (urticaria, respiratory problems or oedema): **clindamycin** IV, 900 mg as a single dose.

6.3 Total breech extraction

Breech extraction of the second twin when the condition of the foetus requires rapid extraction (foetal distress); may be preceded by internal version for transverse foetal lie.

This technique requires experience in obstetrical manoeuvres. If possible, it should be performed in a CEmONC facility. Prepare for a caesarean section in case the total breech extraction fails.

6.3.1 Relative contra-indication

– Scarred uterus (risk of uterine rupture)

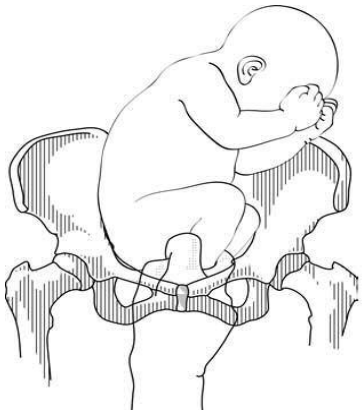
6.3.2 Technique

– Routinely insert an IV line.
– Empty bladder.
– Proceed slowly; it may be necessary to pause periodically to allow the uterus to re-soften.
– Insert a hand into the uterus and bring down one foot.
– Do not rupture the membranes right away (they will rupture on their own when the foot is pulled down, or will be ruptured artificially once the foot is down).
– Delivering the foot:

  Complete breech (Figures 6.7a and 6.7c)
  - Grasp one or both ankles with one hand, index and middle finger straddling the back of the foot;
  - Apply gentle traction to bring the leg to the vulva.

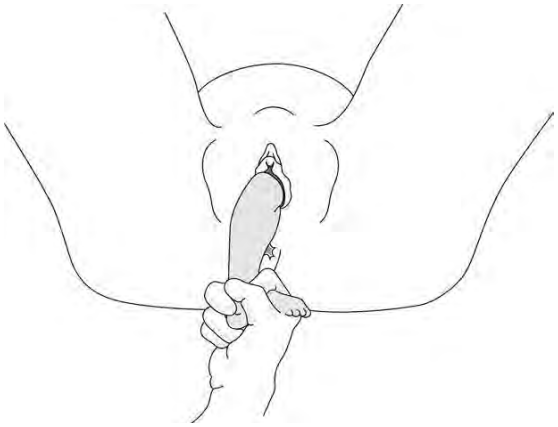
  Frank breech (Figures 6.7b and 6.7c)
  - Grasp a single foot, and bring it down by bending the knee until the lower leg is against the thigh, then continue bringing it down until the leg is fully extended;
  - If a hand is grasped rather than a foot, push it back up and start over (feel for the bend at the ankle).
– Delivering the breech (Figures 6.8)
  - Apply gentle, continuous, downward traction on the leg to deliver the anterior hip, the infant's back anteriorly.
  - Once the anterior hip has been delivered, pull gradually upward to deliver the posterior hip.
  - Once the pelvis is out, with thumbs on the loins, take hold of the hips and pelvis with the other fingers. Pull the pelvis downward, keeping the back anterior, until the tips of the shoulder blades are seen.
– Deliver the shoulders and head: Lovset and Bracht manœuvres (Section 6.1.4).
– Explore the uterus to rule out uterine rupture.
– Routine antibiotic prophylaxis after clamping the cord: **cefazolin** or **ampicillin** slow IV[b], 2 g as a single dose.

[b] For patients with a history of immediate hypersensitivity reaction to penicillin (urticaria, respiratory problems or oedema): **clindamycin** IV, 900 mg as a single dose.



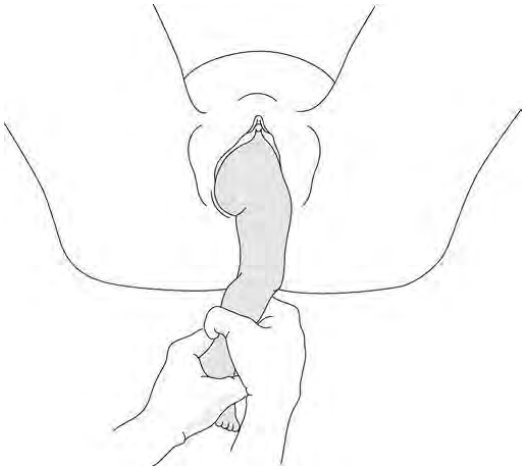
6.7a
Grasping one or both feet
in the complete breech

6.7b
Grasping the anterior foot
in the frank breech

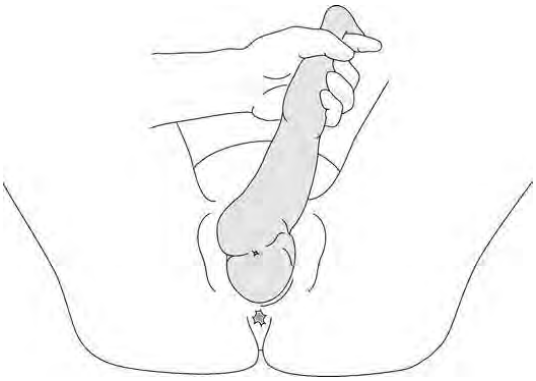


6.7c
Bringing one foot down

Figures 6.7
Total breech extraction



6.8a
Downward traction
to deliver the anterior hip



6.8b
Upward traction
to deliver the posterior hip

Figures 6.8
Delivery of the breech in a total breech extraction

6.4 Caesarean section

Performing a caesarean section requires technical expertise and good obstetric knowledge for determining appropriate indications. There can be difficulties (haemorrhage, difficulty extracting the foetus, etc.) and complications (bladder injury, uterine tear, foetal trauma, etc.). Compared to vaginal delivery, caesarean section is associated with higher maternal mortality and an increased risk of complications for future pregnancies, regardless of the setting in which it is performed.

6.4.1 Indications

Absolute, because life-threatening to the mother (1 to 2% of all deliveries)[1]

- Severe, uncontrolled ante-partum bleeding (tachycardia and hypotension).
- Malpresentation that cannot be turned (shoulder, brow or chin-posterior face).
- Absolute foeto-pelvic disproportion (partograph showing a failure to progress in the active phase of labour despite good uterine dynamics) and no possibility of instrumental extraction.
- Uterine rupture.
- History of 3 or more caesarean sections.

Relative

The decision to perform caesarean section should consider the risk/benefit for the mother and the infant in the given context: access to services and the availability and level of neonatal care.
The risks to the mother should be evaluated in the short term (death, infection, thrombo-embolism, etc.) and the medium/long term (future uterine rupture, placenta praevia or accreta during another pregnancy, etc.). In low-resource contexts with difficult access to services and a high fertility rate, both the immediate and the medium and long term risks to the mother often outweigh the potential benefits to the infant.

6.4.2 Prerequisites for performing a caesarean

- Skilled human resources for determining whether surgery is indicated, administering the anaesthesia and performing the surgery.
- Appropriate facilities (operating room, sterilisation, post-operative recovery room and blood transfusion).
- Appropriate equipment.
- Appropriate care and monitoring.

6.4.3 Pre-operative care

- Patient's consent.
- Anaesthesia evaluation.
- Routine prophylaxis against gastric acid aspiration:
  cimetidine PO (effervescent tablet): 200 mg in 30 ml of water, 20 minutes prior to surgery

6.4.4 Peri-operative care

– Standard skin preparation.
– Foley catheter insertion.
– Routine antibiotic prophylaxis:
cefazolin slow IV[c]: 2 g as a single dose (to be preferably administered 15 to 60 minutes prior to incision, otherwise, at incision)[2], EXCEPT if prolonged rupture of membranes, maternal fever, frank chorioamnionitis, peritonitis, infected or prolonged uterine rupture or septic shock. In these cases, administer the appropriate antibiotic therapy[d].
– Administration of **oxytocin**:
  • 10 IU by slow IV injection routinely after clamping the cord
  Then
  • 20 IU in 1 litre of Ringer lactate administered over 2 hours at a rate of 160 drops per minute (in the event of persistent haemorrhage, up to 60 IU maximum).

6.4.5 Post-operative care

– Close initial monitoring:
Vital signs, bleeding, analgesia, etc. in the recovery room.
Transfer to inpatient unit after consulting anaesthetist.
– Analgesics (by oral route whenever possible):
  • Routine analgesics on a fixed schedule:
  Day 0 to Day 1, **tramadol**: 50 mg every 8 hours
  Day 0 to Day 3, **ibuprofen**: 400 mg every 8 hours
  Day 0 to Day 5, **paracetamol**: 1 g every 6 hours
  Adjust according to the pain self-assessment. If necessary, add **morphine**: 10 mg every 4 hours.
  • Routine, regular pain self-assessment (self-assessment scale): see the MSF handbook, *Clinical guidelines*.
  • Respect the contra-indications; avoid non-steroidal anti-inflammatory drugs in situations where clotting and renal function may be compromised (sepsis, pre-eclampsia).

  The surgeon may infiltrate the wound at the end of the procedure with **levobupivacaine 0.5%** (150 mg or 2 mg/kg, maximum 30 ml); this provides increased pain relief in the first 4 to 8 hours after surgery.
– Thromboprophylaxis:
Not done routinely for uncomplicated caesarean sections. Desirable, with a low-molecular-weight heparin, in the event of:
  • caesarean section with hysterectomy;
  • history of deep vein thrombosis;
  • two risk factors for thromboembolism (infection, prolonged labour, pre-eclampsia, severe bleeding or sickle cell disease).
– Infusion and IV catheter:
If uncomplicated caesarean section:
  • Day 0: 1 litre of 5% glucose and 1 litre of Ringer lactate over 24 hours.
  • Day 1: remove the IV catheter.

[c] In patients with a history of immediate hypersensitivity reaction to penicillin (urticaria, respiratory problems or oedema): **clindamycin** IV, 900 mg as a single dose.

[d] Intrauterine foetal death, tinged or meconium-stained amniotic fluid and an initial attempt to extract vaginally are not indications for antibiotic therapy.

- Feeding:
  - Spinal anaesthesia: fluids may be resumed 2 hours post-operatively.
  - General anaesthesia: fluids may be resumed 4 hours post-operatively.
  - Uncomplicated caesarean section (no hysterectomy or pelvic peritonitis): light meal may be given 6 hours post-operatively. It is not necessary to wait until the patient passes gas.
- Urinary catheter:
  Routine catheter removal on Day 1, unless:
  - Blood-stained urine when catheter is removed.
  - Urine output < 500 ml/24 hours.
  - Peri/post-operative complication (wait to consult the surgeon and/or anaesthetist).
- Early mobilisation:
  - Day 0: mobilisation at the edge of the bed beginning 6 hours post-operatively.
  - Day 1: patient out of bed for the first time.
- Dressing and suture removal:
  - If hygiene conditions are good: uncover wound on Day 1.
  - Otherwise, remove dressing on Day 5 (or at discharge if stay less than 5 days). There is no need to change the dressing every day.
  - Remove skin sutures (if not absorbable) on Day 7.
- Cleaning:
  Simple shower; no intravaginal cleansing.
- Breast-feeding:
  - Begin breast-feeding as soon as possible.
  - Monitor the infant (risk of drowsiness if the mother receives tramadol or morphine).
- Documentation:
  - Operative report.
  - On discharge: give patient a document specifying the reason for the caesarean section and the type of hysterotomy performed (classical/low transverse), to aid in deciding the route of delivery for a subsequent pregnancy.

References

1 UON Network. Tackling Unmet Need for Major Obstetric Interventions. Concepts, General Principles and International Network. http://www.uonn.org/pdf/Guide1.pdf

2 Sullivan SA, Smith T, Chang E, et al. Administration of cefazolin prior to skin incision is superior to cefazolin at cord clamping in preventing postcesarean infectious morbidity: a randomized, controlled trial. Am J Obstet Gynecol 2007; 196; 455.e1-455.e5.

Chapter 7:
Labour dystocia and malpresentations

7.1 Prolonged labour

Excessively prolonged dilation or delivery. The term “prolonged labour” applies only at or after 4 cm dilation and 3 contractions per 10 minutes. Before that point, it is usually a question of “false labour” (i.e. prolonged latent phase).

Prolonged labour can be due to foeto-pelvic disproportion (mechanical dystocia) and/or inadequate contractions (dynamic dystocia).

The main risks of prolonged labour are obstruction (Section 7.2) and foetal distress.

7.1.1 Diagnosis

– Protracted cervical dilation (dilation progresses less than 1 cm/hour during the active phase);

or

– The foetus has failed to engage after more than 1 hour of complete dilation in a multipara and 2 hours of complete dilation in a primipara;

or

– The active pushing phase until birth of the infant is longer than 30 minutes in multipara and 1 hour in primipara.

7.1.2 Management

See algorithms on following pages.
For general patient care during labour, see Chapter 5, Section 5.1.4.

Notes:

– Oxytocin is contra-indicated in case of frank foeto-pelvic disproportion (risk of uterine rupture).

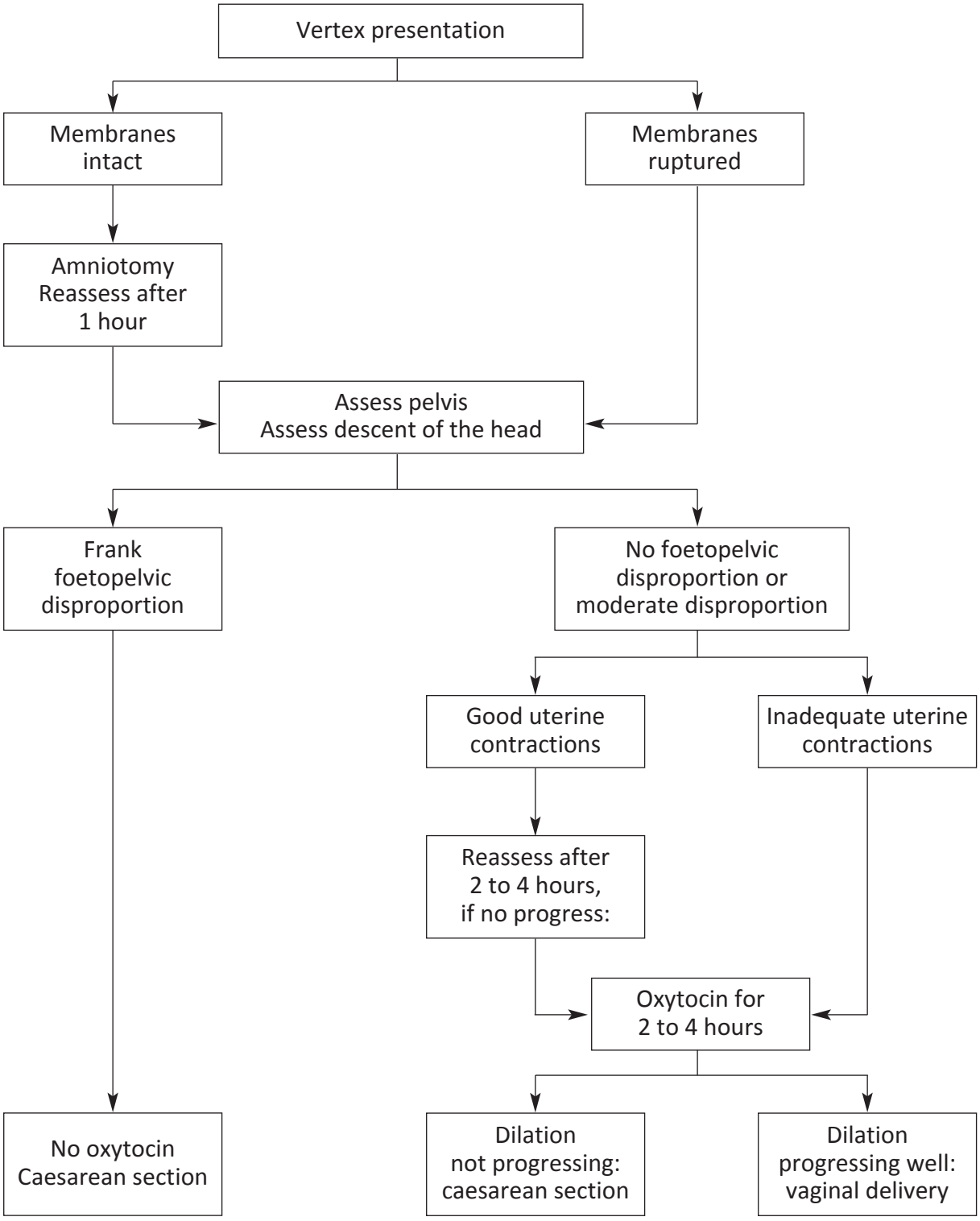
– In case of foetal distress (prolonged deceleration of the foetal heart rate to less than 100 beats per minute after each uterine contraction) and if the foetus is viable:
  - At complete dilation, with the presenting part engaged: instrumental delivery (Chapter 5, Section 5.6);
  - Prior to complete dilation, or at complete dilation with presenting part not engaged: consider caesarean section earlier than in the algorithms, but the context needs to be taken into account when deciding a caesarean section for exclusive foetal indication (Chapter 6, Section 6.4).

  In either case, do not use—or stop, if already using—oxytocin.

– If the foetus is dead, avoid caesarean section whenever possible. Allow more time for dilation and engagement. Consider embryotomy (Chapter 9, Section 9.7).

Management of protracted cervical dilation

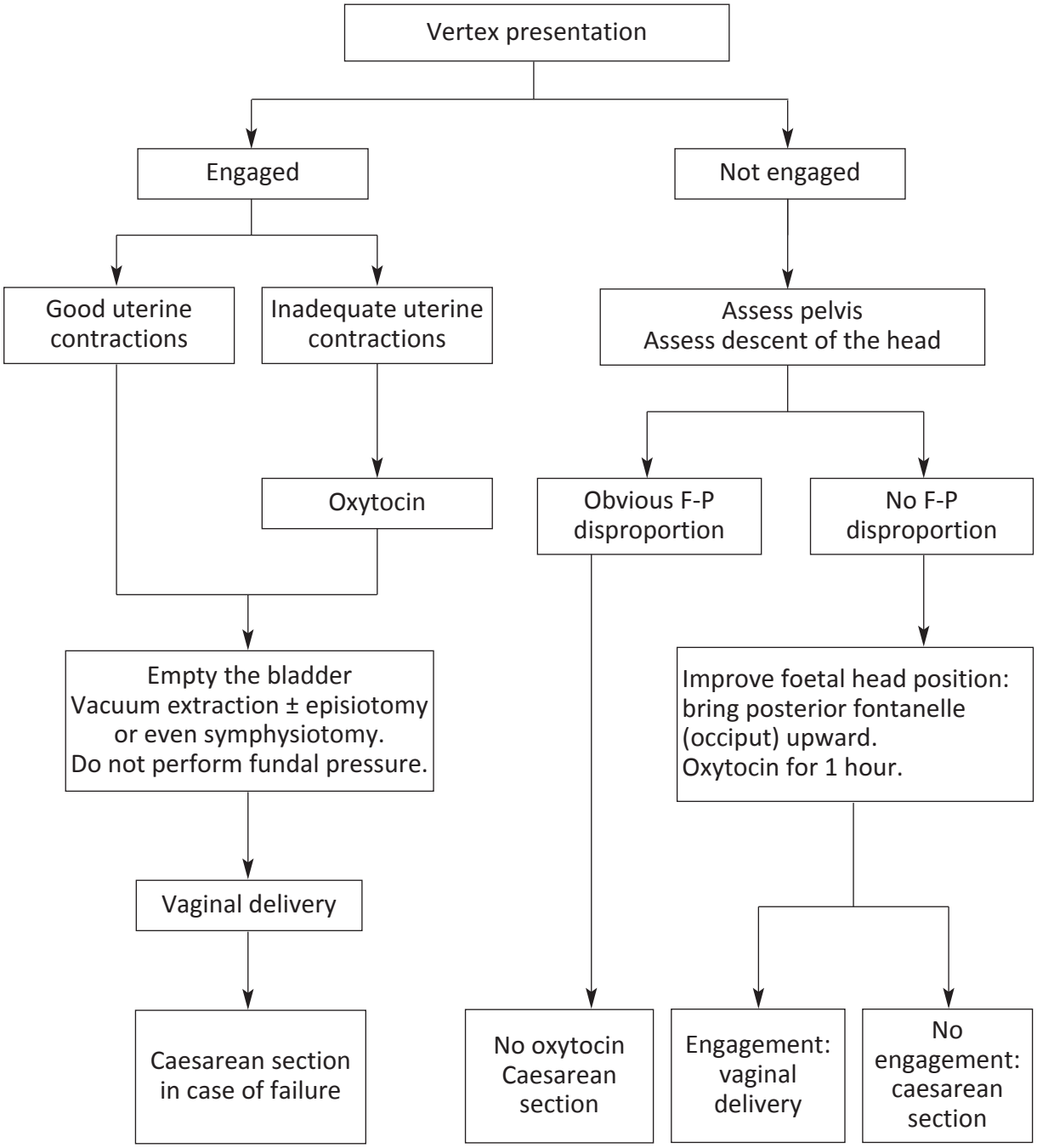
Crossing of the partograph action line
or more than 4 hours at the same dilation



For other presentations, see *Breech presentation* (Chapter 6, Section 6.1), *Transverse lie and shoulder presentation* (Section 7.6), *Face presentation* (Section 7.9), *Brow presentation* (Section 7.10).

Management of protracted foetal descent at complete dilation

No engagement after 1 hour (multipara) and 2 hours (primipara) and/or no delivery despite good expulsive efforts after 30 minutes (multipara) and 1 hour (primipara)



For other presentations:

– *Breech presentation*: caesarean section or, in rare cases, manoeuvres (do not attempt any manoeuvre on a non-engaged breech);

– *Shoulder, chin-posterior face, or brow presentation*: caesarean section.

7.2 Obstructed labour

Active labour which lasts longer than 24 hours, sometimes several days.

7.2.1 Diagnosis

- Dehydration.
- Possible hypovolaemic shock.
- Patient dazed, anxious, agitated, in pain.
- Imminent uterine rupture (pathological retraction ring, hourglass shape, see Chapter 3, Section 3.3).
- Amniotic infection: fever, foul-smelling amniotic fluid.
- Distended bladder.
- On vaginal examination:
  - oedematous cervix;
  - depending on the presentation:
    Vertex: caput that may reach the vaginal opening, but vertex itself not engaged and pelvis seems narrow;
    Breech: retention of aftercoming head;
    Transverse: neglected shoulder, prolapsed arm and hand.
- Foetus often dead or in life-threatening condition.

7.2.2 Possible causes

- Foeto-pelvic disproportion (including malpresentations and praevia obstructions).
- Pushing with an incompletely dilated cervix.

7.2.3 Complications

- Uterine rupture.
- Uterine infection, septicaemia, peritonitis.
- Compression injuries to the bladder and rectum, leading to the formation of fistulae.
- High maternal and foetal mortality.

7.2.4 Management

- Insert an IV line (16-18G catheter), fluid resuscitation (Ringer lactate or 0.9% sodium chloride).
- Insert a urinary catheter, if it is possible without damaging the urethra. Otherwise, insert suprapubic catheter. Relieving the bladder distension is sometimes enough to produce delivery.
- Depending on the cause of the obstruction and the medical equipment available:
  - The foetus is alive and viable: caesarean section.
  - The foetus is non-viable or if there is no possibility of caesarean section: symphysiotomy, episiotomy and vacuum extraction.
  - The foetus is dead: embryotomy.
- Antibiotic therapy for prolonged rupture of membranes or a rupture of unknown duration (Chapter 4, Section 4.9) and for chorioamnionitis (Chapter 11, Section 11.4.2).

– There is a significant risk of postpartum haemorrhage due to uterine atony: if active management of third stage labour fails, quickly perform manual removal of placenta then, administer oxytocin.
– Speculum examination: if tissue necrosis, excision under sterile conditions.
– Perineal and vulvar toilet, 2 times daily.

7.2.5 Prevention/management of vaginal fistulae[a]

– Encourage the patient to drink 4 to 5 litres of water per day.
– Leave the urinary catheter in place for 14 days, then:
  • If there is no fistula: remove the urinary catheter.
  • If the fistula is ≤ 4 cm diameter, attempt conservative treatment. Leave the urinary catheter in place for at least 4 to 6 weeks to allow fistula to heal. Keep the catheter in place as long as the fistula is not closed and as long as a gradual decrease of its diameter is observed at each weekly inspection.
  • If the fistula is > 4 cm diameter or the conservative treatment fails or the patient has fistula for over 3 months, refer or register the patient for surgical treatment.

[a] For more information on vaginal fistulae, see: Guiding principles for clinical management and programme development Obstetric Fistula. World Health Organization, Geneva 2006. http://whqlibdoc.who.int/publications/2006/9241593679_eng.pdf?ua=1

7.3 Labour induction

Triggering labour artificially before it begins naturally.

Broadly speaking, induction is a two-step sequence: the first part involves cervical ripening (effacement, mid-position, early dilation), the second, induction of contractions that dilate the cervix.

7.3.1 Indications

Induction of labour is not an emergency procedure. It should be done only when there is a clear indication, in a CEmONC facility (refer if necessary) to allow rapid intervention in the event of complications (e.g., uterine rupture or foetal distress).

When referral to a CEmONC facility is not possible or there is limited (or no) foetal monitoring, indications are restricted to the following situations:
- Intrauterine foetal death (Chapter 4, Section 4.11);
- Maternal indication for termination of pregnancy and non-viable foetus;
- Severe pre-eclampsia and eclampsia (Chapter 4, Section 4.5 and 4.6);
- Premature rupture of membranes with risk of infection (Chapter 4, Section 4.9).

Notes:
- Prolonged pregnancy (over 41 weeks LMP) is traditionally considered an indication for inducing labour; this is not made in practice, however, due to the frequent uncertainty about the due date.
- Suspected foetal macrosomia at term is not an indication for induction.

7.3.2 Methods[1]

Administration of prostaglandins

misoprostol 200 micrograms tablet:
25 micrograms PO (dissolve one tablet in 200 ml of water and give 25 ml of this solution) every 2 hours until good contractions are obtained; do not exceed 150 micrograms total dose;
or
50 micrograms vaginally into the posterior fornix (a quarter tablet) every 6 hours until good contractions are obtained; do not exceed 150 micrograms total dose.

Note: dose of misoprostol is different in case of intrauterine foetal death (Chapter 4, Section 4.11).

or
dinoprostone gel: 1 mg vaginally into the posterior fornix. A second dose may be administered after 6 hours if the patient has not gone into labour.

Wait 6 hours[2] after the last dose of prostaglandins before using oxytocin during labour.

Artificial rupture of membranes and administration of oxytocin

Artificial rupture of membranes (Chapter 5, Section 5.3) is performed while applying gentle pressure (if needed) on the head through the abdomen to prevent cord prolapse.

Administration of oxytocin alone

This is not as effective as the other methods, but may be used if:
– Prostaglandins are not available;
– Bishop score is ≥ 6 (Table 7.1);
– Artificial rupture of membranes is not feasible because the foetal head is too high.

Mechanical method using a Foley catheter balloon

Wear sterile gloves. With a speculum in place, insert a 16-18G Foley catheter into the cervical canal, guiding it with fingers or forceps. Inflate the balloon with sterile water in 10 ml increments until it is well inflated in the cervix (30 ml, on average) and apply continuous light pressure (catheter taped to the inner thigh) for 24 hours maximum.

Stripping the membranes

During the vaginal examination, if the cervix is open, insert one finger into the internal os and separate the membranes with a circular motion. This can help start labour, or at least cervical ripening, in the following hours or days.

7.3.3 Conditions

The choice of induction method depends on the initial degree of cervical ripening. The riper the cervix, the more effective and rapid the induction.

Assessment of the cervix is facilitated by a scoring system for cervical ripening: the Bishop score.

Table 7.1 - Bishop Score (the higher the score, the riper the cervix)

Criteria	0	1	2	3
Cervical dilation (at the internal os)	closed	1 finger	2 fingers	> 2 fingers
Cervical length	long	mid-length	short	effaced
Position of the foetal head relative to the ischial spines, in cm (foetal station)	–3	–2	–1 or 0	+1 or +2
Cervical consistency	firm	medium	soft	
Cervical position	posterior	mid position		

The cervix is considered ripe, that is, favourable to induction, if the score is 6 or greater. Labour is induced by artificially rupturing the membranes and administering oxytocin.

If the cervix is unfavourable or unripe (score below 6, with at most a long, firm, posterior cervix), ripen the cervix using a prostaglandin before triggering contractions with oxytocin or, if prostaglandins are not available, use a mechanical method and then oxytocin.

Special situations

– Scarred uterus:
  - Foetus alive and viable: prostaglandins are contra-indicated:
    - if the cervix is unfavourable: mechanical induction and oxytocin or caesarean section;
    - if the cervix is favourable: artificial rupture of membranes and oxytocin at half-dose.
  - Foetus alive but non-viable: as for intrauterine foetal death.
– Intrauterine foetal death: see Chapter 4, Section 4.11.

7.4 The use of oxytocin during labour

7.4.1 Indications

– Induction of labour.
– Correction of a dynamic dystocia: delayed dilation in a woman in labour, with arrest for more than 2 hours, due to inadequate uterine contractions. The cervix must be dilated more than 3 to 4 cm, and effacement in progress. The membranes must have been ruptured.
– Contractions fail to resume 15 minutes after the birth of a first twin.

7.4.2 Risks of using oxytocin during labour

– Maternal risk: uterine rupture, especially in a scarred uterus, but in a sound uterus as well, particularly if it is overdistended (multiparity, polyhydramnios, multiple pregnancy) or if there is major foeto-pelvic disproportion.
– Foetal risk: foetal distress due to uterine hypertony (uterine contraction without relaxation).

7.4.3 Contra-indications to the use of oxytocin during labour

– Obvious foeto-pelvic disproportion, including malpresentation (brow, transverse, etc.).
– Complete placenta praevia.
– Spontaneous uterine hypertony.
– Foetal distress.
– Two or more prior caesarean sections.
– Prior classical caesarean section (vertical uterine incision).
– Absence of medical indication.

7.4.4 Situations requiring special precautions

– Prior single low transverse caesarean section.
– Grand multiparity.
– Overdistended uterus.

Oxytocin may be used to correct a dynamic dystocia during labour, provided the following conditions are respected:
1) maximum infusion rate of 30 drops/minute for 5 IU in 500 ml;
2) interval of at least 30 minutes between dose increases.

7.4.5 Conditions for oxytocin use

– Given the risk to both mother and foetus, use of oxytocin during labour requires:
  • close maternal monitoring (check for hyperstimulation, dystocia and imminent rupture at least every 30 minutes);
  • close foetal monitoring (check for decelerations in heart rate at least every 30 minutes);
  • proximity to an operating theatre, in order to perform prompt caesarean section if needed.
– Position the patient on her left side.

In case of foetal distress, uterine hyperkinesia (more than 5 contractions in 10 minutes) or uterine hypertony (absence of uterine relaxation): stop the oxytocin.

After delivery, however, there is no risk of uterine rupture or foetal distress, and oxytocin can be used more readily.

Table 7.2 - Use of oxytocin

Indications	Precautions before administration	Technique	Monitoring during administration
During labour			
Labour induction	• On vaginal exam, assess cervical dilation and effacement, and engagement. • The harder and more closed the cervix and the higher the station, the harder induction will be. • Verify the absence of foetal distress.	• Dilute 5 IU in 500 ml or 10 IU in 1 litre of Ringer lactate or 0.9% sodium chloride. • Start at 5 to 8 drops/minute, then increase by 5 to 8 drops/minute every 30 minutes, until contractions are effective (3 contractions of more than 40 seconds in 10 minutes). On average, 20 drops/minute results in satisfactory uterine contractions. Do not exceed 60 drops/minute. • Once the infant has delivered: - use the existing IV line to administer the appropriate dose of oxytocin for prevention of postpartum haemorrhage; - let the current infusion finish.	• Appearance and quality of contractions, uterine relaxation. • Foetal heart rate. • General condition of the mother. • Cervical dilation. Rupture the membranes as soon as possible. If the woman has not gone into labour after 8 hours: stop the infusion and start again the next day, if delivery is not urgent.
Correction of dynamic dystocia	• Cervix at least 3-4 cm on vaginal exam. • Spontaneous or artificial rupture of membranes. • No foeto-pelvic disproportion.	As for labour induction.	• Resumption or augmentation of contractions, uterine relaxation. • Foetal heart rate. • General condition of the mother. • Cervical dilation.
No contractions 15 minutes rth of first twin	• Verify that presentation is vertical (not transverse).	• Start or resume oxytocin infusion. • As for labour induction, but increase more rapidly: 5 drops every 5 minutes.	• Resumption or augmentation of contractions, uterine relaxation. • Foetal heart rate.
Note: outside of labour, oxytocin is use as below			
Haemorrhage due to uterine atony	• First, manually remove the placenta, if needed. • Routine uterine exploration.	IV infusion over 2 hours of 20 IU in 1 litre of Ringer lactate or 0.9% sodium chloride at a rate of 160 drops/minute. At the same me, give 5 to 10 IU by slow IV injec on; repeat if necessary un l the uterus becomes firm and contracted; do not exceed 60 IU total dose.	• Heart rate, blood pressure, blood loss. • Uterine retraction.
After caesarean se		10 IU by slow IV i clamping the cord then 20 IU by IV infusion in 1 litre of Ringer lactate or 0.9% sodium chloride over 2 hours at a rate of 160 drops/minute.	• Uterine retraction.
Prevention of post-partum haemorrhage	• Verify that there is no 2nd twin.	5 to 10 IU by slow IV or IM injec on, before or a er the 3rd stage, depending on staff exper se.	

7.5 Shoulder dystocia

Delivery cannot progress after the head is out, because the shoulders are impacted in the pelvis. Shoulder dystocia is especially common when the foetus is large.

This is a life-threatening emergency for the foetus (distress, rapid death by asphyxiation).

Additional assistants are required. Explain the situation to the assistants and the patient to obtain their cooperation.

7.5.1 Management

The HELPERR mnemonic is a useful tool for addressing this emergency[3]:

H	Call for Help
E	Evaluate for Episiotomy
L	Legs (the McRoberts manoeuvre)
P	Suprapubic Pressure
E	Enter manoeuvres (internal rotation)
R	Remove the posterior arm
R	Roll the patient

H: Call for help.

E: Evaluate for episiotomy

Episiotomy is not routinely needed since the shoulder is impacted on the bony pelvis. However, it can be performed to make more room for manoeuvres.
The recommended time for attempting manoeuvres is 30 seconds to 1 minute each. An assistant should inform the operator how much time has passed.

L: McRoberts manoeuvre (hyperflexion of the mother's thighs)

Ask two assistants to push the patient's knees firmly toward her chest. This manoeuvre alone is effective in releasing a shoulder in more than 70% of cases.

P: Suprapubic pressure

While maintaining the hyperflexion of the thighs, an assistant presses firmly just above the symphysis pubis to try to reduce the diameter of the shoulders and lower the anterior shoulder under the symphysis while the operator applies continuous downward traction on the foetal head. Do not apply fundal pressure, as this will impact the shoulder and can result in uterine rupture.

E: Internal manoeuvres

If this fails, perform internal rotation manoeuvres while maintaining the hyperflexion of the thighs. There are several options, depending on whether there is easier access to the anterior or posterior shoulder:

- Rubin's manoeuvre: insert the fingers of one hand behind the anterior shoulder and push toward the foetal chest to try to free the shoulder.
- Wood's corkscrew manoeuvre, to be combined with Rubin's manoeuvre: place two fingers of the free hand against the front of the posterior shoulder and apply pressure to free the shoulders by turning (in a corkscrew manner).
- Reverse Wood's corkscrew manoeuvre: similar, but rotating in the opposite direction.

R: Remove the posterior arm

If this fails, bring down one foetal arm to reduce the diameter of the shoulders and allow delivery:

– Kneel to get the proper axis of traction.
– Reach in to find the posterior arm, and bring it to the vaginal opening: slide a hand behind the foetus' head and move it along his arm, trying to get hold of his hand. Grasp it and draw it down along his abdomen to the vaginal opening. The delivery can then continue.
– If it is impossible to get hold of the hand, place two fingers along the humerus, like a splint. Bend the elbow and sweep the humerus across the chest to bring down the arm.

R: Roll the patient onto her hands and knees

Roll the patient to “all-fours position”. The pelvic diameters increase in this position.

Carefully examine the vagina after these manoeuvres, since lacerations are common.

 Above all, do not:

– Apply excessive traction to the foetal head, as this can rupture the brachial plexus on the side of the anterior shoulder.
– Pivot the head by twisting the neck, as this can also cause neurological injury.

7.5.2 Methods of last resort

– General anaesthesia to relax the muscles.
– Fracture of the foetal clavicle by direct pressure on the middle part of the clavicle.
– Symphysiotomy (Chapter 5, Section 5.7).
– Embryotomy in case of foetal death and failure of the manoeuvres (Chapter 9, Section 9.7).
– Push the head back in (very difficult), then perform caesarean section.

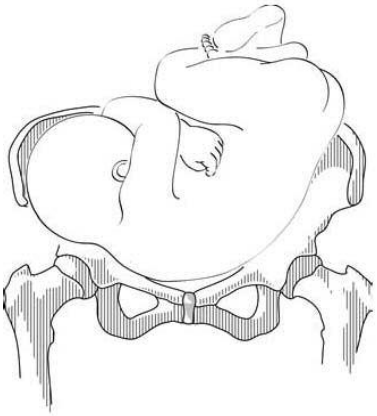
7.6 Transverse lie and shoulder presentation

A transverse lie constitutes an absolute foeto-pelvic disproportion, and vaginal delivery is impossible.

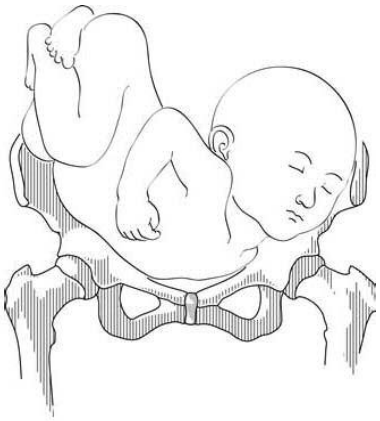
This is an obstetric emergency, because labour is obstructed and there is a risk of uterine rupture and foetal distress.

7.6.1 Diagnosis

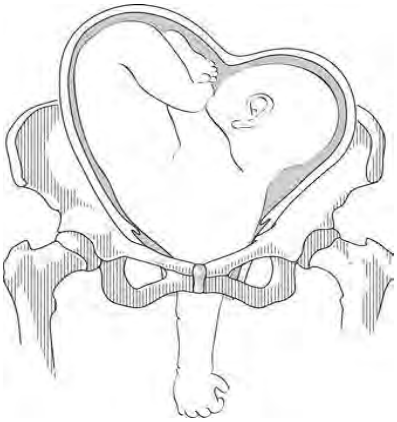
- The uterus is very wide: the transverse axis is virtually equivalent to the longitudinal axis; fundal height is less than 30 cm near term.
- On examination: head in one side, breech in the other (Figures 7.1a and 7.1b). Vaginal examination reveals a nearly empty true pelvis or a shoulder with—sometimes—an arm prolapsing from the vagina (Figure 7.1c).



7.1a: Dorsoinferior (back down) left shoulder presentation



7.1b: Dorsosuperior (back up) left shoulder presentation



7.1c: Neglected shoulder presentation

Figures 7.1
Transverse lie and shoulder presentation

7.6.2 Possible causes

– Grand multiparity.
– Uterine malformation.
– Twin pregnancy.
– Prematurity.
– Placenta praevia.
– Foeto-pelvic disproportion.

7.6.3 Management

This diagnosis should be made before labour begins, at the final prenatal visit before the birth.

At the end of pregnancy

Singleton pregnancy

– External version 4 to 6 weeks before delivery, in a CEmONC facility (Section 7.7).
– If this fails, delivery should be carried out by caesarean section, either planned or at the beginning of labour (Chapter 1, Section 1.3.2).

Twin pregnancy

– External version is contra-indicated.
– If the first twin is in a transverse lie (unusual): schedule a caesarean section.
– If the second twin is in a transverse lie: there is no strict indication for caesarean section, but plan delivery in a CEmONC facility so that it can be performed if necessary. Deliver the first twin and then, depending on the experience of the operator, perform external and/or internal version on the second twin.

During labour, in a CEmONC facility

The foetus is alive and the membranes intact

– Gentle external version, between two contractions, as early as possible, then proceed as with normal delivery.
– If this fails: caesarean section.

The foetus is alive and the membranes ruptured

– Complete dilation:
  • Multipara with relaxed uterus and mobile foetus, and an experienced operator: internal version and total breech extraction.
  • Primipara, or tight uterus, or immobile foetus, or engaged arm, or scarred uterus or insufficiently-experienced operator: caesarean section.
– Incomplete dilation: caesarean section.
  Caesarean section can be difficult due to uterine retraction. Vertical hysterotomy is preferable. To do the extraction, get hold of a foot in the fundus (equivalent to a total breech extraction, but by caesarean section).

The foetus is dead

Embryotomy for transverse lie (Chapter 9, Section 9.7.7).

During labour, in remote settings where surgery is not available

The foetus is alive and the membranes intact

Try to refer the patient to a CEmONC facility. Otherwise:
– Attempt external version as early as possible.
– If this fails, wait for complete dilation.
– In order to perform version under the proper conditions, perform general or spinal anaesthesia, depending on what is possible.
– Perform an external version (Section 7.7) combined with an internal version (Section 7.8), perhaps using various positions (Trendelenburg or knee-chest).

The foetus is alive and the membranes ruptured

Try to refer the patient to a CEmONC facility. Otherwise:
– Complete dilation:
  • Put the woman into the knee-chest position.
  • Between contractions, push the foetus back and try to engage his head.
  • Vacuum extraction (Chapter 5, Section 5.6.1) and symphysiotomy (Chapter 5, Section 5.7) at the slightest difficulty.
– Incomplete dilation: Trendelenburg position and watchful waiting until complete dilation.

The foetus is dead

Try to refer the patient, even if referral takes some time.
Otherwise, embryotomy for transverse lie (Chapter 9, Section 9.7.7).

7.7 External version

A procedure to convert:
– a transverse lie into a longitudinal (cephalic or breech) presentation,
or
– a breech presentation into a cephalic presentation.

7.7.1 Conditions

– Pregnancy near term (37 weeks LMP).
– Prior to labour, or at the very start of labour.
– Relaxed uterus.
– No obstacle to vaginal delivery.
– Membranes intact.

External version is very rarely associated with complications. Complications have, however, been reported (placental abruption, rupture of a scarred uterus and foeto-maternal haemorrhage). Therefore, this manoeuvre should only be attempted in a CEmONC facility.

7.7.2 Contra-indications

Absolute

– Placenta praevia.
– Twin pregnancy (for the first twin).

Relative

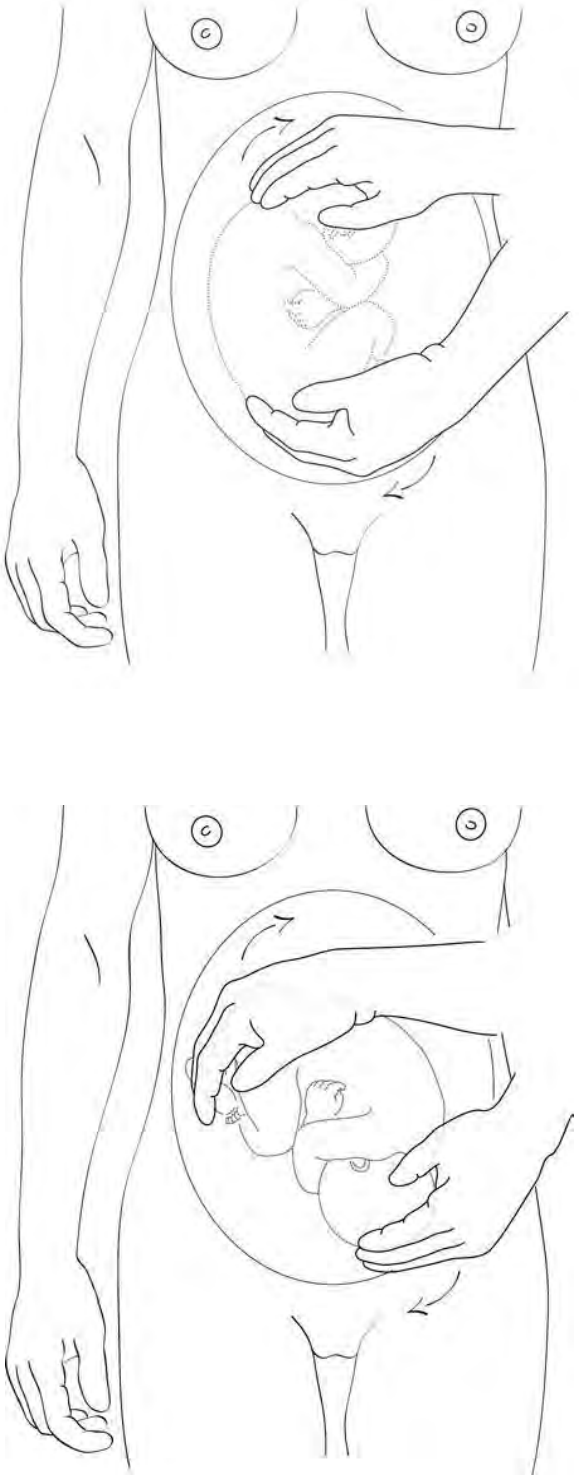
– Foetal distress.
– Severe intrauterine growth restriction.
– Prematurity.
– Scarred uterus.
– HIV infection.

Note: in case of transverse lie when referral is not possible, in the interest of the mother external version may be attempted to permit vaginal delivery, without taking into account relative contra-indications.

7.7.3 Technique

– Woman lying on her back, legs half bent, bladder empty.
– Perform when the uterus is relaxed.
– First, push back the breech or shoulder, which is often down in the pelvis (vertical movement), then attempt rotation slowly, and always in the direction of foetal flexion: thus bringing either the head or the breech to the pelvic inlet by the shortest possible route (Figures 7.2).

– Monitor the foetal heart rate after each attempt, and stop if the rate slows. In most cases, foetal heart rate abnormalities improve within 30 minutes.
– External version should be followed by 24 hours of bed rest and monitoring.



Figures 7.2
Version to convert a breech presentation to a cephalic presentation

7.8 Internal version

Manual intrauterine procedure to convert one presentation to another, usually a transverse lie into a breech.

7.8.1 Indications and conditions

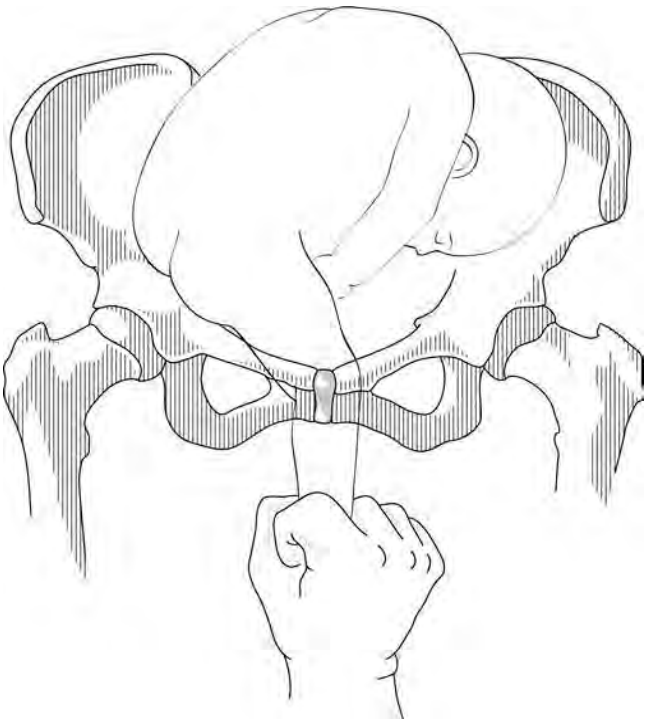
– Shoulder presentation during labour, at complete dilation with a relaxed uterus. This manoeuvre should be performed with extreme caution (risk of uterine rupture).
– Delivery of a second twin in cephalic presentation or transverse lie: version to bring the foetus into the breech position and allow a total breech extraction (Chapter 6, Section 6.3).
– Conditions necessary in all cases: normal pelvis, presenting part not engaged, bladder empty.
– Grasping one or both feet is best done through membranes that have been left intact[4].

7.8.2 Technique

– Strict asepsis: swab perineum with 10% polyvidone iodine, wear sterile gloves.
– Perform anaesthesia if possible.
– Insert the hand and determine the position of the foetus:
  • with the fingers in the form of a cone, go through the vaginal opening and the cervix toward the fundus;
  • hold the fundus in place with the other hand on the abdomen.
– Grasp one foot or if possible both feet, firmly, without haste but not too slowly, since a prolonged manoeuvre might cause the uterus to contract (Figure 7.3a). It is better not to rupture the membranes immediately because the uterine retraction and lack of amniotic fluid will make it difficult to grasp and move the foetus. The membranes will spontaneously rupture when pulling the foot or will be artificially ruptured once the foot is down.
– Pull the foot/feet gently to the vaginal opening (Figure 7.3b).
– The delivery then continues as a breech delivery, ending with a total extraction if a twin, or normally, if not.
– Manually explore the uterus after delivery of the placenta (to look for uterine rupture), and administer routinely antibiotic prophylaxis (**cefazolin** or **ampicillin** slow IV: 2 g as a single dose)[b].

[b] For patients with a history of immediate hypersensitivity reaction to penicillin (urticaria, respiratory problems or oedema): **clindamycin** IV, 900 mg as a single dose.

7.3a: Catch hold of one foot (preferably both feet)



7.3b: Bring the foot/feet down to the vaginal opening

Figures 7.3
Internal version

7.9 Face presentation

7.9.1 Diagnosis

– Palpation of the mother's abdomen at the start of labour: palpate the occipital region; a cleft between the head and the back will be palpable, due to hyperextension of the head.
– On vaginal examination: no suture or fontanelle can be felt; orbits, nose, mouth, ears and chin palpable. Palpation of the chin is essential to confirm the diagnosis.

7.9.2 Management

Determine the orientation of the chin—anterior (at the mother's pubis) or posterior.

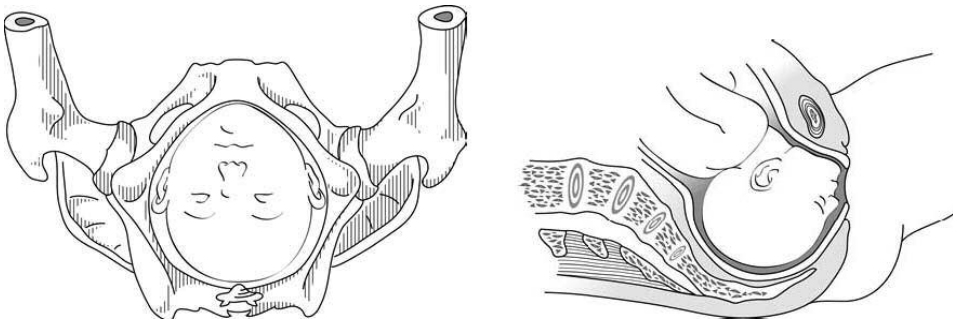
The chin is anterior

Vaginal delivery is possible. Labour may be slow, patience is required.

If uterine contractions are inadequate, oxytocin may be used.

Episiotomy is usually needed during delivery (Figures 7.4), given the maximum amount the perineum can stretch.

If instrumental delivery is necessary, use forceps. Vacuum extraction is contra-indicated for a live infant.



Figures 7.4
Chin anterior: delivery possible

The chin is posterior

Vaginal delivery is not possible (Figure 7.5). A caesarean section must be arranged. Refer if necessary.

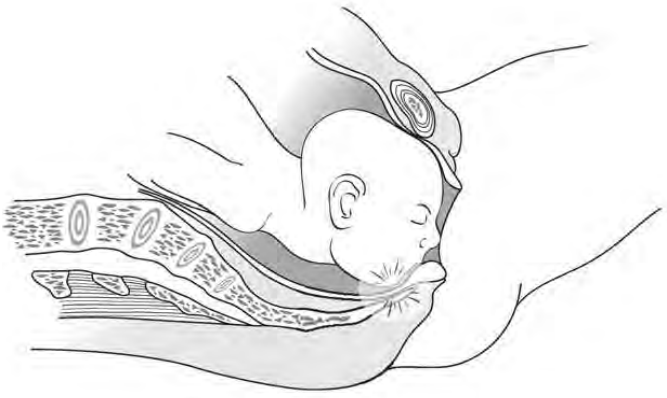
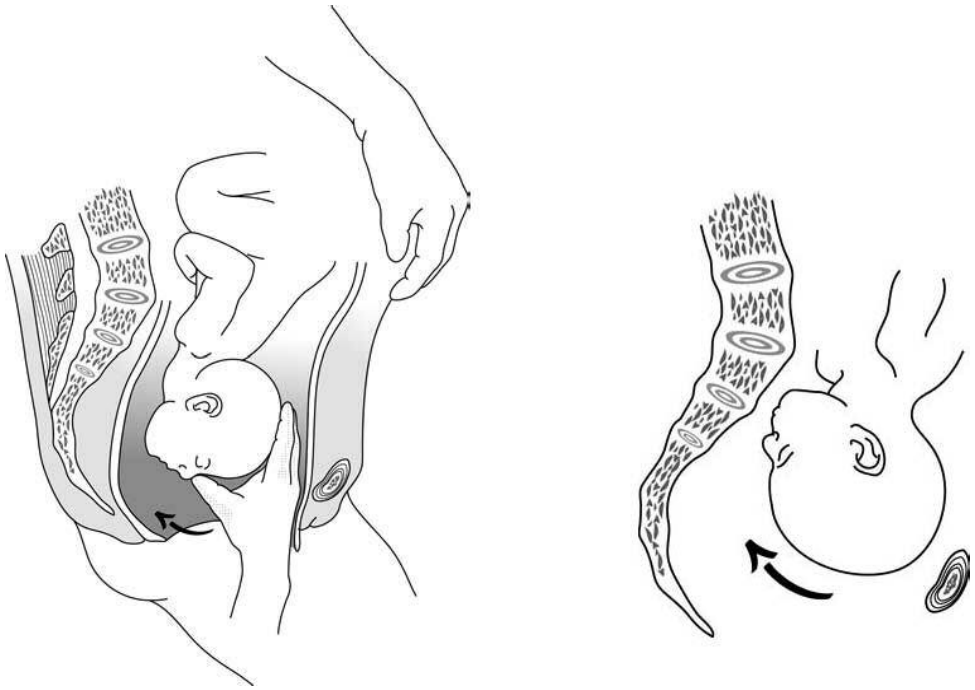


Figure 7.5
Chin posterior: impaction

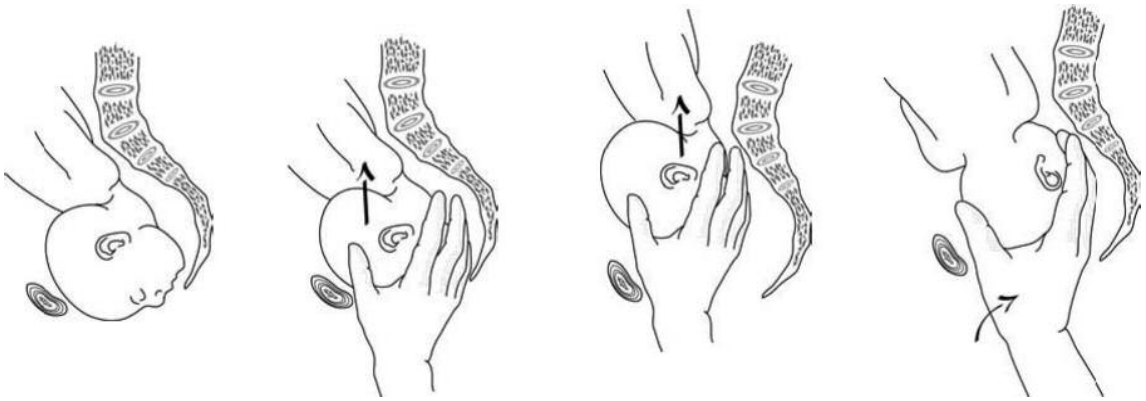
If caesarean section is not feasible and referral is not possible, attempt the following manoeuvres:

– Flex the head to obtain a vertex presentation: with one hand in the vagina, grasp the top of the skull and flex the neck, using the other hand, on the abdomen, to apply pressure to the foetal chest and buttocks. Obviously, the presenting part must not be engaged, and it is often hard—or impossible—to keep the head flexed (Figures 7.6).



Figures 7.6
Manoeuvre to convert face to vertex presentation

– Rotate the head to bring the chin anteriorly: push the face and chin back to free the shoulders from the pelvic inlet then, turn the head within the pelvic cavity, using a hand on the abdomen to help the rotation by applying pressure to the shoulders. In this way, the chin is brought to the front (Figures 7.7).



Figures 7.7
Rotation manoeuvre to bring the chin anteriorly

– Version: internal podalic version, then total breech extraction (Figure 7.8).

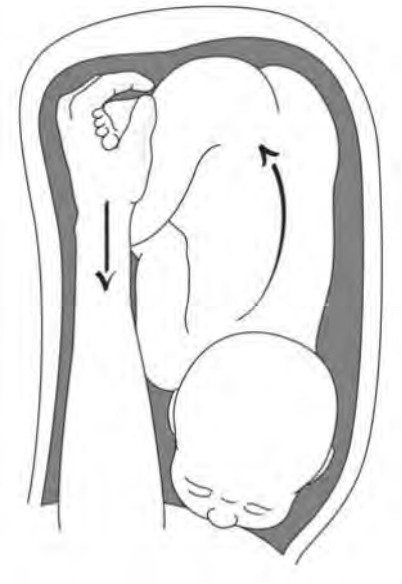


Figure 7.8
Internal podalic version

All these manoeuvres are difficult and pose a significant risk of uterine rupture. They must be done when the uterus is not contracting. Whenever possible, perform caesarean section instead.

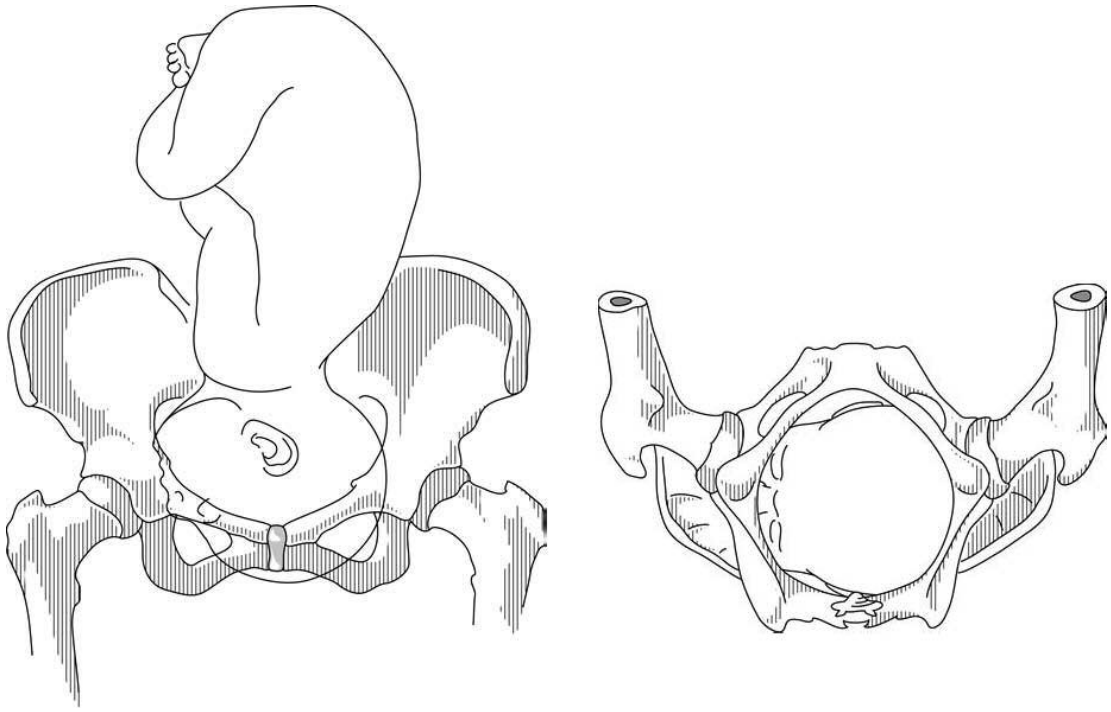
7.10 Brow presentation

Brow presentation constitutes an absolute foeto-pelvic disproportion, and vaginal delivery is impossible (except with preterm birth or extremely low birth weight).

This is an obstetric emergency, because labour is obstructed and there is a risk of uterine rupture and foetal distress.

7.10.1 Diagnosis

– Head is high; as with a face presentation, there is a cleft between the head and back, but it is less marked.
– On vaginal examination the brow, orbits, anterior fontanelle and, occasionally, the eyes and bridge of the nose are palpable (Figures 7.9). But it is not possible to palpate:
  • the chin (it is not a face presentation),
  • the posterior fontanelle (it is not a vertex presentation).



Figures 7.9
Brow presentation

Any mobile presenting part can subsequently flex. The diagnosis of brow presentation is, therefore, not made until after the membranes have ruptured and the head has begun to engage in a fixed presentation. Some brow presentations will spontaneously convert to a vertex or, more rarely, a face presentation.

During delivery, the presenting part is slow to descend: the brow is becoming impacted.

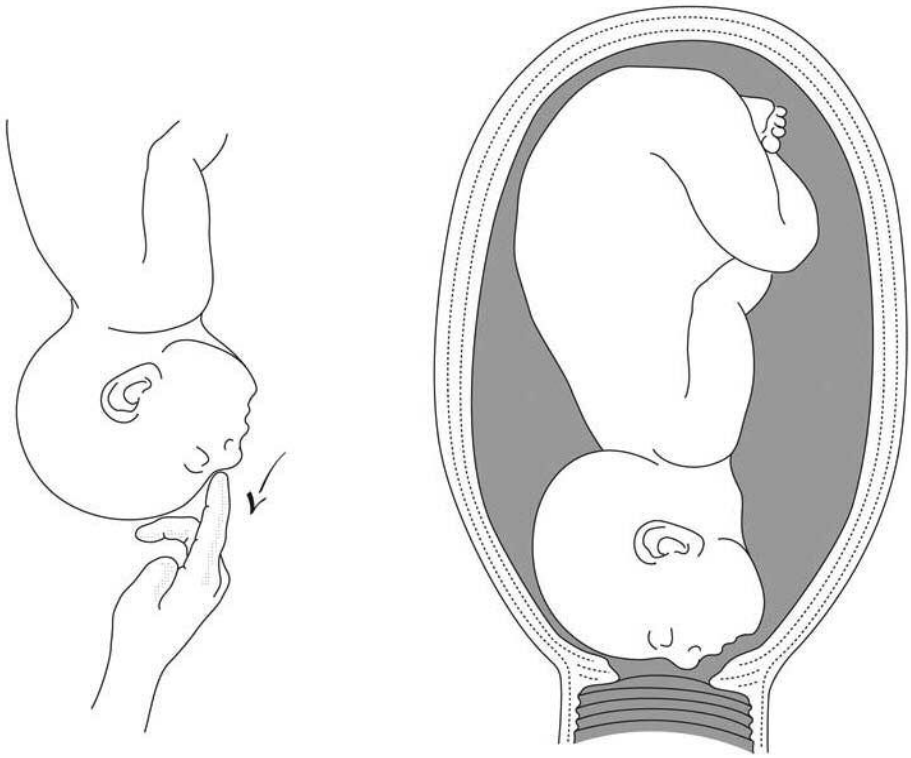
7.10.2 Management

The foetus is alive

– Perform a caesarean section. When performing the caesarean section, an assistant must be ready to free the head by pushing it upward with a hand in the vagina.

– As a last resort, if caesarean section is impossible, attempt two manoeuvres:
  • Convert the brow presentation to a face presentation: between contractions, insert the fingers through the cervix and move the head, encouraging deflexion (Figures 7.10).
  • Attempt internal podalic version (Section 7.9).

  Both these manoeuvres pose a significant risk of uterine rupture. Vacuum extraction, forceps and symphysiotomy are contra-indicated.



Figures 7.10
Manoeuvre to convert brow to face presentation

The foetus is dead

Perform an embryotomy if the cervix is sufficiently dilated (Chapter 9, Section 9.7); otherwise, a caesarean section.

References

1 Word Health Organization. WHO recommendations for induction of labour. Geneva, 2011. http://whqlibdoc.who.int/publications/2011/9789241501156_eng.pdf?ua=1

2 Martindale - The Complete Drug Reference. Oxytocin (Last reviewed: 2011-05-10).

3 Elizabeth G. Baxley, Robert W. Gobbo. Shoulder Dystocia. Am Fam Physician. 2004 Apr 1;69(7):1707-1714. http://www.aafp.org/afp/2004/0401/p1707.html

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Chapter 8:
Third stage of labour

8.1 Normal third stage of labour

The third stage of labour refers to the period that starts immediately after delivery of the newborn and ends with the completed delivery of the placenta and its attached membranes.

There is a significant risk of haemorrhage during this stage of labour. All patients require close monitoring and active prevention of haemorrhage, whether or not there are risk factors.

8.1.1 Description

The third stage usually lasts 5 to 15 minutes.

- After the newborn is delivered, there is a rest period without contractions that lasts, on average, 10 minutes. Use this time to take care of the newborn. Watch the mother carefully, however, for signs of haemorrhage, which can occur at any time.
- Then, contractions resume, the placenta separates spontaneously. On abdominal palpation the uterine fundus can be felt ascending and then descending again, corresponding to the migration/descent of the placenta. When the entire placenta has reached the vagina, the uterus retracts and forms a hard ball above the pubic bone.
- The blood loss accompanying delivery of the placenta should not exceed 500 ml.

8.1.2 Routine prevention of postpartum haemorrhage

Active management of third stage of labour[1]

Active management of third stage of labour consists in the administration of oxytocin before placental expulsion, followed by controlled cord traction then uterine massage to help retraction of the uterus.

Administration of oxytocin immediately after the birth (or after the birth of the last infant in a multiple pregnancy) AND before delivery of the placenta accelerates separation of the placenta, facilitates its delivery and helps prevent postpartum haemorrhage.

Immediately after the birth of the infant, palpate the mother's abdomen to be sure she is not carrying twins, then administer **oxytocin** slow IV or IM: 5 or 10 IU.

Then after clamping and cutting the cord, deliver the placenta with controlled cord traction (during a contraction with counter pressure to the uterus, with a hand placed on the abdomen).

When oxytocin is used prior to delivery of the placenta, there is in theory, and especially if the injection is not done immediately (i.e. within 3 minutes), a risk of retained placenta. For this reason, the birth attendant who administers oxytocin immediately after delivery of the infant must be able to perform manual removal of the placenta, should it be necessary. If these conditions are not met, oxytocin should be administered after placental expulsion.

Use of oxytocin after delivery of the placenta

If oxytocin has not been given prior to placenta delivery, it should be administered after the placenta has been completely delivered. This is less effective in preventing postpartum haemorrhage, however.

oxytocin slow IV or IM: 5 or 10 IU

Uterine exploration to remove any placental fragments will be more difficult after injecting oxytocin. Be sure that the placenta is complete before administering oxytocin.
In addition, massage the uterus to help uterine retraction.

8.1.3 Monitoring

– The birth attendant should check:
  • The heart rate and blood pressure, and the amount of vaginal bleeding, while waiting for the placenta to deliver. Monitoring should be maintained after expulsion of the placenta (every 15 minutes for the first hour, then every 30 minutes for the next hour) as the risk of haemorrhage persists.
  • The length of the rest period: in the absence of haemorrhage, a maximum delay of 30 to 45 minutes is tolerated for the expulsion of the placenta. After that, the placenta should be removed manually (Chapter 9, Section 9.2).
  • That the uterus retracts and remains retracted.
  • That the entire placenta has been expelled.
– Uncontrolled traction on the cord (i.e., done without a contraction or counterpressure) is contra-indicated, as it can cause tearing of the placenta and, afterwards, retention of placental fragments (with the attendant risk of haemorrhage and infection).
– Abdominal palpation can be used to determine whether the placenta has separated, by pressing down on the abdomen just above the pubic bone. If the cord does not retract when pressure is applied, the placenta has separated (Figure 8.1).

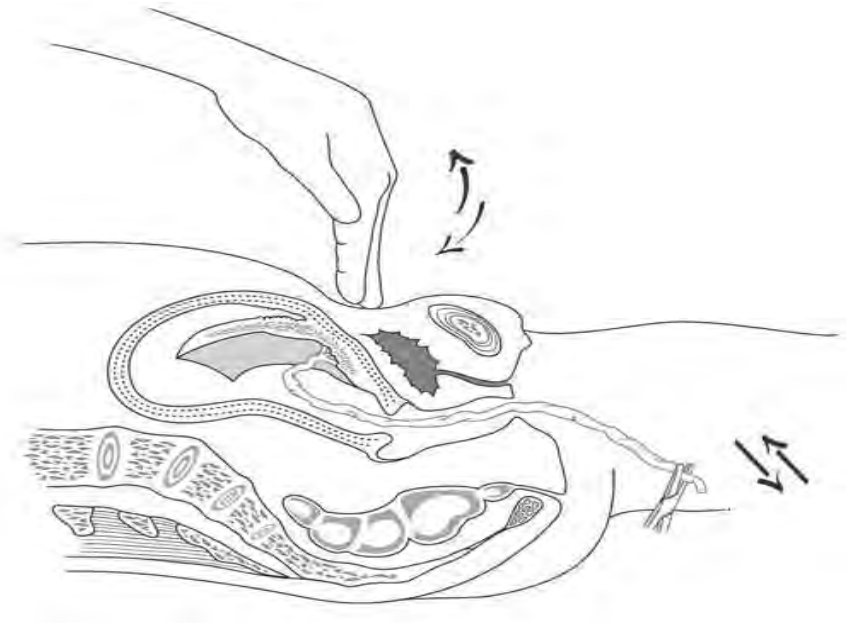


Figure 8.1
Placental separation has occurred if the cord fails to retract with abdominal pressure

– To facilitate expulsion from the vagina if it seems to be going slowly after the separation, apply moderate pressure to the uterine fundus, directed toward the vagina.

8.1.4 Examination of the placenta

Always examine the placenta to verify that it has been completely expelled. The uterus can only retract properly if it is empty. Sooner or later, retained debris will lead to haemorrhage or infection.

Examination of the membranous sac

Straighten the sac by inserting a hand into it, looking for a vessel that ends abruptly—indicating that there might be a succenturiate lobe remaining in the uterus—or for a tear pointing to retained membrane. In these cases, manual uterine exploration may be required (Chapter 9, Section 9.3).

Examination of the maternal surface of the placenta

Regular, bright red cotyledons. Any holes, roughened or depressed areas, or any deep cuts that fail to line up when the cotyledons are brought together may suggest retained placenta, requiring uterine exploration for removal.

8.2 Early postpartum haemorrhage

Early postpartum haemorrhage is defined as bleeding that occurs within 24 hours (usually immediately) after delivery of the placenta. The volume exceeds the normal 500 ml third stage blood loss.

Delay in treatment can lead to coagulation disorders, with a risk of massive, diffuse bleeding. Close delivery room monitoring is crucial for two hours postpartum, in order to rapidly identify and treat haemorrhage.

8.2.1 Possible causes

Uterine atony

The placenta has been expelled, but the uterus fails to retract. The uterus gets larger, extends, and becomes soft. Predisposing factors for uterine atony incude: overstretching, (polyhydramnios, multiple pregnancy, large foetus), prolonged labour, and infection (chorio-amniotitis).

Obstetric trauma

Uterine rupture; cervical, vaginal and vulvar lacerations; episiotomy that is bleeding, uterine inversion.

Retained placenta

The entire placenta or a fragment of the placenta remains in the uterus.
In rare cases, it is impossible to remove the placenta manually because there is no cleavage plane between the placenta and the uterine wall (placenta accreta). In this event, refer for hysterectomy.

Coagulation disorders

Coagulation disorders may be the cause or the result of haemorrhage.
For diagnosis, see Chapter 3, Section 3.2.2.

8.2.2 Management during the first 30 minutes

Treatment is always the same, and performed immediately to avoid massive haemorrhage:

- Ask for help.
- Evaluate the heart rate, blood pressure, level of consciousness, oxygen saturation (if available), and blood loss (blood loss is easily underestimated, up to 50%), then monitor regularly.
- Insert two IV lines (catheter 16-18G), rapid fluid resuscitation with Ringer lactate or 0.9% sodium chloride (1 litre over 15 minutes).
- In anticipation of a blood transfusion, determine the patient's blood type and select potential donors or make sure that blood is available. If transfusion is performed, the blood must have been tested (HIV-1, HIV-2, hepatitis B, hepatitis C and syphilis).
- Measure haemoglobin (HemoCue).
- High-flow oxygen therapy.

- If systolic blood pressure is < 90 mmHg, elevate the legs (keep, or replace, the patient's feet in the delivery table stirrups).
- Perform uterine massage to expel any clots and aid uterine contraction. In case of massive haemorrhage, maintain bimanual compression until uterotonics take effect.
- Make sure the uterus is empty: immediately remove the placenta manually if it has not yet delivered and/or manually explore the uterus.
- Administer routinely a uterotonic to correct uterine atony or ensure uterine retraction: **oxytocin**: 5 to 10 IU by slow IV injection, and at the same time, start an IV infusion with 20 IU of oxytocin in 1 litre of Ringer lactate or 0.9% sodium chloride, to be administered over 2 hours (160 drops/minute).
- Insert a Foley catheter: keeping bladder empty facilitates uterine retraction.
- Inspect systematically the birth canal: check for injury to the cervix or vagina using retractors.
- Record in a chart: results of the initial evaluation, monitoring and actions, indicating the times.

8.2.3 Cause-specific management

Uterine atony

- Administer **oxytocin**: 5 to 10 IU by slow IV injection, and at the same time, start an IV infusion with 20 IU oxytocin in 1 litre of Ringer lactate or 0.9% sodium chloride, administered over 2 hours (160 drops/minute).
- Combine with uterine massage; maintain bimanual compression if bleeding is severe.
- If no effect within 15 minutes:
  misoprostol sublingually: 800 micrograms[2] and/or **methylergometrine** IM: 0.2 mg
- If no effect, insert a balloon for uterine tamponade (Appendix 2).

Obstetric trauma (check routinely)

- Uterine rupture: Chapter 3, Section 3.3.
- Cervical or vaginal tears: Section 8.5.
- An episiotomy can bleed: temporarily stop arterial bleeding with a clamp and suture as quickly as possible.
- Uterine inversion: Section 8.4.

Retained placenta

- Immediate manual removal if the placenta has not yet delivered and/or routine uterine exploration to remove any clots or placental debris (allows good uterine retraction) and to verify that there was no uterine rupture (for vaginal deliveries with a scarred uterus, in particular).
- Perform manual placenta removal and manual uterine exploration under anaesthesia. Do not proceed without anaesthesia unless anaesthesia cannot be performed immediately.
- Give routine antibiotic prophylaxis (**cefazolin** or **ampicillin** slow IV[a]: 2 g as a single dose).

[a] For patients with a history of immediate hypersensitivity reaction to penicillin (urticaria, respiratory problems or oedema): **clindamycin** IV, 900 mg as a single dose.

Coagulation disorders

– Active management of the haemorrhage reduces the risk of secondary coagulation disorders.
– In the event of coagulation disorders, transfuse:
  • fresh whole blood (blood freshly collected, for less than 4 hours, and that has not been refrigerated), or
  • packed red blood cells or whole blood + fresh frozen plasma.

8.2.4 Management of persistent haemorrhage

– Maintain adequate haemodynamics: Ringer lactate up to 2 litres, then a plasma substitute and blood. The goals are systolic blood pressure ≥ 100 mmHg, oxygen saturation ≥ 95%, urine ouput ≥ 30 ml/hour, and normal level of consciousness.
– Insert a Bakri intrauterine balloon (Appendix 2). If the patient is still in a BEmONC facility, it is imperative to transfer her to a CEmONC facility once the balloon is inserted.
– Transfuse if blood loss is heavy (> 1500 ml), to achieve or maintain a haemoglobin level of at least 7 g/dl and/or if there are coagulation disorders. Blood or blood products must have been screened before transfusion (HIV-1, HIV-2, hepatitis B, hepatitis C and syphilis).

  In the event of moderate haemorrhage with no coagulation disorder, transfuse packed red blood cells or whole blood.

  In the event of massive haemorrhage and/or coagulation disorders, transfuse fresh whole blood or packed red blood cells or whole blood + fresh frozen plasma.
– Make sure that all procedures (manual placenta removal, uterine exploration, birth canal inspection, oxytocics, and urinary catheterisation) have indeed been performed.
– Additional measures:
  • at a minimum, massage the uterus every 15 minutes for 2 hours,

  plus, if needed, one of the following procedures:
  • apply pressure to the abdominal aorta (just above the umbilicus) until the femoral pulse is no longer palpable, for example, the time it takes to insert a Bakri balloon or start laparotomy (Figure 8.2);
  • compress the uterus with both hands through the abdominal wall, if it is still large and atonic;
  • compress the uterus between fingers in the vagina and a hand on the abdomen (Figure 8.3);
  • compress the uterus between the fist and a hand on the abdomen (Figure 8.4).

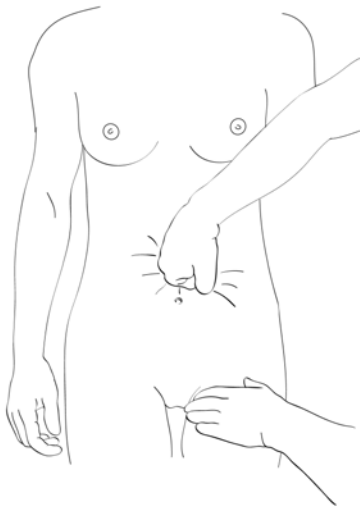


Figure 8.2
Aortic compression

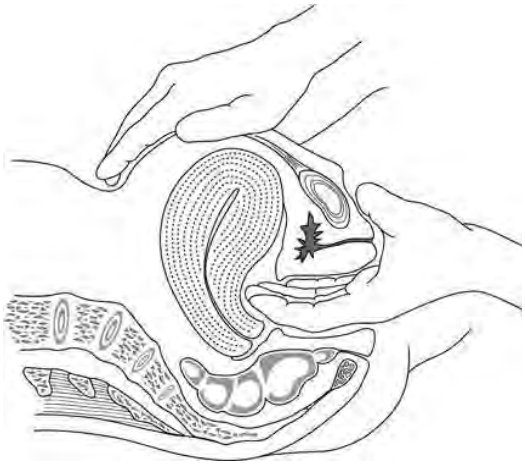


Figure 8.3
Uterine compression through the vagina

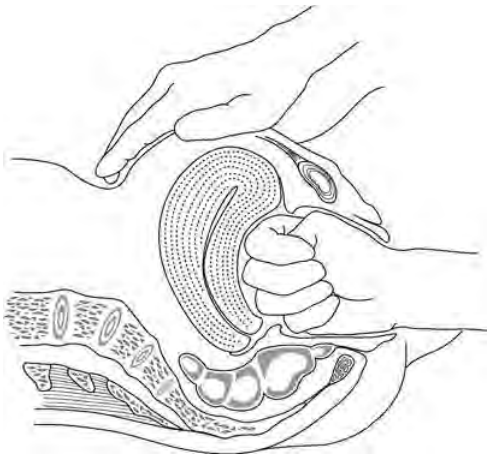


Figure 8.4
Uterine compression through the vagina

– Arrange transfer to a CEmONC facility for surgery if the situation is not controlled and for those who have required a Bakri balloon.
– Further surgical procedures might be:
  • Conservative:
    - Stepwise ligation of the uterine blood supply (round ligaments, utero-ovarian arteries, uterine arteries);
    - Uterine compression suture (B-Lynch or other type suture)[b].
  • Radical: hysterectomy with adnexal preservation. Subtotal hysterectomy is preferable, as it limits the operative time.

Note: after the acute episode, administer **ferrous sulfate** + **folic acid** PO for 3 months (Chapter 4, Section 4.1).

[b] For more information on B-Lynch suture, see: A Comprehensive Textbook of Postpartum Hemorrhage 2nd Edition. Section 9, Chapter 51: Therapy for Non-atonic Bleeding, C. B-Lynch and H. Shah. Conservative Surgical Management.
http://www.glowm.com/pdf/PPH_2nd_edn_Chap-51.pdf

8.3 Late postpartum haemorrhage

Excessive vaginal bleeding from 24 hours to 6 weeks postpartum.

8.3.1 Diagnosis

A combination of the following signs: foul-smelling vaginal bleeding, fever, a uterus that is soft and larger than expected, general deterioration, anaemia.

8.3.2 Possible causes

– Retained placenta or blood clots with secondary infection (endometritis).
– Rarely, persistent trophoblastic disease or choriocarcinoma.

8.3.3 Management

– Admit to inpatient department.

– Administer immediately:
amoxicillin/clavulanic acid IV (dose expressed in amoxicillin): 3 g/day divided into 3 injections administered 8 hours apart
+ **gentamicin** IM: 3 to 5 mg/kg once daily

Continue this treatment for 48 hours (until fever disappears), then change to **amoxicillin/clavulanic acid** PO (dose expressed in amoxicillin): 3 g/day in 2 to 3 divided doses[c] to complete 5 days of treatment
or
ampicillin IV: 6 g/day divided into 3 injections administered 8 hours apart
+ **metronidazole** IV: 1.5 g/day divided into 3 injections administered 8 hours apart
+ **gentamicin** IM: 3 to 5 mg/kg once daily

Continue this treatment for 48 hours (until fever disappears), then change to **amoxicillin** PO: 3 g/day in 3 divided doses + **metronidazole** PO: 1.5 g/day in 3 divided doses, to complete 5 days of treatment.

– Manually explore the uterus when cervical dilation permits, otherwise perform digital curettage (Chapter 9, Section 9.4) or instrumental curettage with the widest curette available (Chapter 9, Section 9.6) and administer a uterotonic agent (**oxytocin** IM or slow IV: 5 to 10 UI, or, if not available, **methylergometrine** IM: 0.2 mg or **misoprostol** sublingually: 800 micrograms).

[c] The daily dose should be given in 2 divided doses if using the 8:1 or 7:1 formulation, and in 3 divided doses if using the 4:1 formulation.

8.4 Uterine inversion

Uterus turns inside-out, typically as the placenta is delivered. Usually due to uterine atony (grand multiparity) or sudden, forceful traction on the cord.

8.4.1 Diagnosis

- Usually, intense pelvic pain with feeling of "something coming down" and haemorrhage of variable severity, quickly followed by vagal and hypovolaemic shock.
- Uterine fundus not apparent on abdominal palpation, protrudes into the vagina, or protrudes from the vaginal opening (Figures 8.5 and 8.6).

8.4.2 Management

- Treat the shock and the haemorrhage immediately: Ringer lactate or 0.9% sodium chloride; blood transfusion if immediately life-threatening. Use blood that has been screened (HIV-1, HIV-2, hepatitis B, hepatitis C and syphilis).
- Trendelenburg position (dorsal decubitus, head down).
- Insert a Foley catheter and monitor urine output.
- Perform general anaesthesia if possible.
- If uterotonic treatment is in progress, stop it long enough to reduce the inversion.
- Swab the perineum with 10% polyvidone iodine.
- If the placenta has not detached, do not perform manual removal until after reducing the inversion.
- While compressing the uterus, push it gradually back through the cervix with one hand (Figures 8.7), toward the umbilicus, to return it to its normal position. Use the other hand, placed on the abdomen, to hold the uterus in place.
- If necessary, explore the uterus (gently, to avoid recurrence) in order to remove any clots.
- Routine antibiotic prophylaxis (**cefazolin** or **ampicillin** slow IV[d]: 2 g as a single dose).
- Resume or start uterotonic treatment: **oxytocin** slow IV or IM: 5 or 10 IU (or, if not available, **methylergometrine** IM: 0.2 mg or **misoprostol** sublingually: 800 micrograms).

If manual reduction of the uterus fails, consider abdominal surgery: reduction of the inversion with possible section of the retracted oedematous cervix, or even delayed hysterectomy after necrosis develops.

[d] For patients with a history of immediate hypersensitivity reaction to penicillin (urticaria, respiratory problems or oedema): **clindamycin** IV, 900 mg as a single dose.

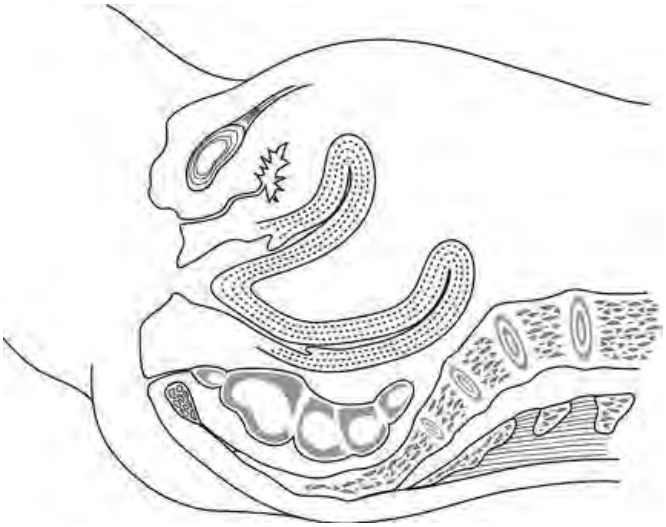


Figure 8.5
The inverted uterus does not reach the vaginal opening

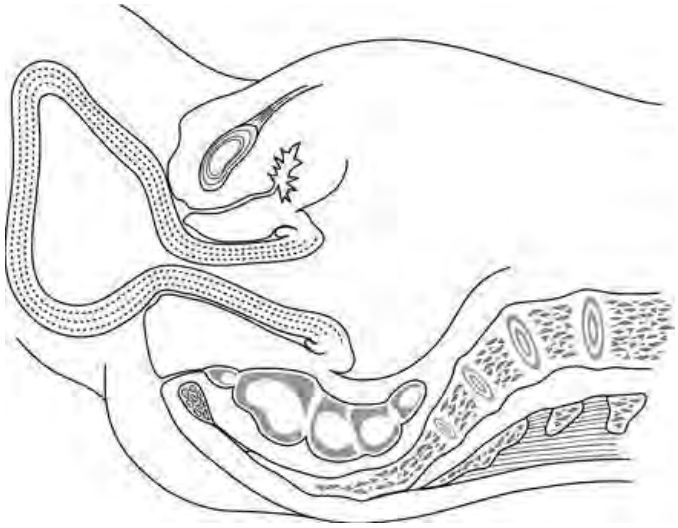
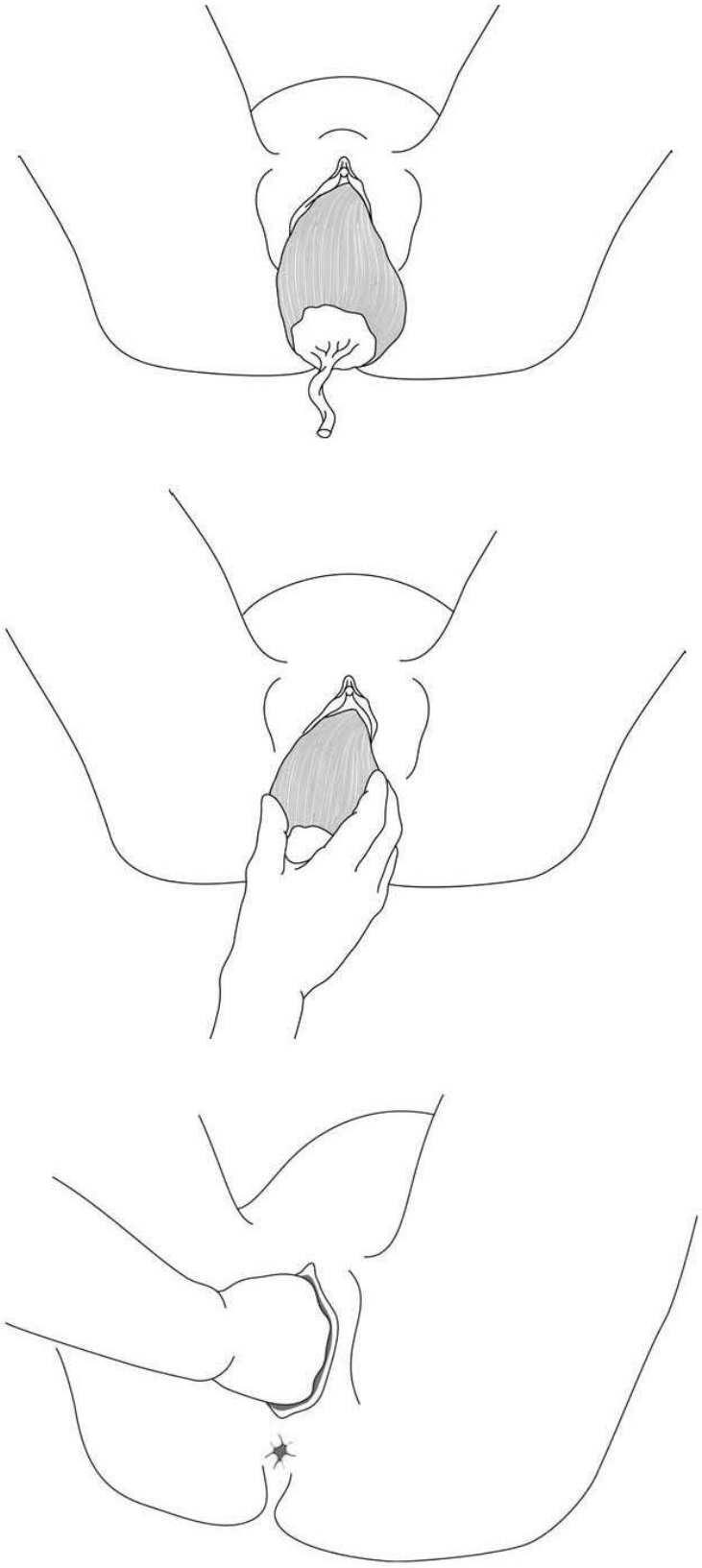


Figure 8.6
The uterus is totally inverted and protrudes through the vaginal opening



Figures 8.7
Manual reduction of the inverted uterus

8.5 Cervical and vaginal tears

Tears occur during delivery, and are more common in cases of cervical oedema, large foetus, or instrumental extraction (forceps or vacuum extractor).

A special sterile set containing vaginal retractors and long instruments should be available in every maternity ward for exploration and treatment of deep cervical and vaginal tears.

8.5.1 Diagnosis

Suspect a tear in cases of postpartum haemorrhage where there is good uterine retraction and uterine rupture has been ruled out.
The source of the bleeding is discovered during inspection of the birth canal, with careful examination of the vagina and cervix using two vaginal retractors.

8.5.2 Management

– Insert an IV line (16-18G catheter) and administer Ringer lactate or 0.9% sodium chloride.
– If possible, perform general or spinal anaesthesia to get good exposure.
– An assistant is usually needed to present the tissues using retractors. Good lighting is essential.
– Swab the perineum with 10% polyvidone iodine.
– Gently pull the cervix toward the outside using atraumatic forceps (ring forceps, for example) and assess the extent of the tears.
  • Small cervical tear, minimal bleeding: should heal spontaneously with no suturing and without complications.
  • On rare occasions, the cervical tear bleeds heavily and requires a few Dec3 (2-0) absorbable figure-of-eight sutures in a single layer. Place the initial suture above the apex of laceration to control retracted arteries (Figure 8.8).
  • The vaginal walls should also be sutured in the event of a bleeding laceration. For multiple vaginal lacerations with friable tissue that tears on suturing, insert a vaginal pack and remove after 24 hours. Insert a Foley catheter while the pack is in place.
  • If the tear extends up to the uterus (lower segment), transfer the patient to a surgical setting for laparotomy.

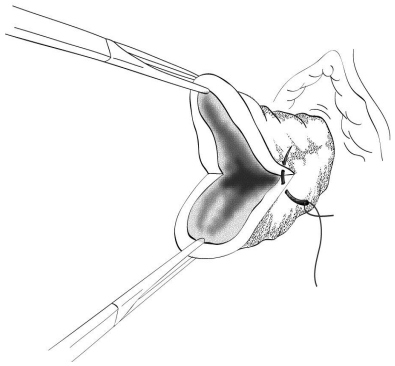


Figure 8.8
Cervical tear

References

1 International Confederation of Midwives and International Federation of Gynaecologists and Obstetricians . Joint Statement Management of the Third Stage of Labour to Prevent Post-partum Haemorrhage. 2003.
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2 WHO recommendations for the prevention and treatment of postpartum haemorrhage. Word Health Organization. Geneva, 2012.
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Chapter 9:
Intrauterine procedures

9.1 Precautions required for intrauterine procedures

There are two types of intrauterine procedures:
– Manual: manual removal of the placenta, uterine exploration, and digital curettage;
– Instrumental: manual vacuum aspiration (MVA), instrumental curettage, and embryotomy.

9.1.1 Precautions common to all intrauterine procedures

Bladder emptying

This facilitates the procedure and reduces the risk of bladder injury.
– Have the patient urinate on her own.
– Insert a sterile urinary catheter only if the patient does not urinate on her own.

Asepsis

– Cleanse the vulva and perineum with the polyvidone iodine scrub (or, if unavailable, ordinary soap). Rinse and dry. Then, swab the vulva and perineum with 10% polyvidone iodine solution.
– Use sterile drapes, sterile compresses and sterile gloves (sterile uterine exploration gloves, with long cuffs, for manual procedures).

Anaesthesia

All procedures should be performed under anaesthesia. A procedure may be done without anaesthesia on two conditions: it is a life-threatening emergency (e.g. postpartum haemorrhage due to retained placenta) and anaesthesia cannot be done immediately.

For manual vacuum aspiration, a combination of premedication and local anaesthetic (paracervical block) provides adequate anaesthesia.

Protection of personnel

All intrauterine procedures expose the practitioner to the risk of HIV infection. Protective clothing is essential: gloves, gown, rubber apron, mask, protective eyewear.

9.1.2 Specific precautions for manual procedures

For all manual intrauterine procedures, add:

– Antibiotic prophylaxis before the procedure:
cefazolin or **ampicillin** slow IV[a]: 2 g as a single dose

AND

– A uterotonic agent (right after the procedure) to improve uterine retraction:
oxytocin IM or slow IV: 5 to 10 IU as a single dose (or, if unavailable, **methylergometrine** IM: 0.2 mg)

[a] For patients with a history of immediate hypersensitivity reaction to penicillin (urticaria, respiratory problems or oedema): **clindamycin** IV, 900 mg as a single dose.

9.2 Manual removal of the placenta

9.2.1 Indications

– Placenta not yet expelled 30 to 45 minutes after delivery.
– Haemorrhage prior to spontaneous expulsion of the placenta.

9.2.2 Technique

(Figure 9.1)

– Follow precautions common to all intrauterine procedures (Section 9.1.1) and specific precautions for manual procedures (Section 9.1.2).
– Cup the fundus with one hand and hold it down.
– Advance the other hand, fully pronated, directly to the fundus and locate the cleavage plane between the uterine wall and the placenta with the fingertips. This hand is inserted all the way up to the forearm in the genital tract.
– Once the cleavage plane has been located, use the side of the pronated hand like a spoon to detach the placenta and bring it out.
– Immediately reinsert the hand to perform uterine exploration.

On very rare occasions, it is impossible to remove the placenta manually because there is no cleavage plane between the placenta and the uterine wall (placenta accreta). In this event, refer for hysterectomy.

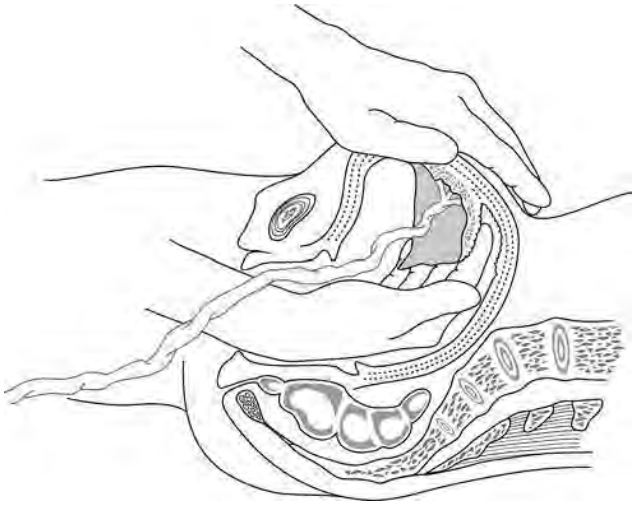


Figure 9.1
Manual removal of placenta

9.3 Uterine exploration

Manual exploration of the uterine cavity to verify the integrity of the uterus and remove any placental debris or blood clots interfering with retraction and, hence, haemostasis.

9.3.1 Indications

- Suspected uterine rupture.
- Suspected retained products after examination of expelled placenta.
- Postpartum haemorrhage within 24 hours of delivery.
- Routinely after manual removal of the placenta.

Note: in the event of postpartum haemorrhage, rule out vaginal or cervical tear, especially if the placenta appears complete and the uterus is well-contracted (Chapter 8, Section 8.5).

9.3.2 Technique

- Follow precautions common to all intrauterine procedures (Section 9.1.1) and specific precautions for manual procedures (Section 9.1.2).
- Systematic uterine exploration: two faces, two sides, one fundus, two horns. Use the fingers to search for placental debris and remove by hand.
- Ensure uterine retraction using abdominal massage: when the uterus retracts it resembles a firm ball.

9.4 Digital curettage

Use of finger(s) to remove placental fragments or blood clots detected late after an abortion or delivery, when insufficient cervical dilation renders uterine exploration impossible (the cervix must however be sufficiently open to allow insertion of one finger, two if possible).

9.4.1 Indications

– Delayed detection of haemorrhagic abortion or retained placenta, where uterine exploration cannot be performed.

9.4.2 Technique

(Figure 9.2)

– Follow precautions common to all intrauterine procedures (Section 9.1.1) and specific precautions for manual procedures (Section 9.1.2).
– Insert the index finger, and the middle finger if possible, into the uterine cavity; cup the uterus through the abdomen with the other hand.
– Systematically explore and remove any remaining fragments.

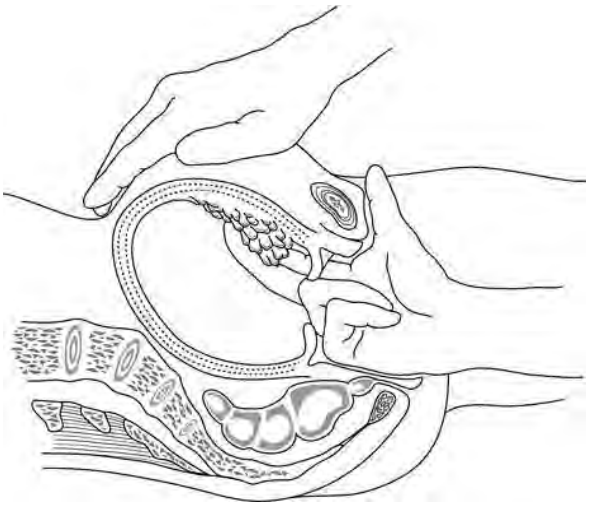


Figure 9.2
Exploration of the uterus with two fingers

9.5 Manual vacuum aspiration (MVA)[b]

Evacuation of the uterine contents using suction.

9.5.1 Indications

– Incomplete abortion before 12 to 14 weeks LMP.
– Molar pregnancy.
– Termination of pregnancy before 12 to 14 weeks LMP (see Chapter 12).

9.5.2 Contra-indications

Absolute

– Pregnancy (non molar) beyond 14 weeks LMP.

Relative

– Purulent cervicitis and pelvic infection: start antibiotics before doing the procedure.
– Coagulation disorders: risk of haemorrhage. MVA must be performed in a facility where emergency surgery and blood transfusion are available.

9.5.3 Equipment

– MVA set containing:
  • 2 Ipas MVA Plus® 60-ml syringes
  • 2 bottles of silicone for lubricating the syringe
  • 20 sets of Ipas Easy Grip® flexible cannulae (4, 5, 6, 7, 8, 9, 10, 12 mm) sterile, single use
  • 5 double-ended Hegar's uterine dilators (3-4, 5-6, 7-8, 9-10, 11-12 mm)
  • 1 Pozzi forceps
  • 1 Collin vaginal speculum
  • 1 probe
  • 1 Cheron dressing forceps
  • 1 100-ml galipot
  • 1 stainless steel instrument basket

  All the equipment is *autoclavable*, except the cannulae, which are *strictly single use.*
– For the procedure:
  • 1 sterile drape for laying out the sterile equipment
  • 1 aperture drape to place over the patient's vulva
  • polyvidone iodine scrub solution or, if unavailable, ordinary soap
  • 10% polyvidone iodine dermal solution
  • sterile compresses and gloves
  • absorptive pad to place under the patient's buttocks
  • 1 bright light

[b] For more information on MVA: Performing Uterine Evacuation with the Ipas MVA Plus®Aspirator and Ipas EasyGrip®Cannulae: Instructional Booklet (second edition, 2007). http://www.ipas.org/~/media/Files/Ipas%20Publications/UTEEVAC2E08.ashx

– For local anaesthesia:
  • long sterile needle (either 22G LP or 21G IM)
  • 1% lidocaine (without epinephrine) + sterile syringe and needle

9.5.4 Technique

Follow precautions common to all intrauterine procedures (Section 9.1.1).

Preparing the patient

– If the patient has a purulent cervicitis or pelvic infection, start antibiotic therapy before performing the aspiration (increased risk of uterine perforation). For antibiotic therapy, see Section 9.6.6.
– If the cervix is firm and closed (i.e. molar pregnancy when the cervix is closed), administer **misoprostol** sublingually or vaginally into the posterior fornix: 400 micrograms as a single dose, at least 3 hours before the procedure[1] to open the cervix and prevent traumatic cervical dilation.
– Oral premedication before paracervical block:
  An hour before the procedure: **diazepam** PO, 10 mg
  A half-hour before the procedure:
  ibuprofen PO: 800 mg
  +
  codeine PO: 30 mg if < 60 kg; 60 mg if > 60 kg
  or
  tramadol PO: 50 mg if < 60 kg; 100 mg if > 60 kg

Note: in cases of incomplete abortion with heavy bleeding, the procedure cannot be delayed. In such cases:
– Do not administer oral premedication;
– If the context permits (CEmONC facility), perform the procedure under general anaesthesia;
– If general anaesthesia is not possible, replace the oral premedication with:
  diazepam IM: 10 mg (do not administer IV, as there is a risk of respiratory depression) + **tramadol** SC: 50 mg if < 60 kg or 100 mg if > 60 kg before the paracervical block.

Preparing the equipment

– Prepare several cannulae of different sizes:
  • As a rule of thumb, the cannula diameter should correspond roughly to the gestational age in weeks LMP. For example, at 10 weeks LMP, choose a cannula that is 8 to 10 mm in diameter.
  • In practice, the diameter of the cannula inserted will depend on the dilation obtained. For example, if at 10 weeks LMP it is only possible to easily dilate up to a No. 8 dilator, use an 8-mm cannula.

Paracervical block

– Insert the speculum; disinfect the cervix and vagina with 10% polyvidone iodine solution.
– Place the Pozzi forceps on the anterior cervix at 12 o'clock and apply gentle traction to the cervix in order to see the transition between the cervix and the vaginal wall. Injections for the paracervical block are given in this transition zone.
  Perform four injections, 2 to 3 ml of **1% lidocaine** each, at four sites around the cervix (2, 5, 8 and 11 o'clock sites), to a maximum depth of 2 to 3 mm; do not exceed 20 ml in total.

Dilation

Dilate the cervix if the cervical canal cannot accommodate the cannula appropriate for gestational age (or the size of the uterus). Dilation should be smooth and gradual:

– With one hand, pull the forceps attached to the cervix and keep traction in order to bring the cervix and the uterine body into the best possible alignment.
– With the other hand, insert the smallest diameter dilator; then switch to the next larger dilator. Continue in this way, using the next size dilator each time, until obtaining dilation appropriate to the cannula to be inserted, without ever relaxing the traction on the cervix.
– Insert the dilator through the internal os. A resistance may be felt: this indicates that there is no need to advance the dilator any further. This resistance is not necessarily felt. In such case, it can be assumed that the internal os has been penetrated when the dilator has been inserted 5 cm beyond the external os.
– Do not force the cervix with the dilators (risk of rupture or perforation, especially when the uterus is very retro- or anteverted).

Aspiration

– Attach the prepared (i.e. under vacuum) sterile syringe to the chosen cannula.
– Maintain traction on the cervix with one hand.
– With the other hand, gently insert the cannula into the uterine cavity. Rotating the cannula while applying gentle pressure facilitates insertion. Slowly and cautiously push the cannula into the uterine cavity until it touches the fundus.
– Release the valves on the syringe to perform the aspiration. The contents of the uterus should be visible through the syringe (blood and the whitish products of conception).
– Hold the syringe by the tube (not the plunger) once a vacuum has been established in the syringe and the cannula has been inserted into the uterus; otherwise, the plunger can go back in, pushing the aspirated tissue or air back into the uterus.
– Carefully (risk of perforation) suction all areas of the uterus, gently rotating the cannula back and forth 180°. Take care not to break the vacuum by pulling the cannula out of the uterine cavity.
– If the syringe is full, close the valves, disconnect the syringe from the cannula, empty the contents, re-establish the vacuum, and reconnect the syringe to the cannula and continue the procedure.
– Stop when the uterus is empty, as indicated by a foamy, reddish-pink aspirate, with no tissue in the syringe. It is also possible to assess the emptiness of the uterus by passing the cannula over the surface of the uterus: if the surface feels rough, or it feels as if the uterus is contracting around the cannula, assume that the evacuation is complete.
– Close the valve, detach the syringe and then, remove the cannula and the forceps. Check for bleeding before removing the speculum.

In a surgical setting, aspiration can be done using a cannula connected to the electric suction machine, with a maximum pressure of 800 mbar.

Examining the aspirated contents

To confirm that the uterus has been emptied, check the presence and quantity of debris, estimating whether it corresponds to the gestational age.

The debris consists of villi, foetal membranes and, beyond 9 weeks, foetal fragments. To inspect the tissues visually, place them in a compress or strainer, and rinse them with water.

9.5.5 Patient follow-up

- No routine uterotonic, except in the event of molar pregnancy.
- After the procedure, bleeding continues without clots. Monitor vital signs and blood loss. Settle the patient comfortably during the monitoring period (at least 2 hours).
- Pain is moderate, and relieved by paracetamol and/or ibuprofen.
- Verify and update tetanus immunization if unsafe abortion is suspected.
- The patient can go home if the vital signs are stable, if she can walk, and she has been given the following information:
  - cramps will continue for a few days (prescribe an analgesic);
  - bleeding will last for 8 to 10 days;
  - menstrual periods will resume within 4 to 8 weeks;
  - she will be fertile again immediately (offer contraception, Chapter 11, Section 11.5);
  - advice on hygiene; no vaginal douches;
  - signs and symptoms for which she must be seen: prolonged bleeding (more than 2 weeks), bleeding heavier than normal menstrual periods, severe pain, fever, chills, malaise, fainting;
  - routine follow-up visit 10 to 15 days after the procedure (look for signs of infection, incomplete evacuation).

9.5.6 Complications

- Incomplete evacuation of the uterus due to cannula that is too small or to interrupted suction: start over.
- Perforated uterus, bleeding, pelvic infection: see Section 9.6.6.
- Air embolism: very rare; can occur when the plunger of the syringe is pushed while the cannula is still inside the uterine cavity.
- Haematometra: in the hours following the procedure, retention of blood in the uterine cavity. The uterus becomes distended and extremely sensitive. Treat by re-evacuating the uterus, administering an oxytocic agent and massaging the uterus.

9.6 Instrumental curettage

Removal of placental fragments after incomplete abortion, or incomplete delivery of the placenta, using an instrument (curette).

9.6.1 Indications

– Retained placenta or blood clots after incomplete abortion:
  Curettage is not the method of choice. It is only used if:
  • Before 12-14 weeks LMP: MVA is not available or is not effective;
  • After 12-14 weeks LMP: the cervix is not dilated enough naturally to perform digital curettage.
– Retained placenta or blood clots after childbirth:
  • Immediately after delivery, it is always possible to perform uterine exploration or digital curettage; there is no reason to perform instrumental curettage.
  • Even some time after delivery, instrumental curettage is used only in exceptional circumstances—when the cervix is not dilated enough naturally to allow uterine exploration or digital curettage.

9.6.2 Precautions

– This procedure should be performed in a CEmONC facility.

9.6.3 Equipment

– Curettage set containing:
  • 1 set of 3 blunt-edge curettes
  • 1 DeBakey tissue forceps
  • 2 vaginal retractors
  • 8 Hegar's uterine dilators (4, 6, 8, 10, 12, 14, 16, 18 mm)
  • 1 Pozzi forceps
  • 1 Collin vaginal speculum
  • 1 uterine sound
  • 1 Cheron dressing forceps
  • 1 100-ml galipot
  • 1 stainless steel instrument basket

9.6.4 Technique

Follow precautions common to all intrauterine procedures (Section 9.1.1).

Preparing the patient

– If the patient has a purulent cervicitis or pelvic infection, start antibiotic therapy before performing the curettage (increased risk of uterine perforation). For antibiotic therapy, see Section 9.6.6.

– In cases of incomplete second trimester abortion or after childbirth: antibiotic prophylaxis (**cefazolin** or **ampicillin** slow IV[c]: 2 g as a single dose).
– Cervix preparation: as for manual vacuum aspiration (Section 9.5.4).

General or spinal anaesthesia

If unavailable, use premedication + paracervical block, as for manual vacuum aspiration (Section 9.5.4).

Dilation

As for manual vacuum aspiration (Section 9.5.4).

Curettage

(Figure 9.3)

– With one hand, pull the Pozzi forceps attached to the cervix and keep traction in order to bring the cervix and the uterine body into the best possible alignment.
– Choose the largest possible curette, since the smaller the curette, the greater the risk of trauma. The limit is the degree of dilation obtained with the dilators.
– The sound can be used, but it is not compulsory. The depth of the uterus can also be assessed by gently advancing the curette to the uterine fundus and noting the length.
– Explore from the fundus down toward the cervix, in order to bring the debris outward, avoiding perforation. Hold the curette lightly between the thumb and index finger, with the handle resting against the tips of the other fingers, thus allowing an oscillatory motion. Do not grasp the curette with the entire hand.
  The goal is to detach the fragments without abrading the mucous membranes. Do not necessarily expect the gritty sensation felt through the curette when curettage is too deep.
  When the procedure is finished, verify that the uterus is empty: no more tissue comes out with the curette. There is a rough feeling as it passes over the entire uterine surface.

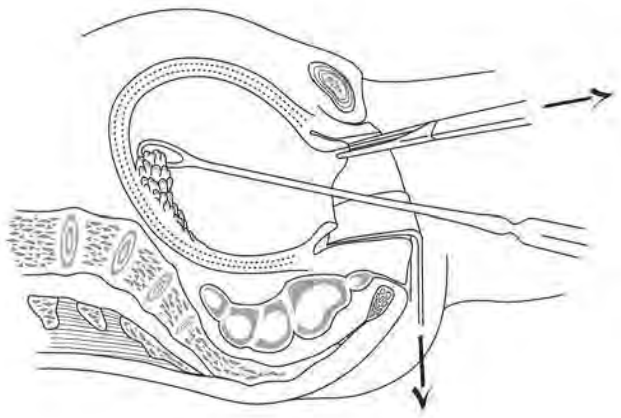


Figure 9.3
Curettage

[c] In patients with a history of immediate hypersensitivity reaction to penicillin (urticaria, respiratory problems or oedema): **clindamycin** IV, 900 mg as a single dose.

9.6.5 Patient follow-up

After abortion

Same follow-up and advice as after manual vacuum aspiration (Section 9.5.5).

After childbirth

– Routinely administer **oxytocin** IM or slow IV: 5 or 10 IU.

9.6.6 Complications

Persistent bleeding

– Incomplete evacuation of the uterus: start over.
– Uterine atony: administer a uterotonic (Chapter 8, Section 8.2.3).
– Vaginal or cervical lacerations (common with unsafe abortions).

Perforation of the uterus

– Perforation by dilators or curettes: bleeding, instrument goes in too far, pain.
– Possible bladder injury and, potentially, subsequent fistula if the bladder was not emptied prior to curettage. If this happens, place a urinary catheter immediately and leave in place for 7 days; this usually allows the bladder to heal.

The treatment is rest plus antibiotics:
amoxicillin/clavulanic acid PO: 3 g/day in 2 or 3 divided doses[d] for 5 days
or
amoxicillin PO: 3 g/day in 3 divided doses + **metronidazole** PO: 1.5 g/day in 3 divided doses for 5 days
In case of infection, treat for 10 days.
If the patient is in a BEmONC facility, refer her to a CEmONC facility.

Monitor for peritoneal signs (pain or guarding) in the following days. Appearance of these signs necessitates laparotomy for investigation of possible lesions of the abdominal organs.

Infections

– Endometritis, salpingitis, pelvic peritonitis, and septicaemia must be prevented by strict asepsis, non-traumatic procedures and prophylactic antibiotics in post-childbirth and second trimester abortion (Section 9.1.2) cases.
– In a febrile patient with active pelvic infection, start antibiotic therapy:
amoxicillin/clavulanic acid IV: 3 g/day in 3 divided doses + **gentamicin** IM: 3 to 5 mg/kg once daily
or
ampicillin IV: 6 g/day in 3 divided doses
+ **metronidazole** IV: 1.5 g/day in 3 divided doses
+ **gentamicin** IM: 3 to 5 mg/kg once daily

[d] The daily dose should be given in 2 divided doses if using the 8:1 or 7:1 formulation, and in 3 divided doses if using the 4:1 formulation.

Continue this treatment for 48 hours (until fever disappears), then change to:
amoxicillin/clavulanic acid PO: 3 g/day in 2 or 3 divided doses[e] to complete 5 days of treatment
or
amoxicillin PO: 3 g/day in 3 divided doses + **metronidazole** PO: 1.5 g/day in 3 divided doses to complete 5 days of treatment

In case of perforation, treat for 10 days.

[e] The daily dose should be given in 2 divided doses if using the 8:1 or 7:1 formulation, and in 3 divided doses if using the 4:1 formulation.

9.7 Embryotomy[f]

Destructive procedure to reduce the volume of a dead foetus to facilitate vaginal delivery when obstruction prevents this from occurring naturally.

This procedure, often performed on a fragile and infected uterus, carries the risk of trauma (e.g., uterine rupture, cervical or vaginal injury, and damage to maternal soft tissue with fistula). This risk is especially high in case of decapitation.

Few people have experience with these procedures. The operators must have the knowledge of obstetrics, must feel comfortable performing obstetric manoeuvres and must have skills to manage potential complications.

Some practitioners would rather perform a caesarean section on a dead foetus than have to mutilate a foetus. However, independently of the mode of delivery (by caesarean section or vaginally), obstructed labour carries a significant risk of puerperal infection, fistula and postpartum haemorrhage. In addition, caesarean section can place the mother at significant risk in terms of both survival and function. The objective of embryotomy is to reduce such risks.

Embryotomy should be performed in a CEmONC facility (refer if necessary, even if the referral takes time).

9.7.1 General conditions and precautions

There is no urgency in extracting the foetus. The priority is maternal intensive care (intravenous line, IV hydration, antibiotic therapy for prolonged rupture of membranes or infection, and urinary catheterisation).

The embryotomy can be performed once the mother is stable, under the following conditions:

- Confirm foetal death: no heart tone on foetal Doppler or ultrasound.
- Confirm the obstacle to vaginal delivery due to size and/or presentation.
- Make sure there is adequate access to the foetus: full or nearly full dilation (> 8 cm) and ruptured membranes.
- Insert a Foley catheter.
- Perform the procedure in the operating room under strict aseptic conditions and anaesthesia; always prepare for laparotomy in case uterine rupture.
- Take time to explain to the mother and family the expected benefits (avoiding caesarean section) and potential complications (possible laparotomy if the embryotomy fails or the uterus ruptures). Obtain the patient's consent.

[f] For more information on destructive delivery, see: Peter C. Bewes, James Cairns, Jim Thornton Maurice King. Primary Surgery: Non-Trauma v.1. 1990 (last update: 2008). http://www.primary-surgery.org/ps/vol1/html/index.html

– After extracting the foetus, routinely check:
  • the uterine cavity (uterine exploration with antibiotic prophylaxis, Section 9.3);
  • the vaginal walls (use the vaginal retractors in the curettage set, for example, to get adequate exposure).
– After the procedure, routinely administer **oxytocin** IM or slow IV: 5 IU or 10 IU.
– In case of prolonged labour with prolonged pressure from the foetus engaged in the pelvis, leave the Foley catheter in place for 14 days to reduce the risk of fistula formation.
– Care for the body of the infant: suture the skin wounds; clean and wrap up the infant to show/give him to the parents or family, depending on their choice.

9.7.2 Contra-indications

– Doubt about whether the foetus is dead
– Uterine rupture
– Dilation less than 8 cm

9.7.3 Equipment

– Smellie perforator (Figure 9.4)
– Dubois scissors or large, curved scissors (Figure 9.5)
– Braun cranioclast (Figure 9.6)
– 4 Faure forceps

Figure 9.4
Smellie perforator

Figure 9.5
Dubois scissors

Figure 9.6
Braun cranioclast

9.7.4 Craniotomy for cephalic presentation with entrapment

Procedure in which the skull is punctured to reduce the volume of the foetal head, which is preventing delivery.

Technique

(Figure 9.7)

- Have an assistant rest both palms on the head of the foetus and apply downward pressure toward the pelvis.
- Insert one hand, shaped like a channel, into the vagina, in contact with the head of the foetus.
- Using the other hand, slide the perforator along the channel formed by the first hand (to protect the vagina) until it makes contact with the head of the foetus. This can be done under direct vision after retraction with vaginal retractors.
- The perforation should be made in the centre of the skull to protect the mother's soft tissues. It is easier to do it in a fontanelle. Rotate the instrument to make the perforation, and then remove it so that the cerebrospinal fluid and/or brain matter can drain through the hole.
- Once the cerebrospinal fluid spills out, the head should collapse and delivery should be easy; if not, apply traction to the skull with 3 or 4 forceps, gripping the scalp around the perforation. If necessary, perform cranioclasis.

Note: if the foetus is hydrocephalic, perforation can be replaced by needle aspiration.

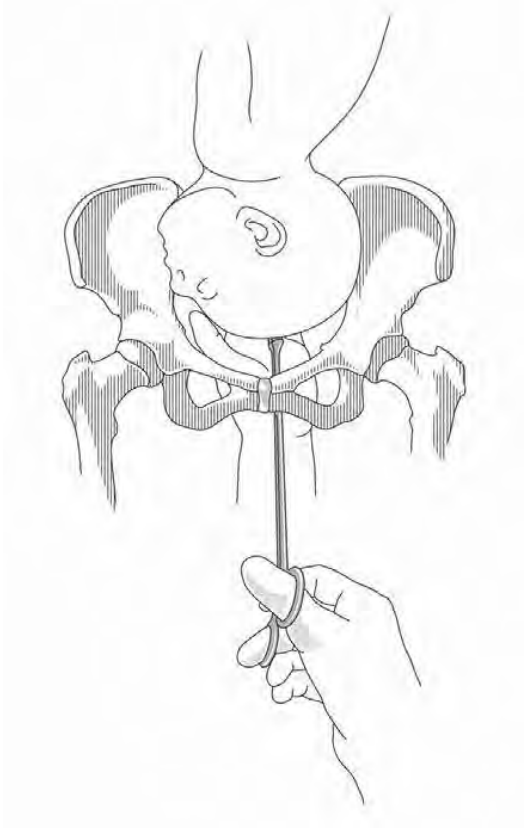


Figure 9.7
Embryotomy with the Smellie perforator

9.7.5 Cranioclasis

After craniotomy, gripping and crushing the bones of the skull to reduce its bulk and allow delivery.

Technique

– Insert the cranioclast's solid jaw into the opening made by the perforator. Place the hollow jaw against the skull.
– Adjust the two jaws with the screw and extract the head in the most favourable orientation.

9.7.6 Craniotomy for retention of the aftercoming head (breech)

Technique

(Figure 9.8)

– Have an assistant rest both palms on the head of the foetus and apply downward pressure toward the pelvis.
– Pull the body of the foetus out and down to gain access to the occiput.
If necessary, retract the anterior vaginal wall using a vaginal wall retractor.
– Insert the perforator (or scissors, if there is no perforator) under the occiput. Rotate the instrument to make the perforation. Open and close to cut up the contents.
– Remove the perforator and apply traction to the trunk. If the head remains trapped, traction can be applied directly to the skull with forceps attached around the perforation.

Note: if the foetus is hydrocephalic, perforation can be replaced by needle aspiration.

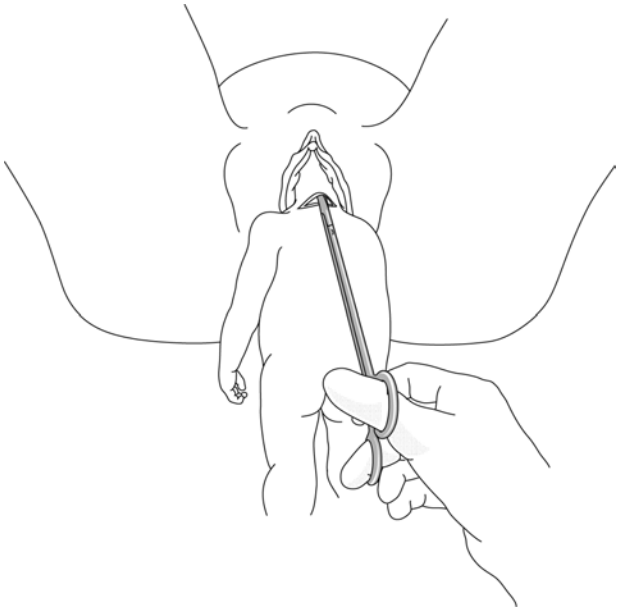


Figure 9.8
Craniotomy for retention of the aftercoming head

9.7.7 Decapitation for transverse lie

Procedure in which the foetus is decapitated to relieve impaction due to a transverse lie.

This is the most difficult type of embryotomy to perform, and the one carrying the greatest risk of maternal trauma.

If the foetus is big and/or hard to access, embryotomy cannot be done and caesarean section is the first and only option. Be aware that the caesarean section will be complicated, with potentially difficult foetal extraction and the risk of enlargement of the hysterotomy.

Embryotomy can be attempted if the foetus is small and easy to access. First try internal version (Chapter 7, Section 7.8) in the operating room under anaesthesia and total breech extraction (Chapter 6, Section 6.3), with or without craniotomy.

Technique

(Figure 9.9)

- Determine the exact position of the foetus (position of the head and neck and which arm is prolapsed.
- In case of neglected shoulder presentation, have an assistant apply traction to the prolapsed arm (do not try to section the arm first, as it can be used to pull the body downward).
- Slide one hand behind the foetus and surround the neck with thumb and index finger, like a necklace.
- With the other hand, slide the closed scissors into the channel formed by the first hand, keeping them flat against the hand. It is imperative to approach the neck at a right angle.
- Using fingers to control and guide, section the neck bit by bit, in the hollow of the hand, opening the scissor blades only slightly each time.
- After decapitation, bring the arms down one after the other and deliver the body.
- To deliver the head, grasp the neck stump and pull downward, performing the delivery as for retention of the aftercoming head, fingers in the foetus' mouth.

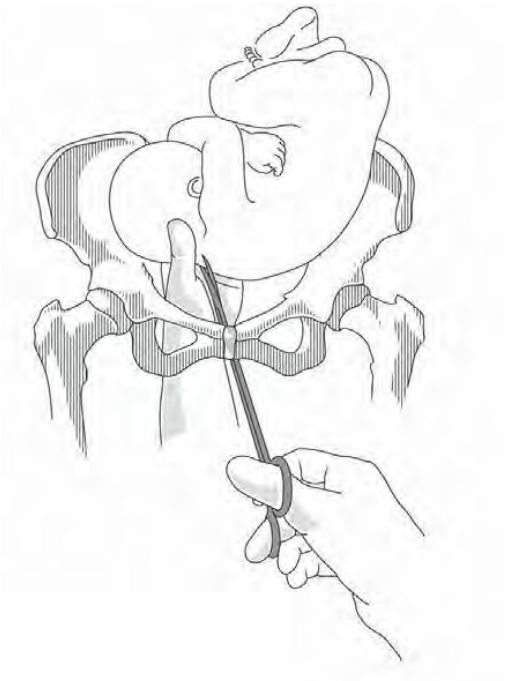


Figure 9.9
Decapitation using scissors

References

1 World Health Organization. Safe abortion: technical and policy guidance for health systems. Geneva, 2012. http://www.who.int/reproductivehealth/publications/unsafe_abortion/9789241548434/en/

Chapter 10:
Newborn care in the maternity hospital

10.1 Routine care and examination in the first few hours of life

Immediately and rapidly assess the infant's condition so that resuscitation can be started, if needed (Section 10.2). The resuscitation equipment should be ready at hand and ready for use.

10.1.1 Clearing the airway

Wipe the nose and mouth to clear the airway.

Only suction the nose and mouth if there is obvious obstruction. Do not enter the larynx/trachea (there is a risk of bradycardia or laryngeal spasm). Preferably use a suction bulb (Penguin).

10.1.2 Cord clamping and cord care

Wait at least 2 minutes before clamping the cord in all infants who are crying vigorously (and especially those weighing less than 2500 g).
For optimal transfusion, keep the infant on the mother's chest.

Clamp the cord with two Kocher forceps 10 cm from the umbilicus and cut between the two forceps. Use sterile blade or scissors – a different pair than were used for episiotomy, if performed.

Tie off the cord with a Barr clamp or sterile thread (double ligature), leaving a 2- to 3-cm stump.

Disinfect the umbilicus with a sterile compress soaked in **7.1% chlorhexidine** (or, if not available, **10% polyvidone** with a maximum of 3 applications total).

10.1.3 Apgar score

The Apgar score is evaluated at 1 and 5 minutes after complete delivery of the infant and recorded in the medical chart and the infant's health record.

The score is a tool for monitoring the infant's adaptation to extra-uterine life. It is not used to determine whether resuscitation is indicated; this should be evaluated at birth, based on whether or not there is spontaneous respiratory effort, without waiting for the 1-minute assessment.

In case of resuscitation, the Apgar score is determined retrospectively.

If the Apgar score is ≤ 4 at 1 minute or ≤ 6 at 5 minutes, the midwife should call the doctor and should initiate necessary steps based on infant's needs. Once stabilised, the infant should be kept under observation for at least 24 hours.

Table 10.1 - Apgar score

Items evaluated/score	0	1	2
Skin colour*	Extreme pallor	Cyanotic extremities No central cyanosis	Totally pink
Respiration	None	Abnormal (slow, shallow, apnoea, etc.)	Normal
Heart rate	0	≤ 100/minute	> 100/minute
Muscle tone	Absent	Hypotony Incomplete flexion of extremities	Good Complete flexion of extremities
Responsiveness (after stimulation)	Nil	Grimace	Good, vigorous cry

* A healthy infant is usually born cyanotic but turns pink within 30 seconds after breathing starts. For infants with dark skin, assess skin colour by the soles of the feet, palms of the hands and mucous membranes.

Table 10.2 - Significance of the Apgar score

1-minute score	
0 - 4	Asphyxia
5 - 7	Difficulty adapting
8 - 10	Good adaptation

5-minute score	
0 - 6	Asphyxia
7 - 8	Difficulty adapting
9 - 10	Good adaptation

10.1.4 Clinical examination

The birth attendant should perform a complete examination of the newborn as soon as possible and preferably within 2 hours. The examination should be done under a warmer for infants.
All observations are recorded on a monitoring sheet.

The first priority is to look for danger signs: e.g. abnormal temperature, abnormal colour, difficulty breathing, neurological signs, severe abdominal distension, or symptomatic hypoglycaemia (Sections 10.3.1 and 10.3.5).

Assess the risk factors for neonatal infection (Section 10.3.4) for all infants, whether the examination reveals danger signs or not.

The examination includes:
– Respiratory rate (normal values for infants 0-1 month are 30-60 breaths/minute)
– Heart rate (normal values for infants 0-1 month are 100-160 beats/minute)
– Temperature

– Weight (weigh the infant naked on an appropriate scale, calibrated beforehand).
– Examination of the skin and mucous membranes, oral cavity, palate, eyes, ears, fontanelles, abdomen, spine, genital organs, anus, feet, hands; neurological examination (posture, tone and reflexes, including sucking, grasp, response to stimulation).
– Check if the infant urinates and produces stools.

10.1.5 Thermoregulation

– At birth, dry the infant with a clean, dry cloth. Then, wrap the infant in another clean, dry cloth. Cover the head with a cap to reduce heat loss.
– Keep the infant in a warm room (at least 25°C).
– Place the infant skin-to-skin against the mother's (dried) body and cover with a dry cloth or blanket.
– Do not bathe the infant for 6 to 12 hours after birth.

The axillary temperature should be kept between 36 and 37°C, and the infant should have pink, warm feet.

10.1.6 Feeding

– Exclusive breastfeeding is the best option (Appendix 3).
– Put the infant to the breast as soon as possible within an hour of birth.
– Encourage breastfeeding on demand day and night (at least 8 times/24 hours, i.e. every 3 hours).
– If the mother is HIV-infected, see Appendix 3, Section 3.7.

10.1.7 Preventive treatments

Routine prophylaxis for gonococcal ocular infection

For all infants:
Apply **1% tetracycline** eye ointment: a 1-cm strip in each eye as soon as possible, preferably within an hour of birth.

Note: if the mother has a symptomatic genital infection at the time of delivery, see Section 10.4.

Routine prophylaxis for haemorrhagic disease of the newborn

phytomenadione (**vitamin K_1**) IM in the anterolateral aspect of the thigh within the first few hours of life:
Infant weighing more than 1500 g: 1 mg as a single dose (0.1 ml if 2 mg/0.2 ml ampoule)
Infant weighing less than 1500 g: 0.5 mg as a single dose (0.05 ml if 2 mg/0.2 ml ampoule)

Note: open ampoules of phytomenadione should be used immediately or discarded. Do not store open ampoules, even in the refrigerator.

Prevention of mother-to-child HIV transmission

All infants of HIV-infected mothers should receive antiretroviral treatment as soon as possible. See the specific PMTCT protocol.

10.1.8 Vaccinations

The monovalent Hepatitis B and BCG vaccines are recommended as soon as possible after birth for all newborns, including low birth weight and premature infants. The oral polio vaccine is recommended at birth in endemic areas or areas at risk of poliovirus importation.

For the Hepatitis B and oral Polio vaccines, the dose administered at birth is an extra dose (called and recorded as "Dose 0"). It does not count as one of the 3 doses required by the Expanded Programme on Immunization during the postnatal period.

The purpose of Hepatitis B Dose 0 is to prevent mother-to-child transmission of the disease. It should be administered as soon as possible, preferably within the first 12 hours of life. While it may still be administered after that time, the later the vaccine is administered, the less effective the protection[1,2]. In principle, this vaccine should be administered in the delivery room.

Table 10.3 - Neonatal vaccination

Vaccin	Contra-indications	Dose/route of administration
Hepatitis B monovalent Dose 0	No contra-indication, but use only the monovalent vaccine (Hepatitis B only)	One dose = 10 micrograms IM injection, anterolateral aspect of the thigh
BCG	Newborn whose mother has active TB as long as she is contagious (Section 10.4.6)*	One dose = 0.05 ml Intradermal injection, deltoid region (at the junction of the lower 2/3 and upper 1/3 of the lateral aspect of the upper arm)
Polio oral Dose 0	No contra-indication	One dose = 2 drops Oral route

* Start the infant on isoniazid preventive therapy, and administer the BCG vaccination when the isoniazid therapy is completed.

Note: to perform an IM injection in newborns:
- Disinfect the skin beforehand (risk of abscess and other infections).
- Use the anterolateral aspect of the thigh (quadriceps muscle). Never inject into the gluteal or deltoid muscle (arm).
- Use the appropriate needle: 26G if < 2500 g; 23G if > 2500 g.
- The maximum amount to inject is 1 ml if < 2500 g; 2 ml if > 2500 g.

10.1.9 Daily monitoring

Newborn (and maternal) mortality is the highest in the first 24 hours after birth. Women are encouraged to stay for 24 hours in the maternity.
Routine monitoring and care includes:
- Temperature, heart and respiratory rate, twice daily.
- Cord disinfection once the first day (use the available antiseptic, Section 10.1.2). After that, keep it clean, dry and exposed to the air (no dressing).
- Support to breastfeeding.
- Urination and stool production.

Record the observations on the newborn's monitoring sheet.

For the discharge criteria: see Section 10.6.

10.2 Neonatal resuscitation

10% of newborns need help breathing properly at birth; this help comes in the form of tactile stimulation and/or airway clearing.

For half of them, these procedures are not sufficient, and if the newborn is not breathing or is gasping despite stimulation/suction, ventilation is needed as of the first minute of life. A small percentage of ventilated newborns will require more advanced resuscitation.

The birth attendant in charge of the delivery is also responsible for the newborn. S/he should start resuscitation immediately then, if necessary, call for help.

⚠ Anticipate the potential need for resuscitation at every birth. The necessary equipment should be ready at hand and ready for use.

Hypothermia compromises resuscitation. Resuscitation should be done in a heated room, if possible under a warming lamp.

10.2.1 Basic resuscitation[a]

Steps 1 to 6 should be performed in the first minute of life.

1 - Check for meconium

If the amniotic fluid is meconium-stained but the infant is breathing spontaneously and is tonic: suction is not indicated; simply wipe the face.

If the amniotic fluid is meconium-stained and the infant is not breathing well or is hypotonic: quickly but gently suction the mouth, preferably with a suction bulb (Penguin).

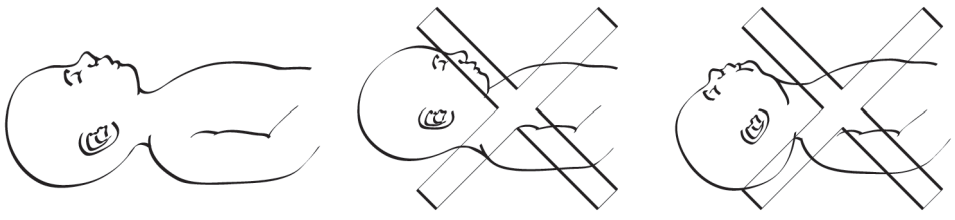
2 - Stimulate the infant by drying

Tactile stimulation can trigger spontaneous breathing. It is done by drying the infant vigorously, but not roughly. Effective respiratory effort should begin within 5 seconds. If not, stop the stimulation; the infant requires additional care.

3 - Clamp and cut the cord

4 - Position the infant's head

Lay the infant on the back with the head in a neutral position (Figure 10.1); avoid flexion or hyperextension of the neck, as this can obstruct the airway.



Correct Incorrect Incorrect

Figure 10.1
Head position for clearing the airway

[a] For more information, refer to the Helping Babies Breathe training course.

5 - Clear the airway (only in the rare cases where there are copious secretions)

Suction the mouth gently – i.e., not too deeply (maximum depth 2 cm from the lips) – and quickly (maximum duration 5 seconds) with a bulb syringe.

6 - Stimulate the infant

Rub the back and the soles of the feet (do not shake, slap or hang the infant by the feet). If effective respiratory effort has not begun after 5 seconds: stop the stimulation; the infant requires ventilation.

7 - Perform bag-mask ventilation (room air)

Fit the mask to the infant's face covering nose and mouth. Press firmly to prevent air leaks. Hold it with one hand, with the thumb on one side and the index and middle fingers on the other (Figures 10.2 and 10.3).

With the other hand, squeeze the bag at a rate of 30 to 50 compressions per minute for 60 seconds.

Ventilation is effective if the chest rises and falls.

Note: excessive ventilation pressure can cause pneumothorax.

If the chest fails to rise:

– Check the connection between the bag and the mask;
– Correct the position of the mask on the face;
– Correct the head position.

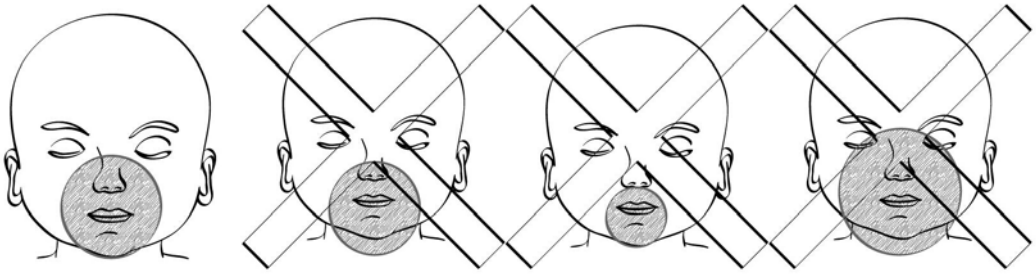


Figure 10.2
Mask position

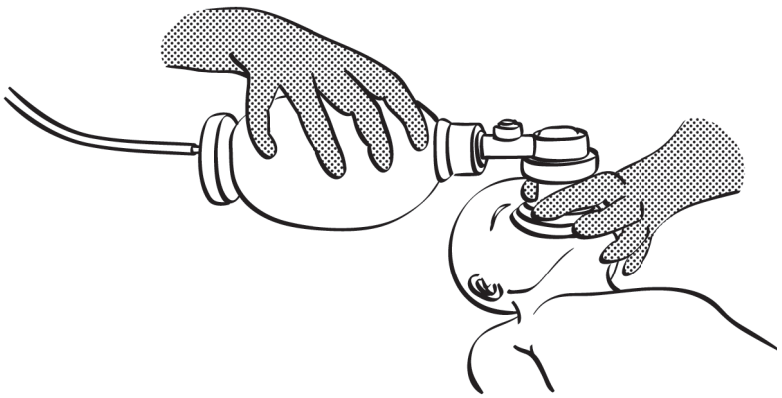


Figure 10.3
Manual ventilation

Check every minute for spontaneous respiratory effort (look for chest movement); do not take the mask off the infant's face to check for spontaneous breathing.

Continue manual ventilation until there is spontaneous respiratory effort.

If oxygen is available: connect the ambu bag to an oxygen reservoir after 1 to 2 minutes of ventilation, setting it at a 2 litres/minute flow rate. Ventilation is a priority and should not be interrupted to connect the oxygen (have an assistant connect the oxygen).

Stop resuscitation if the infant has no heart rate after 10 minutes or if the heart rate is < 60/minute of effective manual ventilation.
If the infant has a heart rate > 60/minute, but does not breathe spontaneously, manual ventilation can be continued. However, resuscitation should be stopped if the infant does not breathe spontaneously within 30 minutes.

Record all procedures on the monitoring sheet.

10.2.2 After resuscitation

Check the infant's immediate needs: blood glucose, head position, oxygen saturation, temperature and assessment for signs of sepsis.

Perform a retroactive Apgar score assessment (Section 10.1.3), and record the results on the monitoring sheet.
If the Apgar score was ≤ 4 at 1 minute or ≤ 6 at 5 minutes, or if the infant was ventilated with a mask for 2 minutes or more:
– Hospitalise in a neonatal care unit (keep the mother and infant together if possible).
– If transfer is not possible, keep the infant under observation for at least 24 hours. Monitor every 2 hours: look for danger signs (Section 10.3.1) and monitor vital signs. Ensure routine care (Section 10.1). Begin breastfeeding as soon as possible.

If the infant is floppy, has no sucking reflex or exhibits other neurological problems (e.g. seizures), check blood glucose. If blood glucose cannot be checked, start presumptive treatment for hypoglycaemia (Section 10.3.5).

If oxygen saturation is low or there are signs of respiratory distress, see Section 10.3.2.

In the event of seizures:
– Check blood glucose and/or treat for hypoglycaemia.
– If the infant continues to have seizures after receiving glucose, administer a loading dose of **phenobarbital** (20 mg/kg) by slow IV infusion (dilute the required dose of phenobarbital in 20 ml of 0.9% sodium chloride and administer over 30 minutes). Never administer phenobarbital as a rapid, undiluted direct IV injection. If intravenous access cannot be obtained, administer the same dose of phenobarbital (undiluted) by IM injection.
– Precaution should be taken when administering phenobarbital; there is a risk of respiratory depression: monitor the infant closely; have ventilation equipment at hand.
– If seizures persist after 30 minutes, give a second dose of phenobarbital (10 mg/kg) by slow IV infusion over 30 minutes as above. If IV access cannot be obtained, administer the second dose (10 mg/kg) of phenobarbital undiluted by IM injection 60 minutes minimum after the first IM dose.
– In any cases, monitor the infant closely for at least 6 hours.
– For recurrent seizures, administer **phenobarbital** PO: 5 mg/kg/day for 5 days.

10.3 Care of the sick newborn

10.3.1 Danger signs

Routinely check all newborns for danger signs at birth and during their stay in the maternity hospital. Danger signs indicate severe infection and require immediate care.

Danger signs	
Temperature	> 38°C: hyperthermia < 35.5°C: hypothermia
Neurological signs	Seizures (including subtle* or "abnormal" movements) Bulging fontanelle Inability to suckle effectively Lethargy or coma Hypotony
Respiration	Apnoea (respiratory pause > 20 seconds or combined with bradycardia) Bradypnoea (respiratory rate < 30/minute) Tachypnoea (respiratory rate > 60/minute) Grunting respirations Chest indrawing
Abdomen	Severe abdominal distension
Skin colour	Generalised cyanosis (blue colouring) Extreme pallor
Skin	Umbilicus red or oozing blood or pus Numerous or large pustules
Joints	Swollen, painful joint (irritability when moved) with reduced joint movement
Blood glucose	Recurrent hypoglycaemia (> 2 episodes)

* Subtle movements: sucking or chewing, blinking or disorganised eye movements, disordered arm or leg movements (pedalling).

10.3.2 Management of life-threatening emergencies

Cyanosis and/or respiratory distress

- Position the head to open the airway.
- Administer oxygen with an appropriate nasal cannula, at a maximum flow rate of 2 litres/minute, monitoring with a pulse oxymeter. The oxygen saturation in full-term or premature infants should be 90 to 95%.
  Use an appropriate paediatric flow splitter so that the oxygen flow can be adjusted correctly when there are several infants on the same oxygen concentrator.
- Place a gastric tube for feeding (Appendix 5).

Apnoea or bradypnoea

– Perform bag-mask ventilation (add oxygen if the ventilation lasts more than 1 to 2 minutes).

Impaired consciousness and/or seizures

– Check the blood glucose or, if that is not possible, treat hypoglycaemia (Section 10.3.5).
– Administer phenobarbital in case of seizures (Section 10.2.2).
– Place a gastric tube for feeding (Appendix 5).

10.3.3 Management of symptomatic neonatal infections

A neonatal infection is likely and an antibiotic therapy and transfer to neonate unit are required:

In presence of one of these danger signs	– Hyperthermia – Seizures – Bulging fontanelle – Apnoea – Severe abdominal distension – Generalised cyanosis – Umbilicus red or oozing blood or pus – Numerous or large pustules – Swollen, painful joint with reduced joint movement – Recurrent hypoglycaemia (> 2 episodes)
OR	
In presence of two of these danger signs **or** **If one these danger signs persist for more than one hour**	– Hypothermia – Inability to suckle effectively – Lethargy or coma – Hypotony – Bradypnoea – Tachypnoea – Grunting respirations – Chest indrawing – Extreme pallor

– The first-line treatment is the combination **ampicillin** IV + **gentamicin** IM.
The ampicillin is preferably used IV; the IM route is an option if the context does not permit proper IV administration. To avoid multiple IM injections, however, it may be better to use **procaine benzylpenicillin** IM[b] + **gentamicin** IM or, as a last resort (if procaine benzylpenicillin is not available) **ceftriaxone**[c] IM + **gentamicin** IM.
– If meningitis is suspected, do not use procaine benzylpenicillin.
– If the infection is cutaneous in origin, replace the ampicillin with cloxacillin IV[d].

[b] Procaine benzylpenicillin may be replaced by fortified penicillin procaine (PPF), same doses. These two penicillins SHOULD NEVER BE USED INTRAVENOUSLY.
[c] Ceftriaxone is contra-indicated in newborns with jaundice.
[d] Due to the risk of local necrosis, cloxacillin should be administered by IV infusion in 5% glucose or 0.9% sodium chloride over 30 to 60 minutes (or if impossible, by slow IV injection over at least 5 minutes).

Symptomatic neonatal infections are treated for a total of 10 to 14 days. This may be shorted to 7 days if there is complete recovery in the first 24 hours. It should never be less than 7 days and never given orally. Gentamicin should usually be stopped after 5 days of treatment.

Premature and low birth weight infants are at greater risk of serious infection.

Table 10.5 - Antibiotic dosages for newborns less than 7 days old

Antibacterial	Birth weight	
	≤ 2000 g	> 2000 g
ampicillin IV/IM injection	100 mg/kg/day in 2 divided doses If meningitis: 200 mg/kg/day in 3 divided doses	150 mg/kg/day in 3 divided doses If meningitis: 300 mg/kg/day in 3 divided doses
gentamicin IM injection	3 mg/kg once daily	5 mg/kg once daily
procaine benzylpenicillin[e] IM injection	50 000 IU/kg once daily If meningitis: do not administer.	
ceftriaxone IV/IM injection	50 mg/kg once daily If meningitis: 100 mg/kg once daily	
cloxacillin IV infusion	50 mg/kg/day in 2 divided doses	75 mg/kg/day in 3 divided doses

In all cases, while awaiting the transfer in neonatal intensive care unit:
- Start antibiotic therapy.
- Ensure routine newborn care (Section 10.1).
- Keep the infant warm in a 25°C room, wrapped in a survival blanket or under a warming lamp if possible, and cover the head with a cap.
- Closely monitor temperature, respiratory rate and oxygen saturation.

10.3.4 Management of asymptomatic newborns at risk of neonatal infection

In asymptomatic newborns (no danger signs), neonatal infection should nevertheless be suspected if any of the risk factors below are present.

Major risk factors (RF)

- Peripartum maternal fever (To ≥ 38°C before delivery or during labour)
- Chorioamnionitis (foul-smelling, cloudy amniotic fluid)
- Prolonged rupture of membranes lasting > 18 hours before delivery

Minor risk factors

- Birth weight < 2000 g
- Resuscitation at birth with manual ventilation
- Meconium-stained amniotic fluid: this is a risk factor for neonatal infection, but not in itself an indication for antibiotic therapy. Meconium-stained amniotic fluid is also a risk factor for pneumothorax and aspiration pneumonia.

[e] Procaine benzylpenicillin may be replaced by fortified penicillin procaine (PPF), same doses. These two penicillins SHOULD NEVER BE USED INTRAVENOUSLY.

Criteria for suspecting asymptomatic neonatal infection

– 1 major RF if the mother did not receive antibiotics during labour (or received less than 2 doses[f])
or
– 1 major RF and birth weight < 2000 g, whether the mother received antibiotics during labour or not
or
– ≥ 2 major RFs, whether the mother received antibiotics during labour or not
or
– 1 major and ≥ 2 minor RFs, whether the mother received antibiotics during labour or not
or
– ≥ 3 minor RFs, whether the mother received antibiotics during labour or not

Management of suspected asymptomatic neonatal infection (one of the criteria above)

– Administer antibiotics for 48 hours[3]: ampicillin IV + gentamicin IM or fortified penicillin procaine IM + gentamicin IM. See Table 10.5 for dosage.
– Monitor for danger signs (Section 10.3.1). If the infant presents at least one danger sign, see Section 10.3.3.
– If the infant has not presented any of the danger signs during the first 48 hours, stop the antibiotics and keep under observation for an additional 48 hours.
– If the infant has not presented any of the danger signs during the observation period or at the discharge clinical examination (preferably done by a doctor): send home. In this case, tell the parents which signs require immediate consultation.

Management for all other asymptomatic newborns (none of the criteria above)

– Keep under observation in the maternity hospital for 24 hours.
– Monitor for danger signs (Section 10.3.1). If the infant presents at least one danger sign, see Section 10.3.3.
– If the infant did not present any danger signs during observation: send home. In that case, tell the parents which signs require immediate consultation.

10.3.5 Management of hypoglycaemia

Criteria defining newborns at risk for hypoglycaemia

– Presence of at least one of the following signs:
  • Hypothermia (axillary temperature < 35.5°C)
  • Irritability or trembling
  • Bradypnoea or apnoea or cyanosis
  • Difficulty breastfeeding (difficulty attaching to the breast, difficulty sucking, inadequate milk production)
  • Hypotony or poor response to stimulation (impaired consciousness)
  • Seizures

[f] Antibiotics during labour when there is a prolonged rupture of membranes (Chapter 4, Section 4.9.3) reduces risk of septicaemia in the newborn. Coverage is considered effective if at least 2 doses have been administered 4 hours apart during labour.

– Birth weight < 2500 g or > 4000 g
– Maternal diabetes
– Mother treated with labetalol

Always check blood glucose[g] if at least one of the above criteria is present.

Management

If the blood glucose is normal (> 2.5 mmol/l or > 45 mg/dl):
– Breastfeeding every 3 hours (add 10% glucose PO if breastfeeding is insufficient).
– Keep the infant warm.
– Check the blood glucose before each meal until there are 3 consecutive normal results.

If the hypoglycaemia is moderate (2 to 2.5 mmol/l or 35 to 45 mg/dl) and it is the first episode of hypoglycaemia:
– Put to the breast and give 5 ml/kg of 10% glucose over 5-10 minutes PO or by gastric tube, or
– Administer 2 ml/kg of 10% glucose by IV infusion as below, if an IV line is already in place and if the newborn is symptomatic.
– Check the blood glucose after 30 minutes; administer IV glucose if blood glucose is < 2.5 mmol/l (< 45 mg/dl).
– Check the blood glucose before each meal until there are 3 consecutive normal results.

If the hypoglycaemia is severe (< 2 mmol/l or < 35 mg/dl) or recurrent:
– Place an IV line and administer 2 ml/kg of 10% glucose.
– If not feasible, administer 10 ml/kg of 10% glucose by gastric tube.
– Then start a continuous infusion of glucose 10%: 80 ml/kg/day for at least 24 hours, if conditions permit.
– Check the blood glucose after 30 minutes and then before each meal until there are 3 consecutive normal results.

The use of 50% glucose (1 ml/kg) sublingually is recommended only if it is impossible to do an infusion or place a gastric tube.

10.3.6 Management of jaundice

Severe jaundice can cause acute encephalopathy, potentially leading to neurological sequelae and death.

Diagnosis

Jaundice is yellow colouring of the skin and mucous membranes due to hyperbilirubinaemia. It appears first on the face, and then moves to the chest and then the extremities.
The examination should be done in day light. It is done by pressing the infant's skin and looking to see if it is yellow immediately after the pressure is removed.

Jaundice can be physiologic, with a yellowish skin colour, without the criteria for pathological jaundice below.
Physiologic jaundice is a diagnosis of exclusion in an infant in excellent general condition who is feeding well and whose neurological examination is normal.

[g] Blood glucose is measured on a sample of capillary blood taken from the lateral aspect of the heel using a lancet or 24G needle. This technique is used for other tests like HemoCue haemoglobin measurement.

Pathological jaundice starts the first day of life (the second day of life if < 35 weeks), and lasts more than 14 days in full-term infants or more than 21 days in premature infants.
It is an intense colour that affects the palms of the hands and soles of the feet, and may be associated with a neonatal infection.

In cases of jaundice, consider septicaemia or congenital malaria.

Management

Infants presenting criteria of severity (early onset jaundice, extensive jaundice, low birth weight, or specific risk) should be referred.

Table 10.6 - Criteria for transferring newborns with jaundice to neonatal unit

Time of onset	Criteria for transfer
Day 0	– All newborns, regardless of birth weight
Day 1	– Newborns < 1500 g – Newborns > 1500 g with extensive jaundice: head, chest, abdomen, upper arms and thighs
Day 2 or later	– Newborns < 1500 g with very extensive jaundice (head, chest, abdomen, upper arm and forearm, thigh and lower leg) – Newborns > 1500 g with: • very extensive jaundice (head, chest, abdomen, upper arm and forearm, thigh and lower leg) AND • at least one of the following risk factors: ABO or Rh incompatibility, G6PD deficiency, inadequate breastfeeding, infection, hypothermia, asphyxia, cephalohaematoma or maternal diabetes – Newborns > 1500 g with no risk factors but extreme jaundice also affecting the palms of the hands and soles of the feet

If there are no criteria of severity or while awaiting the transfer:
– Maintain good hydration (breastfeeding), if necessary use infant formula and a gastric tube.
– Begin treatment for infection, if present.
– Sun exposure is not an effective treatment for severe jaundice. However, if there are no other options, expose the bare newborn to the sun for 10 minutes 4 times a day, in the morning and late afternoon, when the sun is not too strong.
Cover the infant's eyes.

10.4 Specific care when the mother has a transmissible infection

10.4.1 Syphilis

Look for signs of syphilis in all infants of mothers with a positive syphilis test:
– Mucocutaneous rash, grey patches, papules and bullae followed by desquamation of the skin on the palms and soles of the feet;
– Sepsis, jaundice, anaemia, enlarged lymph nodes and abdominal distension with hepatosplenomegaly.

If the infant has no signs of syphilis and the mother received appropriate treatment during the pregnancy (at least one dose of penicillin[h] administered at least one month before delivery), give the infant: **benzathine benzylpenicillin** IM, 50 000 IU/kg as a single dose.

If the infant has signs of syphilis or the mother did not receive appropriate treatment (see above):
– Administer to the infant:
benzylpenicillin IV for 10 days: 100 000 IU/kg/day in 2 divided doses given 12 hours apart from Day 0 to Day 7, and then 150 000 IU/kg/day in 3 divided doses given 8 hours apart from Day 8 to Day 10
– In addition to "standard" precautions, use "contact" precautions[i] during care for 24 hours after starting the treatment.

10.4.2 Genital gonococcal and/or chlamydial infection

Newborns of mothers with purulent cervical discharge at the time of delivery may be asymptomatic or present purulent conjunctivitis, usually within the first 7 days for gonorrhoea and after 7 days for chlamydia. Chlamydial pneumonia is possible.

Administer **ceftriaxone** IM: 50 mg/kg as a single dose (maximum 125 mg) to:
– All infants with purulent conjunctivitis, whether the mother is symptomatic or not;
– All infants born to mothers who were symptomatic at the time of delivery, even if the infants are asymptomatic.

In case of symptomatic conjunctivitis (purulent discharge): clean each eye with 0.9% sodium chloride at least 4 times a day.

If the conjunctivitis persists 48 hours after the ceftriaxone injection, administer :
erythromycin PO: 25 to 50 mg/kg/day in 4 divided doses for 14 days
or **azithromycin** PO: 20 mg/kg once daily for 3 days
If the symptoms appear after 7 days of life, administer ceftriaxone IM + erythromycin or azithromycin PO, as above.

[h] Erythromycin is not an appropriate treatment.
[i] Contact precautions include: isolation of the infant, use of gloves and protective gown at each contact with the infant.

10.4.3 Genital herpes[4]

Infants of mothers who have active genital herpes lesions at the time of delivery may present with neonatal herpes.

The infant is usually asymptomatic at birth. The symptoms appear sometime within the first 4 weeks of life (usually between 3 and 10 days of life).

Symptoms of neonatal herpes may include:
- Local, external involvement: skin, mouth (vesicles) and/or eyes (conjunctivitis);
- Cerebral involvement: encephalitis (with seizures in 60% of cases), accompanied in 60% of cases by local external involvement;
- Disseminated infection: primarily brain, lungs and liver. The infant may present danger signs suggesting septicaemia (fever, lethargy, respiratory distress or seizure). Local external involvement is associated in 60% of cases.

Management depends on the infant's risk at birth:

High risk of herpes infection
- Infant with symptoms of neonatal herpes, or
- Active primary or unknown maternal genital herpes at the time of delivery, or
- Active recurrent maternal genital herpes at the time of delivery, with at least one of the following risk factors: rupture of membranes ≥ 6 hours before delivery (vaginal delivery or caesarean section) or birth weight < 2000 g or premature ≤ 37 weeks or skin laceration or maternal HIV infection.

In these cases, **3% aciclovir** eye ointment: a single application in each eye at birth (in this case, wait 12 hours before applying tetracycline eye ointment, Section 10.1.7) and refer to neonatal care unit for aciclovir IV therapy, with isolation of mother and infant.

Low risk of herpes infection

Recurrent active genital herpes with none of the risk factors listed above.

In these cases, observe for 5 days, with isolation of the mother and infant.
Apply 3% aciclovir eye ointment, as above.
If the infant becomes symptomatic, refer to neonatal care unit for aciclovir IV therapy.
Discharge at 5 days of life if the infant has not developed symptoms; ask parents to seek urgent attention if symptoms appear.

10.4.4 Hepatitis B infection

The infant is asymptomatic.
Administer Hepatitis B vaccine to the infant at birth, regardless of the mother's serological status (Section 10.1.8).

10.4.5 HIV infection

The infant is asymptomatic.
Administer antiretroviral prophylaxis immediately after birth: refer to the PMTCT-specific guides.
For breastfeeding: see Appendix 3, Section 3.7.

10.4.6 Active pulmonary tuberculosis

Congenital tuberculosis is rare, and the infant is usually asymptomatic at birth.

After birth, the mother can transmit tuberculosis to the infant as long as she is contagious, i.e. sputum smear positive or culture positive.
In that case:
- Do not administer BCG.
- Administer preventive therapy to the infant, **isoniazid** PO: 10 mg/kg once daily for 6 months.
- Administer the BCG vaccine after completion of isoniazid therapy.
- Do not separate the mother from the infant (breastfeeding, etc.), but observe the rules for transmission prevention. For more information, refer to the MSF handbook, *Tuberculosis*.

10.5 Care of the low birth weight newborn (1500-2500 g)

Low birth weight indicates prematurity (less than 37 weeks) or intrauterine foetal growth retardation or a combination of the two.

Low birth weight newborns, whether premature or not, are at significant short-term risk of hypothermia, hypoglycaemia, apnoea, respiratory distress, jaundice, infection, anaemia, dehydration and feeding problems, and at significant long-term risk of poor psychomotor development.

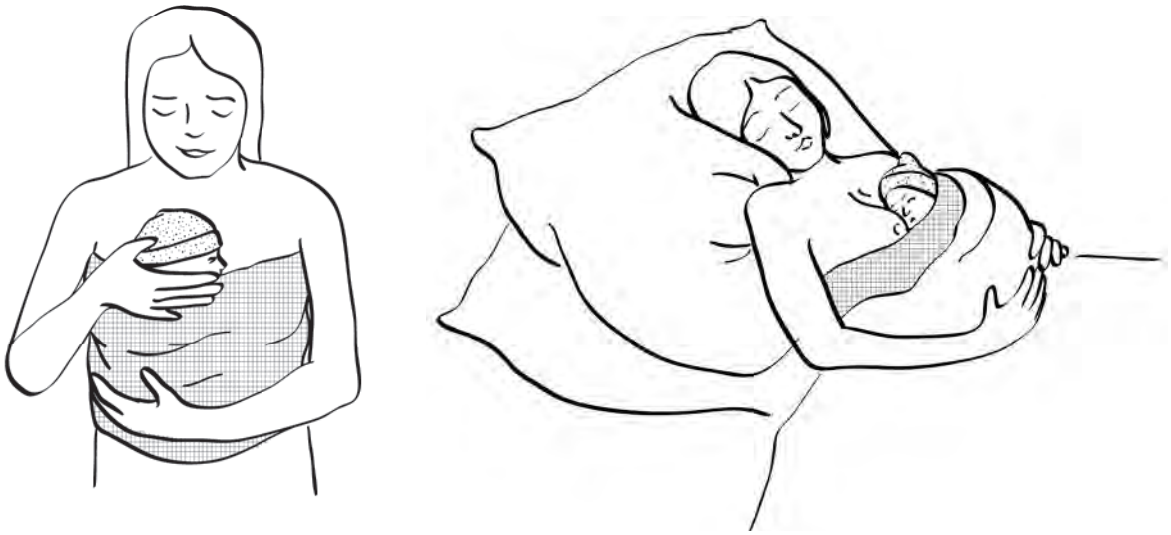
Newborns who are sick or who weigh less than 1500 g should be referred to a neonatal care unit whenever possible.
Newborns who weigh 1500 to 2500 g, regardless of the term, are managed in the maternity hospital if they are not sick, according to the recommendations below.

10.5.1 Kangaroo care

(Figures 10.4)

The Kangaroo mother care[j] is a method of caring for infants that involves putting them on the mother's chest skin-to-skin, preferably 24 hours a day.
This method can be used for all non-sick infant whose birth weight is less than 2500 g (prematurity and/or intrauterine foetal growth retardation).

The bare infant is placed vertically against the mother’s chest; the mouth should always be able to reach the nipple. Use a pagne to hold the infant.
If needed, use a blanket to keep the mother and infant warm.
When the mother is sleeping, her bust should be raised and the infant should be monitored.



Figures 10.4
Kangaroo care

[j] For more information: World Health Organization. Kangaroo mother care: a practical guide. 2003. http://www.who.int/maternal_child_adolescent/documents/9241590351/en/

The objectives of the Kangaroo care are:
– To keep the infant warm and to prevent or treat hypothermia.
– To help get breastfeeding started and keep it going.
– To foster the mother-infant bond and reduce the infant's stress.
– To reduce episodes of apnoea and bradycardia in premature infants.

Note: the skin-to-skin contact can also be done by the father, another family member or a wet-nurse during periods when the mother is not available.

10.5.2 Thermoregulation

– Cover the infant's head to reduce heat loss.
– Make sure that the room temperature is at least 25°C.
– Use the Kangaroo care (Section 10.5.1).

10.5.3 Feeding

– Exclusive breastfeeding is the best choice (Appendix 3).
– If sucking is ineffective but the swallowing reflex is present: express the milk manually or using a breast pump and feed the infant using a cup/spoon (Appendix 3, Sections 3.2 and 3.3).
– If sucking is ineffective and the swallowing reflex is poor or absent: express the milk and feed the infant using a gastric tube (Appendix 3, Sections 3.2 and 3.4).
– For the daily amounts required for feeding, see Appendix 4.
– If the mother does not have enough milk:
  • In the first 72 hours of life, make up the required amounts with 10% glucose PO.
  • After 72 hours of life, make up the amount with infant formula (or if not available, use diluted F 100 milk[k]).

  At the same time, continue to stimulate the mother's milk production (breast pump and the "supplementary nursing" technique, Appendix 3, Section 3.5).
– For newborns less than 1500 g, glucose is routinely given in addition to the mother's milk (Appendix 4).

In case of regurgitation:
– Administer each meal very slowly.
– Hold the infant tilted slightly head-up.

In case of vomiting, abdominal distension, blood in the stool or greenish, foul-smelling stool, stop feeding and request a medical opinion.

In all cases, try putting the infant to the breast periodically to test if breasfeeding is effective or not.

10.5.4 Monitoring

Same monitoring as for a newborn > 2500 g, plus:
– Daily weighing;
– Temperature every 4 hours;
– Blood glucose test before every meal or every 3 hours until there are 3 consecutive normal results. In case of hypoglycaemia, see Section 10.3.5.

[k] Diluted F-100 milk: 1 sachet (456 g) of F-100 milk in 2800 ml of water.

10.6 Criteria for discharge from the maternity hospital

- No danger signs (Section 10.3.1).
- Appropriate management of neonatal infection (Sections 10.3.3 and 10.4) and risk factors for neonatal infection (Section 10.3.4).
- Healthy infant: good breastfeeding on demand, normal respiration and temperature, etc.
- Weight > 1500 g.

AND

- Preventive treatments (Section 10.1.7) and BCG, Hepatitis B (0) and Polio (0) vaccines administered (Section 10.1.8).
- Clinical record filled out (including discharge weight).
- Postnatal visit appointment (Chapter 11, Section 11.3) given.

AND

Information for the mother

1) Breastfeeding: Appendix 3.

2) Infant care:
- Wash the infant with soap and water once a day, and immediately dry with a towel or cloth to avoid hypothermia.
- Cord care: clean with soap and water each time it is soiled, rinse well and dry then let it uncovered. Do not apply an antiseptic or other product or dressing on the cord. The cord falls between the 5th and 15th day after birth.
- Kangaroo care if weight < 2500 g (Section 10.5.1).
- Lay infant on the back.
- Use a mosquito net day and night when the infant sleeps.
- Keep the infant away from sick (contagious) children and adults.
- Wash hands before and after caring for the infant.
- Dispose of stool in the latrine.

3) Danger signs requiring a consultation:
- Inability to breastfeed properly
- Abnormal movements
- Reduced activity
- Trouble breathing
- Abnormal colouring
- Redness or purulent discharge from the umbilicus
- Fever or hypothermia

References

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Chapter 11: Postpartum/postnatal period

11.1 Normal postpartum events

The postpartum period extends from delivery to six weeks after delivery. This is the time it takes for the uterus to return to its initial size and for pregnancy-related biological and hormonal changes to disappear.

11.1.1 Uterine involution

- After the delivery of placenta, the uterus contracts and becomes hard. It is palpable below the umbilicus.
- Around the fifth or sixth day, it is halfway between the navel and the symphysis pubis.
- Around the tenth day, it is at the symphysis pubis.
- After six weeks, it returns to its normal size.
- The internal os closes between the eighth and twelfth day.

11.1.2 Lochia

Vaginal discharge, which is bloody during the first three days and then blood-tinged. It is usually odourless and stops after 15 to 21 days.

11.1.3 Lactation

The first two days: secretion of yellowish colostrum.
Around the third day, breast tenderness, sometimes accompanied by a short-lived fever of 38-38.5°C. The composition of the milk changes: mature milk, which is whiter and more abundant.

11.1.4 Return of menstrual periods

The first menstrual period usually occurs between the sixth and eighth week in women who are not breastfeeding.

11.2 Postpartum care for the mother

More than 60% of maternal deaths occur in the postpartum period and 45% of postpartum deaths occur within the first 24 hours. Women should therefore remain in the health care facility for at least 24 hours[1] after delivery.

11.2.1 In the maternity hospital

Following the immediate post-partum (Chapter 5, Section 5.2.2), monitor during the first day (and daily if the patient stays for more than 24 hours):
- Vital signs (heart rate, blood pressure, temperature, respiratory rate) 2 times/day.
- Uterine involution.
- Vaginal bleeding.
- Perineal tear/episiotomy scar.
- Urination and intestinal transit.
- Signs of anaemia (if present, measure haemoglobin).

Record all information in the patient's chart.
In case of caesarean section, see Chapter 6, Section 6.4.

Inform and advise the mother:
- Personal hygiene (clean the perineum daily with soap and water, change sanitary napkins every 4 to 6 hours).
- Mobilisation and ambulation to prevent thrombosis.
- Infant care (Chapter 10, Section 10.6).
- Breastfeeding (Appendix 3).
- Maternal danger signs requiring immediate consultation:
  - significant vaginal bleeding (e.g., sanitary napkin needs to be changed every 20 to 30 minutes during 1 to 2 hours and/or expulsion of clots in various occasions),
  - headache with visual disturbance or nausea and vomiting; seizures,
  - difficult or rapid breathing,
  - fever,
  - significant abdominal pain,
  - foul-smelling vaginal discharge.
- Contraception (Section 11.5).

Special situations: intrauterine foetal death or neonatal death or child abandonment

In the absence of contra-indication (cardiac valvulopathy, hypertension, preeclampsia, history of postpartum psychosis), lactation may be suppressed by using:
cabergoline PO: 1 mg as a single dose on the first day postpartum to inhibit lactation or 0.25 mg every 12 hours for 2 days to suppress established lactation.

Note: the use of cabergoline is limited to the above particular situations.

If cabergoline is not available or contra-indicated:

– Do not use any other dopamine agonists such as bromocriptine.
– Do not compress the breasts by a bandage (uncomfortable and ineffective).
– Wearing a bra at all times (day and night) and paracetamol can reduce the discomfort of lactation. In the absence of stimulation, milk production stops within one to two weeks.

In addition, psychological support should be offered to all women at the maternity hospital and in post-partum period. See Chapter 4, Section 4.11.2.

11.2.2 Upon discharge

– Schedule an appointment for the postnatal visit (Section 11.3).
– Verify that information and advice were given.
– If there is no clinical anaemia, continue iron + folic acid supplementation for 3 months[1] (Chapter 1, Section 1.2.5). In case of anaemia, see Chapter 4, Section 4.1.

11.3 Postnatal consultations

11.3.1 Timing of postnatal consultations

Two postnatal consultations, for the mother and infant, should be offered within the first six weeks after delivery:

– The first within 8 days of delivery, especially for women who delivered at home. For patients who delivered in a health care facility and stayed there for more than 24 hours, the discharge visit for the mother and infant is considered the first postnatal consultation.

AND

– The second visit within four to six weeks of delivery for all patients.

If the infant weighs less than 2000 g, a weekly consultation is recommended for the first month, and then at 6 weeks.

The postnatal consultations are usually done in the maternity services.

11.3.2 For the mother

– Assess vital signs: heart rate, blood pressure, temperature, respiratory rate.
– Assess uterine involution.
– Assess the healing of the incision in cases of caesarean section.
– Examine the vulva and perineum: look for tears, assess the healing of episiotomy or sutured wound, and appearance of vaginal discharge.
– Inquire about urination and intestinal transit. In case of urine leakage, look for potential fistula (Chapter 7, Section 7.2.5).
– Check for breast lesions.
– Look for anaemia. If there is no clinical anaemia, continue iron + folic acid supplementation for 3 months (Chapter 1, Section 1.2.5). In case of anaemia, see Chapter 4, Section 4.1.
– Perform a dipstick urinalysis if there are any symptoms of urinary tract infection and/or fever and/or hypertension.
– Offer HIV counselling and testing if not done during pregnancy or delivery.
– Note the mother-infant interaction, and the mother's psychological state.
– Provide information on contraception (time until fertility returns, available contraceptive methods, efficacy, benefits, constraints, and adverse effects of each method) and prescribe contraceptive if desired (Section 11.5).
– Administer vitamin A (**retinol** PO: 200 000 IU as a single dose) if not done at delivery.
– Complete tetanus immunisation if necessary.
– Give information and advice (danger signs, hygiene, breastfeeding, use of insecticide-treated mosquito nets for mother and infant).

11.3.3 For the infant

– Clinical examination:
  • height, weight. A term infant should have regained birth weight by Day 10; infants less than 2500 g normally regain their birth weight by Day 14 (unless they have been sick);
  • condition of umbilical cord;
  • presence/absence of danger signs (Chapter 10, Section 10.3.1);
  • if there are signs of anaemia (pallor of conjunctivae, the palms of the hands and soles of the feet), measure haemoglobin.
    Normally, the haemoglobin level of infants younger than 2 months and weighing less than 2500 g at birth should not be < 7 g/dl. Refer to neonatal unit if the haemoglobin is < 7 g/dl in a non-sick infant and < 10 g/dl in a sick infant.
– Apply tetracycline eye ointment (up to 8 days after birth) if not done at birth (Chapter 10, Section 10.1.7).
– Administer vitamin K_1 if not done at birth (Chapter 10, Section 10.1.7). Catch-up can be done up to age 3 months.
– Feeding: assess breastfeeding (Appendix 3).
– Vaccination:
  Normally, vaccinations (Hepatitis B Dose 0, BCG, Polio Dose 0) are given at birth. They are then continued at 6, 10 and 14 weeks (Doses 1, 2 and 3 Polio and the pentavalent vaccine containing Hepatitis B). Follow the recommendations of the Expanded Programme on Immunization.
  If the infant did not receive vaccines at birth:
  • Hepatitis B: Dose 0 may still be administered, but the later it is given, the less effective it is in preventing mother-to-child transmission.
  • Polio and BCG: administer Dose 0 of the Polio vaccine and the BCG vaccine.

11.3.4 Postnatal care card

Register all relevant information on an individual post partum follow-up card (Appendix 6).

11.4 Postpartum complications

11.4.1 Excessive uterine bleeding

Usually the amount of lochia is similar to a normal menstrual period. If the discharge is heavier, consider the possibility of retained products and/or endometritis.

If suspicion of retained placenta:

– Digital curettage or manual vacuum aspiration or extremely cautious instrumental curettage, with antibiotic coverage (Chapter 9).
– Antibiotic therapy for 5 days:
amoxicillin/clavulanic acid PO (dose expressed in amoxicillin): 3 g/day in 3 divided doses
or
amoxicillin PO: 3 g/day in 3 divided doses + **metronidazole** PO: 1.5 g/day in 3 divided doses

11.4.2 Infectious complications

Look for an infectious complication in patients with fever higher than 38°C for more than 48 hours.

Postpartum endometritis and salpingitis

– Fever, usually high.
– Abdominal and/or pelvic pain, foul-smelling or purulent lochia.
– Physical exam: uterus enlarged, soft, painful when mobilized; open cervix; swelling in the posterior fornix.
– Admit to inpatient department and start antibiotic therapy:
amoxicillin/clavulanic acid IV (dose expressed in amoxicillin): 3 g/day in 3 divided doses
+ **gentamicin** IM: 3 to 5 mg/kg once daily
or
ampicillin IV: 6 g/day in 3 divided doses
+ **metronidazole** IV: 1.5 g/day in 3 divided doses
+ **gentamicin** IM: 3 to 5 mg/kg once daily
Continue this treatment for 48 hours after resolution of fever. Do not switch to oral treatment[2].

  For minor, very early forms (no fever, minor pain), outpatient treatment is possible with **amoxicillin/clavulanic acid** PO (dose expressed in amoxicillin): 3 g/day in 3 divided doses for 5 to 7 days.
– Look for retained placenta, and evacuate after 24 to 48 hours of antibiotic therapy. If the patient is haemodynamically unstable due to haemorrhage or infection, perform uterine evacuation immediately.

Pelvic abscess or peritonitis

A complication of untreated puerperal endometritis/salpingitis.
– Abdominal guarding or spasm, ileus, pelvic mass.
– Surgical treatment: laparotomy or, in case the abscess is confined to the Pouch of Douglas, colpotomy to drain the abscess.
– Same antibiotic regimen as for postpartum endometritis and salpingitis.

Other infectious complications

– Abscess after caesarean section.
– Lymphangitis and breast abscess (Section 11.4.3).
– Pyelonephritis (Chapter 4, Section 4.2.7).

Note: in case of fever, systematically test for malaria in endemic areas.

11.4.3 Breast-related complications

Cracked nipples

– Nipple erosion and intense pain when starting to nurse. No fever (except when associated with lymphangitis).
– Clean with soap and clean water before and after each feeding; dry carefully.
– Cracked nipples are often caused by incorrect latching onto the breast: watch the infant nurse, and correct the position if necessary.

Breast engorgement

– Bilateral pain 2 to 3 days after childbirth; hard, painful breasts.
– Warm compresses (before nursing); gentle manual expression (before nursing, if the infant cannot latch onto the overly distended breast or after nursing to finish emptying the breast); more frequent nursing.
  For manual expression, see Appendix 3, Section 3.2.
– Engorgement is a benign problem that subsides in 24 to 48 hours.

Lymphangitis (inflammation of a milk duct)

– Unilateral pain, 5 to 10 days after childbirth. Local inflammation, red, hot painful with no fluctuation, high fever; axillary lymphadenopathy possible. Milk collected on a compress shows no pus.
– Empty the breast by nursing the infant frequently on the involved side. If the mother finds nursing too painful, temporarily stop nursing on the painful side (but empty the breast manually) and continue breastfeeding with the other breast.
– Routine analgesia (**paracetamol** PO: 3 g/day in 3 divided doses).

Mastitis (breast infection)

– Unilateral infection, with satellite lymph node; breast swollen, hot, red, painful, purulent discharge from the nipple, at times associated with fever.
– Temporarily stop nursing on the infected side. Carefully express all milk from the infected breast (manually) and administer an antibiotic with anti-staphylococcal activity:
  cloxacillin PO: 3 g/day in 3 divided doses for at least 7 days.
– Routine analgesia (**paracetamol** PO: 3 to 4 g/day in 3 to 4 divided doses).
– Antibiotic treatment helps prevent progression to breast abscess that requires surgical drainage. Surgical drainage of a “ripe” abscess is urgent, because an abscess can quickly spread.

11.4.4 Urine leakage

– Look for a possible vesicovaginal fistula, especially after a difficult home birth or prolonged labour.
– If there is a fistula: see Chapter 7, Section 7.2.5.
– If there is no fistula, stress incontinence is likely: propose exercises to strengthen the pelvic floor.

Stress incontinence is more common among grand multiparas, after a forceps or vacuum extraction, and in cases of macrosomia. It usually disappears within 3 months with pelvic floor exercises.

11.4.5 Psychological disorders

"The baby blues"

This syndrome has its onset within days after the delivery and lasts usually two weeks.
It is characterised by mood swings, crying, irritability, anxious worrying centred on the infant, and doubts about the ability to be a "good mother", combined with insomnia, loss of appetite and concentration problems.
These problems generally diminish within a few days. Reassurance, family support and follow-up to ensure that the patient does not develop depression are usually sufficient.

Postpartum depression

Post-partum depression develops in the first several weeks after childbirth; it can be severe and is often underestimated.
The characteristic symptoms of depression are sadness, frequent crying, loss of self-confidence, constant concerns about the infant (or, on the contrary, a feeling of indifference), feeling incompetent as a mother, and feelings of guilt (or even aggressive thoughts toward the infant) combined with insomnia and loss of appetite. These symptoms last more than 2 weeks and gradually worsen, leading to a state of exhaustion.
The interview should look for possible suicidal thoughts and assess the mother's ability and desire to take care of the infant (depression can have repercussions for the infant's development).
An understanding and reassuring attitude and help with daily activities by family and friends are essential.
Antidepressant medication may be necessary (choose an antidepressant compatible with breastfeeding, which should be continued whenever possible). See the MSF handbook, *Clinical guidelines.*

Note: perinatal death is associated with increased rates of postpartum depression.

Postpartum psychosis

This occurs less frequently and is characterised by the onset of psychotic symptoms after childbirth.
Symptoms include irritability, important mood swings, delusions, hallucinations, and disorganised, bizarre and sometimes violent behaviour.
The patient should be sent to a doctor immediately. Antipsychotic treatment, and usually hospitalisation, is necessary. See the MSF handbook, *Clinical guidelines*.

11.5 Contraception

Contraceptive method should be chosen based on medical indications or contra-indications[a] and the preference of the woman, who is in the best position to know which method fits her lifestyle.

The following clinical examinations are essential:

– *For hormonal contraception*: blood pressure. Combined oestrogen-progestogen contraceptives are contra-indicated in women with hypertension but progestogen only oral contraceptives and implants can be used.
– *For an intrauterine device*: speculum and digital vaginal examination. Placement of an intrauterine device is contra-indicated in case of pelvic infection. In this situation, the device is inserted after the infection has resolved.

For both methods, exclude pregnancy (if in doubt, perform pregnancy test).

No other laboratory testing is required for prescribing contraceptives.

11.5.1 Contraceptive methods

Breastfeeding

Breastfeeding is a temporary and effective (> 98%) method of contraception, but only if all of the following conditions are met:
– exclusive breastfeeding of an infant less than 6 months old;
– less than 6 hour-intervals between feedings;
– continued amenorrhoea.

Hormonal contraception

There are several products that differ in terms of route of administration, composition or duration of action (Table 11.1).

Table 11.1 - Hormonal contraception

Type	Examples
Combined oestrogen-progestogen oral contraceptives	Ethinyloestradiol/lrvonorgestrel (Microgynon®, Minidril®, etc.)
Progestogen-only contraceptives	
• *Oral progestogens* (“minipill”)	Levonorgestrel (Microlut®, Microval®, Norgeston®, etc.) or desogestrel
• *Progestogen injectables*	Medroxyprogesterone (Depo-Provera®, etc.)
• *Progestogen implants* (long-acting contraception)	Levonorgestrel (Jadelle®), etonogestrel (Nexplanon®), etc.

[a] For more information on contraception: World Health Organization. Medical eligibility criteria for contraceptive use, Fourth edition, 2010. http://www.who.int/reproductivehealth/publications/family_planning/9789241563888/en/

Intrauterine device

This copper device inserted in the uterus provides long-term contraception.

Condoms

Male and female condoms, in addition to their contraceptive effect, are the only method of protection against HIV and other sexually transmitted infections.
They should always be offered in addition to the other methods, as protection against sexually transmitted infections.

Sterilisation

Sterilisation (bilateral tubal ligation for women and vasectomy for men) is irreversible.
If the provision of sterilisation is being considered, inquire about the national regulations (eligibility criteria, etc.).
Patients should be clearly informed about the permanent nature of sterilisation and about possible alternatives (effective, long-acting methods like intrauterine device or contraceptive implants). Written consent is always required to perform the intervention.

Female sterilisation can be performed during caesarean section or by minilaparotomy after delivery.

11.5.2 For women who are breastfeeding

If any of the requirements that make breastfeeding an effective contraceptive method are not met, offer one of these methods.

Hormonal contraception

- Oral progestogens should be initiated at 6 weeks postpartum. If, however, they are the only available or acceptable contraceptive method, they may be started 21 days postpartum.
- Progestogen implants and injections can be used from the sixth week postpartum. However, if a woman cannot be seen again after 6 weeks (e.g. nomadic populations), or if they are the only available or acceptable contraceptive method, implants or injections may be used as soon as the opportunity presents itself, including immediately after delivery.
- Combined oestrogen-progestogen oral contraceptives should be avoided during the first 6 months postpartum. If, however, they are the only available or acceptable contraceptive method, they can be introduced sooner, but only after 6 weeks postpartum.

Intrauterine device

Intrauterine devices can be inserted either in the first 48 hours after delivery (after the third stage of labour), or from the fourth week postpartum.

11.5.3 For women who are not breastfeeding

Hormonal contraception

Hormonal contraception is started on or after Day 21. If a woman cannot be seen again after 21 days (e.g., nomadic populations), progestogen implants or injectables may be used as soon as the opportunity presents itself, including immediately after delivery.

Intrauterine device

As for women who are breastfeeding (Section 11.5.2).

11.5.4 Special situations

HIV infection

Condom use helps prevent HIV transmission to a partner, reinfection by other strains of the HIV virus if the partner himself is HIV-positive, and transmission of other sexually transmitted infections. HIV-positive patients should systematically use condoms.

Since condom use is not always optimal, however, using another effective contraceptive method in addition to condoms to prevent pregnancy is recommended. Different contraceptive methods can be used.

See also *Treatment with liver enzyme inducers*, next section.

Treatment with liver enzyme inducers

For women taking rifampicin and rifabutin, some antiretrovirals (e.g. efavirenz, nevirapine) and certain anti-epileptics (carbamazepine, phenytoin, phenobarbital): use an intrauterine device or an injectable progestogen as liver enzyme inducers reduce the efficacy of implants and oral contraceptives[3].

Post-abortum

Contraception may be started immediately after abortion, with either a hormonal contraceptive or intrauterine device if there is no pelvic infection.

Emergency contraception

Every woman should be informed about—and, if needed, have access to—emergency contraception:

– **levonorgestrel** PO (1.5 mg as a single dose), as soon as possible after unprotected or poorly-protected sex (preferably within 72 hours, and up to 120 hours or 5 days after[4]). There are no contra-indications to emergency contraceptive; it can be used whether a woman is breastfeeding or not.
  The dose of levonorgestrel should be doubled (3 mg) in patient taking a liver enzyme inducer[5].

or

– Intrauterine device, to be inserted within 5 days after the unprotected or poorly-protected sex.

References

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Chapter 12:
Termination of pregnancy on request

12.1 Care before abortion

This chapter describes termination of pregnancy (ToP) for viable intrauterine pregnancies up to 12 to 14 weeks of gestation.

Beyond 14 weeks, the conditions for ending a pregnancy and the management are different, and are not described in this manual.

12.1.1 Information and counselling

The decision of ending a pregnancy belongs to the patient. Her choice should be respected, and there should be no judgment. The role of the health care staff is to allow her to make an informed choice, to provide safe care and confidential environment.

Prior to the abortion an interview has to be ensured:

- Listen to the patient: reason(s) underlying the ToP request, situation, needs and concerns.
- Discuss the possible alternative to ToP: keeping the baby or putting him up for adoption.
- Provide information on ToP methods: description, advantages and disadvantages, follow-up.
- Discuss contraception: available and suitable method after the ToP; see Chapter 11, Section 11.5.

The staff is required to respect the confidentiality of the interview, the examination and the procedure.

The patients' consent for ToP needs to be clearly expressed.

12.1.2 History and examination

(including abdominal palpation, bimanual and speculum examinations)

- If necessary, perform a pregnancy test to confirm pregnancy.
- Estimate the gestational age (date of last menstrual period, fundal height); if necessary, determine the age of the foetus and its location by ultrasound.
- Look for current problems (and treat accordingly): sexually transmitted infection (e.g. abnormal vaginal discharge), vaginal bleeding, pelvic pain, fever, anaemia, etc.
- Take medical history (contra-indication to medical or surgical abortion method, contra-indication to subsequent contraception methods).
- In rare cases where an intrauterine device is in place, it must be removed.

12.1.3 Choosing a method

There are two methods of abortion: medical and surgical. There are advantages and disadvantages to each method.

Table 12.1 - Comparison between medical and surgical abortion

	Medical abortion	Surgical abortion
Advantages	• Non-invasive method. • Low infectious risk.	• Immediate result. • No absolute contraindication. • An intrauterine device can be inserted at the same time, at the end of the procedure.
Disadvantages	• No immediate result; requires a follow-up visit to verify expulsion. • Heavy bleeding and cramping as the pregnancy is expelled. • Bleeding often lasts longer than after aspiration. • Aspiration required in case of failure*.	• Invasive method. • (Low) risk of uterine perforation or cervical laceration. • Antibiotic prophylaxis required.

* i.e. continuing viable pregnancy, in less than 1% of the cases with a combined mifepristone + misoprostol regimen.

Elements that need to be considered in choosing the method are: the patient's preference, contextual constraints (e.g. possibility to return for follow-up visit), the specific contra-indications for each method, and operator experience.

12.2 Medical abortion

The combined mifepristone + misoprostol regimen is more effective than misoprostol used alone[1] and reduces the number of misoprostol doses needed, thus reducing its adverse effects.

The unit where medical abortion is performed should be set up for vacuum aspiration (or for easy referral for vacuum aspiration), should the medical method fail (ongoing pregnancy) or a complication occur (significant bleeding or incomplete expulsion).

12.2.1 Contra-indications

– Coagulation disorders: in this case, vacuum aspiration is preferred.
– Chronic adrenal failure and severe uncontrolled asthma (for mifepristone only).

Note: mifepristone and misoprostol are not to be used for the termination of an ectopic or molar pregnancy.

12.2.2 Protocol

The treatment includes:

– A combination of abortion medications:

  mifepristone PO: 200 mg as a single dose

  then, 36 to 48 hours later:
  misoprostol sublingually or vaginally: 800 micrograms

  Bleeding and cramping can be expected to start within 1 to 3 hours. If there is no bleeding within 3 hours, administer additional doses of **misoprostol**: 400 micrograms every 3 hours if necessary, until expulsion starts; maximum 4 additional doses.
  If mifepristone is not available or contra-indicated, misoprostol alone is administered as above.

AND

– An analgesic or a combination of analgesics[a]:

  ibuprofen PO: 800 mg every 8 hours (max. 2400 mg/day); start with misoprostol and continue as needed after expulsion, up to 3 days maximum.

  If needed, add:
  codeine PO: 30 to 60 mg every 6 hours (max. 240 mg/day)
  or
  tramadol PO: 50 to 100 mg every 6 hours (max. 400 mg/day)

  In case of nausea/vomiting (not routinely):
  metoclopramide PO: 5 mg/dose for women < 60 kg; 10 mg/dose for women > 60 kg. The interval between each dose should be at least 6 hours.

In practice:
Mifepristone is given under direct observation then, the woman goes home. Analgesics are not required at this stage.

[a] These doses may be used in adults and adolescents over 12 years.

Then, according to the context:

– misoprostol is given to the woman to take at home 48 hours later (four 200 microgram tablets for the first dose and one or more additional doses (two 200 microgram tablets, maximum additional 8 tablets). In this case, the protocol should be clearly explained;

or

– the woman comes back and takes misoprostol at the health facility. Between 12 to 14 weeks, she should remain at the facility until complete expulsion.

In addition to misoprostol, analgesics are provided.

12.2.3 Patient information

Before administering medications, the patient should be informed that:

– Medical abortion has approximately a 95% success rate. In case of failure, vacuum aspiration will be performed.
– Mifepristone and misoprostol may have teratogenic effect (this information should be known, in case she changes her mind after taking the drugs or if the regimen fails).
– Abortion starts within hours after taking the first dose of misoprostol and is usually completed within 24 to 48 hours. Occasionally, it can take up to two weeks to complete the abortion.
– She will experience cramping and bleeding. This normally lasts for a few days until abortion is completed. The heaviest bleeding occurs 2 to 5 hours after using misoprostol and usually slows down within 24 hours and should not exceed 48 hours. Light bleeding will last for 1 to 2 weeks.
– Misoprostol, especially when several doses are given, can cause: nausea, diarrhoea, and a fever that should not persist longer than 24 hours after taking the medication.
– Severe pain, heavy bleeding, foul smelling discharge and fever are danger signs requiring immediate medical attention.
– Menstrual periods will resume within 4 to 8 weeks but fertility returns rapidly; ovulation can occur as early as 2 weeks post-abortion.

With regard to contraception, depending on the method chosen, the patient should be informed that:

– Hormonal contraception will be started the day the misoprostol is taken.
– An intrauterine device will be inserted after complete expulsion at the post-abortion visit, provided there is no pelvic infection.

12.2.4 Post-abortion visit

A clinical consultation is routinely recommended 10 to 14 days after the administration of misoprostol to:

– Make sure the abortion is complete;
– Diagnose and treat potential complications;
– Provide contraception, if not done during the procedure. An intrauterine device can be inserted once complete abortion is confirmed.

Confirmation that the abortion is complete is based on clinical evidence: there is a sufficient amount of bleeding, the signs of pregnancy disappear, and the uterus returns to its normal size.
If in doubt:
– Confirm complete evacuation by ultrasound, if available.
– Do not perform pregnancy test, as it remains positive up to one month after abortion.

In the absence of bleeding or in case of minimal bleeding, suspect a failure of abortion but also an ectopic pregnancy.

In case of incomplete abortion, see Chapter 2, Section 2.1.3.

In case of ectopic pregnancy, see Chapter 2, Section 2.2.3.

In case of ongoing pregnancy, perform a vacuum aspiration (Chapter 9, Section 9.5).

12.3 Surgical abortion

Vacuum aspiration (either manual or electric) is an appropriate method of surgical abortion. Instrumental curettage must not be used.

12.3.1 Relative contra-indications

– Purulent cervicitis and pelvic infection: delay the procedure if possible, until antibiotic treatment has been finalized. If the procedure cannot be delayed, start antibiotic therapy before doing the procedure.
– Coagulation disorders: risk of haemorrhage. Aspiration must be performed in a facility where emergency surgery and blood transfusion are available.

12.3.2 Equipment

See Chapter 9, Section 9.5.3.

12.3.3 Technique

Follow precautions common to all intrauterine procedures (Chapter 9, Section 9.1.1).

Patient preparation

– Start antibiotic therapy if infection is present and intervention cannot be delayed. For antibiotic therapy, see Chapter 9, Section 9.6.6.
– Administer **misoprostol** sublingually or vaginally into the posterior fornix: 400 micrograms as a single dose, at least 3 hours before the procedure[2] to open the cervix and prevent traumatic cervical dilation.
– Administer antibiotic prophylaxis: **doxycycline** PO, 200 mg as a single dose or **azithromycin** PO, 1 g as a single dose, one hour before the procedure.
– Administer oral premedication before paracervical block:

  An hour before the procedure:
  diazepam PO: 10 mg

  A half-hour before the procedure:
  paracetamol PO: 1 g
  + **codeine** PO: 30 mg if < 60 kg; 60 mg if > 60 kg
  or
  tramadol PO: 50 mg if < 60 kg; 100 mg if > 60 kg

Then, for the rest of the procedure (preparation equipment, paracervical block, dilation, aspiration, examination of aspirated contents), see Chapter 9, Section 9.5.4.

Immediately after the procedure

An intrauterine device can be inserted (if there is no pelvic infection) if this is the contraceptive method that the patient has chosen.

12.3.4 Patient follow-up

Immediate

- Settle the patient comfortably during the monitoring period (at least 2 hours).
- Monitor vital signs and blood loss.
- Pain management: paracetamol and/or ibuprofen.
- The patient can go home if the vital signs are stable, if she can walk and she has been given the following information:
  - Cramps will continue for a few days.
  - Bleeding will last for 8 to 10 days.
  - Menstrual periods will resume within 4 to 8 weeks.
  - Fertility returns rapidly; ovulation can occur as early as 2 weeks post-abortion. Begin contraception that same day (Chapter 11, Section 11.5).
  - Personal hygiene: cleansing with soap and water once daily; no vaginal douches.
  - Seek immediate medical attention in case of danger signs: severe pain or heavy bleeding, foul smelling discharge or fever.

Post-abortion visit

A consultation is advised 10 to 14 days after the procedure: look for signs of infection and incomplete abortion, and check if contraception is well tolerated.

12.3.5 Complications

See Chapter 9, Section 9.6.6.

References

1 Grossman D. Medical methods for first trimester abortion: RHL commentary (last revised: 3 September 2004). The WHO Reproductive Health Library, Geneva. World Health Organization.
http://apps.who.int/rhl/fertility/abortion/dgcom/en/

2 World Health Organization. Safe abortion: technical and policy guidance for health systems. Geneva, 2012.
http://www.who.int/reproductivehealth/publications/unsafe_abortion/9789241548434/en/

Appendices

Appendix 1. Antenatal care card

Antenatal care card n°:

Name: Age:

Name of husband: Address:

Obstetric history

Last menstrual period **G:** **P:** **A:**

Did previous pregnancies result in:

Live birth	Yes ☐	Number:	No ☐
Still birth (born dead)	Yes ☐	Number:	No ☐
Neonatal death (< 1 month)	Yes ☐	Number:	No ☐
Infant death (1 month - 1 year)	Yes ☐	Number:	No ☐
Miscarriage/abortion	Yes ☐	Number:	No ☐

Problems during previous pregnancies

Anaemia	Yes ☐	No ☐
Hypertension/pre-/eclampsia	Yes ☐	No ☐
Antepartum haemorrhage	Yes ☐	No ☐
Other		

Problems during previous deliveries

Prolonged labour	Yes ☐	No ☐
Malpresentation (breech, other)	Yes ☐	No ☐
Caesarean section	Yes ☐	No ☐
Instrumental extraction	Yes ☐	No ☐
Placenta (manual delivery)	Yes ☐	No ☐
Episiotomy	Yes ☐	No ☐
Postpartum haemorrhage	Yes ☐	No ☐
Infection (puerperal sepsis)	Yes ☐	No ☐
Other		

Medical history

Hypertension	Yes ☐	No ☐
Heart disease	Yes ☐	No ☐
Diabetes	Yes ☐	No ☐
Tuberculosis	Yes ☐	No ☐
Sexually transmitted infection	Yes ☐	No ☐
HIV infection	Yes ☐	No ☐
Epilepsy	Yes ☐	No ☐
Abdominal surgery	Yes ☐	No ☐
Other		

Observations or examinations:

Tetanus vaccination

	Date	Next appointment
TT1		
TT2		
TT3		
TT4		
TT5		

	1st visit	2nd visit	3rd visit	4th visit	5th visit
Date					
Examination					
Gestational age					
Weight					
Blood pressure					
Mid-upper arm circumference (if appropriate)					
Uterine fundus height (cm)					
Foetal heart rate (beats/minute)					
Foetal movements (present/absent)					
Position (longitudinal, transverse, oblique)					
Presentation (cephalic, breech, transverse)					
Conjunctiva (pale, yellow)					
Oedema					
Complaints (use back page if needed)					
Laboratory tests					
Syphilis test (routinely at the first visit)					
If positive: partner/co-wives treated?					
Haemoglobin (routinely at the first visit)					
HIV test (at the first visit)					
Urine analysis (at least once per trimester)					
Rapid malaria test (at least once per trimester)					
Pregnancy test (if appropriate)					
Other tests (e.g., blood type)					
Medications					
Ferrous salts + folic acid or multiple micronutrients					
Albendazole (contra-indicated in 1st trimester)					
Malaria prophylaxis (SP in 2nd and 3rd trim. if appropriate)					
Malaria curative treatment					
Urinary tract infection treatment					
Syphilis treatment					
Sexually transmitted infection treatment					
Other treatment(s)					
Other distributions					
Clean delivery kit (3rd trimester)					
Mosquito nets (2 nets at the first visit)					
Supplementary food					
Next appointment					

Appendix 2. Bakri intrauterine balloon

2.1 Indication

Postpartum haemorrhage due to uterine atony, when uterotonics fail to control bleeding.

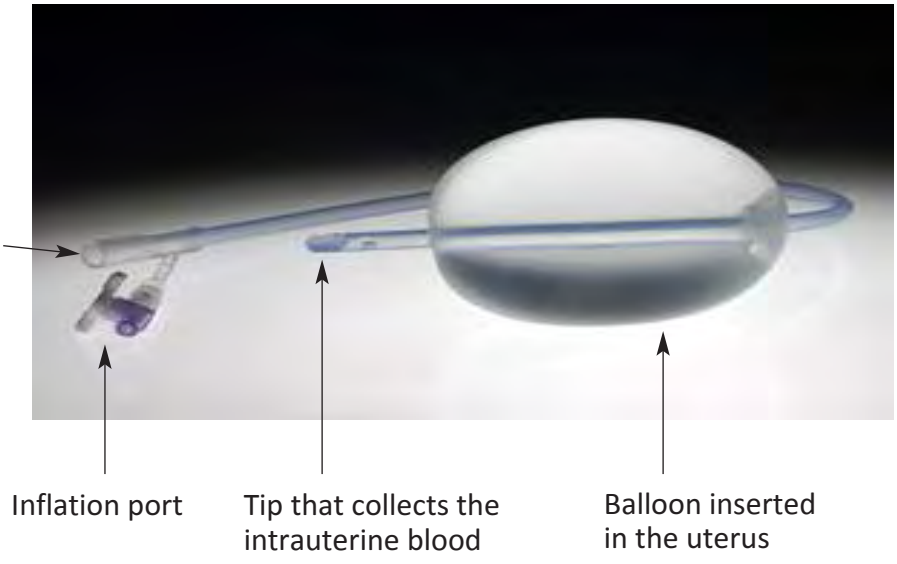
A Bakri balloon is used to reduce intrauterine bleeding and avoid haemostasis hysterectomy. In a BEmONC facility, a Bakri balloon can be used to stabilize the patient before referring her to a CEmONC facility.

2.2 Contra-indications

- Uterine rupture
- Purulent infections of the vagina, cervix or uterus

2.3 Balloon catheter placement

- Assess the need for analgesia/anaesthesia.
- Apply antiseptic solution (10% polyvidone iodine) to the perineal area.
- Remove any blood clots from the uterus (uterine exploration).
- Insert a Foley catheter.
- Estimate the size of the uterus and record it (for monitoring).
- Insert a speculum. Insert the (uninflated) balloon into the uterus, either manually or with atraumatic forceps. Make sure that the entire balloon passes the internal cervical os.
- Inflate the balloon with sterile, room temperature 0.9% sodium chloride, until it can be seen in the cervix (typically, 250 to 300 ml, up to 500 ml maximum); record the volume used).
- Apply gentle traction to the catheter and tape the end to the patient's thigh.
- Connect the drainage port to a fluid collecting bag (urine bag) to monitor haemostasis.



2.4 Associated treatment

– Continuous infusion of **oxytocin**: 20 to 40 IU depending on the dose already administered (maximum 60 IU total dose) in 1 litre of Ringer lactate or 0.9% sodium chloride over 8 hours (42 drops/minute).
– Antibiotic therapy IV: **ampicillin** 1 g + **metronidazole** 500 mg or **amoxicillin/clavulanic acid** 1 g, every 8 hours, until the balloon is removed.
– Start or continue blood transfusion to correct anaemia.

2.5 Patient follow-up

Hourly monitoring: vital signs, urine output, fundal height, vaginal bleeding, volume of blood collected in the collecting bag, oxygen saturation (if available).

If there is no blood flowing into the collection bag but the fundal height is increasing, the catheter may be blocked by clots: check to make sure it is open by instilling 15 to 30 ml of sterile 0.9% sodium chloride.

If there is no blood flowing into the collection bag, no vaginal flow, no increase in fundal height and the patient is stable, the bleeding is controlled: leave the balloon in place for 24 hours.
After 24 hours, remove half the injected volume from the balloon and check bleeding and vital signs after 30 minutes:
– If there is no visible bleeding and the patient is stable, completely deflate and remove the balloon.
– If the bleeding starts up again, re-inflate the balloon for another 6 to 8 hours and/or consider surgery.

If the initial tamponnade fails or the bleeding starts again while the inflated balloon is still in place, surgical treatment is indicated.

Appendix 3. Breastfeeding

Exclusive breastfeeding (no food or drink other than breast milk) for the first 6 months is the best choice for infants, regardless of the term or birth weight.

For HIV-infected mothers, see Section 3.7.

If the infant is unable to suck effectively or at all:
- Breast milk can be expressed with a breast pump or by hand (Section 3.2).
- If the infant has a good swallowing reflex: the milk can then be given by cup, spoon or syringe (Section 3.3).
- If the infant cannot swallow effectively or at all: the milk is given with a gastric tube (Section 3.4) to prevent aspiration and exhausting the infant.

If sucking is ineffective, check for hypoglycaemia (Chapter 10, Section 10.3.5) and danger signs (Chapter 10, Section 10.3.1).

If the child is able to suckle but the quantity of maternal milk is not sufficient, the supplemental suckling technique offers the possibility to feed her/him with infant milk while stimulating milk production (Section 3.5).

Always make sure that any medications being taken by the mother are compatible with breastfeeding, and if necessary, adjust the treatment accordingly.

3.1 Breastfeeding success factors

The factors for success in breastfeeding are:
- Informing pregnant women about breastfeeding benefits and implementation.
- Putting the infant to the breast early, within an hour of birth.
- Correct and comfortable positioning of mother and infant. Proper latch-on allows effective sucking and reduces complications (cracks): the infant should face the mother's body, with the chin against her breast, the nose free and the nipple and most of the areola in the mouth.
- For women with inverted or flat nipples: use techniques to help nipple protrude (nipple massage, use of breast pump just before the infant feeds).
- Maintaining exclusive breastfeeding (unless medically contra-indicated).
- Breastfeeding on demand at least 8 times a day (at least every 3 hours).
- Good hydration (at least 3 litres/day) and a caloric intake > 2500 kcal/day for the mother, as these directly affect the amount of milk produced.
- Nipple care, washing with water before nursing.
- An organisation that allows the mother and infant to stay together 24 hours a day.
- Help with maintaining lactation even if the mother has to be separated from her infant (preventing milk production from stopping due to lack of stimulation).

Do not stop breastfeeding if:
- The infant has diarrhoea: explain to the mother that her milk is not causing the diarrhoea.
- The mother is sick (unless serious condition): explain to the mother that her milk is not of poor quality because she is sick.

3.2 Hand expression and storage of breast milk

Hand expression is an alternative when a breast pump is not available. Milk is expressed every 2 to 3 hours.

Show the mother the technique. Give her a clean cup or container for collecting the milk. The container should be washed, boiled and rinsed with boiled water and air-dried before each use.

Technique

- Wash hands, sit comfortably and hold the container under the breast.
- With the other hand, hold the breast up with four fingers, and place the thumb above the areola.
- Squeeze the areola between the thumb and the fingers while pressing backward toward the rib cage.
- Express each breast for at least 5 minutes, alternating, until the milk stops flowing.
- If the milk fails to flow, check the technique and apply warm compresses to the breasts.

Feed the infant immediately after expressing the milk (by cup or gastric tube).

If the infant does not take all of the collected milk, it can be stored in a clean container in the refrigerator (2 to 8°C) for a maximum of 24 hours[a].
Warm the milk (water bath) to body temperature for the next feeding.

3.3 Administering the milk by cup or other utensil

The milk can be administered using a cup, spoon or syringe.
Use a clean (washed, boiled or rinsed with boiled water and air-dried) container/utensil for each feeding.

Technique

The mother should (with help from a carer):

- Measure out the volume of milk needed according the infant's age and weight (Appendix 4).
- Hold the infant in a half-seated or upright position on her lap.
- Place the cup/spoon gently against the infant's lower lip and touch the outside of the upper lip with the edge of the cup.
- Tilt the cup/spoon so that the milk just reaches the infant's lips.
- Let the infant take the milk at his own pace; never pour the milk into the mouth.
- Stop feeding when the infant closes the mouth and is no longer interested in feeding.

3.4 Administering the milk by oro/nasogastric tube

Indications

- Infants < 1500 g: poor sucking, limited or no coordination between sucking and swallowing, tire rapidly.
- Infants with respiratory distress: risk of aspiration, tire rapidly.

[a] Managing newborn problems: a guide for doctors, nurses, and midwives. World Health Organization. 2003. http://www.who.int/reproductivehealth/publications/maternal_perinatal_health/9241546220/en/

– Infants in poor general condition (asphyxia, meningitis, seizures, etc.): little or no sucking, weak reflexes.
– Infants with cleft palate, particularly when the cleft is very wide.

Placing the tube

See Appendix 5.

Feeding

Before each feeding:
– Check that the abdomen is not distended or painful.
– Aspirate the gastric contents to verify that the gastric tube is in the correct position and evaluate the gastric residual:
  • If the residual is clear or milky and < 2 to 3 ml/kg: re-inject the residual and feed the planned amount.
  • If the residual is clear or milky and > 2 to 3 ml/kg after two consecutive feedings: re-inject the residual and feed enough to reach the total planned amount. If the day's feedings should have been increased, wait until the next day to increase the amounts.
  • If the residual is bilious (yellow-green): do not re-inject the residual; give the planned amount of milk then, reassess the residual. If the residual is still bilious: stop the feeding, look for danger signs (Chapter 10, Section 10.3.1 and 10.3.3) and necrotizing enterocolitis (blood in stools and painful abdominal distension). Insert an intravenous line for maintenance fluid therapy, start antibiotic therapy before transferring the infants to neonate unit.

Administering the milk:
– Take a sterile or clean (washed, rinsed with boiled water and air-dried) syringe, large enough to hold the total amount of the feeding. Remove the plunger and connect the syringe to the conic end of the tube.
– Pour the milk into the syringe, which should be held vertically.
– Ask the mother to hold the syringe 10 cm above the infant and let the milk flow through the tube by gravity.
– Do not use the plunger of the syringe to force the milk down faster.

Each feeding should last 10 to 15 minutes.

For the daily amounts required for feeding, see Appendix 4.

3.5 "Supplementary nursing" technique

This technique is used to maintain breastfeeding when milk production is less than the daily amount needed by the infant.

It consists of giving the infant formula through a feeding tube while stimulating milk production.

Technique

– Cut off the end of a CH8 gastric tube (1 cm from the holes) and remove the cap from the other end.
– Attach the first end to the nipple using adhesive tape. Place the other end in the cup. The infant should have both the nipple and the tube in the mouth while nursing (Figure 1).
– The mother should hold the cup 10 cm below breast-level, so that the milk is not sucked up too quickly.

The infant may need 2 or 3 days to adjust to the technique. If, for the first few days, the infant does not take all of the milk in the cup, give him the rest with a cup, spoon or syringe.

Figure 1
"Supplementary nursing" technique

3.6 Management of feeding problems (summary)

Situation	Management
Problem with breastfeeding, but breastfeeding seems possible (milk production, sucking and swallowing are all adequate)	Give mother more advice, build her confidence, always have a member of the medical team present during breastfeeding, recording observations in the infant's chart.
Breastfeeding with inadequate amount of breast milk (amount of milk produced less than infant's daily requirements)	• Stimulate milk production by frequent breastfeeding (8 x/day). • Use a breast pump and the "supplementary nursing" technique.
Ineffective sucking but good swallowing reflex	• Express the milk with a breast pump or by hand. • Administer the milk using a cup, spoon or syringe.
Ineffective sucking and poor or no swallowing reflex	• Express the milk with a breast pump or by hand. • Feed breast milk via a gastric tube.

3.7 Breastfeeding in HIV-infected women

To reduce the risk of HIV transmission, mothers should receive long-term antiretroviral therapy or for as long as they are breastfeeding.

Exclusive breastfeeding is recommended for the first 6 months of life, with gradual weaning over one month starting at age 6 months. Stopping breastfeeding abruptly is not recommended.

Breast milk substitutes can be used as an alternative to exclusive breastfeeding only under the following conditions:

- There is enough infant formula available for exclusive use to age 6 months.
- The mother (or the person in charge) is able to prepare the formula under good hygiene conditions and frequently enough to limit the risk of diarrhoea or malnutrition.
- There is access to a health care facility offering a full range of paediatric care.

Appendix 4. Daily amounts required for feeding

Birth weight ≥ 2500 g

	Total (ml/kg/day)	**Breast milk**
D1	60	8 x 23 ml
D2	80	8 x 30 ml
D3	100	8 x 38 ml
D4	120	8 x 45 ml
D5	140	8 x 53 ml
D6	160	8 x 60 ml
D7	160-180	8 x 60-68 ml
D8 and after	160-200*	8 x 60-75 ml

* Up to 220 ml/kg may be given, if necessary for growth.

Birth weight 2000 g – < 2500 g

	Total (ml/kg/day)	**Breast milk**
D1	60	8 x 17 ml
D2	80	8 x 23 ml
D3	100	8 x 28 ml
D4	120	8 x 34 ml
D5	140	8 x 40 ml
D6	160	8 x 45 ml
D7	160-180	8 x 45-51 ml
D8 and after	160-200*	8 x 45-56 ml

* Up to 220 ml/kg may be given, if necessary for growth.

Birth weight 1500 g – < 2000 g

	Total (ml/kg/day)	**Breast milk**
D1	60	8 x 13 ml
D2	80	8 x 18 ml
D3	100	8 x 22 ml
D4	120	8 x 26 ml
D5	140	8 x 31 ml
D6	160	8 x 35 ml
D7	160-180	8 x 35-39 ml
D8 and after	160-200*	8 x 35-44 ml

* Up to 220 ml/kg may be given, if necessary for growth.

Birth weight 1250 g – < 1500 g

In principle, newborns whose birth weight is < 1500 g should receive only 10% glucose in continuous IV infusion for the first 48 hours of life, due to the very high risk of acute necrotising enterocolitis with rapid early enteral nutrition.

The table below shows how much milk and glucose to administer simultaneously by mouth, as a last resort – that is, only when it is impossible to administer a continuous infusion and the newborn cannot be transferred to a neonatal care unit.

	Total (ml/kg/day)	**Breast milk**	**10% glucose**
D1	80	12 x 5 ml	12 x 4 ml
D2	100	12 x 7 ml	12 x 4 ml
D3	120	12 x 10 ml	12 x 4 ml
D4	140	12 x 14 ml	12 x 2 ml
D5	160	12 x 18 ml	–
D6	160-180	12 x 18-21 ml	–
D7	160-200	12 x 18-23 ml	–
D8 and after	160-200*	12 x 18-23 ml	–

* Up to 220 ml/kg may be given, if necessary for growth.

Birth weight 1000 g – < 1250 g

	Total (ml/kg/day)	**Breast milk**	**10% glucose**
D1	80	12 x 5 ml	12 x 3 ml
D2	100	12 x 6 ml	12 x 3 ml
D3	120	12 x 8 ml	12 x 3 ml
D4	140	12 x 11 ml	12 x 2 ml
D5	160	12 x 15 ml	–
D6	160-180	12 x 15-17 ml	–
D7	160-200	12 x 15-19 ml	–
D8 and after	160-200*	12 x 15-19 ml	–

* Up to 220 ml/kg may be given, if necessary for growth.

Appendix 5. Placing an oro/nasogastric tube

Gastric tubes must always be used with great caution. There is a risk of aspiration if the tube is used incorrectly.

If possible, use the orogastric route rather than the nasogastric route in cases of respiratory distress or weight below 1500 g. Both nostrils must remain unobstructed for effective breathing.

5.1 Technique

- Choose a CH6 or CH8 tube, depending on the size of the infant's nostrils. The tube must not completely block the opening of the nostril.
- Measure the distance from the mouth (oro-) or bridge of the nose (naso-) to the tragus of the ear, and then the distance from the tragus of the ear to the xyphoid process of the sternum. Mark this insertion length on the tube with a pen.
- Lubricate the tube with water. Hold the infant's head firmly to prevent injury. Insert the tube in a continuous motion to the pen mark.
- Secure the tube with adhesive tape.
- Check for correct tube placement:
  1) aspirate the stomach contents
  AND
  2) inject 2 ml of air into the stomach via the tube. Place a stethoscope on the abdomen to listen for the noise of the air in the stomach.

  If there is any doubt about the tube position, withdraw the tube and start over.
  Intrapulmonary administration of the liquid contents can be fatal.

To feed, connect a 20-ml syringe, without its plunger, to the tube (tulip) and allow the milk in the syringe to flow by gravity (Appendix 3, Section 3.4).

Rinse the tube with a few ml of 0.9% sodium chloride after each use.

5.2 Monitoring

The tube position should always be checked before administering any liquid or medication; check the position of the reference mark, check that aspiration brings up gastric liquid, and inject air into the stomach. If not correctly positioned, re-insert the tube and verify that it is correctly positioned.

Replace the tube every 3 days, switching nostrils with each new tube, or sooner if the tube becomes clogged. Evaluate if tube is still necessary before replacing.

Appendix 6. Postnatal care card

Postnatal care card n°:					
Name:					
Gravida:	Para:	Abortion:			
Age:					
Address:					
Came to ANC:		Yes ☐		No ☐	
Date of delivery:		Full term ☐		Pre-term ☐	
Infant's name:		Birth weight:			

(If more space is needed in case of multiple births, use a separate PNC card to record infant observations)

Previous pregnancies *(to be filled only if no antenatal card available)*				
Live birth	Yes ☐	Number:	No ☐	
Still birth (born dead)	Yes ☐	Number:	No ☐	
Neonatal death (< 1 month)	Yes ☐	Number:	No ☐	
Infant death (1 month - 1 year)	Yes ☐	Number:	No ☐	
Miscarriage/abortion	Yes ☐	Number:	No ☐	

Problems during this pregnancy and delivery	
Anaemia (indicate Hb if known)	
Hypertension/pre-/eclampsia	
Antepartum haemorrhage	
Prolonged/obstructed labour	
Malpresentation (breech, other)	
Caesarean section	
Instrumental extraction	
Placenta (normal/manual delivery)	
Episiotomy	
Perineal laceration (tear)	
Fistula present/management	
Postpartum haemorrhage	
Infection (puerperal sepsis)	
Other:	

Medical history *(to be filled only if no antenatal card available)*							
Hypertension	Yes ☐	No ☐	Epilepsy	Yes ☐	No ☐
Heart disease	Yes ☐	No ☐	HIV infection	Yes ☐	No ☐
Diabetes	Yes ☐	No ☐	Tuberculosis	Yes ☐	No ☐
Abdominal surgery	Yes ☐	No ☐	Other		
Sexually transmitted infection	Yes ☐	No ☐			

Examined by:

Date of next visit (if not discharged):

Date of discharge from PNC:

Newborn referred for follow-up vaccines and growth monitoring
Name of clinic newborn is referred to:

Observations or examinations:

	1st visit (2-8 days post delivery)	**2nd visit** (4-6 weeks post-delivery)
Mother		
Blood pressure		
Temperature		
Anaemia (conjunctiva, haemoglobin)		
Breasts (e.g. infection, engorgement)		
Uterine involution (level of fundus)		
Lochia (colour and quantity)		
Healing (if laceration or episiotomy or C-section)		
Passing urine and stool normally		
Mother-infant interaction		
Treatments:		
Tetanus vaccine (according to schedule)		
Ferrous salts + folic acid or multiple micronutrients		
Retinol (vitamin A)		
Laboratory test results (if any)		
Infant (in case of multiple births, use a separate PNC card to record infant observations)		
Temperature		
Heart rate		
Respiratory rate		
Weight		
Appearance: colour, breathing, activity		
Head-to-toe exam (if not done at birth)		
Cord condition		
Feeding (observe)/weight gain		
Passing urine and stool normally		
Treatments (if not done at birth):		
Tetracycline eye ointment		
Vitamin K		
Doses of vaccines (Hepatitis B0, BCG, Polio 0)		
Other		
Health education		
Self and infant care		
Danger signs for mother and infant		
Breastfeeding (exclusive breasfeeding, support, etc.)		
Contraception		
Resumption of menses and sexual activity		
Infant growth monitoring and vaccinations		

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In the same collection

Clinical guidelines - diagnosis and treatment manual
English, French, Spanish

Essential drugs - practical guidelines
English, French, Spanish, Arabic

Management of a measles epidemic
English, French

Tuberculosis
English, French

Public health engineering
English only

Rapid health assessment of refugee or displaced populations
English only

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