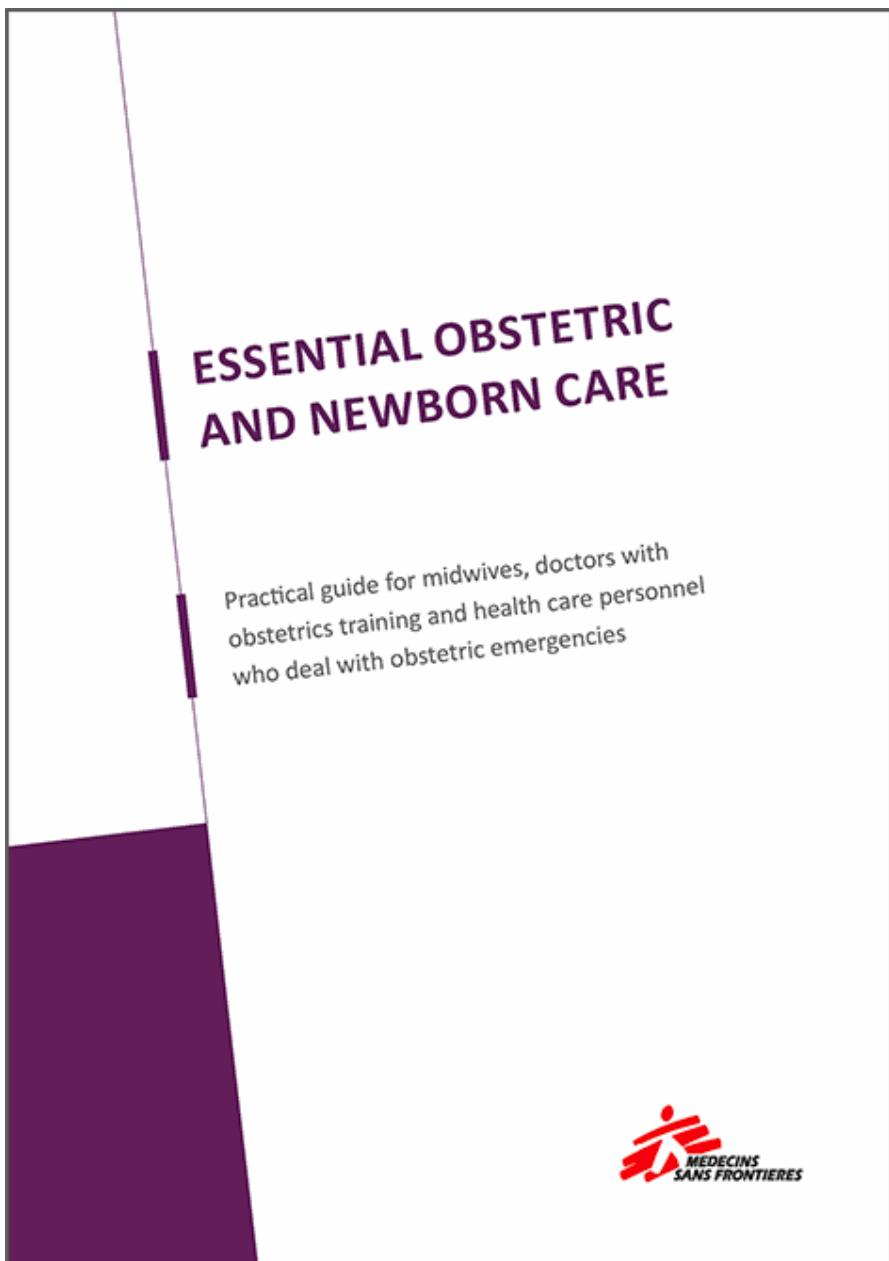




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# Essential obstetric and newborn care

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



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# Table of contents

[Contributors](#)

[Introduction](#)

[Abbreviations and acronyms](#)

[Chapter 1: Diagnosing and monitoring pregnancy](#)

[Chapter 2: Bleeding during the first half of pregnancy](#)

[Chapter 3: Bleeding during the second half of pregnancy](#)

[Chapter 4: Pathologies during pregnancy and pregnancy-related disorders](#)

[Chapter 5: Normal delivery and procedures related to vaginal delivery](#)

[Chapter 6: Special deliveries](#)

[Chapter 7: Labour dystocia and malpresentations](#)

[Chapter 8: Third stage of labour](#)

[Chapter 9: Intrauterine procedures](#)

[Chapter 10: Newborn care in the maternity hospital](#)

[Chapter 11: Postpartum period](#)

[Chapter 12: Termination of pregnancy](#)

[Appendices](#)

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# Introduction

According to the World Health Organization, an estimated 800 women die each day from preventable causes related to pregnancy, delivery and unsafe abortion, as well as 7000 newborns, the majority on the first day or during the first week of life. Almost all maternal (99%) and neonatal (98%) deaths occur in resource-limited countries.

**Essential obstetric and newborn care** is designed to help reduce maternal and neonatal mortality in unfavorable contexts.

This guide does not replace years of specialised training and experience. It is intended for midwives, doctors, and qualified health care personnel who respond to obstetric emergencies.

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 does not perform caesarean sections – though she usually helps determine that one is indicated. On the other hand, a nurse may be permitted to perform antenatal or postnatal consultations, with appropriate training. The medical demography of resource-limited countries often requires the decentralisation of competencies. Similarly, it is important to take the paucity of obstetricians in these countries into account, and recognise that in some countries, general practitioners in remote areas are trained to perform complicated deliveries. Therefore this guide aims to serve all of these personnel with diverse qualifications, by describing basic technical procedures and general management of obstetric emergencies. It can also be used as a training tool.

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 performing a caesarean section would be dangerous or impossible.

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 should permit 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 guide. Please inform the authors of any errors detected.

To ensure that this guide continues to evolve while remaining adapted to field realities, please send any comments or suggestions.

As treatment protocols are regularly revised, please check this website for updates.

# **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	comprehensive emergency obstetric and newborn care
D1 (D2, D3, etc.)	Day 1 or first day (Day 2 or 2 <sup>nd</sup> day, Day 3 or 3 <sup>rd</sup> day, etc.)
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
mg	milligram

ml	millilitre
mmHg	millimetre of mercury
mmol	millimole
MSF	Médecins Sans Frontières
MQ	mefloquine
MUAC	mid-upper arm circumference
MVA	manual vacuum aspiration
PMTCT	prevention of mother-to-child transmission
PO	per os – oral administration
PROM	premature rupture of membranes
SC	subcutaneous administration
SP	sulfadoxine/pyrimethamine
SpO <sub>2</sub>	saturation of arterial blood with oxygen measured by pulse oximetry
tab	tablet
TB	tuberculosis
TV	tetanus vaccine
UNICEF	United Nations Children's Fund
WHO	World Health Organization

# **Chapter 1: Diagnosing and monitoring pregnancy**

[1.1 Diagnosing pregnancy](#)

[1.2 Antenatal consultations](#)

[1.3 Monitoring complicated pregnancies](#)

# 1.1 Diagnosing pregnancy

## 1.1.1 Signs and symptoms of pregnancy

- The first sign of pregnancy is amenorrhea<sup>a</sup> 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), urinary frequency 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.

**Table 1.1 - Signs and symptoms of pregnancy by gestational age**

	Weeks since last menstrual period (weeks LMP)									
	0	4	6	8	12	16	18	20	24	40/41
Amenorrhea										
Uterine enlargement										
Gastrointestinal disturbances										
Breast changes										
Urinary frequency										
Foetal movement (multipara)										
Foetal movement (primipara)										
Uterine contractions										
Foetal movements felt										
Heart tones detected by Doppler ultrasound										
Heart tones heard with Pinard stethoscope										
Transabdominal ultrasound										
Urine pregnancy test										

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

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

## 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 indicated for suspected ectopic pregnancy or early diagnosis of a pregnancy to be terminated.

### **Ultrasound**

Ultrasound is not routinely necessary.

### **Footnotes**

- (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.

# 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, abnormal bleeding (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.

If the woman does not come in until the sixth month or later, try to have at least 2 consultations before the birth.

**Table 1.2 - Schedule of antenatal consultations**

Trimester	Month	Weeks LMP <sup>(a)</sup>	Consultation schedule
First	1	2-5	<= Consultation 1
	2	6-9	
	3	10-13	
Second	4	14-17	<= Consultation 2
	5	18-21	
	6	22-26	
Third	7	27-30	<= Consultation 3
	8	31-35	
	9	36-40/41	

(a) The gestational age is expressed in weeks since last menstrual period (LMP) or, less precisely, in months 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. History taking**

- General feeling about the pregnancy (problems/concerns).
- Social context: family situation, screening for sexual, intimate partner and domestic violence, living conditions, professional activity, etc.
- Date of last menstrual period.
- Obstetric and surgical history:
  - Number of prior pregnancies;
  - Complications during 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.;
- Tetanus immunisation status;
- Current complaints: pelvic pain, contractions, fever, urinary symptoms, vaginal bleeding, abnormal vaginal discharge, etc.

### **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 2018 and the woman is seen on 27 January 2019, 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 2018, the due date is between 22 and 29 September 2019.

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.

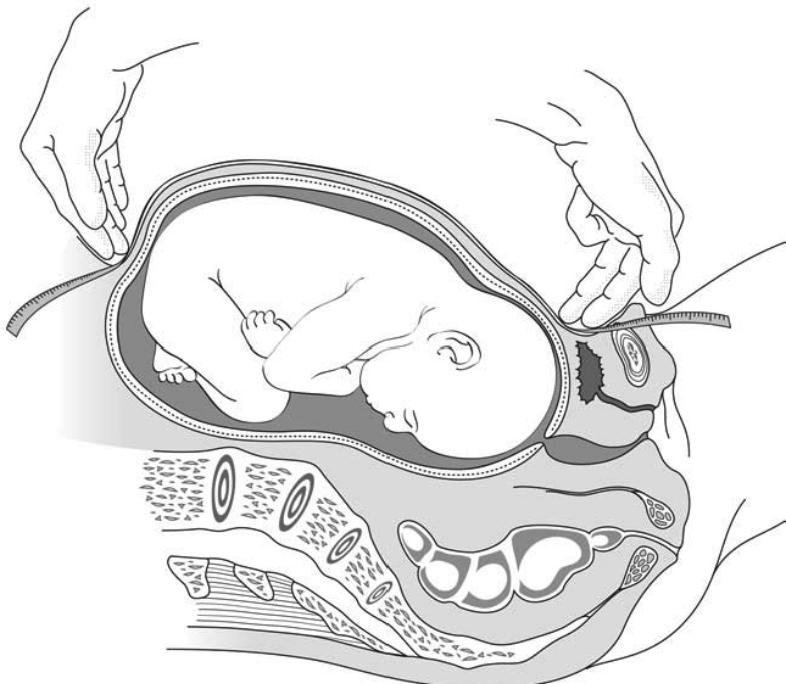
If the woman does not know the date of her last menstrual period, the presumed gestational age and due date is determined based on clinical examination or ultrasound if available<sup>a</sup>.

### **C. Clinical examination**

**In all cases:**

- Weight
- Height (detection of women < 1.50 m)
- Blood pressure (patient seated and resting)
- Look for abdominal scar.
- Look for anaemia, oedema, etc.
- Look for foetal heart tones after 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;
  - from the beginning of 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).

**Figure 1.1 - Measuring the fundal height**



Estimation of gestational age becomes increasingly approximate as the pregnancy progresses. As a rough guide:

**Table 1.3 - Fundal height according to gestational age**

<b>Fundal height</b>	<b>Weeks since last menstrual period</b>
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, symptoms of sexually transmitted infection).
- Vaginal examination (e.g. if there is doubt about the pregnancy diagnosis).

## D. Laboratory tests

**Table 1.4** - Recommended screening tests

Tests	Comments
<b>Syphilis</b>	<p>Syphilis screening should be performed at the first consultation, as early as possible in pregnancy.</p> <p>If the initial test is negative, re-testing is recommended as of 28 weeks LMP for women at high risk of infection or if syphilis prevalence is <math>\geq 5\%</math> [1].</p> <p>If it was not performed during an antenatal consultation, the test should be performed at delivery.</p> <p>Use a treponema-specific rapid test (e.g., SD Bioline®).</p>
<b>Malaria</b>	<p>In endemic areas, perform a rapid test even if there are no symptoms.</p>
<b>HIV infection</b>	<p>Offer a test to all women who do not know their HIV status.</p> <p>Perform rapid tests according to the standard algorithm. Testing cannot be performed without the patient's consent. If it was not performed during an antenatal consultation, it should be performed at delivery.</p> <p>If possible, evaluate the immunological status (CD4 count) if seropositivity is detected, or at the first antenatal consultation for women who already know that they are HIV positive.</p>
<b>Anaemia</b>	<p>Measure haemoglobin (HemoCue).</p> <p>Hb levels defining anaemia are <math>&lt; 11</math> g/dl (first and third trimester) and <math>&lt; 10.5</math> g/dl (second trimester).</p> <p>If it was not measured during an antenatal consultation, it should be measured at delivery.</p>
<b>Urinary tract infection</b>	<p>Test for asymptomatic bacteriuria, even if there are no symptoms (urinalysis with reagent test strips).</p>

## E. Antenatal care card

Fill out all relevant information on an individual antenatal care card to monitor the progress of the pregnancy ([Appendix 1](#)).

### 1.2.4 Subsequent consultations

#### A. History taking

- Foetal movement felt by the mother.
- Current complaints: pelvic pain, contractions, fever, urinary symptoms, vaginal bleeding, abnormal vaginal discharge, 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 tones: should be regular, rapid (110-160/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 tones are auscultated in the umbilical region along the foetus' back, at shoulder level.

#### Only if indicated:

- Genital examination (e.g. to look for symptoms of sexually transmitted infection).
- Vaginal examination (e.g. if mother complains of recurring uterine contractions).

*Note:* a small pelvis<sup>b</sup> is not predictive of foeto-pelvic disproportion and does not justify scheduling a caesarean section. Moreover, foeto-pelvic disproportion can occur with a normal-appearing pelvis. In practice, foeto-pelvic disproportion can only be diagnosed during labour.

## C. Laboratory tests

**Table 1.5 - Recommended screening tests**

Tests	Comments
<b>Urinary tract infection</b>	Look for asymptomatic bacteruria at each consultation.
<b>Malaria</b>	In endemic areas, perform a rapid test at each consultation during the second and third trimesters, unless the woman was tested in the past 4 weeks, the test was positive, and the woman has taken curative antimalarial treatment as a result.
<b>HIV infection</b>	Offer patients who tested negative during the first trimester a new test in the third trimester. There is increased risk of mother-to-child transmission of HIV 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 (TV)<sup>c</sup> 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 <sup>[2]</sup>

Dose	Schedule	Level of protection
TV1	At the first contact with medical services <i>or as early as possible during pregnancy</i>	0%
TV2	At least 4 weeks after TV1 <i>and at least 2 weeks before the delivery due date</i>	80%
TV3	At least 6 months after TV2 <i>or during the next pregnancy</i>	95%
TV4	At least 1 year after TV3 <i>or during another pregnancy</i>	99%
TV5	At least 1 year after TV4 <i>or during another pregnancy</i>	99%

## Anaemia

### Absence of anaemia

If there are no clinical signs of anaemia and no abnormal haemoglobin values:

- Administer iron and folic acid supplementation, starting as soon as possible after gestation starts and continue throughout the rest of the pregnancy. Give either:

**ferrous sulfate/folic acid<sup>d</sup>** (tablet containing 200 mg of ferrous sulfate, 65 mg of elemental iron + 400 micrograms of folic acid) PO: 1 tablet once daily

or

**multiple micronutrients<sup>e</sup>** (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 once daily

*Note:* 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 the prevalence of anaemia in pregnant women is high ( $\geq 40\%$ )<sup>f[3]</sup>.

- In areas where hookworm infection is common (areas with warm, moist climates), administer also an antihelminthic treatment as of the second trimester:  
**albendazole** PO, 400 mg single dose (or **mebendazole** PO: 100 mg 2 times daily for 3 days)
- 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 tests (see below).

## Presence of anaemia

If there is clinical evidence of anaemia (pallor of the palms, conjunctivae or tongue) or if haemoglobin is < 11 g/dl in the first and third trimester or < 10.5 g/dl in the second trimester): see Chapter 4, [Section 4.1.](#)

## Malaria

In all areas with moderate to high *P. falciparum* malaria transmission<sup>[9]</sup> prevention consists of:

- The use of insecticide-treated mosquito nets (2 bed nets should be provided).
- Malaria testing at each antenatal consultation in the second and third trimesters.
  - If the test is positive, no matter the region or stage of pregnancy:  
Administer curative malaria treatment (Chapter 4, [Section 4.3.1](#)).  
Wait one month after curative treatment before screening for malaria again.
  - If the test is negative, intermittent preventive treatment (IPT) is recommended in African moderate to high *P. falciparum* malaria transmission areas:  
Start IPT with **sulfadoxine-pyrimethamine (SP)**<sup>[4]</sup> as early as possible in the second trimester.  
The aim is to administer at least 3 doses between the second trimester and delivery with an interval of at least 1 month between each treatment. There is no maximum number of treatments as long as a one-month interval is respected. The SP dose for each treatment is 3 tablets single dose. This treatment helps reduce the effects of malaria (maternal anaemia and low birth weight). Do not administer this intermittent treatment to HIV-infected women receiving co-trimoxazole prophylaxis.

## Urinary tract infections

Treat all urinary tract infections including asymptomatic bacteriuria<sup>[5]</sup> detected by urine dipstick test (Chapter 4, [Section 4.2.3](#)).

## HIV infection

If test results are positive, start antiretroviral therapy (Chapter 4, [Section 4.4.4](#)).

## Vitamin and micronutrient deficiencies

- Calcium  
Supplementation is recommended for<sup>[6]</sup> :
  - All pregnant adolescents (under 20 years old);
  - 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 at the first antenatal visit and continue throughout the pregnancy:  
**calcium carbonate** PO: one 1.25 g tablet (equivalent to 500 mg of calcium element) 3 times

daily

Wait 2 hours between the administration of calcium and ferrous salts.

- Vitamin D  
Sun exposure and foods are sources of vitamin D. A supplement can be prescribed if there is a risk of deficiency (low exposure to sunlight, diet poor in vitamin D):  
**colecalciferol** (vitamin D<sub>3</sub>) or **ergocalciferol** (vitamin D<sub>2</sub>) PO: 100 000 IU single dose at 6 or 7 months of pregnancy.
- Iodine  
Iodine deficiency during pregnancy increases the risk of miscarriage, prematurity, severe mental and growth restriction in the child, and neonatal or infant death. In areas where iodine deficiency is endemic, iodine supplementation is necessary. Follow national protocol.

## Malnutrition

- If malnutrition is present, admit the woman into a therapeutic feeding programme. If there is no therapeutic feeding programme, ensure supplementation:
  - MUAC 190-230 mm: 2 sachets Plumpy'nut or 3 bars BP100 daily;
  - MUAC < 190 mm: 4 sachets Plumpy'nut or 7 bars BP100 daily.
- In the absence of signs of malnutrition but in a context of food insecurity, food supplementation is recommended for all pregnant women throughout their pregnancy.
- In the event of overweight or obesity, provide advice on how to avoid excessive weight gain during pregnancy.

The above measures apply to most contexts. Other tests and preventive measures relevant in the specific context, or included in the national protocol (e.g. Rhesus factor testing and alloimmunization prophylaxis, screening for cervical cancer, hepatitis B serology, screening for tuberculosis, etc.), 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 address the following:

- Importance of skilled birth assistance.
- The purpose of antenatal consultations.
- The recommended screening tests and preventive treatments during pregnancy.
- Protection against insect vectors: insecticide-treated mosquito nets, protective clothing, certain repellents, etc. according to the context (e.g. malaria, dengue, chikungunya, zika).

- Danger signs during pregnancy, labour and delivery, and the importance of quickly seeking medical care.
- The use of the “birth kit”<sup>h</sup>, depending on the context.
- The purpose of the postnatal consultation.
- Contraception.

## **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 (e.g. substance abuse, domestic violence, genital mutilation).

Individual sessions should in all cases include a personalised birth plan (see below).

## **Birth plan**

With the patient, work out a plan appropriate to her medical and social situation:

- Site for birth: BEmONC or CEmONC 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
<b>BEmONC</b> <b>Basic Emergency Obstetric and Newborn Care</b>	<ul style="list-style-type: none"> <li>• Open 24 hours a day, 7 days a week</li> <li>• Skilled birth attendant(s)</li> <li>• Possibility of: <ul style="list-style-type: none"> <li>▫ parenteral antibiotics</li> <li>▫ uterotonic</li> <li>▫ anticonvulsants if pre-eclampsia or eclampsia</li> </ul> </li> <li>• Possibility of: <ul style="list-style-type: none"> <li>▫ manual removal of the placenta</li> <li>▫ uterine evacuation (vacuum aspiration)</li> <li>▫ instrumental delivery (vacuum extraction)</li> <li>▫ basic neonatal resuscitation</li> </ul> </li> </ul>
<b>CEmONC</b> <b>Comprehensive Emergency Obstetric and Newborn Care</b>	<ul style="list-style-type: none"> <li>• Same as BEmONC facility PLUS</li> <li>• Possibility of: <ul style="list-style-type: none"> <li>▫ surgical management (caesarean section, hysterectomy, etc.)</li> <li>▫ blood transfusion</li> <li>▫ care of low birth weight or sick neonates</li> </ul> </li> </ul>

## Footnotes

- (a) 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).
- (b) 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.
- (c) Use preferably Td vaccine (tetanus and diphtheria toxoids) or, if not available, TT vaccine (tetanus toxoid).
- (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, check 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).
- (f) According to the World Health Organization (1993-2005), the prevalence of anaemia in pregnant women is 57.1% in Africa, 48.2% in South-East Asia, 44.2% in the Eastern Mediterranean region, 30.7% in the Western Pacific region, 25% in the European region and 24.1% in the Americas.

- (g) "Moderate transmission" areas: zones where prevalence rate of malaria is 11 to 50% during most of the year among children aged 2 to 9 years. "High transmission" areas: zones where prevalence rate of malaria is over 50% during most of the year among children aged 2 to 9 years.
- (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, a soap (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.

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# **1.3 Monitoring complicated pregnancies**

The term “complicated pregnancy” refers to any pregnancy 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 intrauterine foetal death.
- Progressive pathology associated with pregnancy 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 1.50 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 i.e. 5 deliveries or more (risk of uterine atony, uterine atony-related haemorrhage, uterine rupture).

*Note:* it is essential that all BEmONC facilities 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 section with vertical (classical) incision or more than two caesarean births;
- Transverse lie.
- In situations where there is a high risk that emergency caesarean or complex obstetrical manoeuvres will be needed:
  - History of caesarean section with 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, in particular in primipara.

### **1.3.3 Situations requiring closer monitoring during pregnancy AND special precautions for delivery (CEmONC)**

- History of abruptio placentae, severe pre-eclampsia or eclampsia.
- Pre-eclampsia (risk of eclampsia, coagulopathy, maternal death, abruptio placentae, intrauterine growth restriction, 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 restriction and postpartum haemorrhage).
- Preterm rupture of membranes (risk of infection, preterm delivery and intrauterine foetal death).

# **Chapter 2: Bleeding during the first half of pregnancy**

[2.1 Abortion](#)

[2.2 Ectopic pregnancy](#)

[2.3 Molar pregnancy \(hydatidiform mole\)](#)

[2.4 Cervicitis](#)

[2.5 Functional bleeding](#)

# **2.1 Abortion**

Ending of pregnancy, either spontaneous (miscarriage) or induced (termination of pregnancy) before 22 weeks LMP.

In countries where termination of pregnancy is legally restricted, induced abortions are often performed under poor conditions (non-sterile equipment, inappropriate equipment and/or substances, unqualified health care personnel, etc.). Complications (trauma, bleeding and severe infection) are common and may be life-threatening.

For termination of pregnancy, 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 bodies are strongly suggestive of unsafe abortion. Look for complications, especially infection.

### **Additional investigations**

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

## **2.1.2 Differential diagnosis**

The main differential diagnoses are: ectopic pregnancy, cervicitis, ectropion (eversion of the cervical mucosa, which is more fragile and may bleed easily on contact, especially after a vaginal examination or sexual intercourse), 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 infection) and treat it.
- Treat pain according to severity ([Appendix 7](#)).

## Missed abortion

If there are no signs of infection and/or no heavy bleeding, there is no urgency to perform uterine evacuation.

- Before 13 weeks LMP

Uterine evacuation can be performed by:

- medication: **misoprostol** 600 micrograms sublingually or 800 micrograms vaginally (in the posterior fornix). Bleeding and cramping can be expected to start within 3 hours. If expulsion has not started within 3 hours, administer additional doses of misoprostol every 3 hours; max. 3 doses in total<sup>[1]</sup>.

or

- manual vacuum aspiration (Chapter 9, [Section 9.5](#)).

- Between 13 and 22 weeks LMP

**mifepristone** PO: 200 mg single dose, and 1 to 2 day later, **misoprostol** 400 micrograms sublingually or intravaginally (into the posterior fornix), every 4 to 6 hours until labour starts, to be repeated if necessary the following day

or

**misoprostol** alone 400 micrograms sublingually or intravaginally (into the posterior fornix), every 4 to 6 hours until labour starts, to be repeated if necessary the following day

In case of 2 or more previous uterine scars or grand multiparity or overdistention of the uterus:

- Preferably use the combined regimen mifepristone + misoprostol, as fewer numbers of misoprostol doses are required.
- Reduce the dose of misoprostol to 200 micrograms every 6 hours.
- Closely monitor the mother for possible signs of impending rupture (heart rate, blood pressure, uterine contractions, pain).

## Ongoing or incomplete abortion without signs of infection

### General measures

- Measure heart rate, blood pressure, temperature; assess severity of bleeding.
- In the event of heavy bleeding:
  - insert an IV line (16-18G catheter) and administer Ringer lactate;
  - closely monitor heart rate, blood pressure, bleeding;
  - prepare for a possible transfusion: determine the patient's blood type, select potential donors or ensure that blood is available. If transfusion is necessary, only use blood that has been screened (HIV-1, HIV-2, hepatitis B, hepatitis C, syphilis, and malaria in endemic areas).
- Treat pain according to severity ([Appendix 7](#)).
- Remove products of conception from the vagina and cervix, if present.

- Look for a cause (e.g. malaria or sexually transmitted infections) and treat it.
- Afterwards, provide iron + folic acid supplementation or, in the event of severe anaemia, a blood transfusion.

### **Uterine evacuation**

- Before 13 weeks LMP

Uterine evacuation is usually required due to retained products of conception, which can cause bleeding and infection. There are 2 options:

- instrumental evacuation: manual vacuum aspiration (Chapter 9, [Section 9.5](#)) or, if not available, instrumental curettage (Chapter 9, [Section 9.6](#)). Aspiration under local anaesthesia is the method of choice<sup>[2]</sup>. It is technically easier to perform, less traumatic and less painful than curettage.
- medication: **misoprostol** 400 micrograms sublingually or 600 micrograms PO single dose<sup>[3]</sup>

- Between 13 and 22 weeks LMP

- instrumental evacuation in case of haemorrhage: manual vacuum aspiration (Chapter 9, [Section 9.5](#)) or instrumental curettage (Chapter 9, [Section 9.6](#)) or digital curettage (Chapter 9, [Section 9.4](#)).
- medication: **misoprostol** 400 micrograms sublingually every 3 hours until expulsion. In the absence of expulsion after 3 additional doses, consider instrumental evacuation.

In case of 2 or more previous uterine scars or grand multiparity or overdistention of the uterus: same precautions as for missed abortion (see above).

## **Septic abortion**

In the event of septic abortion (fever, abdominal pain, tender uterus, foul-smelling discharge), as above AND:

- Remove foreign bodies from the vagina and cervix, if present; clean wounds.
- Perform uterine evacuation as soon as possible, irrespective of gestational age.
- Administer antibiotic therapy as soon as possible:

**amoxicillin/clavulanic acid** IV (dose expressed in amoxicillin): 1 g every 8 hours + **gentamicin** IM: 5 mg/kg once daily

or

**ampicillin** IV: 2 g every 8 hours + **metronidazole** IV: 500 mg every 8 hours + **gentamicin** IM: 5 mg/kg once daily

Continue until the fever disappears (at least 48 hours), then change to:

**amoxicillin/clavulanic acid** PO (dose expressed in amoxicillin) to complete 5 days of treatment

Ratio 8:1: 3000 mg daily (= 2 tablets of 500/62.5 mg 3 times daily)

Ratio 7:1: 2625 mg daily (= 1 tablet of 875/125 mg 3 times daily)

or

**amoxicillin** PO: 1 g 3 times daily + **metronidazole** PO: 500 mg 3 times daily, to complete 5 days of treatment

For very severe infection (infected perforated uterus or peritonitis), treat for 10 days.

- Check and/or update tetanus immunisation (Table 2.1).

**Table 2.1 - Tetanus prophylaxis**

Immunisation status	Spontaneous abortion	Unsafe abortion, with wound or foreign bodies
<b>Not immunised or Immunisation status unknown</b>	Begin immunisation against tetanus	Begin immunisation against tetanus + Human tetanus immune globulin
<b>Incompletely immunised</b>	Tetanus booster	Tetanus booster + Human tetanus immune globulin
<b>Fully immunised <i>Last booster dose:</i></b>		
<b>&lt; 5 years</b>	No prophylaxis	No prophylaxis
<b>5 to 10 years</b>	No prophylaxis	Tetanus booster
<b>&gt; 10 years</b>	Tetanus booster	Tetanus booster + Human tetanus immune globulin

## References

1. IPAS. Clinical Updates in Reproductive Health. March 2018. <https://ipas.azureedge.net/files/CURHE18-march-ClinicalUpdatesinReproductiveHealth.pdf>
2. IPAS. Clinical Updates in Reproductive Health. Uterine evacuation: Replace sharp curettage with aspiration or medications. December 5, 2018. <https://www.ipas.org/clinical-updates/general/uterine-evacuation>
3. World Health Organization. Medical management of abortion. Geneva, 2018. <https://apps.who.int/iris/bitstream/handle/10665/278968/9789241550406-eng.pdf?ua=1>

# **2.2 Ectopic pregnancy**

Implantation of the fertilized egg outside of the uterine cavity, usually in the Fallopian tube. Other locations (abdominal, ovarian, cervical) are less common. Predisposing factors are history of peritonitis or pelvic infection.

## **2.2.1 Diagnosis**

### **Signs and symptoms**

Symptoms common to tubal, abdominal or ovarian ectopic pregnancy:

- Recent history of intermittent abdominal pain, a few weeks of amenorrhea, which may be followed by vaginal bleeding or menstrual irregularity, nausea and vomiting, occasional dizziness or faintness.
- Examination: abdominal tenderness often unilateral; guarding, possible 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 (haematocoele). If a haematocoele forms – especially if it is large – there may be other signs and symptoms:
  - irritation of the bladder or rectum with urinary frequency, 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:

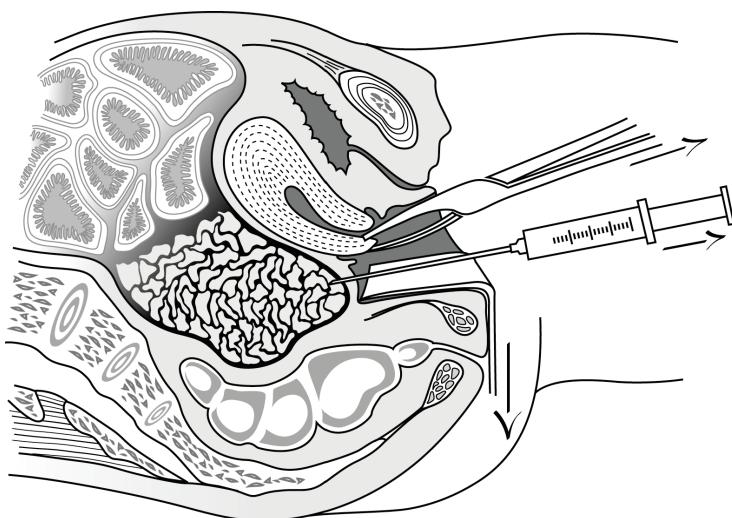
- distended, tender abdomen, shifting dullness;
- exquisite pain in the Pouch of Douglas;
- scapular pain;
- hypovolaemic shock due to bleeding (rapid, weak or unmeasurable pulse, very low or unmeasurable blood pressure, tachypnoea, pallor, cold sensation, damp skin, agitation and anxiety).

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 investigations

- Pregnancy test: usually positive; in case of haematocele, however, it may exceptionally be negative.
- 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:
  - Perform general (ketamine) or local (1% lidocaine) anaesthesia.
  - Swab the perineum, vagina and cervix with 10% povidone iodine.
  - Push 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 long, large-bore needle (e.g. spinal needle 20G) held as close to horizontal as possible, and aspirate with a 20-ml syringe.
  - An aspirate containing non-clotting blood indicates haemoperitoneum.

**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 or ovarian cyst rupture.

### 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: heart rate, blood pressure and bleeding.
- Prepare for a possible transfusion, determine the patient's blood type, select potential donors or ensure that blood is available. If transfusion is necessary, only use blood that has been screened (HIV-1, HIV-2, hepatitis B, hepatitis C, syphilis, and malaria in endemic areas).

### **Special cases**

- In case of 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, occasionally accompanied by heavy bleeding with expulsion of vesicles.

### Additional investigations

- 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: heart rate, blood pressure and bleeding.
- Prepare for a possible transfusion, determine the patient's blood type, select potential donors or ensure that blood is available. If transfusion is necessary, only use blood that has been screened (HIV-1, HIV-2, hepatitis B, hepatitis C, syphilis, and malaria in endemic areas).
- Evacuate the mole using aspiration, or if not available, 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.
- Provide effective contraception for at least one year, or perform 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.

Two weeks after the evacuation, perform an ultrasound if possible to be sure the uterus is empty. If ultrasound is not available and bleeding persists, consider a second aspiration (even when done correctly, retention of molar debris is not uncommon).

Eight weeks after the evacuation, perform the first follow-up pregnancy test. The 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 the test 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 pathogens – *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in more than 40% of cases.

## **2.4.1 Diagnosis**

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

## **2.4.2 Management**

- Administer antibiotics active against chlamydia and gonococcus to the patient and her partner (Chapter 4, [Section 4.2.2](#)).
- An inflamed cervix and/or cervical lesions may indicate dysplasia or cancer. 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**

Reassure the patient; no medication indicated.

# **Chapter 3: Bleeding during the second half of pregnancy**

[3.1 Placenta praevia](#)

[3.2 Abruptio placentae](#)

[3.3 Uterine rupture](#)

[3.4 Diagnosis of bleeding during the second half of pregnancy \(summary\)](#)

# 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.

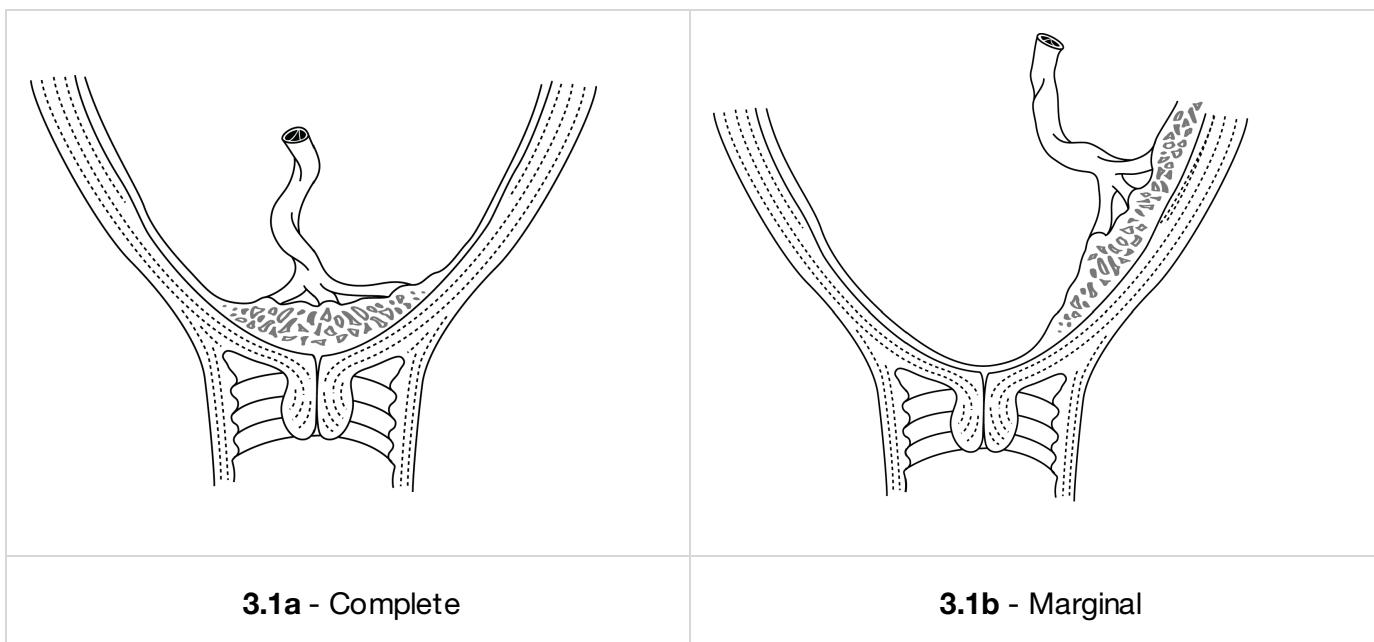
Even under good circumstances (possibility of blood transfusion, high quality surgical setting), maternal and foetal mortality and the risk of postpartum haemorrhage are high.

## 3.1.1 Different types of placenta praevia

There are 4 types of placenta praevia:

- *Complete* placenta praevia (Figure 3.1a), in which the placenta completely covers the internal cervical os;
- *Partial* placenta praevia, in which the placenta partially covers 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.

**Figures 3.1 - Placenta praevia**



## 3.1.2 Diagnosis

### Signs and symptoms

In a woman more than 22 weeks LMP:

- 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.

## Ultrasound

Ultrasound is the method of choice for diagnosing placenta praevia. It makes it possible:

- To avoid a vaginal examination that may trigger massive haemorrhage.
- To determine whether or not the placenta is covering the cervix, and thus the preferred route of delivery.

If ultrasound is not available or is not reliable, careful digital vaginal examination may be performed but only in the operating room, with resources at hand for immediate management of massive haemorrhage (IV line(s), transfusion, emergency caesarean section if necessary). Digital vaginal examination 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 digital vaginal examination.

### 3.1.3 Management

- Insert an IV line (16-18G catheter) and administer Ringer lactate.
- Measure heart rate and blood pressure; assess the severity of the bleeding, measure haemoglobin.
- Prepare for a possible transfusion, determine the patient's blood type, select potential donors or ensure that blood is available. If transfusion is necessary, only use blood that has been screened (HIV-1, HIV-2, hepatitis B, hepatitis C, syphilis, and malaria in endemic areas).
- 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 anaemia is present, treat according to severity.

#### 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 the event of complete or partial placenta praevia:
  - the patient should remain hospitalized 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.

## **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.

## **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](#).

- Insert an IV line (16-18G catheter) and administer Ringer lactate.
- Measure heart rate 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 post-partum haemorrhage.

To assess clotting disorders<sup>[1]</sup>:

- 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 ( $\pm 37^{\circ}\text{C}$ ).
- 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 clotting disorders.

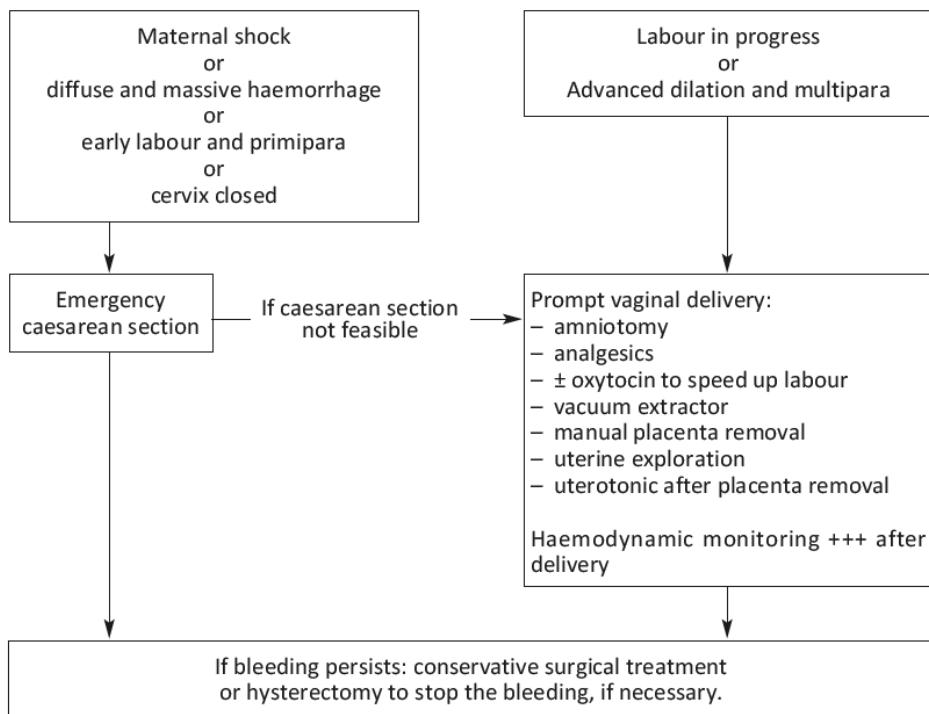
For blood transfusion:

- 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, syphilis, and malaria in endemic areas).

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



## References

1. World Health Organization. Managing complications in pregnancy and childbirth. A guide for midwives and doctors. Geneva 2017.  
<http://apps.who.int/iris/bitstream/handle/10665/255760/9789241565493-eng.pdf?sequence=1>

# 3.3 Uterine rupture

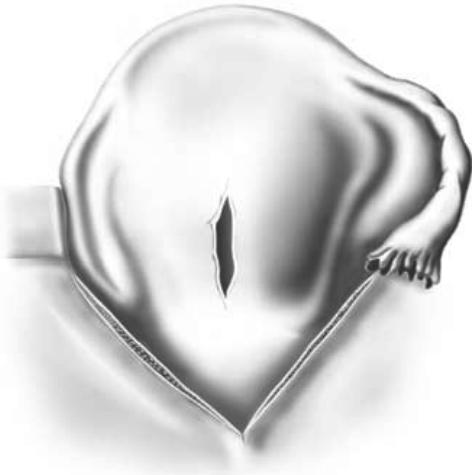
Tear in the uterine wall, in most cases during labour.

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

## 3.3.1 Circumstances in which uterine rupture occurs

- Obstructed labour.
- Grand multiparas (5 deliveries or more).
- 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

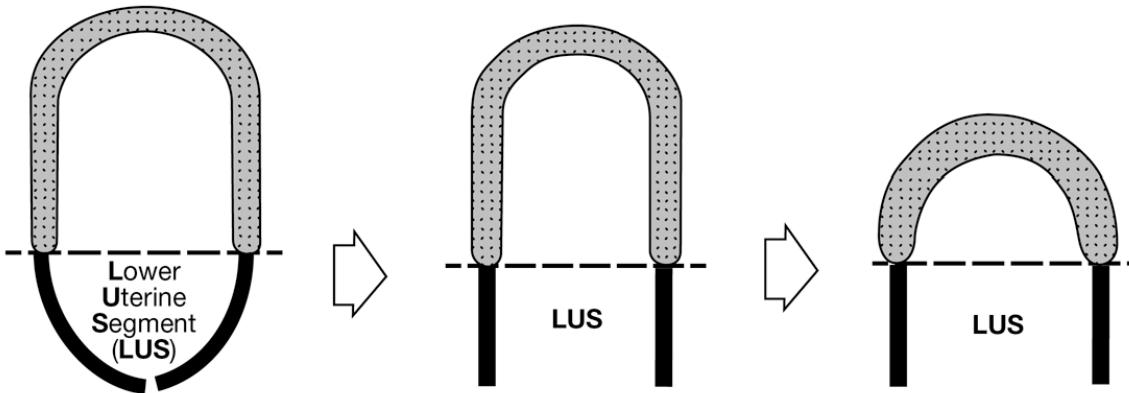
Diagnosis is clinical. A rupture may be diagnosed during labour or after delivery. Though the initial symptoms may be subtle – particularly in cases of scarred uterus – the signs are usually obvious.

### During labour

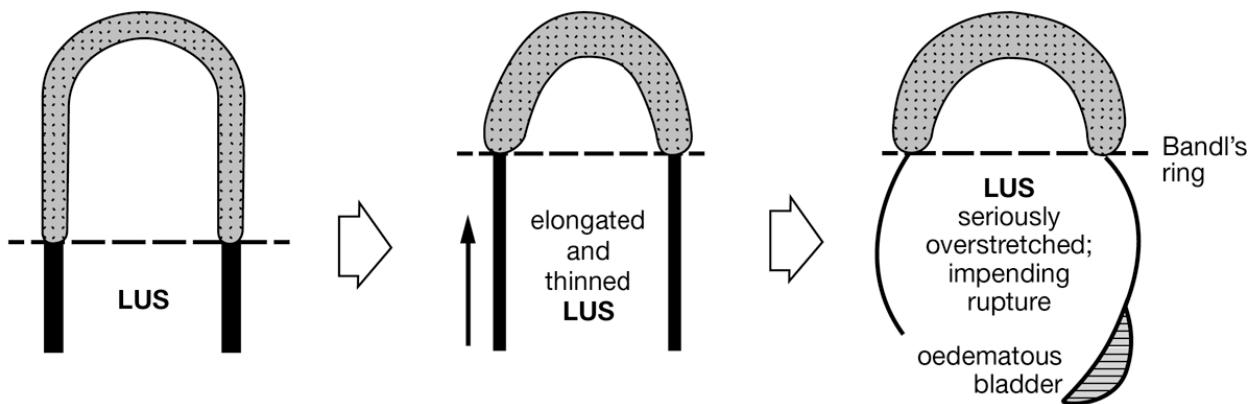
- Impending rupture:
  - maternal agitation;
  - increasingly severe abdominal pain that persists between contractions; abdominal guarding;
  - often, Bandl's ring (Figures 3.3 and 3.4), a sign of obstructed labour. At first glance the Bandl's ring may look like a distended bladder.

**Figure 3.3 - Mechanism of Bandl's ring formation<sup>a</sup>**

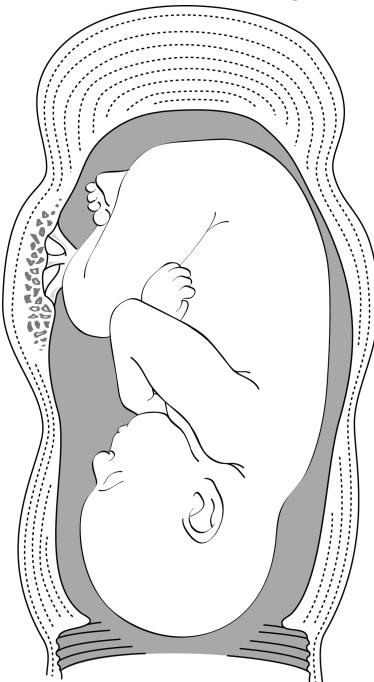
**Normal labour**



**Obstructed labour**



**Figure 3.4 - Impending rupture: hourglass uterus “Bandl's ring”**



- 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 tones.
  - 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](#).

- Insert 2 IV lines (16-18G catheter) and administer Ringer lactate.
- Measure heart rate 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 foetus.

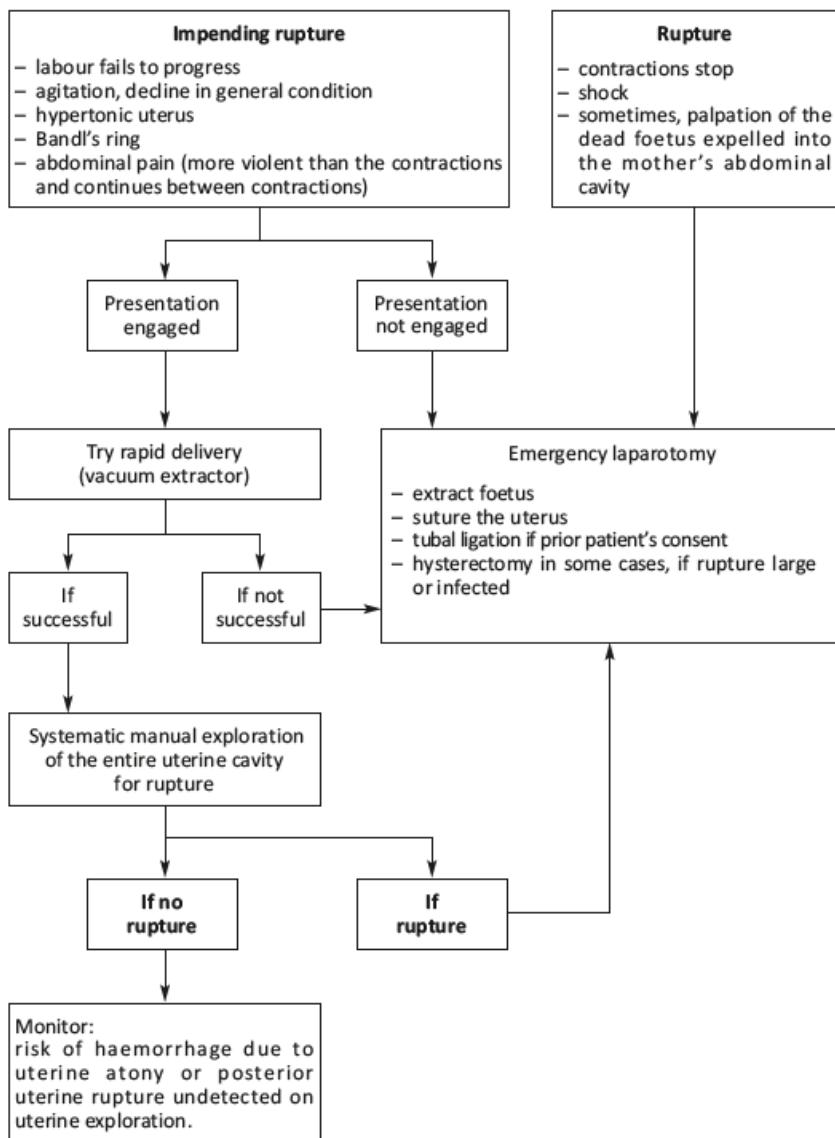
Check the integrity of the bladder, which may have been injured if it is very adherent to the lower uterine segment (continuous suture in one or two planes and urinary catheterisation for at least 7 days).

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

In the event of uterine infection or extensive rupture with severe bruising around the wound or suture repair is not possible, perform a subtotal hysterectomy with ovarian conservation.

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**



## Footnotes

- (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>

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

**Table 3.1 - Aetiological diagnosis**

	<b>Placenta praevia</b>	<b>Abruptio placenta</b>	<b>Uterine rupture</b>
<b>History</b>			
	<ul style="list-style-type: none"> <li>• Twin pregnancy</li> <li>• Caesarean section</li> <li>• Bleeding during a previous pregnancy</li> </ul>	<ul style="list-style-type: none"> <li>• Pre-eclampsia</li> <li>• Primipara</li> <li>• Trauma</li> </ul>	<ul style="list-style-type: none"> <li>• Long labour</li> <li>• Primipara</li> <li>• Dystocia</li> <li>• Grand multipara (<math>\geq 5</math>)</li> <li>• Caesarean section</li> <li>• Overuse of uterotonic</li> </ul>
<b>Clinical signs</b>			
<b>Bleeding</b>	<ul style="list-style-type: none"> <li>• Bright red blood</li> <li>• Painless bleeding, spontaneous or after vaginal exam or sexual intercourse</li> </ul>	<ul style="list-style-type: none"> <li>• Bleeding without warning sign</li> <li>• Light flow of blackish blood, or sudden bright red bleeding</li> <li>• Bleeding with severe, constant uterine and lower back pain</li> </ul>	Variable
<b>Haemorrhagic shock</b>	<ul style="list-style-type: none"> <li>• Blood loss visible</li> <li>• Shock proportional to amount of bleeding</li> </ul>	<ul style="list-style-type: none"> <li>• Blood loss not always visible</li> <li>• Shock out of proportion to the amount of visible bleeding (intra-abdominal or retroplacental bleeding)</li> <li>• Diffuse haemorrhage</li> </ul>	<ul style="list-style-type: none"> <li>• Blood loss not always visible</li> <li>• Shock out of proportion to the amount of visible bleeding (intra-abdominal bleeding)</li> </ul>
<b>Uterus</b>	<ul style="list-style-type: none"> <li>• Soft uterus</li> <li>• Contractions, if present, are intermittent</li> <li>• Foetus high and mobile</li> </ul>	<ul style="list-style-type: none"> <li>• Painful, continuous contraction ("woody uterus")</li> <li>• Foetal position hard to determine (hard uterus and haematoma)</li> </ul>	Foetus sometimes expelled into the abdominal cavity: uterus is retracted into a ball, the foetus felt under the skin
<b>Vaginal exam</b>	Soft, spongy placenta	Cervix often closed	

	Perform only one, very cautious, vaginal exam if ultrasound is not available.	Vaginal exam not helpful in diagnosis of abruptio placenta.	
<b>Foetal heart tones</b>	Normal in the absence of maternal shock	Absent or weak	Absent or weak

# **Chapter 4: Pathologies during pregnancy and pregnancy-related disorders**

[4.1 Iron deficiency anaemia](#)

[4.2 Bacterial infections](#)

[4.3 Parasitic infections](#)

[4.4 Viral infections](#)

[4.5 Hypertensive disorders in pregnancy](#)

[4.6 Eclampsia](#)

[4.7 Abnormally large uterus](#)

[4.8 Polyhydramnios](#)

[4.9 Premature rupture of membranes](#)

[4.10 Threatened preterm delivery](#)

[4.11 Intrauterine foetal death](#)

# 4.1 Iron deficiency anaemia

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

Pre-existing anaemia due, for example, to nutritional deficiency or malaria may be aggravated by pregnancy.

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

## 4.1.1 Diagnosis

- Clinical signs: pallor of the conjunctivae, mucous membranes, palms, and the soles of the feet; fatigue, dizziness, tachycardia, heart murmur.
- Signs of serious illness: intense pallor, impaired consciousness, dyspnoea, Hb level below 7 g/dl.
- Measure Hb 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<sup>a</sup>) PO: 1 tablet 2 to 3 times daily until Hb level rises to normal, then change to preventive treatment<sup>[1]</sup> (Chapter 1, [Section 1.2.5](#)).

Addition of **ascorbic acid** (vitamin C) PO, 500 mg once daily, improves iron absorption.

In areas where hookworm is endemic, add an 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.

In the event of severe anaemia:

- Transfusion is indicated in the following cases:
  - Less than 36 weeks LMP:
    - Hb ≤ 5 g/dl, even if there are no signs of decompensation
    - Hb > 5 g/dl and < 7 g/dl if there are signs of decompensation or sickle cell disease or severe malaria or serious bacterial infection or pre-existing heart disease
  - 36 weeks LMP or over:
    - Hb ≤ 6 g/dl, even if there are no signs of decompensation
    - Hb > 6 g/dl and < 8 g/dl if there are signs of decompensation or sickle cell disease or severe malaria or serious bacterial infection or pre-existing heart disease
- In the third trimester:

- Arrange for delivery in a CEmONC facility.
- Given the risk of haemorrhage and rapid decompensation during delivery, be prepared for transfusion for any woman whose Hb is < 7 g/dl, even if anaemia is relatively well-tolerated.

## Footnotes

- (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.

## References

1. World Health Organization. Guideline: Daily iron and folic acid supplementation in pregnant women. Geneva. 2012.  
[http://apps.who.int/iris/bitstream/10665/77770/1/9789241501996\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/77770/1/9789241501996_eng.pdf)

# 4.2 Bacterial infections

For clinical signs and diagnosis, refer to the [Clinical guidelines](#), MSF.

In addition to antimicrobial therapy, administer **paracetamol** PO (1 g 3 times daily) in case of axillary temperature  $\geq 38.5^{\circ}\text{C}$ .

## 4.2.1 Syphilis

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

- For the mother:
  - Antibiotherapy: **benzathine benzylpenicillin IM<sup>a</sup>**, 2.4 MIU per injection (half-dose in each buttock)  
Early syphilis (primary, secondary, or latent infection of less than 12 months duration): single dose  
Late latent syphilis (infection of more than 12 months duration or of unknown duration): one injection weekly for 3 weeks<sup>[1]</sup>
  - 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<sup>[2]</sup>.

For penicillin-allergic patients only, use **erythromycin** PO: 500 mg 4 times daily for 14 days (early syphilis) or 30 days (late latent syphilis). 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 neonate, see Chapter 10, [Section 10.4.1](#).

## 4.2.2 Gonorrhoea

Gonorrhoea can cause premature rupture of membranes, preterm labour, and severe neonatal conjunctivitis.

Gonorrhoea is often associated with chlamydial infection.

- For the mother:
  - Treat simultaneously for gonorrhoea and chlamydia<sup>[3]</sup>:  
**ceftriaxone** IM: 250 mg single dose (or, if not available, **cefixime** PO: 400 mg single dose)  
+  
**azithromycin** PO: 1 g single dose

- Give the same treatment to the sexual partner(s).
- For the neonate, see Chapter 10, [Section 10.4.2](#).

## 4.2.3 Urinary tract infections (including asymptomatic bacteriuria)

Asymptomatic bacteriuria and cystitis, if left untreated, can lead to pyelonephritis and preterm labour.

### Asymptomatic bacteriuria

Asymptomatic bacteriuria is defined as the presence of leukocytes and nitrites in urine, with no urinary symptoms.

If only leukocytes are detected in urine, repeat the dipstick test after vulval toilet with soap and water. If, on repeat, leukocytes without nitrites are again detected, diagnose asymptomatic bacteriuria and treat as acute cystitis.

### Acute cystitis

Cystitis is defined as urinary symptoms and the presence of leukocytes and/or nitrites in urine.

- Antibiotherapy for acute cystitis:
  - fosfomycin-tromethamine** PO: 3 g single dose or **cefixime** PO: 200 mg 2 times daily for 5 days
- Inform the patient that cystitis symptoms should disappear within 2 to 3 days. If not, she should consult again.
- Advise the patient to drink 1.5 litres of water daily.

### Acute pyelonephritis

Acute pyelonephritis can progress to maternal sepsis and preterm labour. Early treatment is important in preventing these complications.

- Look for signs of serious illness (sepsis or septic shock, dehydration) or complications (urinary tract obstruction, renal abscess) or risk of complications (functional or structural abnormality of the urinary tract (lithiasis, malformation, etc.) or severe immunodepression).
- Admit to inpatient department; bed rest.
- Increase fluid intake: 1.5 litres of water daily.
- Antibiotherapy:
  - Uncomplicated pyelonephritis:
    - Start with **ceftriaxone** IM or slow IV injection (over 3 minutes)<sup>b</sup> : 1 g once daily then change to oral route after 24 to 48 hours of apyrexia with:
    - amoxicillin/clavulanic acid** PO (dose expressed in amoxicillin) to complete 10 to 14 days of treatment Ratio 8:1: 2000 mg daily (= 2 tablets of 500/62.5 mg 2 times daily)
    - Ratio 7:1: 1750 mg daily (= 1 tablet of 875/125 mg 2 times daily)
    - or
    - cefixime** PO: 200 mg 2 times daily to complete 10 to 14 days of treatment

- Severe or complicated pyelonephritis or absence of clinical improvement after 24 hours of treatment:  
**ceftriaxone** slow IV injection (over 3 minutes) or infusion (over 30 minutes)<sup>b</sup> : 1 g once daily then  
**amoxicillin/clavulanic acid** PO or **cefixime** PO as above  
+ **gentamicin** IM or slow IV (over 3 minutes): 5 mg/kg once daily for the first 3 days of treatment
- In the event of threatened preterm delivery: see [Section 4.10.](#)

## Footnotes

- (a) Only the IM route may be used. To reduce the pain during the injection, the powder can be reconstituted with 8 ml of 1% lidocaine (without epinephrine).
- (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.

## References

1. Centers for Disease Control and Prevention. Syphilis Pocket Guide for Providers. 2017.  
<https://www.cdc.gov/std/syphilis/Syphilis-Pocket-Guide-FINAL-508.pdf>
2. Yang CJ, Lee NY, Lin YH, et al. Jarisch-Herxheimer reaction after penicillin therapy among patients with syphilis in the era of the HIV infection epidemic: incidence and risk factors. Clin Infect Dis. 2010 Oct 15;51(8):976-9. doi: 10.1086/656419.  
<http://cid.oxfordjournals.org/content/51/8/976.full.pdf>
3. Update to CDC's Sexually Transmitted Diseases Treatment Guidelines, Infections Weekly August 10, 2012 / 61(31):590-594.  
[http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6131a3.htm?s\\_cid=mm6131a3\\_w](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6131a3.htm?s_cid=mm6131a3_w)

# 4.3 Parasitic infections

For clinical signs and diagnosis, see [Clinical guidelines](#), MSF.

## 4.3.1 Malaria<sup>[1]</sup>

Malaria in pregnancy is associated with low birth weight, increased risk of anaemia and, in low transmission areas, an increased risk of severe malaria and death.

The diagnosis should be confirmed by rapid test or microscopic examination (thick or thin smear).

### Uncomplicated falciparum malaria

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

**Table 4.1** - Dosage of ACT

<b>ACT</b>	<b>Formulation</b>	<b>Dosage</b>
<b>artemether/lumefantrine (AL or co-artemether)</b>	Co-formulated tablets, 20 mg artemether/120 mg lumefantrine per tab, blister of 24 tab	4 tab 2 times daily on D1, D2, D3
	Co-formulated tablets, 80 mg artemether/480 mg lumefantrine per tab, blister of 6 tab	1 tab 2 times daily on D1, D2, D3
<b>artesunate (AS) + amodiaquine (AQ)</b>	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
<b>artesunate/mefloquine (AS/MQ)</b>	Co-formulated tablets, 100 mg AS/220 mg MQ per tab, blister of 6 tab	2 tab once daily on D1, D2, D3
<b>dihydroartemisine/piperaquine (DHA/PPQ)</b>	Coformulated tablets, 40 mg DHA/320 mg PPQ Blister of 9 tab	Women 36 to 59 kg 3 tab once daily on D1, D2, D3
	Coformulated tablets, 40 mg DHA/320 mg PPQ Blister of 12 tab	Women 60 to 79 kg 4 tab once daily on D1, D2, D3

*Note:* the combination AS/SP is contra-indicated in HIV-infected women taking co-trimoxazole preventive therapy.

Quinine is an alternative:

**quinine** PO: 10 mg/kg 3 times daily for 7 days

In South-East Asia and Amazon region, quinine should be given in combination with **clindamycin** PO: 10 mg/kg 2 times daily 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 guide [Essential drugs](#), MSF.

or, if not available,

**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 ( $\pm$  clindamycin) is an alternative.

**quinine** IV infusion (dosage is expressed in quinine dihydrochloride):

Loading dose: 20 mg/kg diluted in glucose solution (5% or 10%), 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*, *P. knowlesi***

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 Ancylostomiasis (hookworms) and ascariasis**

**albendazole** PO: 400 mg single dose (or, if not available, **mebendazole** PO: 100 mg 2 times daily for 3 days)

Do not administer during the first trimester of pregnancy. Wait until the second trimester before administering treatment.

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

## References

1. World Health Organization. Guidelines for the treatment of malaria. Third edition, Geneva, 2015.  
[http://apps.who.int/iris/bitstream/handle/10665/162441/9789241549127\\_eng.pdf?sequence=1](http://apps.who.int/iris/bitstream/handle/10665/162441/9789241549127_eng.pdf?sequence=1)

# 4.4 Viral infections

For clinical signs and diagnosis, refer to the [Clinical guidelines](#), MSF.

## 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 ([Appendix 7](#)).
  - Antiviral treatment: **aciclovir** PO, 400 mg 3 times daily for 7 days
  - In immunocompromised patients, continue the treatment until symptoms resolve.
  - Prophylactic treatment (**aciclovir** PO: 400 mg 4 times daily as of 36 weeks LMP and until delivery) can be proposed to reduce the risk of recurrent herpes at delivery.
- For the neonate, 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.

Administration of **aciclovir** PO (800 mg 5 times daily for 7 days) as soon as possible after the onset of rash may reduce these risks<sup>[1]</sup>.

## 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 special obstetric measures.
- For the neonate: routine hepatitis vaccination as soon as possible within 24 hours after birth has been demonstrated to prevent 70 to 95% of infections<sup>[2]</sup> (Chapter 10, [Section 10.1](#)).

### 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.

Treatment is symptomatic (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<sup>[3]</sup>. This risk may be reduced to less than 2%.

Offer HIV testing to all pregnant women with unknown HIV status when they come for ante- or postnatal consultations or delivery.

HIV negative women should also be re-tested at their first antenatal consultation, during the third trimester and during the breastfeeding period.

For antiretroviral therapy protocols in mothers and children, refer to specialised prevention of mother-to-child transmission (PMTCT) guides.

### 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 for life.

### Intra-partum care

- Continue (or start) antiretroviral therapy.
- 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.
- The criteria for induction of labour are the same as for non HIV-infected women.
- Delay cord clamping for 1-3 minutes.
- Administer antiretroviral prophylaxis to the neonate immediately after birth.
- Prevention and treatment of postpartum haemorrhage: as for non HIV-infected women.

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.

### Postpartum care

- For the mother: continue (or start) antiretroviral therapy.

- For the neonate: systematic antiretroviral prophylaxis and early diagnosis of infection.

## References

1. Clinical practice guideline of the Society of Obstetricians and Gynaecologists of Canada. Management of Varicella Infection (Chickenpox) in Pregnancy, No. 274, March 2012.  
<http://sogc.org/wp-content/uploads/2013/01/gui274CPG1203E.pdf?1668a1>
2. Hepatitis B. Epidemiology and Prevention of Vaccine-Preventable Diseases. The Pink Book.  
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3. World Health Organization, UNFPA. HIV transmission through breastfeeding. A review of available evidence. Geneva, 2004.  
[http://www.unfpa.org/webdav/site/global/shared/documents/publications/2004/hiv\\_transmission.pdf](http://www.unfpa.org/webdav/site/global/shared/documents/publications/2004/hiv_transmission.pdf)

# **4.5 Hypertensive disorders in pregnancy**

Gestational hypertension and chronic hypertension may be complicated by pre-eclampsia. Pre-eclampsia carries a significant risk of complications:

- Placental abruption, HELLP syndrome<sup>a</sup>, eclampsia, stroke, maternal death;
- Foetal growth restriction, foetal distress, foetal death.

The goal of antihypertensive treatment is to prevent maternal complications of severe hypertension.

Treatment is administered if systolic blood pressure is  $\geq 160$  mmHg or if diastolic blood pressure is  $\geq 110$  mmHg. The objective of treatment is to lower blood pressure to around 140/90 mmHg.

Antihypertensive treatment does not improve foetal prognosis. It should be carried out with caution. It is essential to preserve placental perfusion and to avoid excessive fall in maternal blood pressure.

## **4.5.1 Diagnosis**

Pathologies	Definitions <sup>[1]</sup>
<b>Hypertension</b>	<p>In a pregnant woman, seated and at rest, measured twice:</p> <p>Systolic blood pressure (SBP) <math>\geq 140</math> mmHg and/or</p> <p>Diastolic blood pressure (DBP) <math>\geq 90</math> mmHg</p>
<b>Severe hypertension</b>	SBP $\geq 160$ mmHg and/or DBP $\geq 110$ mmHg
<b>Gestational hypertension</b>	Hypertension isolated (with no proteinuria or other signs of pre-eclampsia) develops after 20 weeks LMP.
<b>Pre-eclampsia without severe features</b>	<p>Hypertension after 20 weeks LMP and</p> <p>proteinuria on dipstick urinalysis (1+ or more) with no signs of end-organ damage (see below) or severe hypertension.</p>
<b>Pre-eclampsia with severe features</b>	<p>Hypertension after 20 weeks LMP with or without proteinuria on dipstick urinalysis and</p> <p>One or more signs of end-organ damage:</p> <ul style="list-style-type: none"> <li>• severe headache, tinnitus</li> <li>• visual disturbances</li> <li>• epigastric pain, nausea, vomiting</li> <li>• hyperreflexia (overactive knee-jerk response, twitching and spasms)</li> <li>• oliguria (urine output <math>&lt; 400</math> ml/day or <math>&lt; 30</math> ml/hour)</li> <li>• pulmonary oedema</li> <li>• thrombocytopenia (platelet count <math>&lt; 100\,000/\text{mm}^3</math>)</li> <li>• renal impairment (serum creatinine level <math>&gt; 1.1</math> mg/dl)</li> <li>• altered hepatic function (elevated transaminases over twice the normal value)</li> </ul> <p>OR</p> <p>Hypertension after 20 weeks LMP and</p> <p>Proteinuria on dipstick urinalysis and</p> <p>Severe hypertension, persistent despite treatment</p>

## Chronic hypertension

Hypertension predating the pregnancy or develops before 20 weeks LMP

### Notes:

- In pre-eclampsia, other symptoms may be observed: dark urine, low urine output, sudden onset or increase in oedema of the legs and hands. These symptoms alone do not confirm the diagnosis of pre-eclampsia, but call for monitoring of blood pressure and proteinuria.
- Abnormally high proteinuria is no longer considered a severe feature in pre-eclampsia. Nevertheless, if it is not possible to perform regular and reliable monitoring of blood creatinine levels, heavy proteinuria (3+ or more on dipstick urinalysis) should be considered as a criteria for referral to a CEmONC facility.
- In women with proteinuria and no hypertension, consider urinary tract infection, contamination of urine with blood or vaginal secretions, nephropathy. In these cases, monitor to ensure early detection of pre-eclampsia.

## 4.5.2 Management of gestational and chronic hypertension

- Rest; monitoring once weekly: BP, proteinuria.
- Assess the risk of foetal growth restriction (fundal height).
- Normal sodium and caloric intake.
- Inform the patient about the warning signs that require urgent medical attention (severe headache, tinnitus, visual disturbances, epigastric pain, nausea, vomiting, dyspnea). In the event of proteinuria or other warning signs developing, treat as for pre-eclampsia.
- If SBP  $\geq$  160 mmHg or DBP  $\geq$  110 mmHg, administer an antihypertensive treatment:  
**labetalol** PO: 100 mg 2 times daily then increase if necessary in 100 to 200 mg increments until an effective dose is reached, usually 200 to 400 mg 2 times daily. If higher daily doses are required, divide in 3 doses (max. 2.4 g daily)  
or  
**methyldopa** PO: 250 mg 2 or 3 times daily 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 daily (max. 3 g daily)

### Notes:

- In case of treatment failure, these drugs can be combined.
- Do not stop antihypertensive treatment abruptly.
- Diuretics and angiotensin-converting-enzyme inhibitors (enalapril, etc.) are contra-indicated.
- If the mother is taking labetalol, monitor the neonate for at least 72 hours after birth (risk of hypoglycaemia, bradycardia and respiratory distress).

## 4.5.3 Management of pre-eclampsia without severe features

Before 37 weeks LMP

- Admit as inpatient; rest; monitoring: BP, proteinuria.
- Assess the risk of foetal growth restriction (fundal height).
- Normal sodium and caloric intake.
- Do not stop uterine contractions if they occur; let the woman deliver.
- If SBP  $\geq$  160 mmHg or DBP  $\geq$  110 mmHg, administer an antihypertensive treatment ([Section 4.5.2](#)).

Pre-eclampsia is an evolving condition, always deteriorating. As soon as even a single sign of severe pre-eclampsia appears or in case of heavy proteinuria (3+ or more on dipstick urinalysis), transfer to a CEmONC facility.

### **After 37 weeks LMP**

- Admit as inpatient; rest; same monitoring and antihypertensive treatment.
- Induce labour as soon as the cervix is favourable (or before if the mother's condition deteriorates or in case of true intrauterine growth restriction).

## **4.5.4 Management of pre-eclampsia with severe features**

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

### **Delivery**

Delivery should take place 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. One of the following regimens may be used:

<b>magnesium sulfate</b> 5 g ampoule (500 mg/ml, 10 ml) <b>IV/IM protocol</b>	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	
<b>magnesium sulfate</b> 5 g ampoule (500 mg/ml, 10 ml) <b>IV protocol</b>	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 per hour by continuous infusion. Continue this treatment for 24 hours after delivery.

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

During administration, monitor:

- Patellar reflex (knee-jerk), BP, heart rate 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 magnesium sulfate overdose start with disappearance of the patellar reflex then hypotension, arrhythmia, respiratory depression (< 12 breaths/minute). If the patellar reflex disappears, stop magnesium sulfate immediately and administer **calcium gluconate** (1 g IV).

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

## Antihypertensive treatment

- If SBP  $\geq$  160 mmHg or DBP  $\geq$  110 mmHg, administer an antihypertensive treatment ([Section 4.5.2](#)).
- If the oral route is impossible, use parenteral labetalol or hydralazine. When administering, monitor the mother's BP and heart rate and the foetal heart rate.

The dose is adjusted according to changes in BP. Hypertension is controlled when DBP is between 90 and 100 mmHg and SBP 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. **DBP should not go below 90 mmHg.** In the event of hypotension, use Ringer lactate solution to bring the DBP back up to 90-100 mmHg. Proceed with caution and monitor the patient closely as there is a risk of fluid overload and pulmonary oedema.

One of the following regimens may be used:

<b>labetalol</b> 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 total dose of 300 mg.
or	
<b>hydralazine</b> 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 total dose of 20 mg.
or	
<b>hydralazine</b> 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 (max. 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.
- Methylergometrine is contraindicated.

- Pre-eclampsia can appear up to 7 days after delivery (and on rare occasions up to 6 weeks).

## 4.5.5 Secondary prophylaxis for severe pre-eclampsia

**acetylsalicylic acid** PO: 75 to 150 mg once daily 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<sup>[2]</sup>.

During the next pregnancy, calcium supplementation is recommended<sup>[3]</sup> in women with low calcium intake (Chapter 1, [Section 1.2.5](#)).

### Footnotes

- (a) The HELLP syndrome (haemolysis, elevated liver enzymes, low platelets) is a potential lifethreatening complication for both the mother and foetus).

### References

1. Society for the Study of Hypertension in Pregnancy. The classification, diagnosis and management of the hypertensive disorders of pregnancy: A revised statement from the ISSHP. *Pregnancy Hypertens.* 2014 Apr;4(2):97-104.
2. World Health Organization. Prevention and treatment of pre-eclampsia and eclampsia. Summary of recommendations. Geneva, 2011. WHO/RHR/11.30.  
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# 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 (and up to 6 weeks after delivery).

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

## 4.6.2 Management

- Protect against injury, maintain airway, place in recovery position.
- Seizures: **magnesium sulfate<sup>a</sup>** as for severe pre-eclampsia ([Section 4.5.4](#)). Continue treatment for 24 hours after delivery or 24 hours after the last seizure, whichever was more recent.
- Nursing care, hydration, Foley catheter insertion; monitoring as for severe pre-eclampsia ([Section 4.5.4](#)).
- Oxygen: 4 to 6 litres/minute.
- If SBP  $\geq$  160 mmHg or DBP  $\geq$  110 mmHg: antihypertensive treatment as for severe pre-eclampsia ([Section 4.5.4](#)).
- **Delivery within 24 hours**, either vaginally or by caesarean section, depending on the state of the cervix, gestational age and condition of the foetus.

## 4.6.3 Secondary prophylaxis

Administer **acetylsalicylic acid** PO, as for pre-eclampsia ([Section 4.5.5](#)).

### Footnotes

- (a) If magnesium sulfate is not available, use **diazepam**: 10 mg 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 (foetal macrosomia).

## **4.7.2 Management**

- Verify the due date (date of last menstrual period).
- Perform ultrasound, if possible.
- Depending on the diagnosis: twin pregnancy (Chapter 6, [Section 6.2](#)), polyhydramnios ([Section 4.8](#)), molar pregnancy (Chapter 2, [Section 2.3](#)).
- In the event of foetal macrosomia:

There is an increased risk of foeto-pelvic disproportion. Anticipate the need for referral to a CEmONC facility during labour for caesarean section if necessary. If referral is difficult (distance, security, etc.), refer patient prior to onset of labour.

The risk of postpartum haemorrhage is increased: routinely insert an IV line.

Other risks associated with foetal 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). 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**

- Look for diabetes and treat if found.
- Examine the neonate 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. In the event of cord prolapse, a caesarean section may be considered taking into account gestational age and potential presence of foetal malformation.
- In the event of acute polyhydramnios in the second trimester, perform vaginal delivery.

- Risk of postpartum haemorrhage (routinely insert an IV line).

# **4.9 Premature rupture of membranes**

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

## **4.9.1 Diagnosis**

In case of doubt, perform speculum examination: look for fluid pooling in the vagina or leaking from cervical os when patient coughs.

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

## **4.9.2 Risks**

- Intra uterine infection; suspect infection in case of maternal fever associated with one or more of the following signs: persistent foetal tachycardia or foetal death, foul-smelling or purulent amniotic fluid, uterine contractions. Never administer a tocolytic agent, no matter what the gestational age, when intra-uterine infection is suspected.
- Prolapsed cord.
- Pre-term birth, if the rupture occurs before 37 weeks LMP.

## **4.9.3 Management**

- In the event of preterm rupture of membranes, look for a maternal cause (e.g. urinary or genital tract infection) and treat accordingly.
- Admit to inpatient department and monitor: temperature, heart rate, blood pressure, uterine contractions, foetal heart tone, abnormal amniotic fluid (foul-smelling, 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.
- Antibiotherapy:
  - For the mother:

<b>Diagnosis</b>	<b>Treatment</b>
Preterm (< 37 weeks) and No infection and no labour	<b>amoxicillin</b> PO: 1 g 3 times daily for 7 days Do not use amoxicillin/clavulanic acid (increased incidence of necrotizing enterocolitis in neonates).
Preterm (< 37 weeks) and No infection and labour in progress	<b>ampicillin</b> IV: 2 g, then 1 g every 4 hours during labour until the child is born (whether the patient received amoxicillin PO beforehand) Do not continue antibiotics after delivery.
Term ( $\geq$ 37 weeks) and No infection and rupture of membranes $\geq$ 12 hours, whether in labour or not	<b>ampicillin</b> IV: 2 g, then 1 g every 4 hours during labour until the child is born Do not continue antibiotics after delivery.
Presence of infection whether in labour or not, regardless of the duration of the rupture	<b>ampicillin</b> IV: 2 g every 8 hours + <b>metronidazole</b> IV: 500 mg every 8 hours + <b>gentamicin</b> IM: 5 mg/kg once daily Continue IV administration for 48 hours after fever disappears then, change to amoxicillin + metronidazole PO to complete 7 days of treatment.

- For the neonate: see Chapter 10, [Section 10.1.1](#) and [Section 10.3.3](#).
- If there are uterine contractions:
  - Before 34 weeks LMP: tocolytic agent, except if there are signs of intra-uterine 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 the event of infection, induce labour immediately (Chapter 7, [Section 7.3](#)).
  - If there is no infection:
    - At term: if labour does not start spontaneously, induce labour 12 to 24 hours after rupture of membranes;
    - For preterm rupture (< 37 weeks LMP), transfer the mother, if possible, to a facility where the preterm neonate can receive intensive care.
- Before term: monitor and, if there are no complications, perform induction at 37 weeks LMP.<sup>[1]</sup>
- 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 the event of severe maternal infection, start antibiotic therapy prior to dexamethasone.

## References

1. Morris JM, Roberts CL, Bowen JR, Patterson JA, Bond DM, Algert CS, Thornton JG, Crowther CA; PPROMT Collaboration. Immediate delivery compared with expectant management after preterm pre-labour rupture of the membranes close to term (PPROMT trial): a randomised controlled trial. Lancet. 2016 Jan 30;387(10017):444-52.

# 4.10 Threatened preterm delivery

Regular uterine contractions and cervical changes before 37 weeks LMP.

## 4.10.1 Risk factors

- Preterm rupture of membranes before 37 weeks LMP
- Maternal infection
- Pregnancy-related disorder (e.g. pre-eclampsia, polyhydramnios, placenta praevia)
- Multiple pregnancy
- Cervical insufficiency
- Age < 18 years
- Malnutrition

## 4.10.2 Management

- Look for and treat any maternal infection; always perform urinalysis (dipstick test); perform rapid malaria test in endemic areas.
- Let the woman deliver:
  - If > 34 weeks LMP and membranes have ruptured.
  - If labour is too advanced to be stopped (cervix effaced, 5 cm dilation), no matter what gestational age.
  - If the mother's life is threatened (poor general condition, pre-eclampsia, eclampsia, abruptio placentae, severe haemorrhage, etc.), no matter what gestational age.
  - If foetal death is confirmed (no foetal movements and no foetal heart tones 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 may be enough for mild forms (contractions but no cervical changes).
  - Tocolytic therapy:  
The main objective is to postpone delivery in order to administer corticosteroids for accelerating foetal lung maturation.  
**nifedipine** PO (immediate release tablet): 10 mg to be repeated every 15 minutes if uterine contractions persist (max. 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.  
Duration of the treatment is 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: consider episiotomy, even if the foetus is small; before 34 weeks LMP vacuum extraction is contra-indicated, use forceps if instrumental extraction is required.
- Prepare for neonatal resuscitation (Chapter 10, [Section 10.2](#)). Closely monitor neonate's temperature (risk of hypothermia) and blood glucose (risk of hypoglycaemia).

## **4.10.4 Preventing preterm delivery**

- Treatment of infections and other disorders during pregnancy.
- Rest for women with predisposing factors: multiple pregnancy, polyhydramnios, previous preterm delivery.

# 4.11 Intrauterine foetal death

Foetal death from 23 weeks LMP, prior to labour.

## 4.11.1 Diagnosis

Diagnosis is confirmed by ultrasound.

If ultrasound is not available, the following signs suggest foetal death but are not sufficiently sensitive to justify a hasty, rash decision. Errors are common. Repeat the exam, do not rush.

- 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.

## 4.11.2 Management

- If the mother has no life-threatening disorder:
  - Treat any maternal pathology (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 (eclampsia, placenta praevia, abruptio placentae, intrauterine infection, severe maternal disease such as congestive heart failure): urgently induce labour.
- If the amniotic sac has been ruptured for more than 12 hours: antibiotherapy ([Section 4.9.3](#)) and induction of labour.
- 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<sup>a</sup>, 2 g 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 postpartum period.

- Inhibition of lactation may be of psychological importance for some women following intrauterine death (Chapter 11, [Section 11.2.1](#)).
- Staff should avoid persuading parents to see and hold the neonate but should strongly support such desires when expressed (however, this is discouraged if the neonate has been mutilated in case of embryotomy or presents severe malformations). In this case, prepare the neonate as usual, cleaned and wrapped. The body must be given to the parents if they want to organize a funeral.

## 4.11.3 Induction of labour

- In the third trimester, if the cervix is favourable (Bishop's score  $\geq 6$ ): oxytocin and rupture membranes.
- In the third trimester, if the cervix is not favourable or in the second trimester, administer by order of preference:

<b>mifepristone</b>	<b>mifepristone</b> PO: 200 mg single dose
+	+
<b>misoprostol</b>	1 to 2 days later <b>misoprostol</b> as indicated below, depending on gestational age

or, if not available

<b>misoprostol alone</b>	<ul style="list-style-type: none"> <li>• Between 23 and 26 weeks LMP 200 micrograms sublingually or intravaginally, every 4 to 6 hours until labour starts, to be repeated if necessary the following day</li> <li>• Between 27 and 33 weeks LMP 100 micrograms sublingually or intravaginally every 4 to 6 hours until labour starts, to be repeated if necessary the following day</li> <li>• As of 34 weeks LMP 25 micrograms intravaginally every 6 hours or 25 micrograms PO every 2 hours, to be repeated if necessary the following day</li> </ul>
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- In case of prior caesarean section or grand multiparity or overdistention of the uterus, given increased risk of uterine rupture:
  - If oxytocin is used, see Chapter 7, [Section 7.4.4](#) for precautions for use.
  - If a misoprostol is used:
    - ▷ Preferably use the combined regimen mifepristone + misoprostol, as fewer numbers of misoprostol doses are required.
    - ▷ Reduce the dose of misoprostol between 23 and 33 weeks LMP:
      - ▷ 23 to 26 weeks LMP: 100 micrograms every 6 hours
      - ▷ 27 to 33 weeks LMP: 50 micrograms every 6 hours
    - ▷ Closely monitor the mother for possible signs of impending rupture (heart rate, blood pressure, uterine contractions, pain).

- ▶ As of 34 weeks LMP, consider using a Foley catheter 24 hours after administration of mifepristone and before administration of misoprostol in order to increase cervical dilation and reduce the total dose of misoprostol used.

## Footnotes

- (a) For patients with a history of immediate hypersensitivity reaction to penicillin (urticaria, respiratory problems or oedema): **clindamycin** IV 900 mg single dose + **gentamicin** IV 5 mg/kg single dose.

# **Chapter 5: Normal delivery and procedures related to vaginal delivery**

[5.1 Normal delivery](#)

[5.2 Monitoring labour and delivery](#)

[5.3 Artificial rupture of the membranes](#)

[5.4 Prolapsed cord](#)

[5.5 Nuchal cord](#)

[5.6 Instrumental delivery](#)

[5.7 Symphysiotomy](#)

[5.8 Episiotomy](#)

[5.9 Perineal repair](#)

[5.10 Deinfibulation](#)

# **5.1 Normal delivery**

## **5.1.1 General recommendations**

Personnel should wear personal protective equipment (gloves, goggles, clothing and eye protection) to prevent infection from blood and other body fluids.

Ensure a calm reassuring environment and provide the woman as much privacy as possible during examinations and delivery. Encourage her to move about freely if desired and to have a person of her choice to accompany her.

Anticipate the need for resuscitation at every birth. The necessary equipment should be ready at hand and ready for use.

## **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 dilation 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.

Likewise, cervical dilation with few or no contractions should not be considered the start of labour.

Multiparous women in particular may have a dilated cervix (up to 5 cm) at term before the onset of labour.

If in doubt, in both cases, re-examine 4 hours later. If the cervix has not changed labour has not begun and the woman does not need to be admitted to the delivery room.

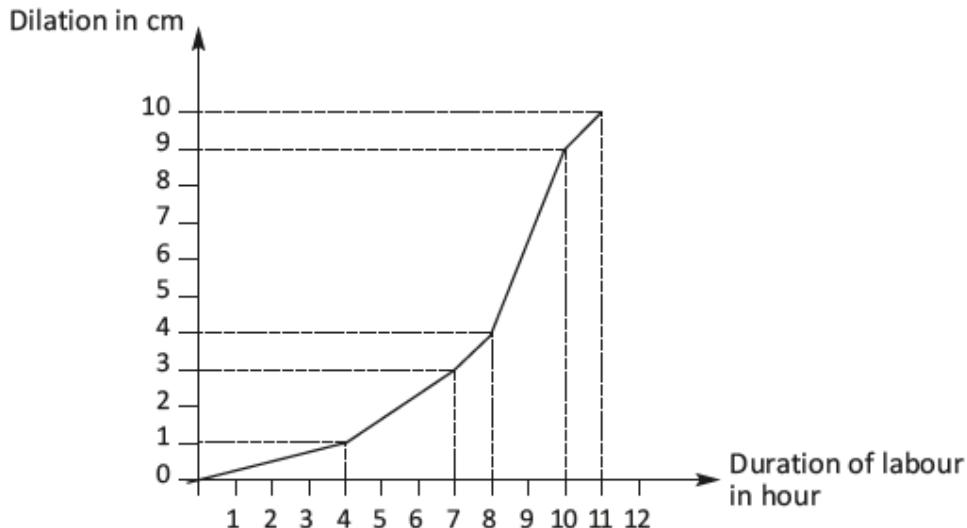
## **5.1.3 Stages of labour**

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

1) Latent phase: from the start of labour to approximately 5 cm of dilation. Its duration varies depending on the number of prior deliveries.

2) Active phase: from approximately 5 cm to complete dilation<sup>[1]</sup>. During this phase the cervix dilates faster than during the latent phase. The time to dilate varies with the number of previous deliveries. As a rule, it does not last longer than 10 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 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 heart rate, blood pressure and temperature every 4 hours or more often in case of abnormality.
- Ask the woman to empty her bladder regularly (e.g. every 2 hours).
- Keep the woman hydrated (offer her water or tea).
- Encourage the woman to move about freely during labour. Position changes and walking around help relieve the pain, enhances the progress of labour and helps 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 (foetal 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 110 to 160 beats per minute. The foetal heart rate may slow down during a contraction. If it becomes completely normal again as soon as the uterus relaxes, there is probably 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 maternal vital signs: heart rate, blood pressure and temperature.
  - Check the uterine tonus. If hypertonic, look for excessive administration of oxytocin (which should therefore be stopped) or placental abruption (Chapter 3, [Section 3.2](#)).
  - 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 beats/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 systolic blood pressure  $\geq 90$  mmHg.
  - Perform a vaginal examination to look for cord prolapse.
- If the foetal heart rate is more than 180 beats/minute:

The most common cause is maternal febrile infection.

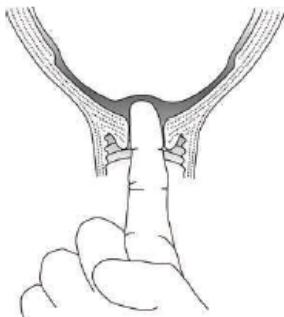
  - Look for the cause of the infection (uterine infection, pyelonephritis, malaria, etc.) and treat.
  - Treat the fever (paracetamol).
  - In case of fever of unknown origin, administer antibiotics as for a prolonged rupture of membranes (Chapter 4, [Section 4.9](#)).

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.

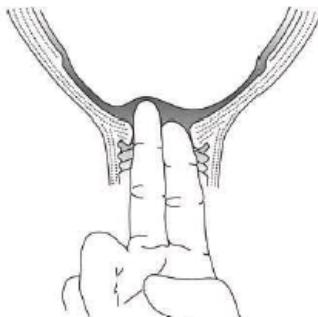
## Dilation during active phase

- The cervix should remain soft, and dilate progressively. Dilation should be checked by vaginal examination every 4 hours if there are no particular problems (Figures 5.2).
- No progress in cervical dilation between two vaginal examinations is a warning sign.
- Action must be taken if there is no progress for 4 hours: artificial rupture of membranes, administration of oxytocin, caesarean section, depending on the circumstances.

#### **Figures 5.2 - Estimating cervical dilation**



5.2a: 1 finger = 1.5 cm



5.2b: 2 fingers = 3 to 3.5 cm

#### **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.

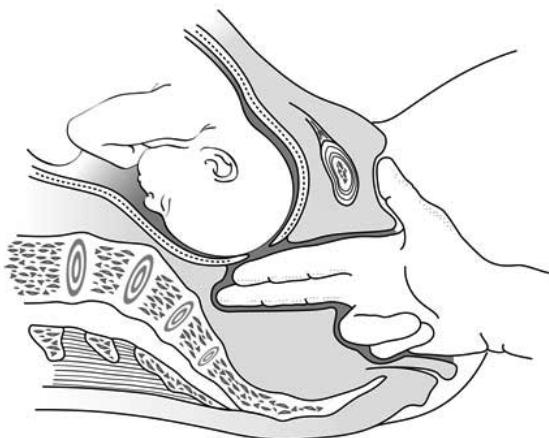
#### **Foetal progress**

- 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:

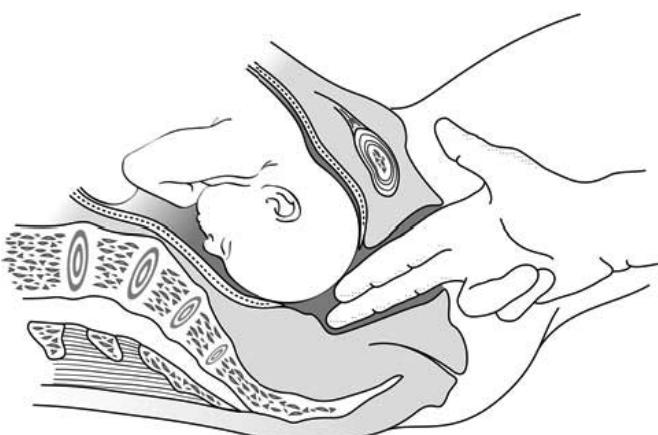
On vaginal examination, the presenting part prevents the examiner's fingers from reaching the sacral concavity (Figures 5.3a and 5.3b). The presence of caput (benign diffuse swelling of the foetal head) can lead to the mistaken conclusion that the foetal head is engaged.

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).

### Figures 5.3 - Diagnosing engagement



**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

- 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 infant

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 2 hours in a multipara and 3 hours in a primipara

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 on all fours (Figures 5.4).

**Figures 5.4 - Delivery position**



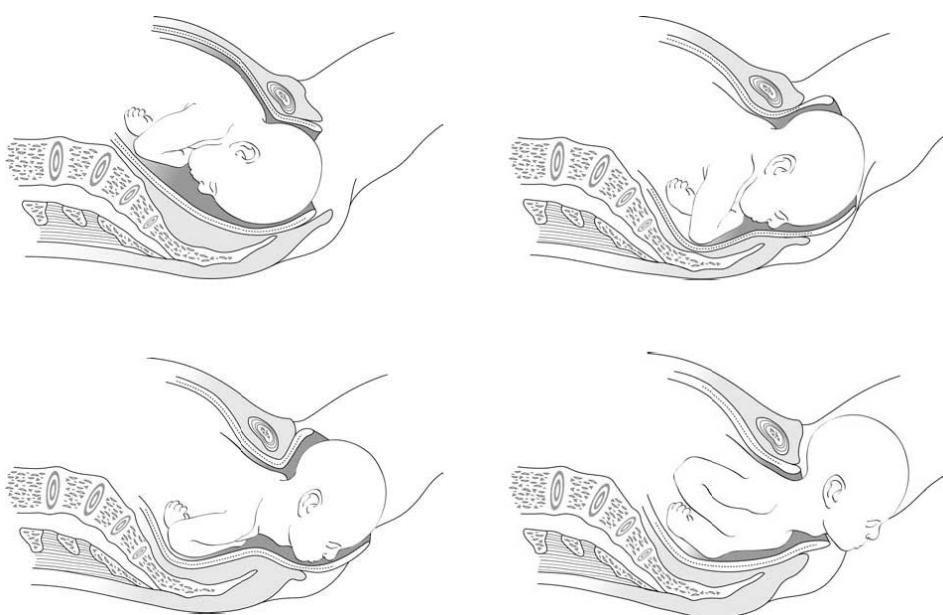
5.4a: Lying on left side



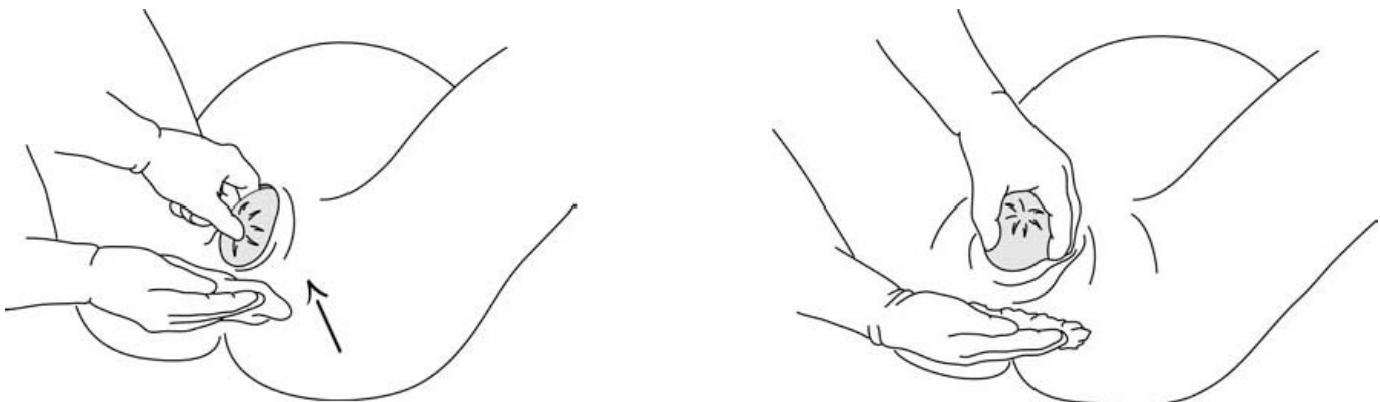
5.4b: Lying on back

- 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).
- If labour is progressing well and there is no foetal heart rate abnormality, let the woman follow her own urge to push. In other cases, expulsive effort should be directed. The woman 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 after each contraction.
- 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).

**Figures 5.5 -** The different stages of occiput-anterior delivery

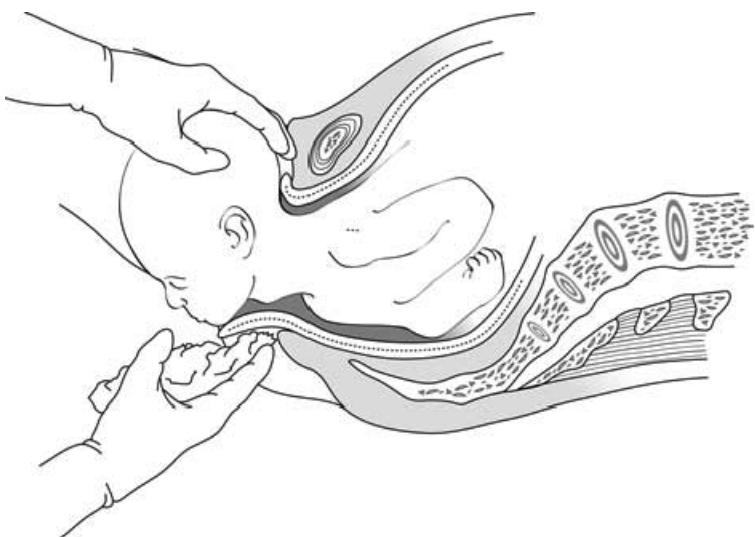


**Figures 5.6 -** Progressive delivery of the head



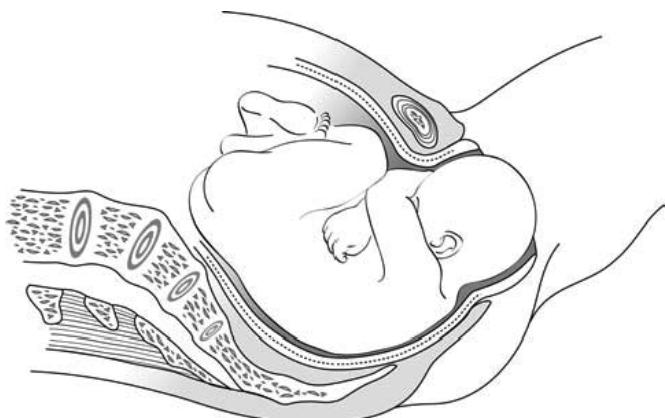
During this final phase—an active one for the birth attendant—the woman should stop all expulsive efforts and breathe deeply. With one hand, the birth attendant controls the extension of the head and moves it slightly side-to-side, in order to gradually free the parietal protuberances; if necessary (not routinely), the chin can be lifted with the other hand (Figure 5.7).

**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.

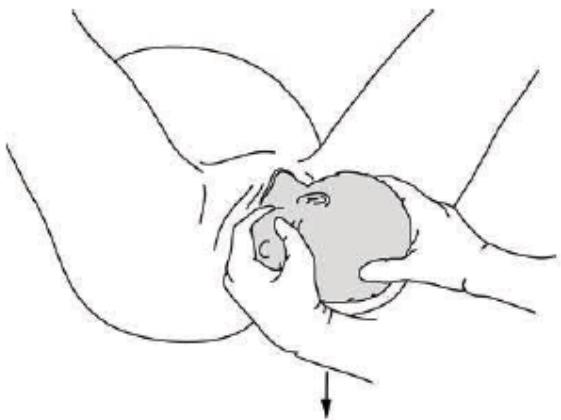
**Figure 5.8 - Occiput-posterior delivery**



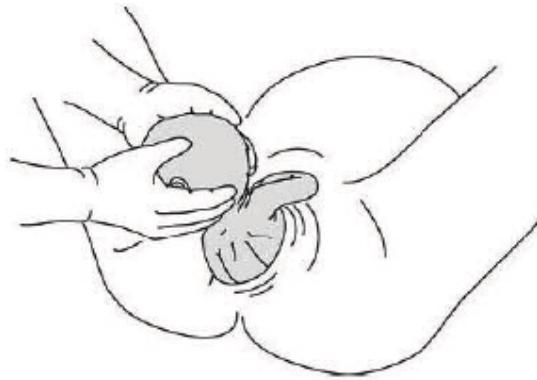
- The head, once delivered, rotates spontaneously by at least 90°. The birth attendant helps this movement by grasping the head in both hands and exerting gentle downward traction to bring the anterior shoulder under the symphysis and then deliver it then, smooth upward traction to deliver the posterior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

To reduce the risk of perineal tears, control the delivery of the posterior shoulder.

### **Figures 5.9 - Delivery of shoulders**



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



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

- Place the neonate on mother's chest. For neonatal care, see Chapter 10, [Section 10.1](#).

## **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**

See Chapter 10, [Section 10.1.1](#).

## **References**

1. World Health Organization. WHO recommendations Intrapartum care for a positive childbirth experience, Geneva, 2018.  
<http://apps.who.int/iris/bitstream/handle/10665/272447/WHO-RHR-18.12-eng.pdf?ua=1> [Accessed 18 june 2018]

# 5.2 Monitoring labour and delivery

## 5.2.1 Partograph

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

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

Start the graph at 5 cm of dilation, and 3 contractions every 10 minutes. In certain situations, e.g. induction of labour, it is started at 4 cm of dilation.

Indicators are plotted 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
  - Drugs administered (oxytocin, antibiotics, etc.)
- Foetal indicators:
  - Foetal heart rate
  - Amniotic fluid (colour, odour and quantity)
  - Descent of the foetal head and head moulding

## 5.2.2 Interpreting the WHO partograph

The WHO partograph 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 alert line, this means that the dilation is less than 1 cm per hour. In this case, transfer to a CEmONC facility must be considered if the woman is at an outpatient clinic or a BEmONC facility. If the woman is at a CEmONC facility, closer monitoring is required.

The action line is located 4 hours to the right of the alert line. If the dilatation curve crosses this line, decisions must be made (augmentation of labour, artificial rupture of membranes, caesarean section, etc.). See [Chapter 7](#).

### The WHO partograph

Name	Gravida	Para	Hospital number
Date of admission	Time of admission	Ruptured membranes	hours
Fetal heart rate	200 190 180 170 160 150 140 130 120 110 100 90 80		
Amniotic fluid Moulding			
Cervix (cm) (Plot X)			
Descent of head (Plot O)			
Hours			
Time			
Contractions per 10 min.	5 4 3 2 1		
Oxytocin U/L drops/min.			
Drugs given and IV fluids			
Pulse • and BP			
Temp °C			
Urine protein			
acetone			
volume			

## 5.2.3 Immediate postpartum maternal monitoring

- Vital signs (heart rate, 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 woman drinks and urinates.
- Check if there are other treatment indications, e.g., antibiotherapy for prolonged rupture of membranes with intra-uterine infection (Chapter 4, [Section 4.9.3](#)), 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 [Section 11.4](#).

# **5.3 Artificial rupture of the membranes**

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 if labour fails to progress.
- To speed up delivery once the cervix is fully dilated if labour fails to progress.
- 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 to 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 presenting part.
- Use sterile technique (infection risk as a result of opening the amniotic cavity to pathogens).

## **5.3.3 Contra-indications**

### **Absolute**

- Complete placenta praevia
- Transverse lie

### **Relative**

- Dilation less than 5 cm, irregular contractions (false labour, latent phase).
- 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.

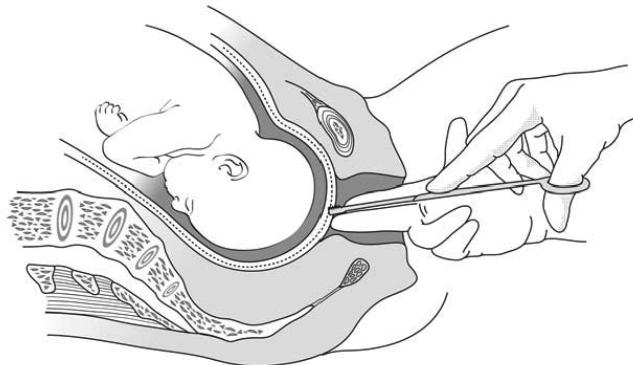
## **5.3.4 Technique**

(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% povidone 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 meconium staining, in the absence of an abnormal foetal heart rate, is not diagnostic of foetal distress, but requires closer monitoring.
- Make sure the cord has not prolapsed.
- Check the foetal heart rate before and after amniotomy.

**Figure 5.10 - Artificial rupture of membranes**

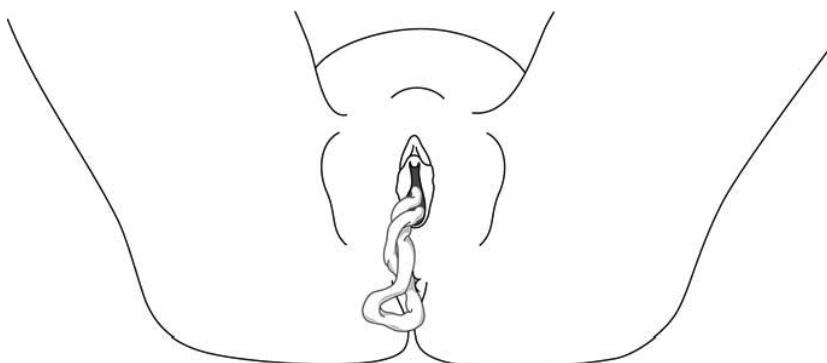


# 5.4 Prolapsed cord

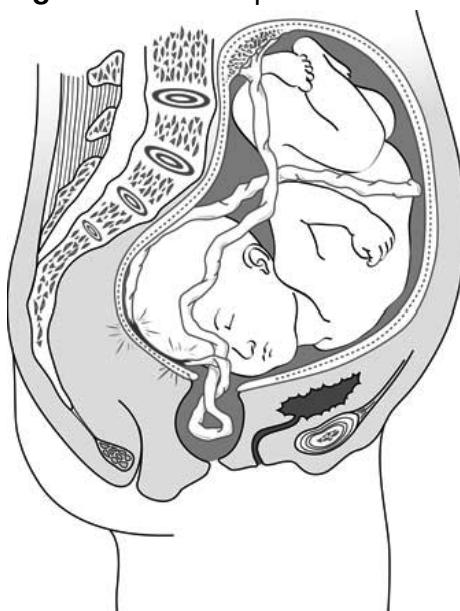
The umbilical cord drops in front of the presenting part, usually when the membranes rupture (due to low insertion or excessive length, transverse or breech presentation, sudden rupture of the amniotic sac, excess amniotic fluid, twin pregnancy).

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 (extreme premature)

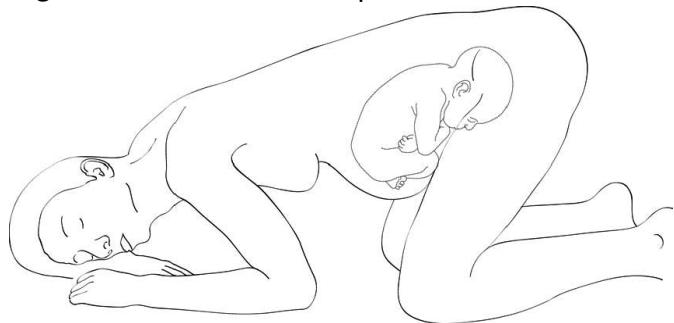
No specific intervention, vaginal delivery, no caesarean section.

### 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.
- Manually push the presenting part toward the uterine fundus to relieve pressure on the cord. Do not remove hand until extraction of the foetus by caesarean section. If it is difficult to maintain manual elevation of the foetus through the vagina, fill the bladder with 500 ml of 0.9% sterile sodium chloride to maintain upward displacement.
- Caesarean section, holding the presenting part of the cord via the vagina until extraction. Check for foetal heart tones right before the procedure. If foetal heart tone is no longer heard, it is better to let vaginal delivery proceed (the foetus 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 ([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 may cause foetal distress and halt the progress of birth after delivery of the head.

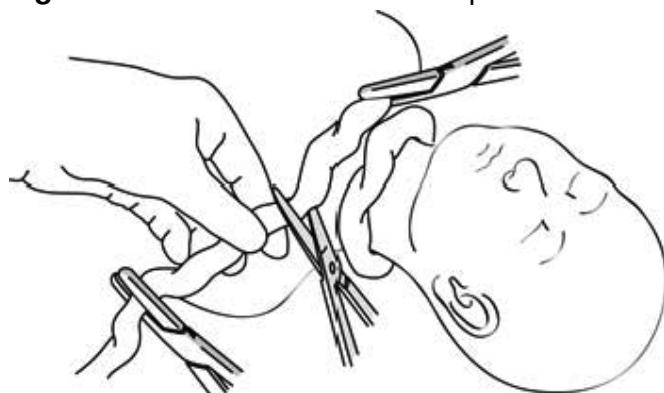
Nuchal cord does not become visible until after the head is delivered.

If the loop is loose, slip it over the neonate'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 perform neonatal resuscitation, 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.
- Head engaged.
- Accurate diagnosis of the head position.
- Amniotic sac ruptured.
- Bladder empty.

## **5.6.1 Vacuum extractor**

Flexion and traction device for facilitating delivery of the foetus.

There are various models, but all have:

- A metal, plastic or silicone 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.

### **Indications**

- Failure to progress due to insufficient or ineffective expulsive effort despite good uterine contractility (using oxytocin, if necessary).
- Foetal distress 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**

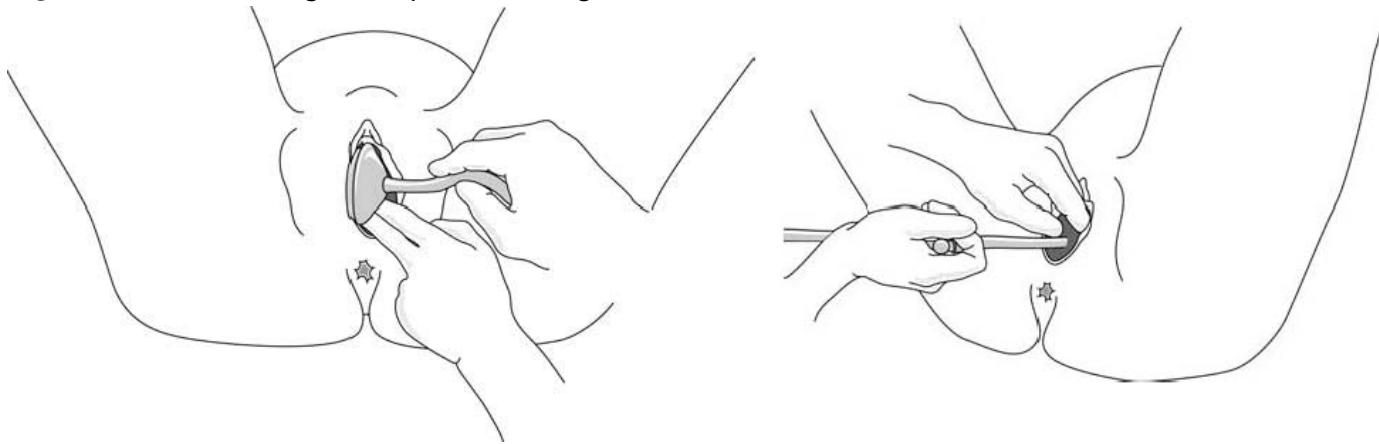
- Breech, transverse, face or brow presentation.
- Preterm neonate (< 34 weeks): the bones of the skull are too soft.
- Head not engaged.
- Cervix not fully dilated.

### **Technique**

- Place the woman on her back with knees bent and thighs apart.
- Swab the perineum and the vagina with 10% povidone iodine.
- Empty the bladder (insert a sterile urinary catheter).

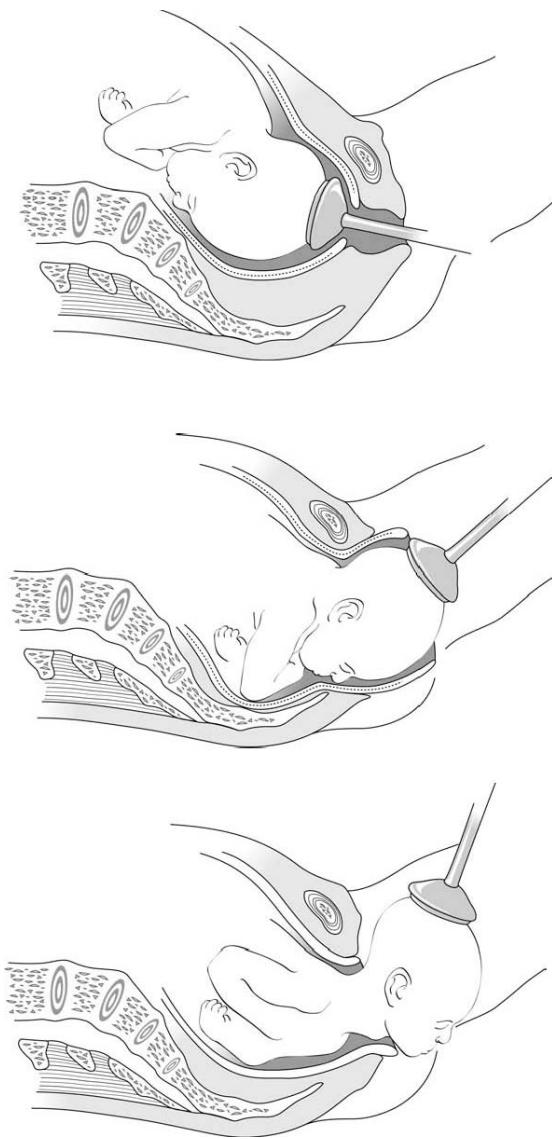
- Prepare the sterile part of the instrument (the cup), using sterile gloves.
- Insert the cup into the vagina (Figures 5.15) and apply it to the scalp, as close as possible to the posterior fontanelle—that is, anteriorly for occiput anterior presentations.
- With one hand holding the cup, circle the 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 5.15 - Inserting the cup into the vagina**



- If required have an assistant connect the cup to the vacuum system.
- Hold the cup to the foetus' head with one hand.
- Pump to reach a negative pressure. Check for trapped vaginal or cervical tissue before starting traction. 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 woman 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 5.16).

**Figures 5.16 - Vacuum extractor traction: axis varies depending on the progress of the head**



- If the cup is positioned incorrectly or the traction is too sudden, the cup can detach. If this happens, re-apply it (but no more than 3 times).
- When the 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.

**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 20 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.

## **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.

Forceps can be used when a vacuum extractor cannot be used as in a mentum anterior face presentation.

### **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 cartilage 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<sup>a</sup>:
  - 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 the event of shoulder dystocia when other manoeuvres have failed.
- In the event of entrapped aftercoming head in a breech when other manoeuvres have failed.

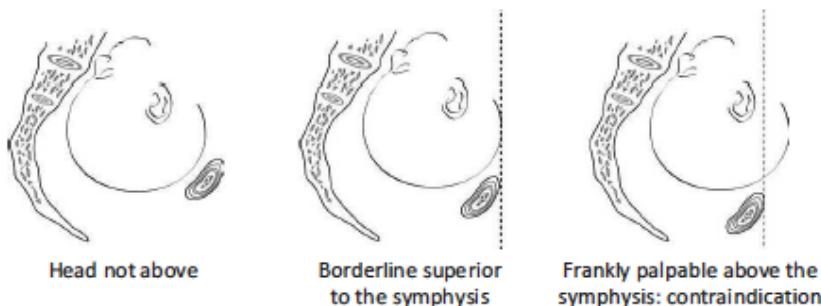
## 5.7.2 Conditions

- Membranes ruptured, full dilation.
- The foetal head is not palpable above the symphysis pubis or by less than 2/5 (Figure 5.17).

## 5.7.3 Contra-indications

- Head not engaged.
- Brow presentation.
- Dead foetus perform an embryotomy (Chapter 9, [Section 9.7](#)).
- Cervix not fully dilated.
- Severe cephalo-pelvic disproportion, with head above the symphysis by more than 2/5 (Figure 5.17).

**Figure 5.17 - Position of the foetal head**



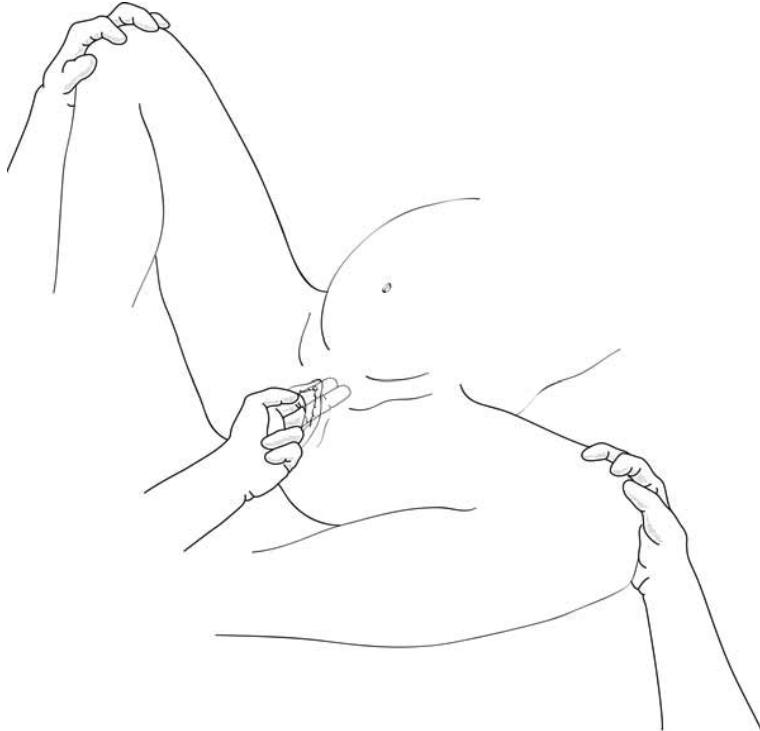
## 5.7.4 Equipment

- Scalpel, suturing equipment, delivery set with episiotomy scissors
- Vacuum extractor
- Foley catheter
- Sterile drape, compresses and gloves
- 10% povidone iodine
- 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 5.18).

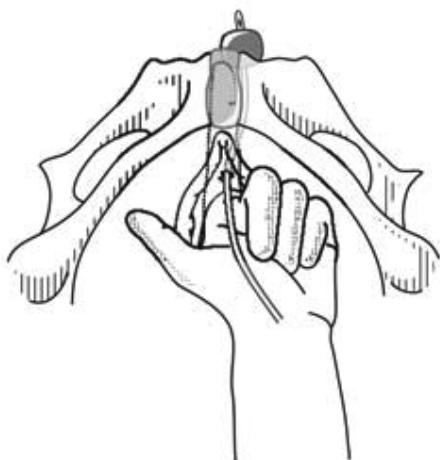
**Figure 5.18 - Supported lithotomy position**



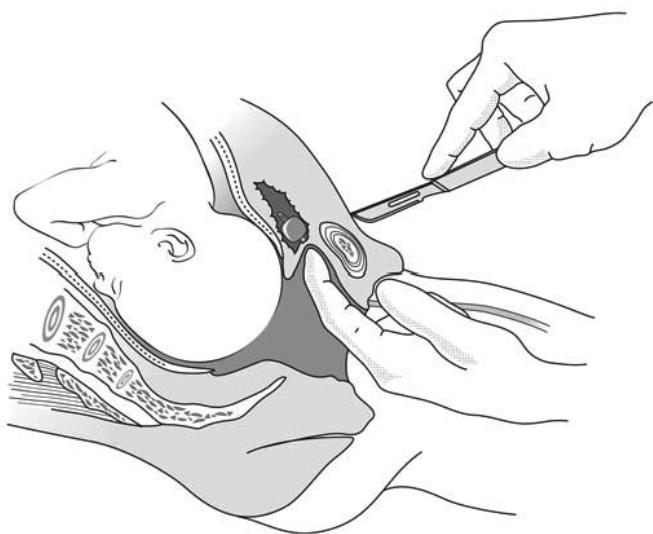
- Shave the incision site; swab the pubic and perineal region with 10% povidone iodine.
- Place a sterile fenestrated drape over the symphysis.
- Insert the Foley catheter, which allows location of the urethra throughout the procedure.
- Local anaesthesia: 10 ml of 1% lidocaine, infiltrating the skin and subcutaneous tissues superior, anterior, and inferior to the symphysis, along the midline, down to the cartilage. 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 5.19 and 5.20). 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.

**Figure 5.19** - Finger pushing the urethra out of the way

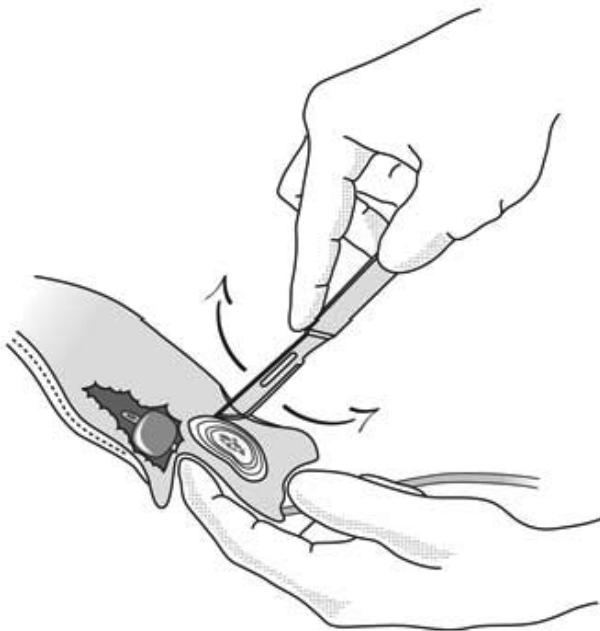


**Figure 5.20** - Finger pushing the head and urethra out of the way



- 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 5.21), 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).

**Figure 5.21 - Scalpel moves back and forth**



- Do not cut the vagina.
- Perform an episiotomy; use a vacuum extractor to deliver the neonate.
- One or two stitches suffice to close the wound after delivery.

## 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.
- Remove the Foley catheter after 3 days, except if haematuria present during catheterization or in case of obstructed labour (Chapter 7, [Section 7.2.5](#)).
- 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 antibiotic therapy (**amoxicillin** PO: 1 g 3 times daily 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.
- Osteomyelitis: extremely rare if rigorous sterile technique has been used.

## Footnotes

- (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.

# **5.8 Episiotomy**

Incision on the perineum

## **5.8.1 Indications**

Episiotomy can cause infection, haemorrhage and/or chronic pain. It 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 case of symphysiotomy.

Episiotomy should be considered in the following situations:

- Prolonged delivery, 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.
- 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.

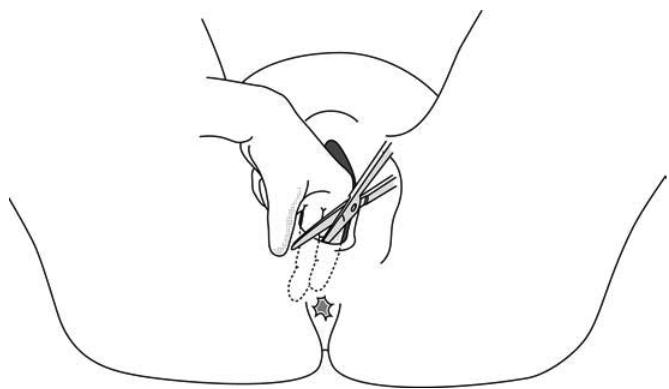
## **5.8.2 Equipment**

- Delivery sets containing 2 pairs of scissors
- 10% povidone iodine, sterile compresses
- 1% lidocaine

## **5.8.3 Technique**

- Swab the perineum with 10% povidone 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 5.22).

**Figure 5.22** - Cutting the perineum



- 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).

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).

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.

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.

## 5.9.1 Equipment

- Suture set containing sterile scissors, dissecting forceps and needle holder
- 10% povidone iodine
- 1% lidocaine
- One or two Dec 3 (2/0) absorbable sutures
- A rapidly absorbable suture for closing the skin or, if not available, a non-absorbable Dec 3 (2/0) suture
- Sterile drape and gloves
- Good lighting

## 5.9.2 Technique

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

- Swab the perineum and vagina with povidone iodine 10%.
- Position a sterile aperture drape. Make a tampon from sterile compresses, to be inserted into the vagina to absorb the intra-uterine bleeding while suturing (caution: do not forget to remove them after finishing sutures).
- 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 the suturing in the operating theatre under general or spinal anaesthesia.

## **Superficial vulvar tears (first-degree)**

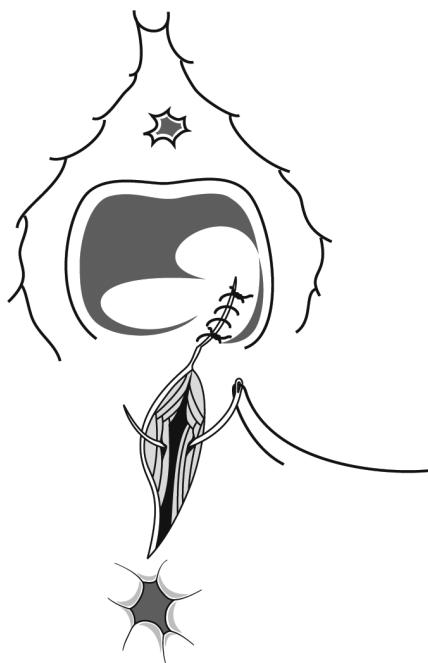
- If they are not bleeding and confined to the area near the vaginal opening: basic care, no suturing.
- If they are bleeding or deep: simple continuous or interrupted suture using absorbable suture material.

## **Episiotomy or simple second-degree perineal tears (second-degree)**

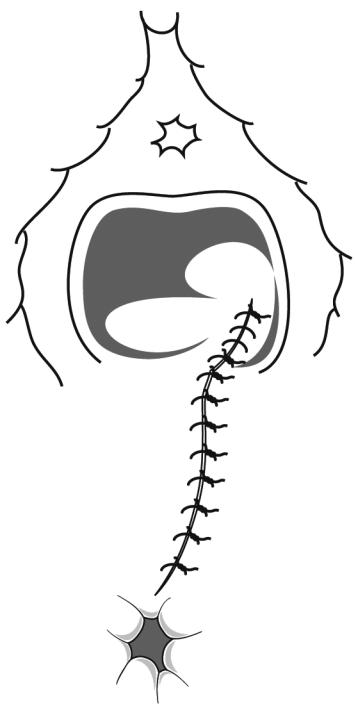
- Locate the apex of the cut/tear and place a first stitch there.
- Suture the vaginal mucosa going from the inside out, to just behind the hymenal remnants, using a continuous or interrupted figure-of-eight absorbable suture; stitches should be close enough to prevent lodging of lochia in the following days, but not too deep, to avoid going into the rectum (Figure 5.23).
- Next, suture the muscle layer with 2 or 3 absorbable figure-of-eight sutures (Figure 5.24) or continuous suture.
- 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 5.25). Because the tissues will be oedematous in the days following the birth, avoid tying the knots too tight. Continuous subcuticular suture using absorbable suture materials is also possible.
- Perform a rectal examination to make sure that no stitches can be felt in the rectum. Remove compresses from inside the vagina.



**Figure 5.23** - Suturing the mucosa



**Figure 5.24** - Suturing the muscle



**Figure 5.25** - Suturing the skin

## Rupture of the anal sphincter (third-degree)

- Administer an antibiotic prophylaxis (**cefazolin** IV 2 g + **metronidazole** IV 500 mg single dose).
- A tear in the muscular ring can result in retraction of the 2 torn ends of the muscle, now hidden in the tissues. Insert a finger into the rectum to locate the 2 ends.
- Suture the sphincter with 2 or 4 absorbable horizontal mattress sutures (Figure 5.26).
- Continue in the same sequence as in the preceding case.

**Figure 5.26 - Suturing the anal sphincter**



## **Tear in the rectal mucosa (fourth-degree)**

- Administer an antibiotic prophylaxis (**cefazolin** IV 2 g + **metronidazole** IV 500 mg single dose).
- Protect the wound from faecal material by placing a compress in the rectum (as with the vaginal tampon, do not forget to remove it).
- Suture the rectal mucosa, going from high to low, using absorbable, interrupted stitches (Figures 5.27).
- Continue in the same sequence as in the preceding case.

**Figures 5.27 - 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 2 times daily.
- For non-absorbable sutures: remove the stitches between the 5<sup>th</sup> and 8<sup>th</sup> day.
- Routine analgesia: paracetamol and/or ibuprofen (especially if there is perineal oedema). See [Appendix 7](#).
- For third- and fourth-degree tears, a laxative may be given to prevent passage of hard stools over the sutured rectal mucosa.

### 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 necrotic tissues
- In the event of minor infection: no antibiotic; drainage is enough.
- In the event of severe infection: antibiotic therapy for 5 days:

**amoxicillin/clavulanic acid PO**

Ratio 8:1: 3000 mg daily (2 tablets of 500/62.5 mg 3 times daily)

Ratio 7:1: 2625 mg daily (1 tablet of 875/125 mg 3 times daily)

or

**amoxicillin** PO: 1 g 3 times daily + **metronidazole** PO: 500 mg 3 times daily

# **5.10 Deinfibulation**

Infibulation or Type III genital 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
- 10% povidone iodine
- 1% lidocaine
- One or two Dec 3 (2/0) absorbable sutures
- Sterile drape, compresses and gloves

## **5.10.2 Technique**

- Ask the woman to urinate.
- Administer local anaesthesia with 1% lidocaine.
- Swab the perineum and vagina with 10% povidone 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 lochia.

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](#)

[6.2 Twin pregnancy](#)

[6.3 Total breech extraction](#)

[6.4 Caesarean section](#)

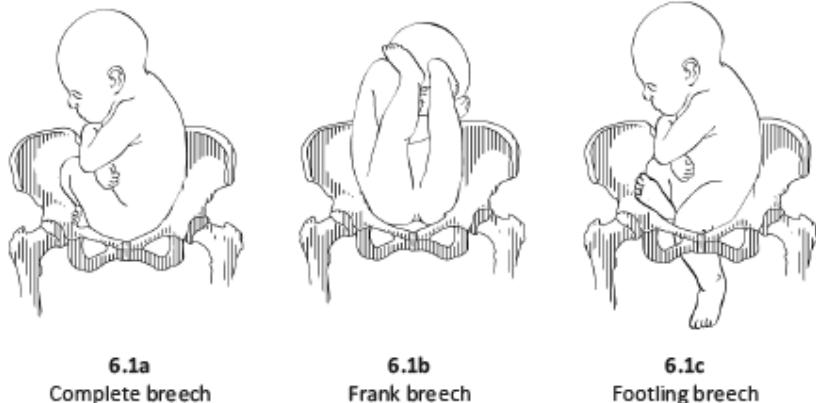
# 6.1 Breech presentation

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).

**Figures 6.1** - 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.
- The clinical diagnosis may be difficult: 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.

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.

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 depends on the number of previous births, the state of the membranes and how far advanced the labour is.

## **During labour**

- Monitor dilation every 2 to 4 hours.
- 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 stalls, transfer the mother to a CEmONC facility unless already done, to ensure access to surgical facility for potential caesarean section.

## **At delivery**

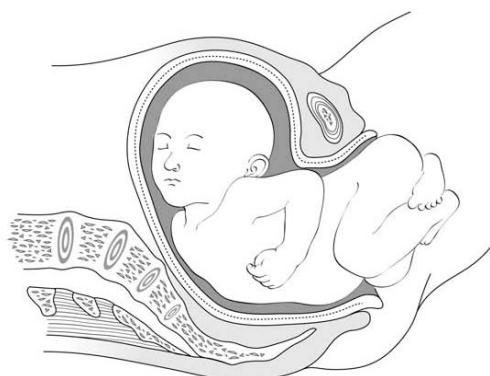
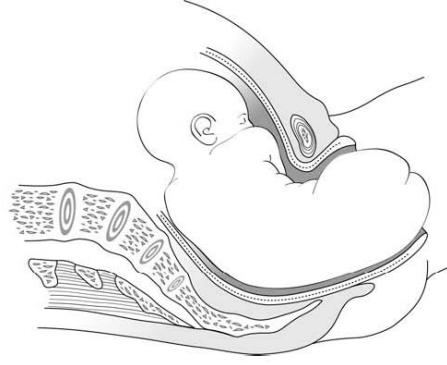
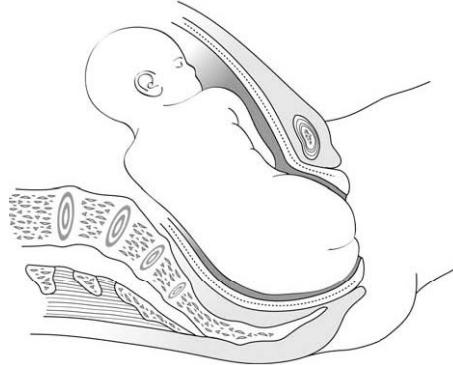
- Insert an IV line before expulsion starts.
- Consider episiotomy at expulsion. Episiotomy is performed when the perineum is sufficiently distended by the foetus's buttocks.
- Presence of meconium or meconium-stained amniotic fluid is common during breech delivery and is not necessarily a sign of foetal distress.
- The infant delivers *unaided*, as a result of the mother's pushing, simply supported by the birth attendant who gently holds the infant by the bony parts (hips and sacrum), 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 2 methods for lowering the arms so that the shoulders can descend:

### **1 - Lovset's manoeuvre**

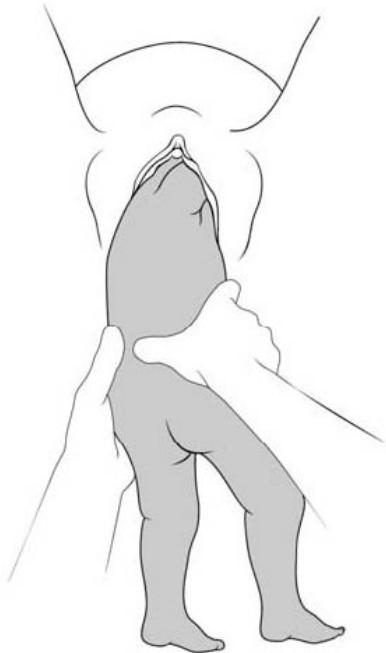
- With thumbs on the infant's sacrum, take hold of the hips and pelvis with the other fingers.
- Turn the infant  $90^\circ$  (back to the left or to the right), to bring the anterior shoulder underneath the symphysis and engage the arm. Deliver the anterior arm.
- Then do a  $180^\circ$  counter-rotation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

**Figures 6.3 - Lovset's manoeuvre**

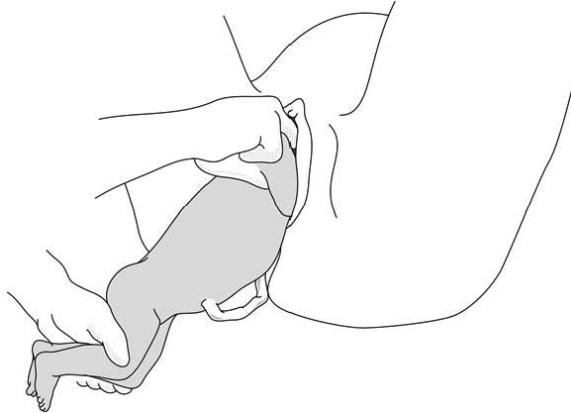
**6.3a - Turning the infant to bring down the anterior shoulder**



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



**6.3c** - Delivering the anterior arm and shoulder



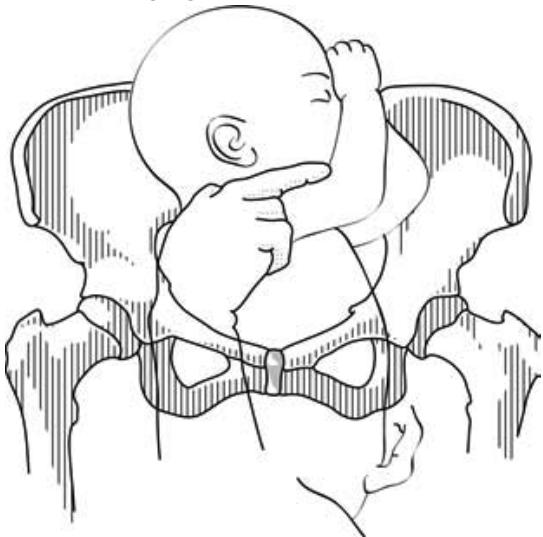
## 2 - Suzor's manoeuvre

In case the previous method fails:

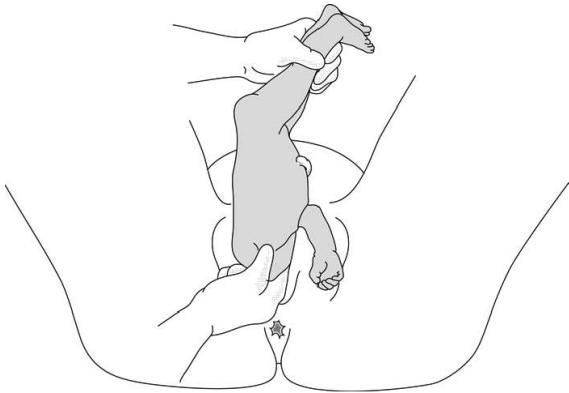
- Turn the infant 90° (its back to the right or to the left).
- Pull the infant downward: insert one hand along the back to look for the anterior arm. With the operator thumb in the infant armpit and middle finger along the arm, bring down the arm (Figure 6.4a).
- Lift infant upward by the feet in order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

**Figures 6.4** - Suzor's manoeuvre

#### **6.4a - Bringing down the anterior arm**



#### **6.4b - Delivering the posterior shoulder**



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

### **1 - Bracht's manoeuvre**

- 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:

- 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 this manoeuvre.

## **Figures 6.6 - Modified Mauriceau manoeuvre**

### **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.



## **3 - Forceps on aftercoming head**

This procedure can only be performed by an operator experienced in using forceps.

# **6.2 Twin pregnancy**

Simultaneous development of two foetuses in the uterine cavity.

More than two foetus can exceptionally develop 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 tones 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.

## **6.2.3 Management during delivery**

Twin deliveries (and all multiple deliveries) should take place in a CEmONC facility, if possible.

### **Delivering the first twin**

- Insert an IV line before expulsion starts.
- Deliver the first twin 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.
- Vaginal delivery is possible 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.

- External version is contra-indicated.
- If the first twin is in a transverse lie (unusual): schedule a caesarean section.

### **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 too large uterus.

- Continue heart rate monitoring of the second twin. In the event of abnormal heart rate, expedite delivery of the second twin.
- If the presentation is normal, as well as the foetal heart rate, await spontaneous delivery.
- If contractions have not resumed after 15 to 30 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 of the second twin 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:** in case of multiple pregnancies with more than two fetuses, proceed as with second twin.

## **Delivering the placenta**

- After the second twin is born, administer:
  - **oxytocin** routinely: 5 to 10 IU by IM or slow IV
  - **cefazolin** or **ampicillin** slow IV<sup>a</sup>: 2 g 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.

## **Footnotes**

- (a) For patients with a history of immediate hypersensitivity reaction to penicillin (urticaria, respiratory problems or oedema): **clindamycin** IV 900 mg single dose + **gentamicin** IV 5 mg/kg single dose.

# **6.3 Total breech extraction**

Breech extraction of the second twin, in particular 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)**

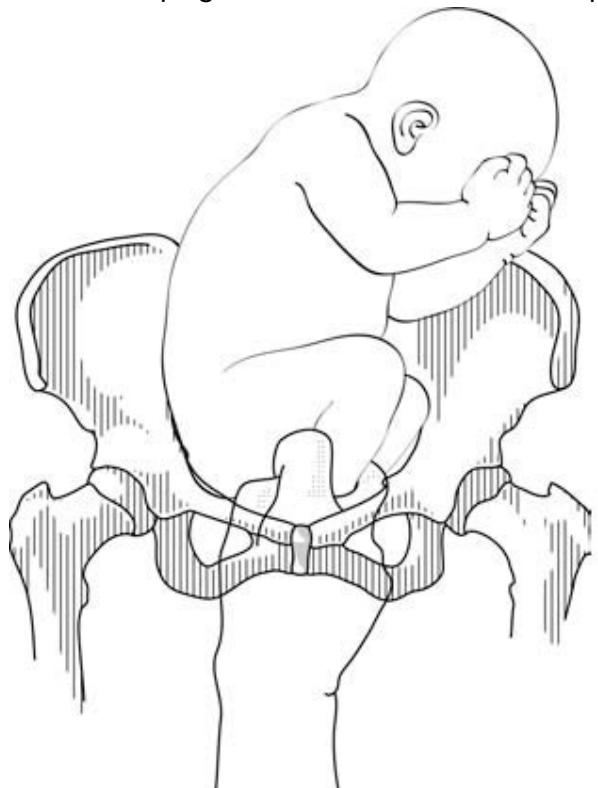
- Grasp one or both ankles with one hand, index and middle finger straddling the back of the foot;
- Apply gentle traction to bring the leg to the vulva.

### **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).

### **Figures 6.7 - Total breech extraction**

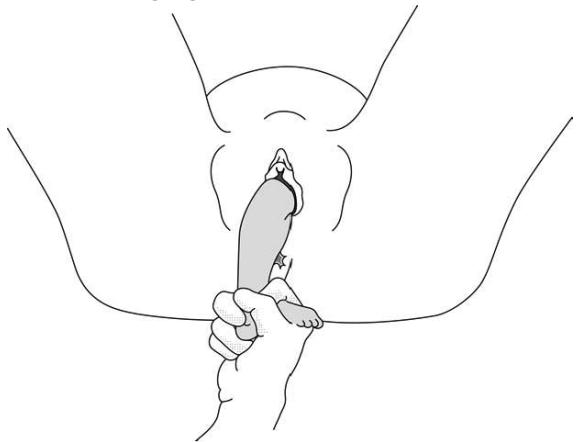
**6.7a** - Grasping one or both feet in the complete breech



**6.7b** - Grasping the anterior foot in the frank breech



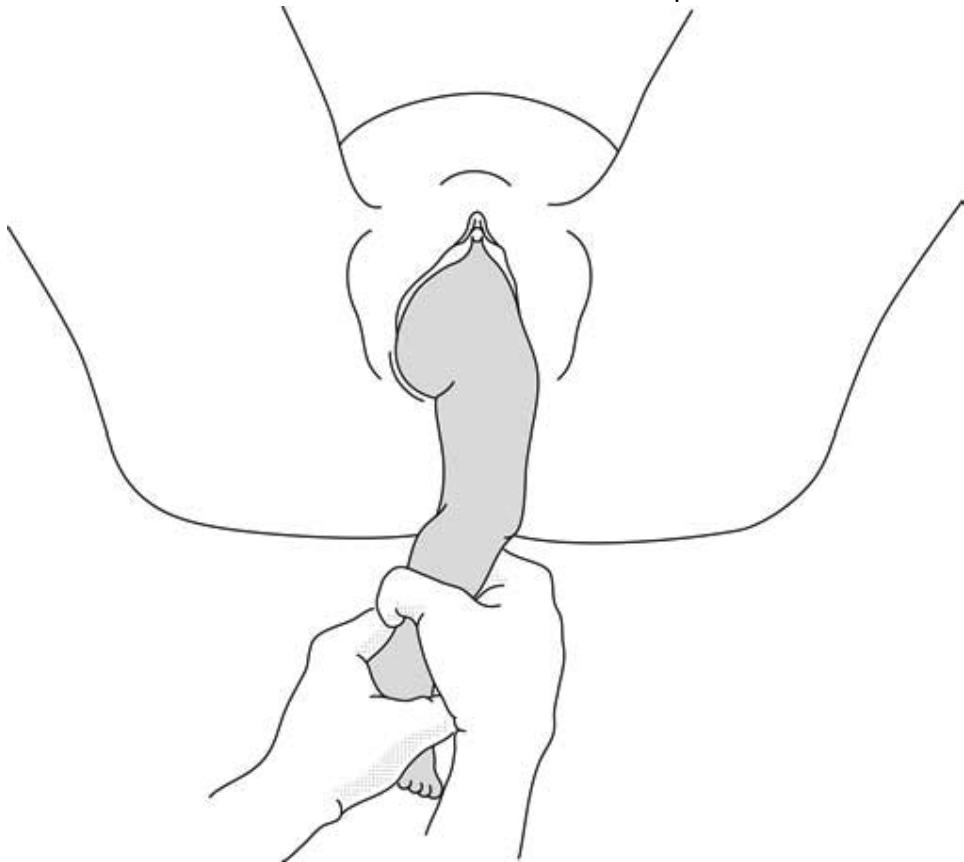
### **6.7c - Bringing one foot down**



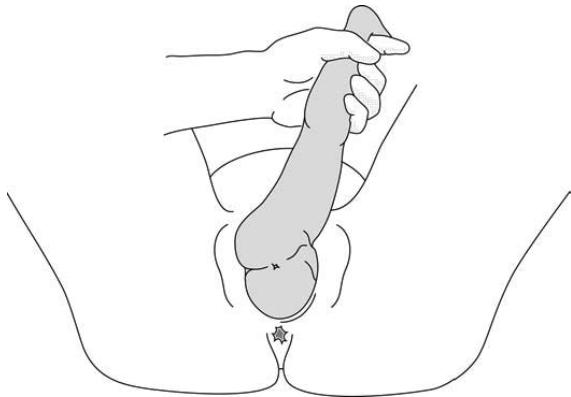
- Delivering the breech (Figures 6.8)
  - Apply gentle, continuous, downward traction on the leg to deliver the anterior hip, the foetal back anteriorly.
  - Once the anterior hip has been delivered, pull gradually upward to deliver the posterior hip.
  - Once the pelvis is out, with thumbs on the loins, 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.

### **Figures 6.8 - Delivery of the breech in a total breech extraction**

#### **6.8a - Downward traction to deliver the anterior hip**



### 6.8b - Upward traction to deliver the posterior hip



- Deliver the shoulders and head: Lovset and Bracht manoeuvres ([Section 6.1.4](#)).
- Explore the uterus to rule out uterine rupture.
- Routine antibiotic prophylaxis after clamping the cord: **cefazolin** or **ampicillin** slow IV<sup>a</sup>, 2 g single dose.

### Footnotes

- (a) For patients with a history of immediate hypersensitivity reaction to penicillin (urticaria, respiratory problems or oedema): **clindamycin** IV 900 mg single dose + **gentamicin** IV 5 mg/kg single dose.

# 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

These situations threaten directly the life of the mother (1 to 2% of all deliveries)<sup>[1]</sup>:

- 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 contexts with difficult access to services and a high fertility rate, the risks to the mother often outweigh the potential benefits to the infant. In any case, information about alternatives to caesarean section with corresponding risks and benefits should be shared with the woman, enabling her to make a choice.

**Note:** when a caesarean is planned, it 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. If the due date is uncertain and there is a very high risk of uterine rupture (e.g., history of severe uterine rupture or more than 3 prior caesarean sections), consider caesarean section prior to onset of labour, during the ninth month, with preparation for managing neonatal respiratory distress. In other indications, 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).

## 6.4.2 Prerequisites for performing a caesarean section

- 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 of 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 surgical skin preparation.
- Foley catheter insertion.
- Routine antibiotic prophylaxis: **cefaZolin** slow IV<sup>a</sup> : 2 g single dose (to be preferably administered 60 minutes prior to incision)<sup>[2]</sup>.
- Administer the appropriate antibiotherapy in case of<sup>b</sup> :
  - prolonged rupture of membranes or intra-uterine infection (Chapter 4, [Section 4.9](#));
  - peritonitis, infected or prolonged uterine rupture, septic shock.
- 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 max.).

## 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:
    - ▷ D0 to D1, **tramadol**: 50 mg every 8 hours
    - ▷ D0 to D3, **ibuprofen**: 400 mg every 8 hours
    - ▷ D0 to D5, **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 [Clinical guidelines](#), MSF.

- 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, max. 30 ml); this provides increased pain relief in the first 4 to 8 hours after surgery.

- Thromboprophylaxis (low molecular-weight heparin):
  - Not done routinely for uncomplicated caesarean sections.
  - Desirable 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:

  - D0: one litre of 5% glucose and one litre of Ringer lactate over 24 hours.
  - D1: remove the IV catheter.
- 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 removal on D1, unless:

  - Blood-stained urine when catheter is removed.
  - Urine output < 500 ml per 24 hours.
  - Peri/post-operative complication (wait to consult the surgeon and/or anaesthetist).
- Early mobilisation:
  - D0: mobilisation at the edge of the bed beginning 6 hours post-operatively.
  - D1: patient out of bed for the first time.
- Dressing and suture removal:
  - If hygiene conditions are good: uncover wound on D1.
  - Otherwise, remove dressing on D5 (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 D7.
- Cleaning:
 

Simple shower; no intravaginal cleansing.
- Breastfeeding:
  - Begin breastfeeding as soon as possible.
  - Monitor the neonate (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.

## Footnotes

- (a) In patients with a history of immediate hypersensitivity reaction to penicillin (urticaria, respiratory problems or oedema): **clindamycin** IV 900 mg single dose + **gentamicin** IV 5 mg/kg single dose.
- (b) Intrauterine foetal death, tinged or meconium-stained amniotic fluid and an initial attempt to extract vaginally are not indications for antibiotic therapy.

## References

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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](#)

[7.2 Obstructed labour](#)

[7.3 Labour induction](#)

[7.4 The use of oxytocin during labour](#)

[7.5 Shoulder dystocia](#)

[7.6 Transverse lie and shoulder presentation](#)

[7.7 External version](#)

[7.8 Internal version](#)

[7.9 Face presentation](#)

[7.10 Brow presentation](#)

# 7.1 Prolonged labour

Excessively prolonged active or pushing phase of labour. The term “prolonged labour” applies only at or after 5 cm dilation and 3 contractions per 10 minutes. Before that point, it is a “false labour” or prolonged latent phase.

Prolonged labour can be due to foeto-pelvic disproportion (mechanical dystocia) and/or inadequate contractions (dynamic dystocia) and/or ineffective maternal pushing efforts in the second stage of labour.

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

## 7.1.1 Diagnosis

- Arrest of cervical dilation for 4 hours during the active phase
- or
- Protracted foetal engagement or descent after more than 2 hours of complete dilation in a multipara and 3 hours of complete dilation in a primipara

## 7.1.2 Management

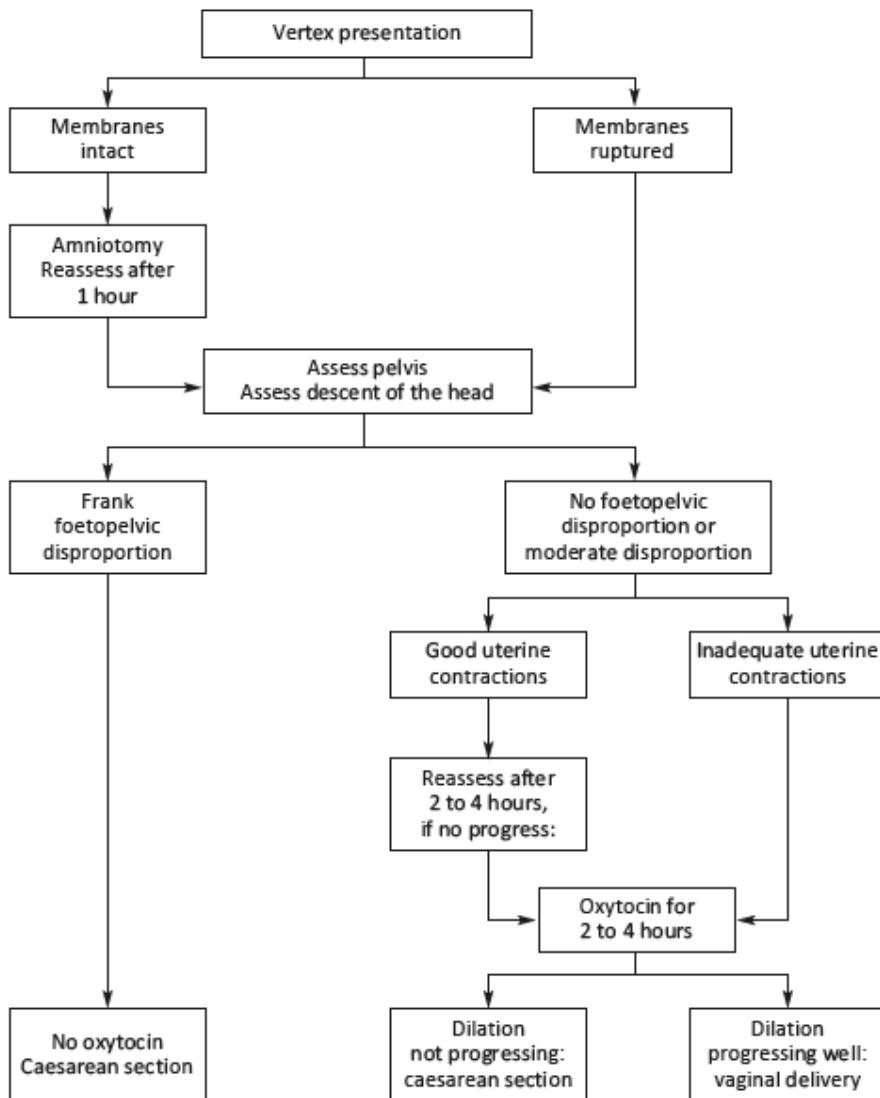
See algorithms below.

For general patient care during labour, see Chapter 5, [Section 5.1.4](#).

### Notes:

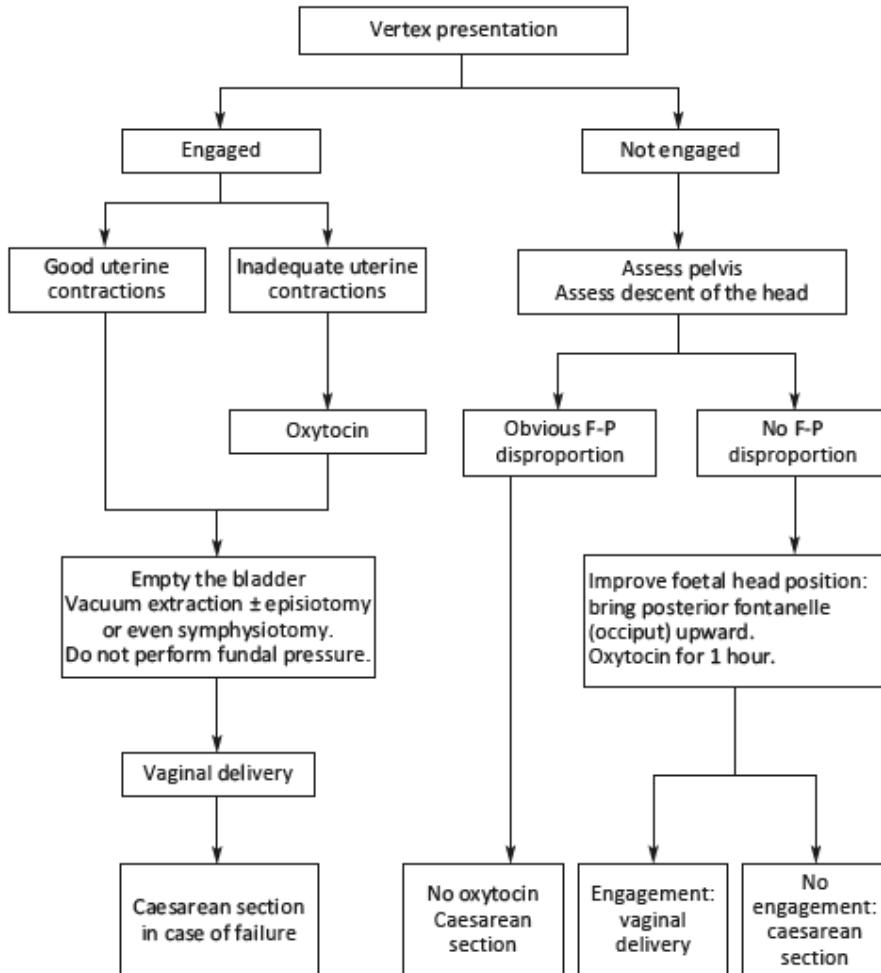
- Oxytocin is contra-indicated in case of frank foeto-pelvic disproportion (risk of uterine rupture).
- In the event of foetal distress (baseline < 100/min or deceleration > 5 minutes or repetitive decelerations after contraction for a period > 30 minutes)<sup>a</sup> and if the foetus is viable:
  - 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 arrest of cervical dilation for 4 hours during the active phase



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 engagement or descent after more than 2 hours of complete dilation in a multipara and 3 hours of complete dilation in a primipara**



For other presentations (breech, shoulder, chin-posterior face, or brow presentations): caesarean section.

## Footnotes

- (a) In case a cardiotocograph is used, abnormal variability can also indicate foetal distress. For more information, see FIGO Intrapartum Fetal Monitoring Guidelines  
<https://www.who.int/reproductivehealth/publications/0015088>

# **7.2 Obstructed labour**

Active labour which lasts longer than 24 hours, sometimes several days with insurmountable barrier preventing the foetal descent.

## **7.2.1 Diagnosis**

- Patient dazed, anxious, agitated, in pain
- Dehydration and possible hypovolaemic shock
- Possible distended bladder
- Imminent uterine rupture (pathological retraction ring, hourglass shape, see Chapter 3, [Section 3.3](#))
- Frequent amniotic infection (fever, foul-smelling amniotic fluid)

On vaginal examination:

- Oedema of the 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).
- Pushing with an incompletely dilated cervix.

## **7.2.3 Complications**

- Uterine rupture.
- Intrauterine 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 Foley 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 (Chapter 9, [Section 9.7](#)).
- Antibiotherapy for prolonged rupture of membranes or a rupture of unknown duration (Chapter 4, [Section 4.9](#)) or for intrauterine infection (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 (Chapter 9, [Section 9.2](#)) then, administer oxytocin (Haemorrhage due to uterine atony, [Table 7.2](#)).
- Speculum examination: if tissue necrosis, excision under sterile conditions.
- Perineal and vulvar toilet 2 times daily.

## **7.2.5 Prevention/management of vaginal fistulae<sup>a</sup>**

- Encourage the patient to drink 4 to 5 litres of water daily.
- Leave the Foley catheter in place for 14 days, then:
  - If there is no fistula: remove the Foley catheter.
  - If the fistula is ≤ 4 cm diameter, attempt conservative treatment. Leave the Foley 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.

### **Footnotes**

- (a) For more information: Obstetric Fistula - Guiding principles for clinical management and programme development. World Health Organization, Geneva 2006.  
[http://whqlibdoc.who.int/publications/2006/9241593679\\_eng.pdf?ua=1](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 [Section 4.6](#));
- Premature rupture of membranes with infection (Chapter 4, [Section 4.9](#)).

**Note:** pregnancy over 41 weeks LMP is traditionally considered an indication for inducing labour. This indication is only applicable if the due date is known with certainty.

## 7.3.2 Methods<sup>[1]</sup>

### Administration of prostaglandins

**misoprostol** PO: one 25 microgram tablet every 2 hours until good contractions are obtained; max. 8 doses or 200 micrograms per 24 hours

Wait 4 hours after the last dose of misoprostol before using oxytocin during labour.

#### Notes:

- If 25 microgram misoprostol tablets are not available, dissolve a 200 microgram tablet of misoprostol in 200 ml of water and administer 25 ml of this solution (25 ml = 25 micrograms).
- The oral route should be preferred<sup>[2]</sup>. If oral administration is not possible (vomiting, impaired consciousness), use vaginal route (25 micrograms of misoprostol into the posterior fornix every 6 hours until good contractions are obtained).
- Note, in the event of intrauterine foetal death, dose of misoprostol may be different depending on gestational age: see Chapter 4, [Section 4.11](#).

### 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 in the following situation:

- Prostaglandins not available or contra-indicated;
- Bishop score  $\geq 6$  ([Table 7.1](#));
- Artificial rupture of membranes not feasible because the foetal head is too high.
- Artificial rupture of membranes not recommended (HIV infected patient, breech presentation).

## **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 until it is well inflated in the cervix (30-50 ml) and apply continuous light pressure (catheter taped to the inner thigh) for 12 to 24 hours.

### **Notes:**

- Limited evidence supports simultaneous use of a Foley catheter and oxytocin as a safe and effective method for induction of labour.<sup>[3]</sup>
- A Foley catheter should only be used simultaneously with a uterotonic, if delivery cannot be delayed (e.g. eclampsia). In this case, misoprostol should be preferred.<sup>[4][5]</sup>

## **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 cm)	2 fingers (2-3 cm)	> 2 fingers (≥ 4 cm)
Cervical length	long (≥ 4 cm)	mid-length (2-4 cm)	short (1-2 cm)	effaced (< 1 cm)
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 or contra-indicated, use a mechanical method and then oxytocin.

## 7.3.4 Special situations

- Scarred uterus:
  - Foetus alive and viable: prostaglandins are contra-indicated:
    - the cervix is favourable: artificial rupture of membranes and oxytocin.
    - the cervix is unfavourable: mechanical induction and oxytocin or caesarean section.

For precautions for use of oxytocin see [Section 7.4.4](#). It is contra-indicated in women with 2 or more uterine scars.
  - Foetus alive but non-viable: as for intrauterine foetal death.
- Grand multiparity and/or overdistended uterus:
 

For precautions for use of oxytocin see [Section 7.4.4](#).

Whatever method used, induction of labour should be approached with caution as there is a risk of uterine rupture.
- Intrauterine foetal death: Chapter 4, [Section 4.11](#).

## References

1. Word Health Organization. WHO recommendations for induction of labour. Geneva, 2011.

2. Chen W, Xue J, Peprah MK, Wen SW, Walker M, Gao Y, Tang Y. A systematic review and network meta-analysis comparing the use of Foley catheters, misoprostol, and dinoprostone for cervical ripening in the induction of labour. BJOG. 2016 Feb;123(3):346-54.  
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4. [Levine LD](#), [Downes KL](#), [Elovitz MA](#), [Parry S](#), [Sammel MD](#), Srinivas SK. Mechanical and Pharmacologic Methods of Labor Induction: A Randomized Controlled Trial. Obstet Gynecol. 2016 Dec;128(6):1357-1364.
5. Al-Ibraheemi Z, Brustman L, Bimson BE, Porat N, Rosenn B. Misoprostol With Foley Bulb Compared With Misoprostol Alone for Cervical Ripening: A Randomized Controlled Trial. Obstet Gynecol. 2018 Jan;131(1):23-29.

# **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 active phase of labour, with arrest for more than 4 hours, due to inadequate uterine contractions. 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 an unscarred 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 indication.

## **7.4.4 Situations requiring special precautions**

- Prior single low transverse caesarean section.
- Grand multiparity (5 deliveries or more).
- Overdistended uterus.

These factors increase the risk of uterine rupture. Oxytocin may be used provided the following precautions are respected:

1. maximum infusion rate of 30 drops/minute for 5 IU in 500 ml (i.e. 15 milli-units per minute);
2. assess maternal and foetal status before every dosage increase;
3. interval of at least 30 minutes between dose increases;
4. do not increase dosage (possibly even decrease dosage) if satisfactory uterine contractions and progress of cervical dilation.

## **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 the event 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	Before administration	Technique	Monitoring during administration
<b>During labour</b>			
Labour induction	<ul style="list-style-type: none"> <li>On vaginal exam, assess cervical dilation and effacement, and engagement (Bishop score <math>\geq 6</math>, <a href="#">Table 7.1</a>).</li> <li>Verify the absence of foetal distress.</li> </ul>	<ul style="list-style-type: none"> <li>Dilute 5 IU in 500 ml or 10 IU in 1 litre of Ringer lactate or 0.9% sodium chloride to obtain a solution of 10 milliunits per ml.</li> <li>Start at 5 drops/minute, then increase by 5 drops/minute every 30 minutes, until contractions are effective (3 to 4 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.</li> <li>Once the neonate has delivered: use the existing IV line to administer the appropriate dose of oxytocin for prevention of postpartum haemorrhage; let the current infusion finish.</li> </ul>	<ul style="list-style-type: none"> <li>Appearance and quality of contractions, uterine relaxation.</li> <li>Foetal heart rate.</li> <li>General condition of the mother.</li> <li>Cervical dilation.</li> </ul> <p>Rupture the membranes as soon as possible. If the woman has not gone into labour after 12 hours: stop the infusion and consider caesarean section.</p>
Correction of dynamic dystocia	<ul style="list-style-type: none"> <li>Cervix at least 5 cm on vaginal exam.</li> <li>Spontaneous or artificial rupture of membranes.</li> <li>No foeto-pelvic disproportion.</li> </ul>	As for labour induction.	<ul style="list-style-type: none"> <li>Resumption or augmentation of contractions, uterine relaxation.</li> <li>Foetal heart rate.</li> <li>General condition of the mother.</li> </ul>

			<ul style="list-style-type: none"> <li>• Cervical dilation.</li> </ul>
No contractions 15 minutes after the birth of first twin	Verify that presentation is vertical (not transverse).	<ul style="list-style-type: none"> <li>• Start or resume oxytocin infusion.</li> <li>• As for labour induction, but increase more rapidly: by 5 drops every 5 minutes.</li> </ul>	<ul style="list-style-type: none"> <li>• Resumption or augmentation of contractions, uterine relaxation.</li> <li>• Foetal heart rate.</li> </ul>

**Note: outside of labour, oxytocin is use as below**

Haemorrhage due to uterine atony	<ul style="list-style-type: none"> <li>• First, manually remove the placenta, if needed.</li> <li>• Routine uterine exploration.</li> </ul>	IV infusion over 2 hours of 20 IU in 1 litre of Ringer lactate or 0.9% sodium chloride (160 drops/minute). At the same time, give 5 to 10 IU by slow IV injection; repeat if necessary until the uterus becomes firm and contracted (max. 60 IU total dose).	<ul style="list-style-type: none"> <li>• Heart rate, blood pressure, blood loss.</li> <li>• Uterine retraction.</li> </ul>
After caesarean section		10 IU by slow IV injection after clamping the cord then IV infusion over 2 hours of 20 IU in 1 litre of Ringer lactate or 0.9% sodium chloride (160 drops/minute).	Uterine retraction.
Prevention of postpartum haemorrhage	Verify that there is no second twin.	5 to 10 IU by slow IV or IM injection, before or after the third stage, depending on staff expertise.	

# 7.5 Shoulder dystocia

Delivery cannot progress after the head is out, because the shoulders are impacted in the pelvis.

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 HELPER mnemonic is a useful tool for addressing this emergency<sup>[1]</sup>:

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 to 60 seconds 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 the whole hand behind the foetus' head and move it along his posterior arm up to his elbow (if the back of the foetus is toward the operator's right side, the left hand is used, if the back is toward the operator's left side, the right hand is used). Bend the arm and grasp the forearm or wrist and draw across the foetal chest to the vaginal opening. The delivery can then continue.

## 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 (difficult to perform deliberately).
- 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.

## **References**

1. 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>

# 7.6 Transverse lie and shoulder presentation

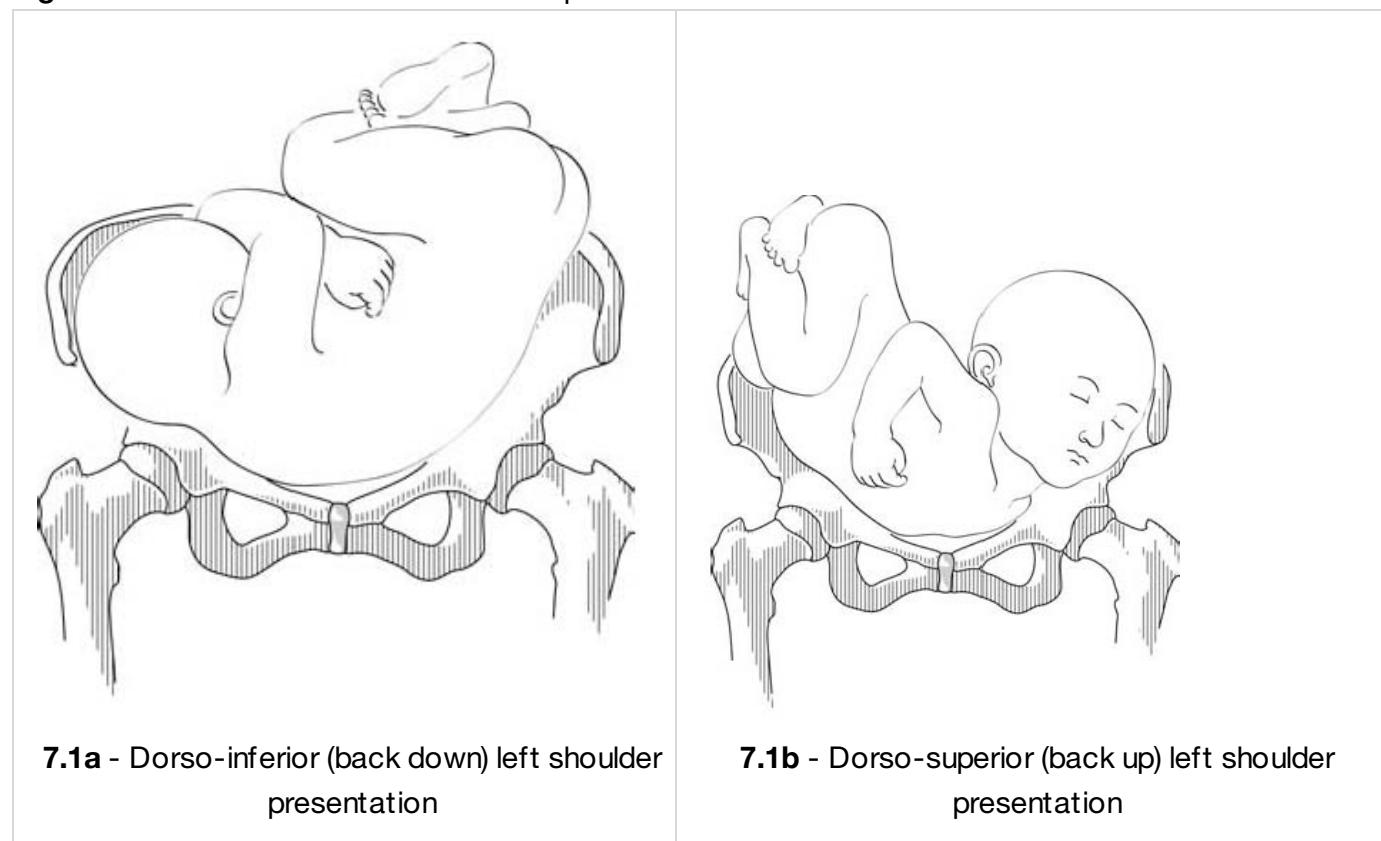
A transverse lie constitutes an absolute foeto-pelvic disproportion, and vaginal delivery is impossible.

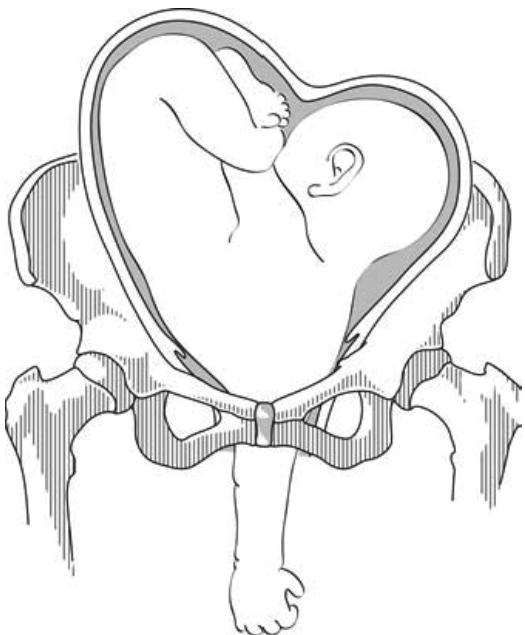
This is an obstetric emergency, because labour is obstructed and there is a risk of uterine rupture and foetal distress.

## 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).

**Figures 7.1 - Transverse lie and shoulder presentation**





7.1c - Neglected shoulder presentation

## 7.6.2 Possible causes

- Grand multiparity (5 deliveries or more)
- Uterine malformation
- Twin pregnancy
- Prematurity
- Placenta praevia
- Foeto-pelvic disproportion

## 7.6.3 Management

This diagnosis should be made before labour begins, at the last 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 6, [Section 6.4.1](#)).

#### 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 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, assess the foetal position and give a few minutes for the second twin to adopt a longitudinal lie. If

the second twin stays in a transverse lie, and depending on the experience of the operator, perform external version ([Section 7.7](#)) and/or internal version ([Section 7.8](#)) on the second twin.

## **During labour, in a CEmONC facility**

### **Foetus alive and membranes intact**

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

### **Foetus alive and 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 perform extraction, grasp a foot in the fundus (equivalent to a total breech extraction, but by caesarean section).

### **Foetus dead**

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

## **During labour, in remote settings where surgery is not available**

### **Foetus alive and membranes intact**

Try to refer the patient to a CEmONC facility. If not feasible:

- Attempt external version as early as possible.
- If this fails, wait for complete dilation.
- Perform an external version ([Section 7.7](#)) combined with an internal version ([Section 7.8](#)), possibly placing the woman in various positions (Trendelenburg or knee-chest).

### **Foetus alive and membranes ruptured**

Try to refer the patient to a CEmONC facility. If not feasible:

- 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.

### **Foetus dead**

Try to refer the patient, even if referral takes some time.

If not feasible, 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 or other obstacle to vaginal delivery (tumour, fibroid)
- Twin pregnancy (for the first twin)

### **Relative**

- Foetal distress
- Severe intrauterine growth restriction
- Prematurity
- Scarred uterus
- Untreated HIV infection

**Note:** in the event 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.

**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<sup>[1]</sup>.

## 7.8.2 Technique

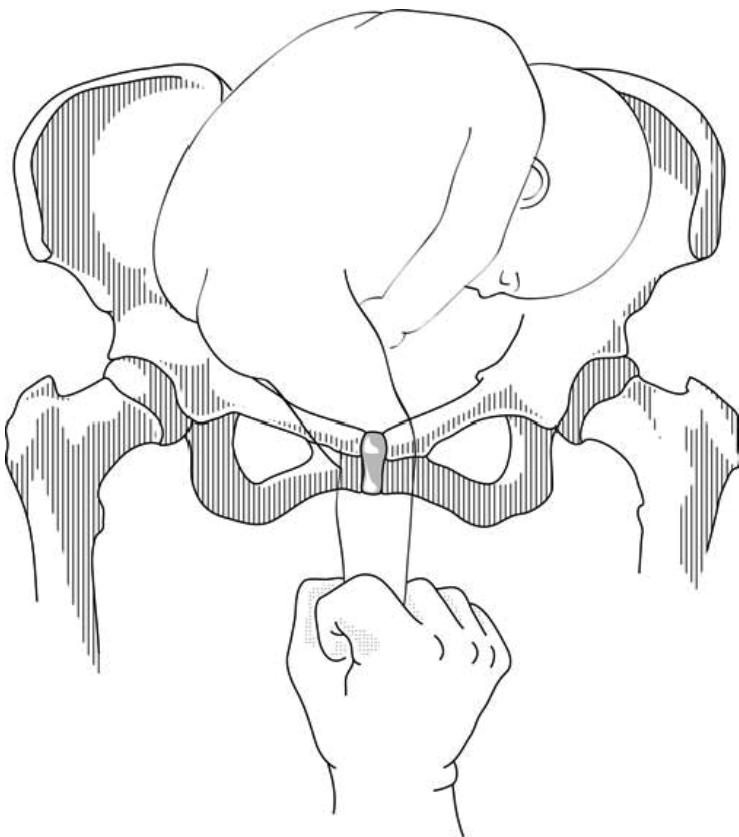
- Strict asepsis: swab perineum with 10% povidone iodine, wear sterile gloves.
- Perform spinal anaesthesia if possible.
- Insert the hand and determine the position of the foetus:
  - with the fingers in the form of a cone, go through the vaginal opening and the cervix toward the fundus;
  - hold the 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 normally as a breech delivery. For the second twin proceed with total breech extraction (Chapter 6, [Section 6.3](#)).
- 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 single dose)<sup>a</sup>.

**Figures 7.3 - Internal version**

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



**7.3b** - Bring the foot/feet down to the vaginal opening



## Footnotes

- (a) For patients with a history of immediate hypersensitivity reaction to penicillin (urticaria, respiratory problems or oedema): **clindamycin** IV 900 mg single dose + **gentamicin** IV 5 mg/kg single dose.

## **References**

1. J Rabinovici, G Barkai, B Reichman, D M Serr, S Mashiach. Internal podalic version with unruptured membranes for the second twin in transverse lie. *Obstetrics and Gynecology*; 1988; 71(3 Pt 1):428-30.

# 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

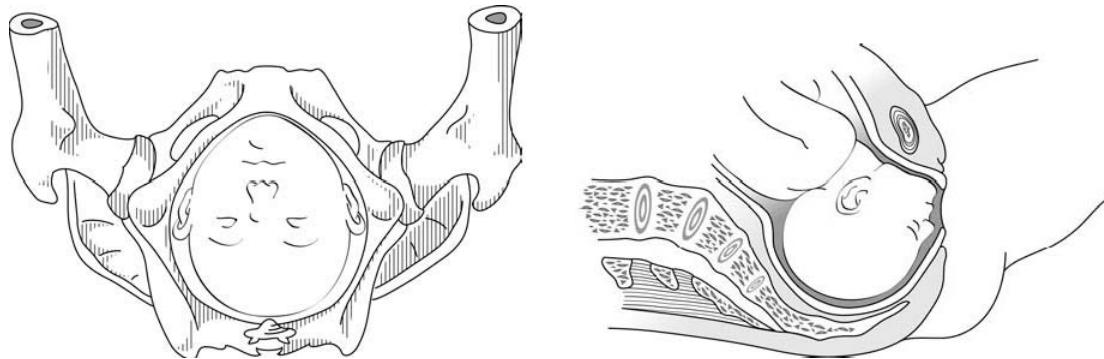
Vaginal delivery is possible. Labour may be slow, patience is required.

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 foetus.

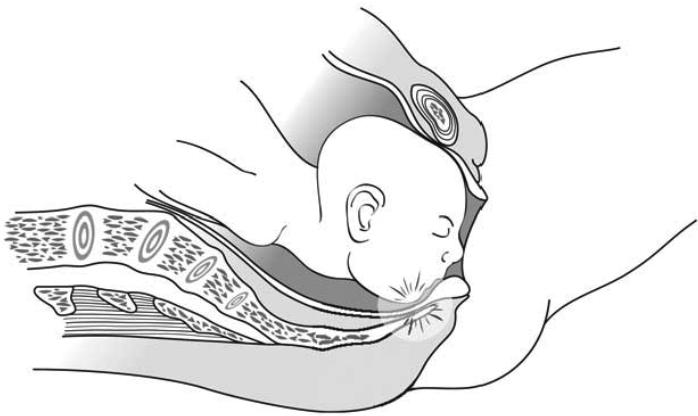
**Figures 7.4** - Chin anterior: delivery possible



### The chin is posterior

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

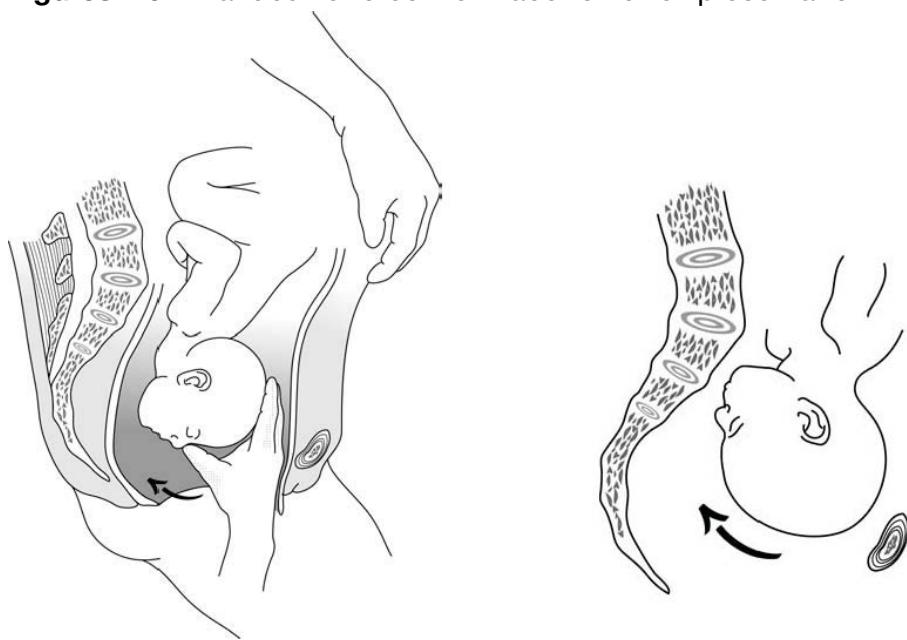
**Figure 7.5** - Chin posterior: impaction



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

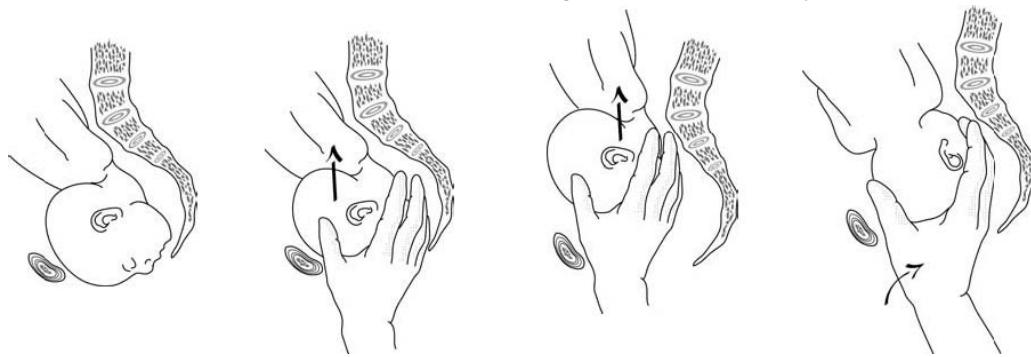
- Flex the head to obtain a vertex presentation: with one hand in the vagina, grasp the top of the skull and flex the neck, using the other hand, on the abdomen, to apply pressure to the foetal chest and buttocks. Obviously, the presenting part must not be engaged, and it is often hard—or impossible—to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

**Figures 7.6 - Manoeuvre to convert face to vertex presentation**



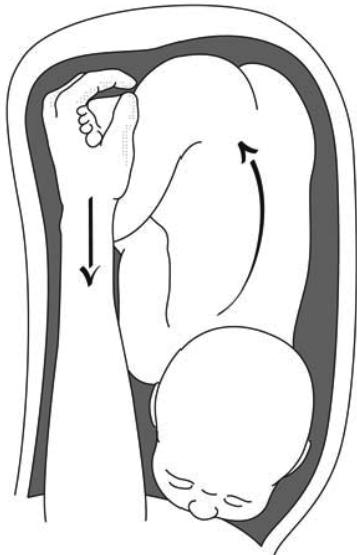
- Rotate the head to bring the chin anteriorly: push the face and chin back to free the shoulders from the pelvic inlet then, turn the head within the pelvic cavity, using a hand on the abdomen to help the rotation by applying pressure to the shoulders. In this way, the chin is brought to the front (Figures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

# 7.10 Brow presentation

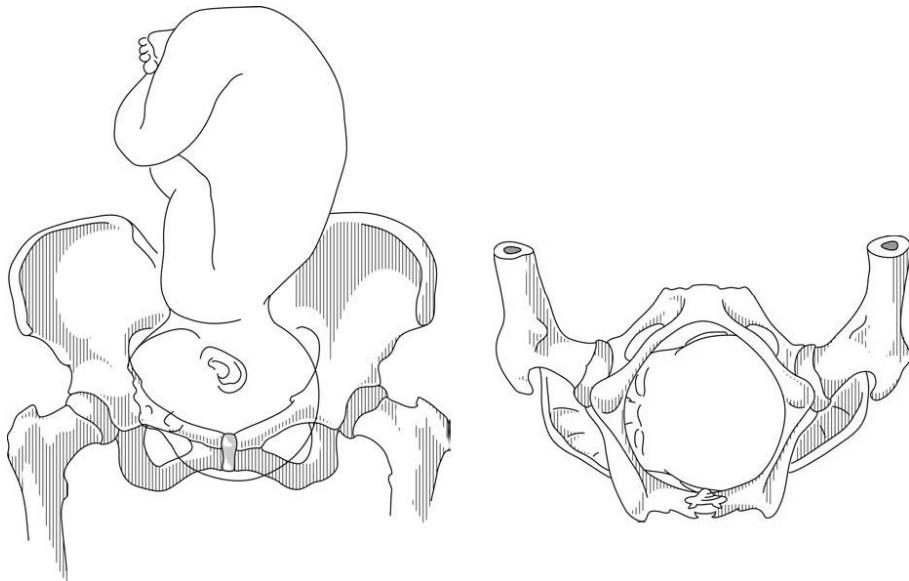
Brow presentation constitutes an absolute foeto-pelvic disproportion, and vaginal delivery is impossible (except with preterm birth or extremely low birth weight).

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.

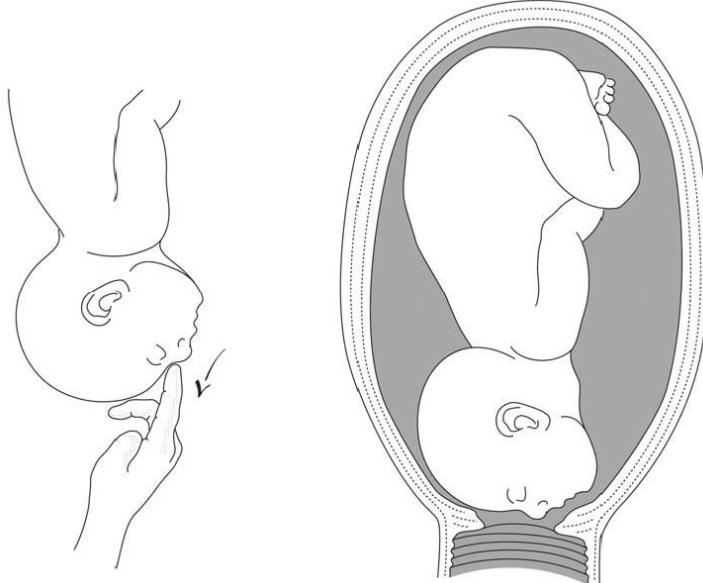
During delivery, the presenting part is slow to descend: the brow is becoming impacted.

## 7.10.2 Management

### Foetus 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 extension (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**



## Foetus dead

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

# **Chapter 8: Third stage of labour**

[8.1 Normal third stage of labour](#)

[8.2 Early postpartum haemorrhage](#)

[8.3 Late postpartum haemorrhage](#)

[8.4 Uterine inversion](#)

[8.5 Cervical and vaginal tears](#)

# **8.1 Normal third stage of labour**

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

There is a significant risk of haemorrhage during this stage. All patients require close monitoring and routine prevention of postpartum haemorrhage (PPH).

## **8.1.1 Description**

This stage usually lasts 5 to 15 minutes.

- After the infant is delivered, there is a rest period without contractions that lasts, on average, 10 minutes. Use this time to take care of the neonate. Watch the mother carefully, however, for signs of PPH, 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.

In the absence of PPH, 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](#)).

## **8.1.2 Routine prevention of postpartum haemorrhage**

### **Active management of third stage of labour**

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.

After the birth, palpate the mother's abdomen to be sure she is not carrying twins. Administration of 5 or 10 IU **oxytocin** slow IV or IM immediately after the birth (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 PPH.

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). 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 risk of bleeding and infection.

When oxytocin is used prior to placental delivery, 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 birth 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.

## **Administration of oxytocin after placental delivery**

If oxytocin has not been given prior to placental delivery, it should be administered after the placenta has been completely delivered. However, this is less effective in preventing PPH.

**oxytocin slow IV or IM: 5 or 10 IU**

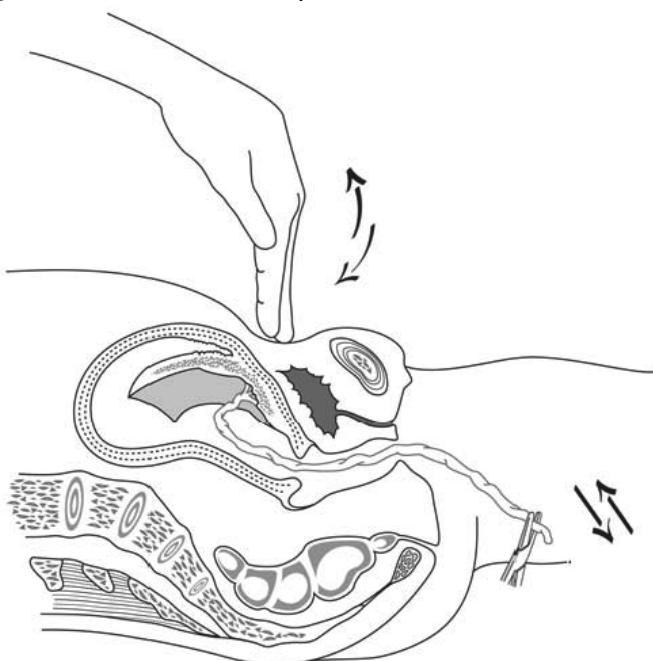
Uterine exploration to remove any placental fragments will be more difficult after injecting oxytocin. Be sure that the placenta is complete before administering oxytocin.

In addition, massage the uterus to help uterine retraction.

### **8.1.3 Monitoring**

- Heart rate, blood pressure, the amount of blood loss, while waiting for the placenta to deliver and after placental expulsion (every 15 minutes for the first hour, then every 30 minutes for the next hour) as the risk of PPH persists.
- Placental separation: press 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). 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.
- The uterus retracts and remains retracted.

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



## **8.1.4 Examination of the placenta**

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.

# 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.

Close delivery room monitoring is crucial for 2 hours post-partum, in order to rapidly identify and treat postpartum haemorrhage (PPH).

Blood loss is often underestimated (up to 50%).

Delay in treatment can lead to coagulation disorders, with a risk of massive, diffuse bleeding.

The four main causes of PPH are:

- Uterine atony (70% of cases): the placenta has been expelled, but the uterus fails to retract. The uterus gets larger, extends, and becomes soft. Factors for uterine atony include: overstretching (polyhydramnios, multiple pregnancy, foetal macrosomia), prolonged labour and infection (chorioamnionitis). It can be the cause or an aggravating factor of the PPH.
- Obstetric trauma (20% of cases): uterine rupture, particularly in case of vaginal delivery in women with a scarred uterus but also in women without uterine scarring; cervical and vaginal lacerations; uterine inversion.
- Retained placenta (10% of cases): the entire placenta or a fragment of the placenta remains in the uterus.
- Coagulation disorders (< 1% of cases): see Chapter 3, [Section 3.2.2](#).

## 8.2.1 Management during the first 30 minutes

- Ask for help as resuscitation measures and obstetric management must be performed in parallel.
- Record in a chart: results of the initial evaluation, monitoring and actions, indicating the times.

**Table 8.1** - Initial management

Resuscitation	Initial obstetric management
<ul style="list-style-type: none"> <li>• Lay the patient flat.</li> <li>• Monitor: blood pressure (BP), heart rate, consciousness, respiratory rate, SpO<sub>2</sub> (if available).</li> </ul> <p>Objectives: systolic BP ≥ 90 mmHg, SpO<sub>2</sub> ≥ 95%, normal level of consciousness, urine output ≥ 30 ml/hour.</p> <ul style="list-style-type: none"> <li>• If systolic BP &lt; 90 mmHg, elevate the legs (keep, or replace, the patient's feet in the delivery table stirrups).</li> <li>• Insert 2 IV lines (catheter 16-18G).</li> <li>• Fluid replacement: Ringer lactate or 0.9% sodium chloride (1 litre in 15 minutes to be repeated as required).</li> <li>• Add 1 g of <b>tranexamic acid</b> (in patient &lt; 15 years, 15 mg/kg, max. 1 g) in the first litre used for fluid resuscitation.</li> <li>• Oxygen (15 litres/minute).</li> <li>• Determine the patient's blood type, select potential donors or make sure that blood is available<sup>(a)</sup>.</li> <li>• Measure haemoglobin level (HemoCue).</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate and monitor blood loss.</li> <li>• Remove the placenta manually if it has not yet delivered.</li> <li>• Perform uterine massage to expel any clots and aid uterine contraction (to be repeated every 15 minutes for the first 2 hours after PPH).</li> <li>• Insert a Foley catheter: keeping bladder empty facilitates uterine retraction.</li> <li>• Perform uterine exploration to remove any blood clots or placental fragments and check for absence of uterine rupture.</li> <li>• Administer <b>oxytocin</b> to correct potential uterine atony or ensure uterine retraction: 5 to 10 IU by slow IV then, start an IV infusion with 20 IU in 1 litre of Ringer lactate or 0.9% sodium chloride, administered over 2 hours (160 drops/minute).</li> <li>• Inspect the birth canal, check for injury to the cervix or vagina using retractors.</li> <li>• If bleeding persists 15 minutes after initiating oxytocin and only if uterine atony is suspected, administer: <b>misoprostol</b> sublingually<sup>(b)</sup> : 800 micrograms<sup>[1]</sup> and/or <b>methylergometrine</b> IM: 0.2 mg</li> </ul>

(a) If transfusion is performed, the blood must have been tested (HIV-1, HIV-2, hepatitis B, hepatitis C and syphilis, and malaria in endemic areas).

(b) If the sublingual route is not feasible, administer the same dose rectally.

## 8.2.2 Management of persistent haemorrhage

**Table 8.2** - Management after the first 30 minutes

Resuscitation	Further obstetric management
<ul style="list-style-type: none"> <li>• Continue fluid replacement.</li> <li>• Administer a second dose of <b>tranexamic acid</b> 30 minutes after the first dose: 1 g (15 mg/kg in patient &lt; 15 years, 1 g max.) in a bag of 100 ml of 0.9% sodium chloride administered over 15 minutes. Do not administer further tranexamic acid.</li> <li>• Administer blood transfusion in dedicated vein if: <ul style="list-style-type: none"> <li>▫ massive haemorrhage (&gt; 1500 ml), or</li> <li>▫ haemodynamic instability, or</li> <li>▫ coagulation disorders, or</li> <li>▫ haemoglobin ≤ 7 g/dl</li> </ul> </li> <li>• Transfuse fresh whole blood or packed red blood cells or whole blood + fresh frozen plasma in the event of massive haemorrhage and/or coagulation disorders.</li> </ul>	<ul style="list-style-type: none"> <li>• In the event of persistent atony: insert an intrauterine balloon<sup>(c)</sup>.</li> <li>• Additional measures if necessary (<a href="#">Section 8.2.3</a>).</li> <li>• If bleeding continues, perform the following: <ul style="list-style-type: none"> <li>▫ Conservative surgical treatment: <ul style="list-style-type: none"> <li>▷ Stepwise ligation of the uterine blood supply (round ligaments, utero-ovarian arteries, uterine arteries);</li> <li>▷ Uterine compression suture (B-Lynch or other type suture)<sup>a</sup></li> </ul> </li> <li>▫ Radical surgical treatment: hysterectomy with adnexal preservation. Subtotal hysterectomy is preferable, as it limits the operative time.</li> </ul> </li> </ul>

(c) If an intrauterine balloon is inserted in a BEmONC facility, it is imperative to transfer the patient to a CEmONC facility in order to have surgical resources on hand should they be necessary.

## 8.2.3 Management of immediate massive haemorrhage

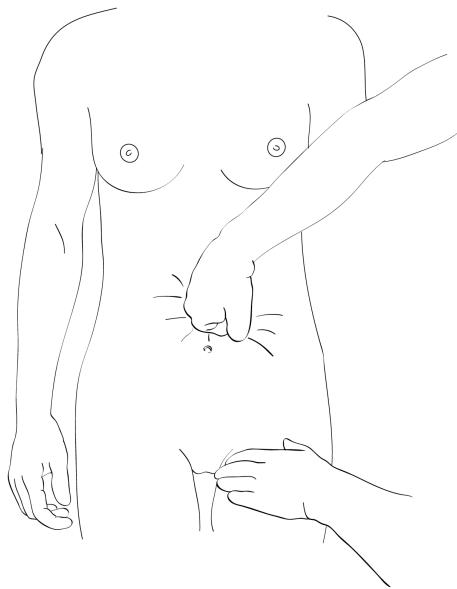
In the event of 150 ml of blood loss per minute or shock:

- Perform initial management as quickly as possible and do not wait 30 minutes to perform further obstetric management (intrauterine balloon tamponade, surgical procedures).
- Start transfusion as quickly as possible.
- If necessary, perform one of the additional compression measures below.

### Aortic compression

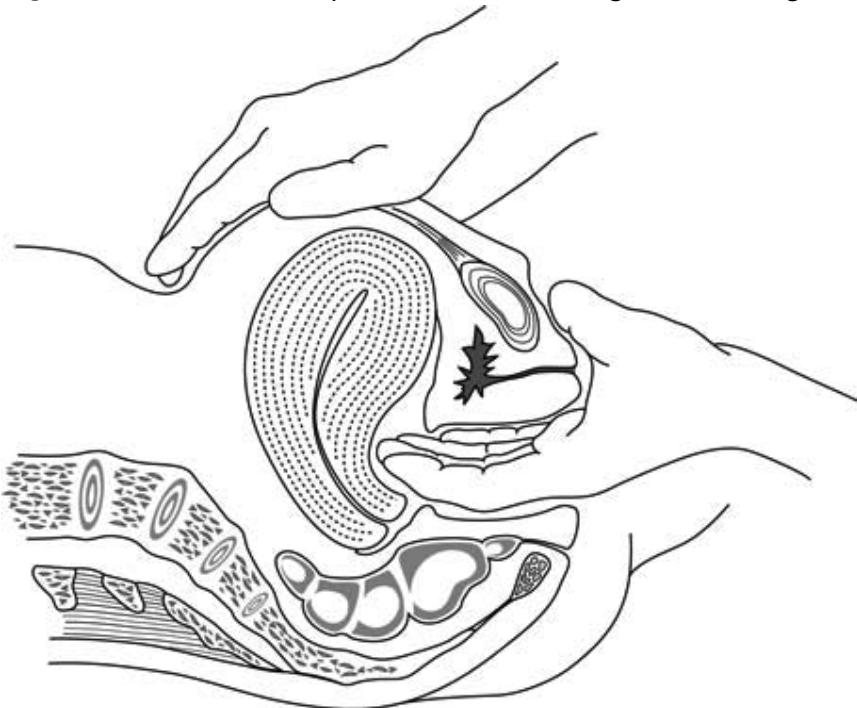
Apply pressure to the abdominal aorta (just above the umbilicus) until the femoral pulse is no longer palpable, for example, the time it takes to insert an intrauterine balloon or start laparotomy (Figure 8.2).

**Figure 8.2 - Aortic compression**

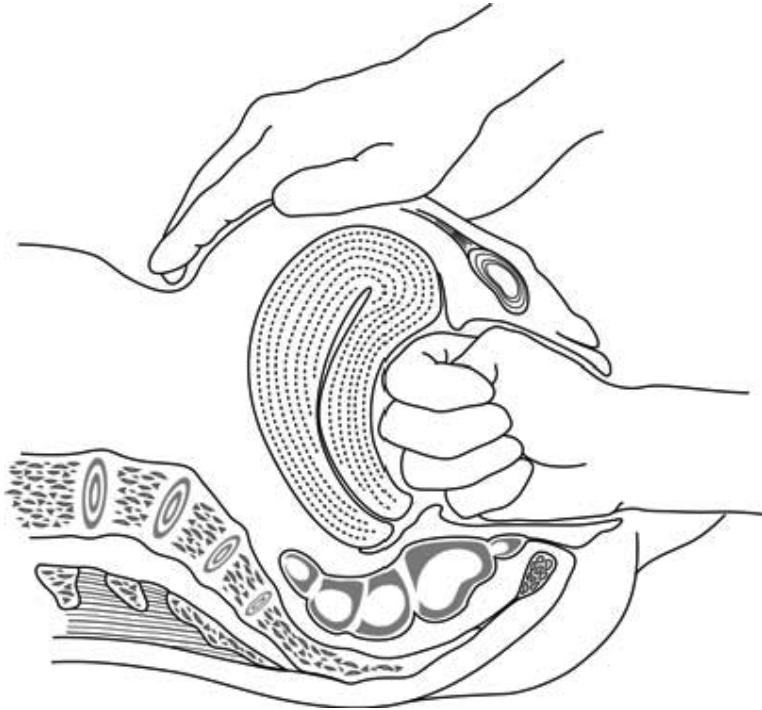


**Bimanual uterine compression (Figure 8.3 and Figure 8.4).**

**Figure 8.3 - Uterine compression between fingers in the vagina and a hand on the abdomen**



**Figure 8.4 - Uterine compression between the fist and a hand on the abdomen**



## 8.2.4 Cause-specific management

If the following causes are identified, additional specific management is required.

### Obstetric trauma

- 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 (Chapter 9, [Section 9.1.2](#)).
- 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

- 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.
- Coagulation disorders may be the cause and the result of PPH. Active management of PPH reduces the risk of secondary coagulation disorders.

## Footnotes

- (a) For more information on B-Lynch suture: A Comprehensive Textbook of Postpartum Hemorrhage 2<sup>nd</sup> 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](http://www.glowm.com/pdf/PPH_2nd_edn_Chap-51.pdf)

## References

1. World Health Organization. WHO recommendations for the prevention and treatment of postpartum haemorrhage. Geneva, 2012.  
[http://apps.who.int/iris/bitstream/10665/75411/1/9789241548502\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/75411/1/9789241548502_eng.pdf)

# 8.3 Late postpartum haemorrhage

Excessive vaginal bleeding from 24 hours to 6 weeks after delivery.

## 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 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 an antibiotic therapy:

**amoxicillin/clavulanic acid** IV (dose expressed in amoxicillin): 1 g every 8 hours + **gentamicin** IM: 5 mg/kg once daily

or

**ampicillin** IV: 2 g every 8 hours + **metronidazole** IV: 500 mg every 8 hours + **gentamicin** IM: 5 mg/kg once daily

Continue until the fever disappears (at least for 48 hours), then change to:

**amoxicillin/clavulanic acid** PO (dose expressed in amoxicillin) to complete 5 days of treatment

Ratio 8:1: 3000 mg daily (2 tablets of 500/62.5 mg 3 times daily)

Ratio 7:1: 2625 mg daily (1 tablet of 875/125 mg 3 times daily)

or

**amoxicillin** PO: 1 g 3 times daily + **metronidazole** PO: 500 mg 3 times daily, 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).

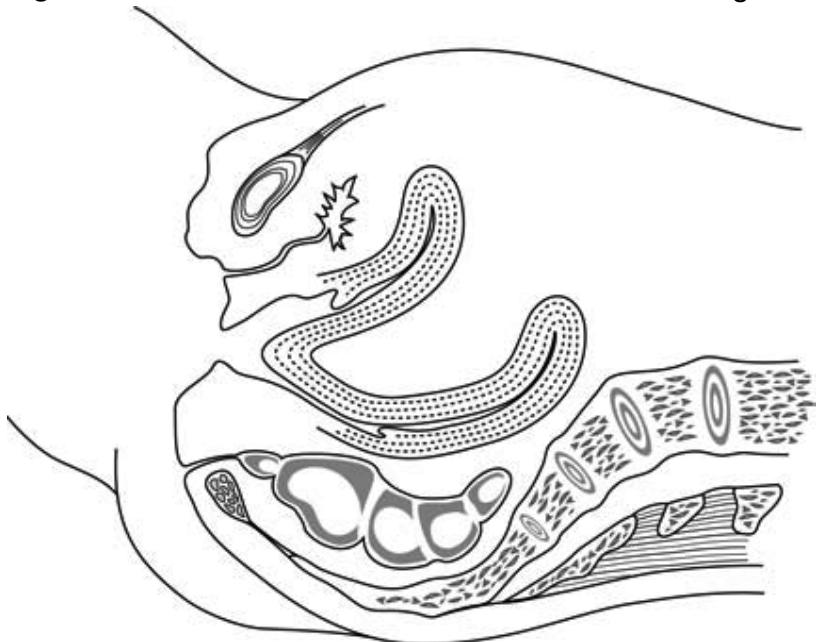
# 8.4 Uterine inversion

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

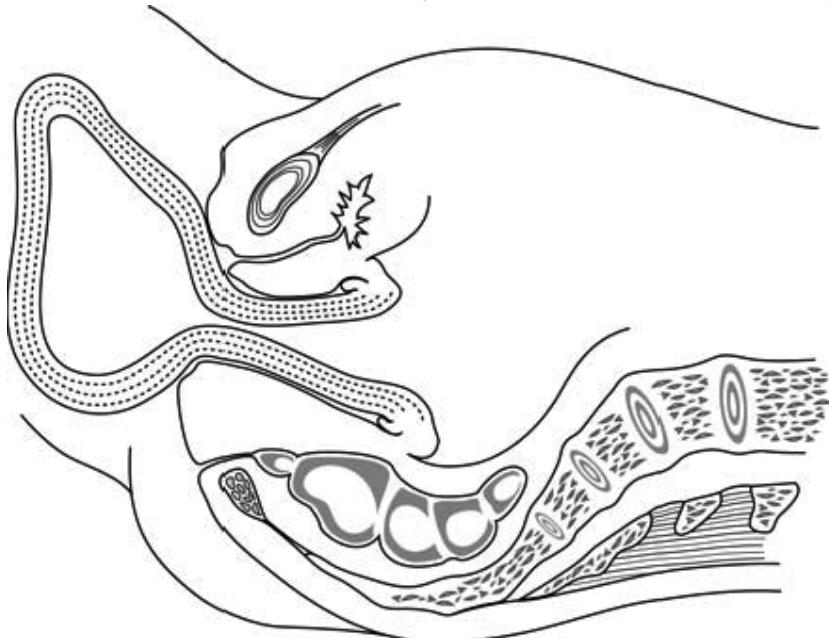
## 8.4.1 Diagnosis

- Usually, intense pelvic pain with feeling of “something coming down” and haemorrhage of variable severity, quickly followed by 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).

**Figure 8.5 -** The inverted uterus does not reach the vaginal opening



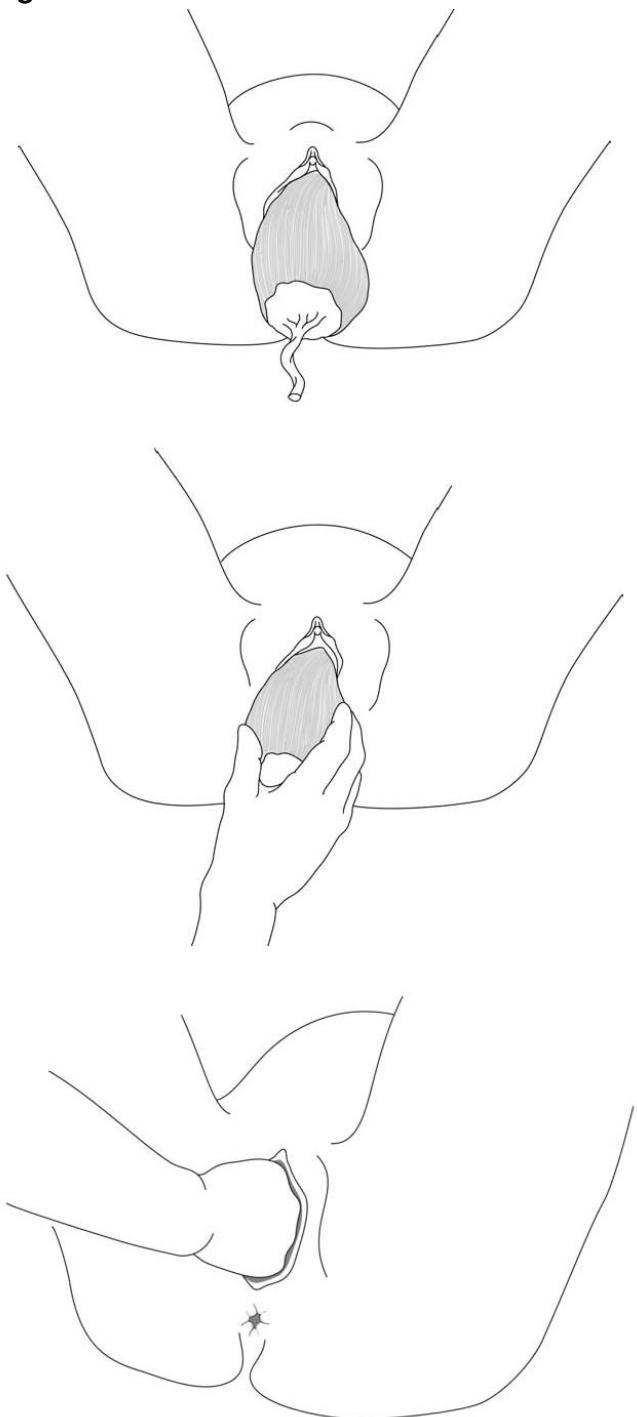
**Figure 8.6** - The uterus is totally inverted and protrudes through the vaginal opening



## 8.4.2 Management

- Treat the shock and the haemorrhage immediately: see Resuscitation, [Table 8.1](#). Blood transfusion in the event of immediate massive haemorrhage.
- Administer tranexamic acid IV ([Section 8.2.1](#)) in the event of massive haemorrhage or if bleeding persists after 15 minutes of initial management.
- 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% povidone 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.
- Give routine antibiotic prophylaxis (Chapter 9, [Section 9.1.2](#)).
- 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).

**Figure 8.7 - Manual reduction of the inverted uterus**



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.

# 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

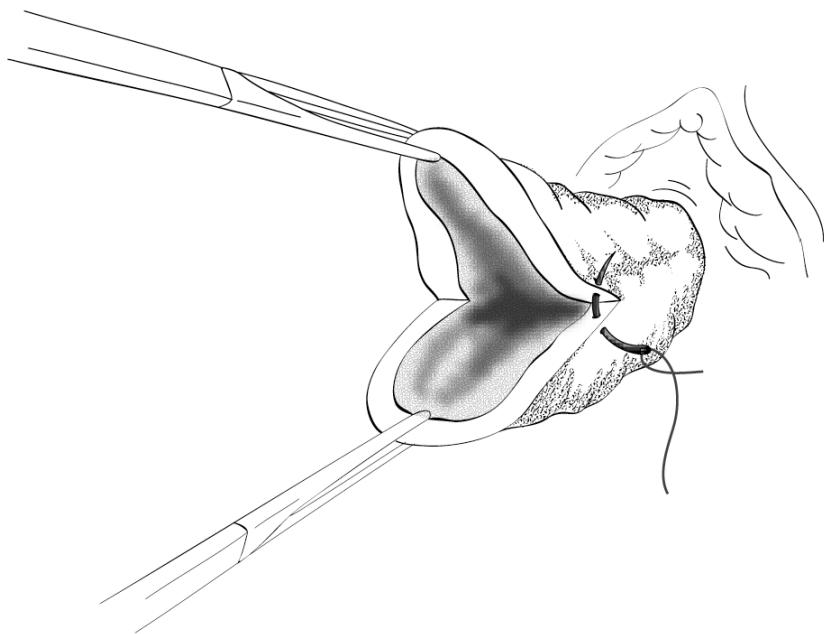
Suspect a tear in cases of postpartum haemorrhage where there is good uterine retraction and uterine rupture has been ruled out.

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.
- In the event of blood loss > 500 ml, see [Section 8.2](#).
- If possible, perform spinal or general 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% povidone 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.
  - Larger cervical tear, heavy bleeding: a few Dec 3 (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**



# **Chapter 9: Intrauterine procedures**

[9.1 Precautions required for intrauterine procedures](#)

[9.2 Manual removal of the placenta](#)

[9.3 Uterine exploration](#)

[9.4 Digital curettage](#)

[9.5 Manual vacuum aspiration \(MVA\)](#)

[9.6 Instrumental curettage](#)

[9.7 Embryotomy](#)

# **9.1 Precautions required for intrauterine procedures**

There are 2 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 povidone iodine scrub (or, if not available, ordinary soap). Rinse and dry. Then, swab the vulva and perineum with 10% povidone iodine solution.
- Use sterile drapes, sterile compresses and sterile gloves (sterile gynaecological 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 performed 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 blood-borne pathogen infection.

Personal protective equipment is essential (gloves, gown, rubber or plastic 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<sup>a</sup> : 2 g single dose

AND

- A uterotonic agent (right after the procedure) to improve uterine contraction:  
**oxytocin** IM or slow IV: 5 to 10 IU single dose

## Footnotes

- (a) For patients with a history of immediate hypersensitivity reaction to penicillin (urticaria, respiratory problems or oedema): **clindamycin** IV 900 mg single dose + **gentamicin** IV 5 mg/kg single dose.

# 9.2 Manual removal of the placenta

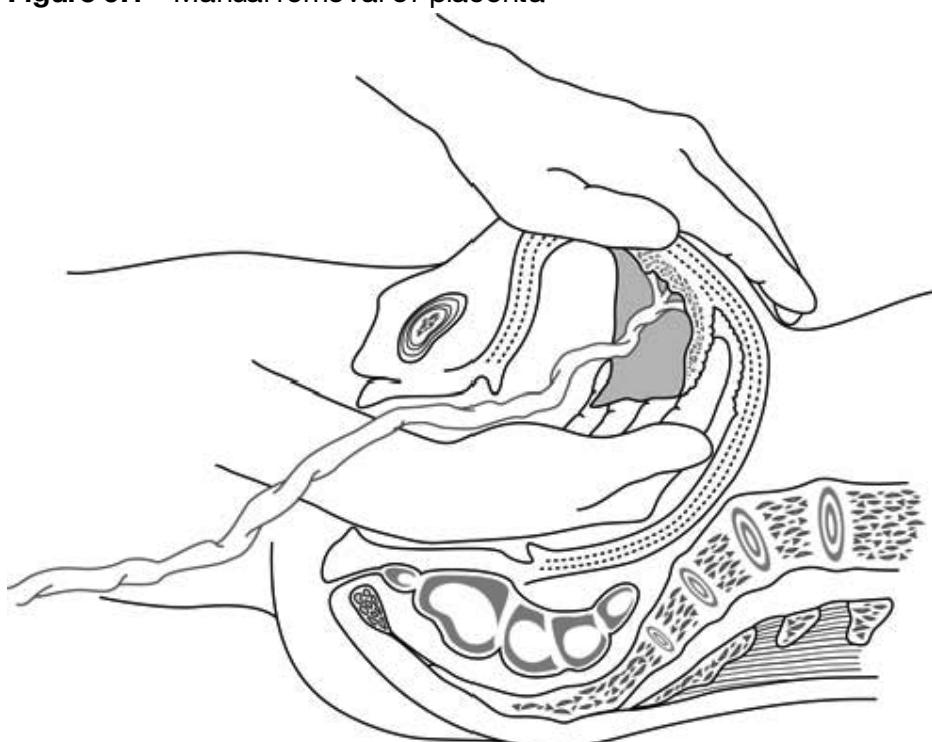
Evacuation of the placenta from the uterus by hand.

## 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** - Manual removal of placenta



- 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 into the uterus, supinated, 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 supinated 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.

# **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 contraction and, hence, haemostasis.

## **9.3.1 Indications**

- Suspected uterine rupture.
- Suspected retained products after examination of the 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](#)).
- Routine 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

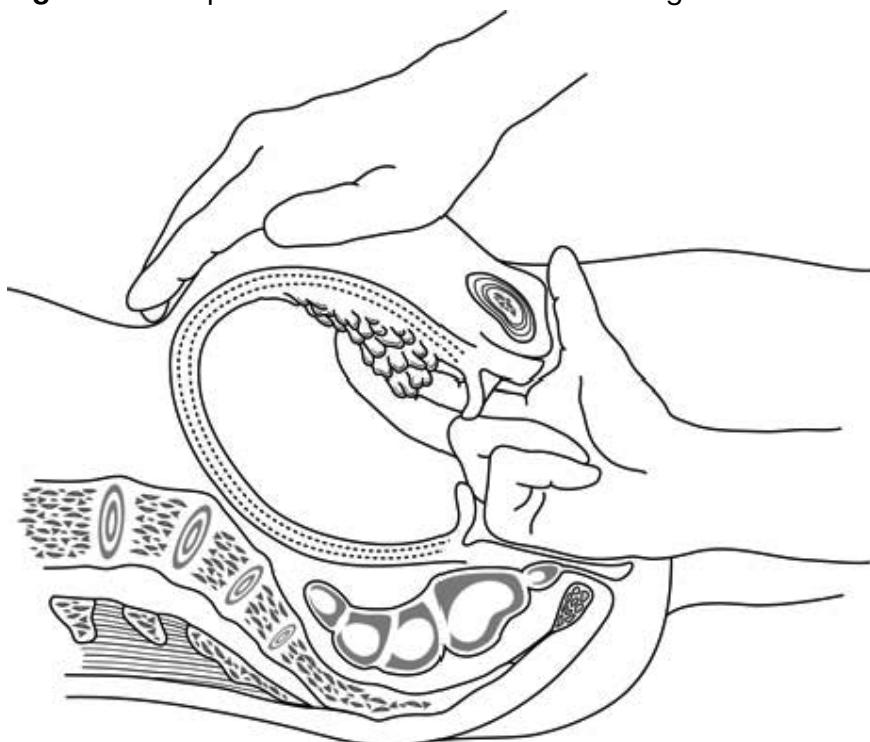
Use of finger(s) to remove placental fragments or blood clots detected late after an abortion or delivery, when insufficient cervical dilation renders uterine exploration impossible (however the cervix must be sufficiently open to allow insertion of one finger, two if possible).

## 9.4.1 Indication

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

## 9.4.2 Technique

**Figure 9.2** - Exploration of the uterus with two fingers



- 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.

# 9.5 Manual vacuum aspiration (MVA)

Evacuation of the uterine contents using suction.

## 9.5.1 Indications

- Incomplete abortion before 13 weeks LMP
- Molar pregnancy
- Termination of pregnancy before 13 weeks LMP (see [Chapter 12](#))

**Note:** beyond 13 weeks LMP, MVA is ineffective, except in case of molar pregnancy.

## 9.5.2 Precautions

- Purulent cervicitis and pelvic infection: start antibiotics before performing 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:
  - 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, tenaculum
  - 1 Collin vaginal speculum
  - 1 uterine sound
  - 1 Cheron dressing forceps
  - 1 100-ml gallipot
  - 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
  - povidone iodine scrub solution or, if not available, ordinary soap
  - 10% povidone iodine dermal solution
  - sterile compresses and gloves
  - absorbent pad to place under the patient's buttocks
  - 1 bright light

- 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 MVA (increased risk of uterine perforation). For antibiotic therapy, see [Section 9.6.6](#).

#### Cervical ripening

- The cervix is open: no cervical ripening with misoprostol.
- The cervix is closed: **misoprostol** 400 micrograms single dose, sublingually 1 to 3 hours before the procedure or vaginally into the posterior fornix, 3 hours before the procedure <sup>[1]</sup> to open the cervix and prevent traumatic cervical dilation.

#### Antibiotic prophylaxis

One hour before the procedure: **doxycycline** PO 200 mg single dose or **azithromycin** PO 1 g single dose

#### Oral premedication

- One hour before the procedure: **ibuprofen** PO 800 mg single dose
- Only in the event of excessive anxiety: **diazepam** PO 10 mg single dose

**Note:** in case 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 and anaesthetist available), perform the procedure under IV conscious sedation or general anaesthesia;
- If IV conscious sedation or general anaesthesia is not feasible, replace the oral premedication with **diclofenac** IM: 75 mg

### 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

- Prepare the local anaesthetic: draw up 20 ml of 1% lidocaine.
- Insert the speculum; apply 10% povidone iodine solution on the cervix and vagina.

- 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 4 injections, 3 to 5 ml each, at 4 sites around the cervix (2, 5, 7 and 10 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 loss of resistance may be felt: this indicates that there is no need to advance the dilator any further. This loss of 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

- Maintain traction on the cervix with one hand by holding the Pozzi forceps.
- 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; then pull back 1 cm.
- Attach the prepared (i.e. under vacuum) sterile syringe to the cannula.
- 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 lose 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 a grating sensation is felt or the uterus contracts 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 millibars.

## 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.

Routine ultrasound to confirm complete uterine evacuation is not recommended.

## 9.5.5 Patient follow-up

- Do not administer an uterotonic routinely, except in the event of molar pregnancy.
- After the procedure, mild bleeding continues without clots. Monitor vital signs and blood loss for at least 2 hours. Settle the patient comfortably during monitoring period.
- Pain is usually moderate, and relieved by paracetamol and/or ibuprofen ([Appendix 7](#)).
- Check and update tetanus vaccination if unsafe abortion is suspected (Chapter 2, [Section 2.1.3](#)).
- The patient can go home if the vital signs are stable, she can walk, and she has been given the following information:
  - cramps will continue for a few days (give an analgesic);
  - bleeding will last for 8 to 10 days;
  - menstrual periods will resume within 4 to 8 weeks;
  - she will be fertile again within 8 to 10 days (offer contraception, Chapter 11, [Section 11.5](#));
  - advice on hygiene; no vaginal douches;
  - signs and symptoms requiring consultation: prolonged bleeding (more than 2 weeks), bleeding heavier than normal menstrual periods, severe pain, fever, chills, malaise, fainting.

## 9.5.6 Complications

- Incomplete evacuation of the uterus due to the use of a cannula 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.

For more information on MVA: Performing Uterine Evacuation with the Ipas MVA Plus®Aspirator and Ipas EasyGrip®Cannulae: Instructional Booklet (second edition, 2007).

<https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.194.935&rep=rep1&type=pdf>

## References

1. Ipas. (2018). Clinical Updates in Reproductive Health. L. Castleman & N. Kapp (Eds.). Chapel Hill, NC: Ipas.  
<https://ipas.azureedge.net/files/CURHE18-march-ClinicalUpdatesinReproductiveHealth.pdf>

# **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 13 weeks LMP: MVA is not available or is not effective;
  - After 13 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.
  - 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**

The procedure should be performed in a CEmONC facility.

## **9.6.3 Equipment**

- Curettage set:
  - 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, tenaculum
  - 1 Collin vaginal speculum
  - 1 uterine sound
  - 1 Cheron dressing forceps
  - 1 100-ml gallipot
  - 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 the event of incomplete second trimester abortion or after childbirth: antibiotic prophylaxis (**cefazolin** or **ampicillin** slow IV<sup>a</sup>: 2 g single dose).
- Cervix preparation: as for manual vacuum aspiration ([Section 9.5.4](#)).

## General or spinal anaesthesia

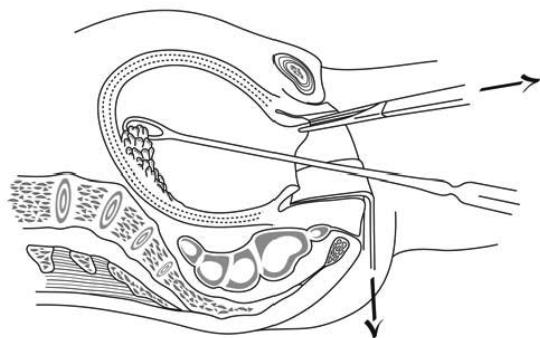
If not available, use premedication + paracervical block, as for manual vacuum aspiration ([Section 9.5.4](#)).

## Dilation

As for manual vacuum aspiration ([Section 9.5.4](#)).

## Curettage

**Figure 9.3 - Curettage**



- 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.

## 9.6.5 Patient follow-up

## After abortion

Same follow-up and advice as after MVA ([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 5 to 10 IU **oxytocin** slow IV.
- Vaginal or cervical lacerations (common with unsafe abortions): suture if necessary.

### Perforation of the uterus

- Perforation by dilators or curettes: bleeding, instrument goes in too far, pain.
- The treatment is rest plus antibiotics for 5 days:  
**amoxicillin/clavulanic acid** PO (dose expressed in amoxicillin):  
Ratio 8:1: 3000 mg daily (2 tablets of 500/62.5 mg 3 times daily)  
Ratio 7:1 ratio: 2625 mg daily (1 tablet of 875/125 mg 3 times daily)  
or  
**amoxicillin** PO: 1 g 3 times daily + **metronidazole** PO: 500 mg 3 times daily  
In the event of fever with foul smelling vaginal discharge, 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.
- 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.

### 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 pelvic infection, start antibiotic therapy:

**amoxicillin/clavulanic acid** IV (dose expressed in amoxicillin): 1 g every 8 hours + **gentamicin** IM: 5 mg/kg once daily

or

**ampicillin** IV: 2 g every 8 hours + **metronidazole** IV: 500 mg every 8 hours + **gentamicin** IM: 5 mg/kg once daily

Continue until the fever resolves (at least 48 hours), then change to:

**amoxicillin/clavulanic acid** PO (dose expressed in amoxicillin) to complete 5 days of treatment

Ratio 8:1: 3000 mg daily (2 tablets of 500/62.5 mg 3 times daily)

Ratio 7:1: 2625 mg daily (1 tablet of 875/125 mg 3 times daily)

or

**amoxicillin** PO: 1 g 3 times daily + **metronidazole** PO: 500 mg 3 times daily, to complete 5 days of treatment

In the event of perforation, treat for 10 days.

## Footnotes

- (a) In patients with a history of immediate hypersensitivity reaction to penicillin (urticaria, respiratory problems or oedema): **clindamycin** IV 900 mg single dose + **gentamicin** IV 5 mg/kg single dose.

# **9.7 Embryotomy**

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

There are several types of embryotomy:

- Craniotomy: a procedure in which a perforation is made in the foetal skull to reduce the volume of the foetal head which prevents delivery. It can be done on either an obstructed cephalic presentation or an entrapped aftercoming head in a breech.
- Cranioclasis: a procedure to crush the bones of the foetal skull. It is done if necessary after craniotomy in order to allow extraction of the foetal head.
- Decapitation: a procedure in which the foetus is decapitated to relieve impaction due to a transverse lie.
- Evisceration: a procedure in which an incision is made in the abdomen or thorax in the case of a mass or fluid collection (ascites) which is preventing delivery of the foetus.
- Cleidotomy: a procedure in which one or both clavicles are cut to reduce the biacromial diameter in case of a shoulder dystocia not resolved by other manoeuvres.

Embryotomy, especially as 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 the event 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 tones 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 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 of uterine rupture.
- Take time to explain to the mother and family the expected benefits (avoiding caesarean section) and potential complications (possible laparotomy if the event of embryotomy failure or uterine rupture). Obtain the patient's consent.
- 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 the event of obstructed labour, 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 or alive
- Uterine rupture
- Incomplete dilation

## 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



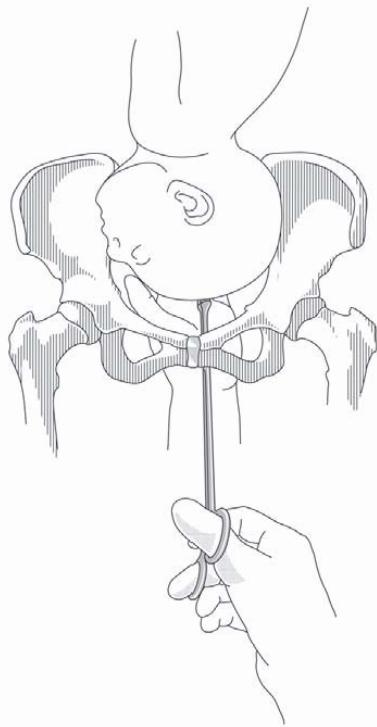
Figure 9.5  
Dubois scissors



Figure 9.6  
Braun cranioclast

## 9.7.4 Craniotomy for obstructed cephalic presentation

Figure 9.7 - Embryotomy with the Smellie perforator



- Have an assistant place both palms on the mother's abdomen to apply downward pressure on the foetal head toward the pelvis.
- Insert one hand, shaped like a channel, into the vagina, in contact with the foetal head.
- 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 foetal head. 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 cranioclastis.

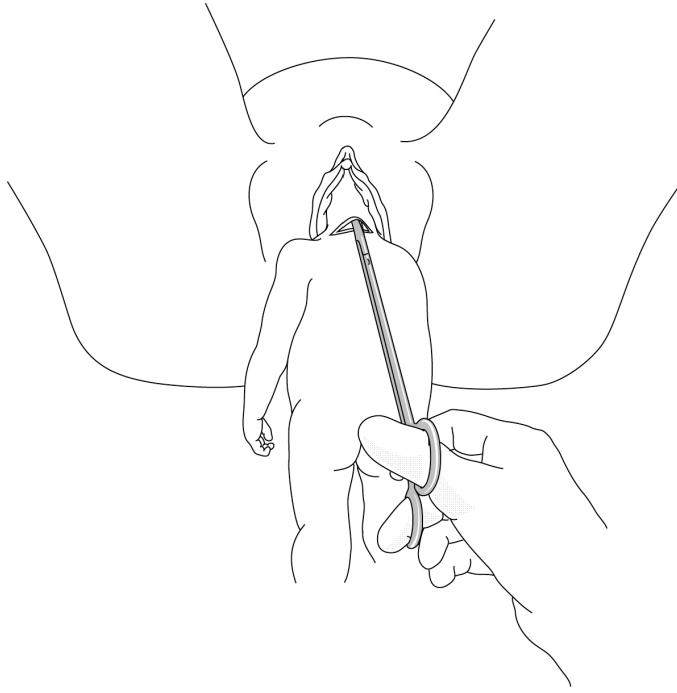
**Note:** if the foetus is hydrocephalic, perforation can be replaced by needle aspiration.

## 9.7.5 Cranioclastis

- Insert the cranioclast's solid jaw into the opening made by the perforator. The hollow jaw is placed beside the skull similar to the placement of obstetric forceps.
- Adjust the two jaws with the screw and extract the head in the most favourable orientation.

## 9.7.6 Craniotomy for entrapped aftercoming head in a breech

Figure 9.8 - Craniotomy for retention of the aftercoming head



- Have an assistant place both palms on the mother's abdomen to apply downward pressure on the foetal head 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.

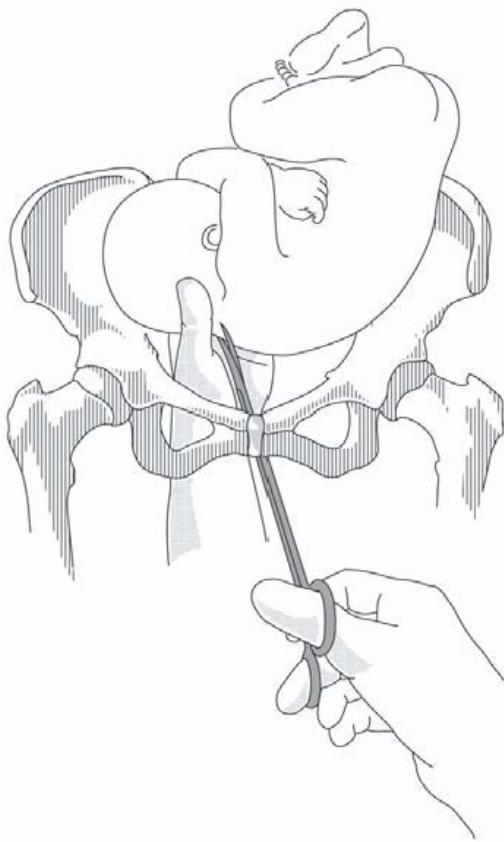
## 9.7.7 Decapitation for transverse lie

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.

**Figure 9.9** - Decapitation using scissors



- Determine the exact position of the foetus (position of the head and neck and which arm is prolapsed).
- In case of neglected shoulder presentation (Chapter 7, [Section 7.6.1](#)), 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.

## 9.7.8 Evisceration

- Initially, attempt to puncture the abdomen with a needle. This might be sufficient to reduce the foetal ascites to allow delivery.
- In case of failure (either insufficient fluid reduction or a solid mass), use scissors to incise, under vision, the abdominal wall and remove the organs.

## 9.7.9 Cleidotomy

It is difficult to cut one or both clavicles with Dubois scissors and there is a high risk of cutting maternal tissue. It should not be attempted unless all of the obstetrical manoeuvres described in Chapter 7, Section 7.5.1. have failed after several attempts.

For more information on destructive delivery, see: Primary Surgery: Non-Trauma v.1. 1990.

[https://storage.googleapis.com/global-help-publications/books/help\\_prymairsurgery.pdf](https://storage.googleapis.com/global-help-publications/books/help_prymairsurgery.pdf) [Accessed 12 December 2018]

# **Chapter 10: Newborn care in the maternity hospital**

[10.1 Routine care and examination](#)

[10.2 Neonatal resuscitation](#)

[10.3 Care of the sick newborn](#)

[10.4 Specific care when the mother has a transmissible infection](#)

[10.5 Care of the low birth weight neonates \(< 2500 g\)](#)

[10.6 Criteria for discharge from the maternity hospital](#)

# 10.1 Routine care and examination

## 10.1.1 In the first hours of life

 Anticipate the need for resuscitation at every birth. The necessary equipment should be ready at hand and ready for use.

### Initial assessment

At birth, dry thoroughly and rapidly assess the neonate's condition:

The neonate	
<ul style="list-style-type: none"><li>• Is not breathing spontaneously or has difficulty breathing</li><li>• Has poor muscle tone</li><li>• Has a heart rate less than or equal to 100 beats/minute</li><li>• Has persistent central cyanosis at 1 minute</li></ul>	<ul style="list-style-type: none"><li>• Is breathing or crying spontaneously</li><li>• Has good muscle tone and responds when stimulated</li><li>• Has a heart rate above 100 beats/minute</li><li>• Becomes pink rapidly</li></ul>
 <b>Commence resuscitation</b> <u>Section 10.2</u>	 <b>Proceed to routine care</b>

**Note:** if the amniotic fluid is meconium-stained but the neonate is breathing spontaneously, wipe the face and start routine care as below.

### Thermoregulation

- At birth:
  - dry the neonate with a clean, dry cloth;
  - wrap the neonate in another clean, dry cloth;
  - place the neonate against the mother's (dried) body and cover with a dry cloth or blanket.
- Perform a full clinical examination with the neonate under an infant warmer.
- Cover the head with a cap to reduce heat loss.
- Axillary temperature should be kept between 36 and 37 °C, and the neonate should have pink, warm feet.

- Keep the neonate in a warm room (between 23 and 25 °C).
- Delay bathing the neonate until 24 hours after birth. If it is not possible for cultural reasons, delay for at least 6 hours.

For low birth weight neonates, see [Section 10.5](#).

## Cord clamping and cord care

- Wait at least 1 to 3 minutes before clamping the cord (especially neonates weighing less than 2500 g).
- 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 those used for episiotomy.
- Tie off the cord with a Barr clamp or sterile thread (double ligature), leaving a 2 to 3 cm stump.
- Disinfect the umbilicus: apply **7.1% chlorhexidine digluconate** (delivering 4% chlorhexidine) to the tip, stump and base of the cord. If not available, disinfect with **10% povidone iodine**. Put a single application at birth.

## Apgar score

The Apgar score is evaluated at 1 and 5 minutes after birth and recorded in the neonate's medical chart and health record.

The score is a tool for monitoring the neonate'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  $\leq 4$  at 1 minute or  $\leq 6$  at 5 minutes, the midwife should call the doctor and should initiate necessary steps based on the neonate's needs.

**Table 10.1 - Apgar score**

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

(a) A healthy neonate is usually born cyanotic but turns pink within 30 seconds after breathing starts. In neonates with dark skin, it may be more difficult to assess skin colour change. If so, look at the soles of the feet, palms of the hands and mucous membranes to assess for the change from blueish to pink.

**Table 10.2 - Significance of the Apgar score**

1-minute score		5-minute score	
<b>0 - 4</b>	Asphyxia	<b>0 - 6</b>	Asphyxia
<b>5 - 7</b>	Difficulty adapting	<b>7 - 8</b>	Difficulty adapting
<b>8 - 10</b>	Good adaptation	<b>9 - 10</b>	Good adaptation

## Feeding

- Put the neonate to the breast as soon as possible within an hour of birth.
- Breastfeeding on demand day and night (at least 8 times per 24 hours, i.e. every 3 hours).
- For more information, see [Appendix 3](#).
- In the event of maternal HIV infection, see [Appendix 3, Section 3.7](#).

For low birth weight neonates, see [Section 10.5](#).

# Clinical examination and assessment of risk factors

A full clinical examination of the neonate should be completed in the delivery room as soon as possible, under an infant warmer, by the birth attendant.

The priority is to recognise danger signs that may indicate severe illness ([Section 10.3.1](#)) and to assess for risk factors for infection and hypoglycaemia.

Record all observations on a monitoring sheet.

## A. Routine clinical examination

- Vital signs:
  - respiratory rate: normal range 30 to 60 breaths/minute
  - heart rate: normal range 100 to 160 beats/minute
  - temperature: normal range  $\geq 36^{\circ}\text{C}$  and  $< 37.5^{\circ}\text{C}$
- Weight (weigh the neonate naked on an appropriate scale, calibrated beforehand)
- Skin: see danger signs, [Section 10.3.1](#).
- Head: fontanelles, eyes, ears, oral cavity (palate, mucous membranes)
- Chest: respiratory effort, heart sounds, breath sounds
- Abdomen: shape, size, umbilicus, genital organs, anus, spine
- Extremities: limbs, feet, hands
- Neurology: posture, tone, reflexes (sucking, grasp, response to stimulation)

## B. Assessment for risk factors for neonatal infection

Prophylactic antibiotics for 48 hours ([Section 10.3.3](#)) is indicated if the neonate presents with:

- 1 major risk factor (except if, for PROM  $\geq 18$  hours or for maternal fever, the mother received adequate antibiotic therapy i.e. at least 2 doses of IV ampicillin administered 4 hours apart with the last dose administered within 4 hours prior to birth)

OR
- 3 minor risk factors (or more)

Major risk factors	Minor risk factors
Maternal fever ( $\geq 38^{\circ}\text{C}$ ) before or during labour in preterm	Preterm or birth weight $< 2000$ g
Prolonged rupture of membranes (PROM) $\geq 18$ hours	Resuscitation at birth
Foul-smelling, cloudy amniotic fluid	Meconium stained amniotic fluid
Twin with clinical signs of infection	Home delivery (Chapter 11, <a href="#">Section 11.3.3</a> )

## C. Assessment for risk factors for hypoglycaemia

- Check blood glucose within one hour of birth in neonates with one of the following risk factors:
  - Birth weight  $< 2500$  g or  $> 4000$  g

- Maternal diabetes
- Mother treated with labetalol
- Difficulty breastfeeding (difficulty with sucking or attaching to the breast)
- If blood glucose is normal ( $\geq 2.5$  mmol/l or  $\geq 45$  mg/dl), observe that the neonate is breastfed at least every 3 hours. Check blood glucose before each meal until there are 3 consecutive normal results.
- If blood glucose is  $< 2.5$  mmol/l or  $< 45$  mg/dl, see hypoglycaemia, [Section 10.3.4](#).

#### **D. Assessment for mother-to-child transmissible diseases**

If not done prior to birth, check if the mother may have any disease transmissible to the neonate ([Section 10.4](#)).

## **Preventive treatments**

### **Gonococcal conjunctivitis**

As soon as possible, preferably within an hour of birth: apply a 1 cm strip of **1% tetracycline** eye ointment in each eye.

**Note:** if the mother has a symptomatic genital infection at the time of delivery, see [Section 10.4](#).

### **Haemorrhagic disease of the newborn**

Administer **phytomenadione** (vitamin K<sub>1</sub>) IM in the anterolateral aspect of the thigh within the first few hours of life:

- Neonate weighing 1500 g or more: 1 mg single dose (0.1 ml if 2 mg/0.2 ml ampoule)
- Neonate weighing less than 1500 g: 0.5 mg single dose (0.05 ml if 2 mg/0.2 ml ampoule)

### **Rickets and vitamin D deficiency**

Neonates particularly at risk (preterm, low birth weight, maternal malnutrition, contexts with prevalence of vitamin D deficiency) and if possible all neonates should receive vitamin D for 6 months:

- **colecalciferol** (vitamin D<sub>3</sub>) or **ergocalciferol** (vitamin D<sub>2</sub>) PO:
  - Preterm or neonates living in contexts of high risk vitamin D deficiency: 600 to 1200 IU once daily
  - Term neonates: 400 to 800 IU once daily

**Note:** the number of IU per drop of oral solution varies according to manufacturers. Check instructions for use.

### **Mother-to-child HIV transmission**

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

## **Vaccinations**

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

For the oral Polio vaccine, 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 hepatitis B birth dose is to prevent mother-to-child transmission of the virus. It should be administered as soon as possible, preferably in the delivery room, or at least within the first 24 hours of life. While it may still be administered after that time, the later the vaccine is administered, the less effective the protection<sup>[1][2]</sup>.

**Table 10.3 - Neonatal vaccination**

Vaccine	Contra-indications	Dose/route of administration
<b>Hepatitis B</b> monovalent	None but use only the monovalent vaccine	One dose = 5 to 10 micrograms (follow manufacturer's instructions) IM injection, anterolateral thigh
<b>Polio oral</b> bivalent (poliovirus types 1 and 3)  Dose 0	None	One dose = 2 drops (approximately 0,1 ml) Oral route
<b>BCG</b>	Neonate whose mother has active tuberculosis ( <u>Section 10.4.6</u> ) <sup>(b)</sup>	One dose = 0.05 ml Intradermal injection, deltoid region (junction of lower 2/3 and upper 1/3 lateral aspect of upper arm)

(b) Start the neonate on isoniazid preventive therapy, and administer the BCG vaccination when the isoniazid therapy is completed.

## 10.1.2 After the first hours of life

Neonatal (and maternal) mortality is the highest in the first 24 hours after birth. Women are encouraged to stay for 24 hours in the maternity.

For the first 24 hours (or more if the mother stays in maternity longer than 24 hours), monitor the neonate and record observations in the neonate's monitoring sheet:

- Monitor:

- Danger signs
- Temperature, heart and respiratory rate 2 times daily
- Weight once daily
- Urine and stool
- Keep cord clean, dry and exposed to the air (no dressing).
- Observe breastfeeding.

For low birth weight neonates, see [Section 10.5](#).

For the discharge criteria of the neonate, see [Section 10.6](#).

## References

1. Weekly epidemiological record/Relevé épidémiologique hebdomadaire : Hepatitis B vaccines/Vaccins anti-hépatite B, 2 october 2009, 84<sup>th</sup> year/2 octobre 2009, 84<sup>e</sup> année, No. 40, 2009, 84, 405–420.  
<http://www.who.int/wer/2009/wer8440.pdf>
2. Vaccines. Sixth edition by Stanley Plotkin, Walter Orenstein and Paul Offit (2013).

# 10.2 Neonatal resuscitation

10% of neonates 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 neonate 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.

## 10.2.1 Basic resuscitation<sup>a</sup>

Hypothermia compromises resuscitation. Resuscitation should be done in a heated room, if possible under an infant warmer.

Steps 1 to 5 should be performed in the first minute of life. Record all procedures on the monitoring sheet.

### 1 - Stimulate the neonate by drying

Tactile stimulation can trigger spontaneous breathing. It is done by drying the neonate.

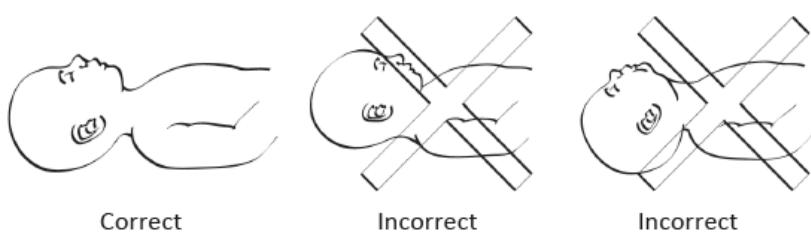
If the neonate starts to breathe or cry within 5 seconds, proceed to routine care ([Section 10.1](#)).

If not, stop stimulation and proceed to step 2.

### 2 - Clear the airway

Lay the neonate 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.

**Figure 10.1** - Head position for clearing the airway



Only in 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. If neonate is still not breathing or not breathing well, proceed to step 3.

### **3 - Stimulate the neonate**

Rub the back and the soles of the feet vigorously but not roughly (do not shake, slap or hang the infant by the feet, etc.). If the neonate is having difficulty breathing or still not breathing after 5 seconds: stop active stimulation, and proceed to steps 4 and 5.

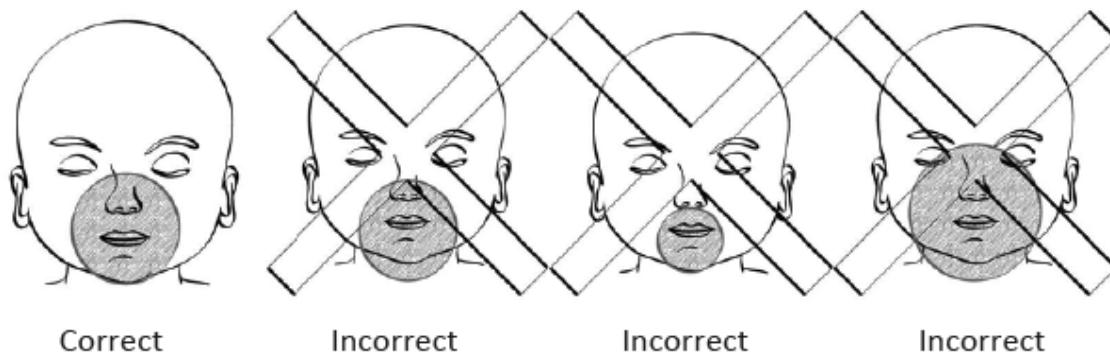
### **4 - Clamp and cut the cord**

If not already done, clamp and cut the cord.

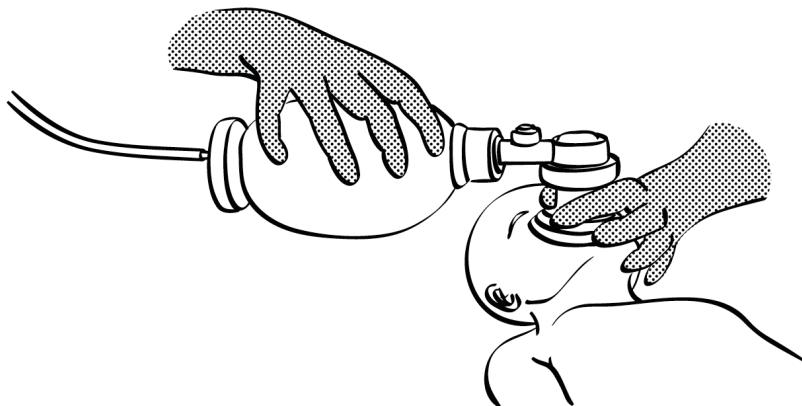
### **5 - Perform bag-mask ventilation (room air)**

- Fit the mask over the 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 60 breaths/minute for 60 seconds. Ventilation is effective if the chest rises and falls.  
Attention, excessive ventilation pressure can cause a 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 neonate's face to check for spontaneous breathing.
- Continue manual ventilation until there is spontaneous respiratory effort.

## 6 - Oxygenation

If oxygen is available: connect the ambu bag to an oxygen reservoir after 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 neonate has:

- No heart rate after 10 minutes.
- No spontaneous respiration after 20 minutes of effective ventilation, even if the heart rate is adequate.

## 10.2.2 After resuscitation

- Re-evaluate all vital signs, look for danger signs and measure blood glucose. Perform a retroactive Apgar score assessment ([Section 10.1.1](#)).
- Record the results on a monitoring sheet.
- Transfer to a neonatal care unit is indicated if one of the following is present:
  - The neonate was ventilated with a mask for 2 minutes or more.
  - The Apgar score was  $\leq 4$  at 1 minute or  $\leq 6$  at 5 minutes.
  - Any danger sign is present ([Section 10.3.1](#)).
  - Keep the mother and neonate together where possible.
- If the neonate appears well (no indications for transfer) or if transfer is necessary but impossible:
  - Keep under observation for at least 24 hours.
  - Every 2 hours, check for any danger signs ([Section 10.3.1](#)) and monitor vital signs.
  - Ensure routine care ([Section 10.1](#)).
  - Begin breastfeeding as soon as possible.
- If the neonate deteriorates during close observation, refer to [Section 10.3](#) for further management.

## Footnotes

- (a) For more information, refer to the Helping Babies Breathe training course.

# **10.3 Care of the sick newborn**

## **10.3.1 Danger signs**

Danger signs may present at delivery or develop within hours or days after birth.

All neonates should be examined for danger signs at birth, during their stay in maternity or at the first post-natal visit if born at home.

If any of the following signs are present, treat immediately ([Section 10.3.2](#)) and transfer to a neonatal care unit.

Danger signs	
<b>Temperature</b>	<ul style="list-style-type: none"> <li>• Hyperthermia (axillary temperature <math>&gt; 38^{\circ}\text{C}</math>)</li> <li>• Hypothermia (axillary temperature <math>&lt; 35.5^{\circ}\text{C}</math>)</li> </ul>
<b>Neurological signs</b>	<ul style="list-style-type: none"> <li>• Bulging fontanelle</li> <li>• Hypotonia</li> <li>• Lethargy or coma</li> <li>• Unable to breastfeed</li> <li>• Seizures including subtle or abnormal movements: <ul style="list-style-type: none"> <li>▫ deviation of the eyes with or without spasms, eyelid blinking</li> <li>▫ sucking, smacking or other mouth movements</li> <li>▫ swimming or pedalling movements</li> </ul> </li> </ul>
<b>Respiration</b>	<ul style="list-style-type: none"> <li>• Apnoea or bradypnoea (<math>\text{RR} &lt; 30/\text{minute}</math>)</li> <li>• Tachypnoea (<math>\text{RR} &gt; 60/\text{minute}</math>)</li> <li>• Severe chest indrawing</li> <li>• Grunting</li> </ul>
<b>Heart</b>	<ul style="list-style-type: none"> <li>• Tachycardia (<math>\text{HR} &gt; 180/\text{minute}</math>)</li> <li>• Prolonged capillary refill time (<math>&gt; 2 \text{ seconds}</math>)</li> </ul>
<b>Abdomen</b>	Severe abdominal distension
<b>Skin colour</b>	<ul style="list-style-type: none"> <li>• Generalised cyanosis (blue colouring)</li> <li>• Extreme pallor</li> <li>• Extensive jaundice (yellow colouring)</li> </ul>
<b>Skin</b>	<ul style="list-style-type: none"> <li>• Umbilicus red or oozing blood or pus</li> <li>• Numerous or large pustules</li> </ul>
<b>Joints</b>	Swollen, painful joint (irritability when moved) with reduced joint movement
<b>Blood glucose</b>	Recurrent hypoglycaemia (blood glucose level $< 2.5 \text{ mmol/litre}$ or $< 45 \text{ mg/dl}$ on more than 2 episodes)

## 10.3.2 General management

- Stabilise the neonate before transfer to the neonatal unit:

- Position the head to open the airway.
- Administer oxygen with an appropriate nasal cannula, at a maximum flow rate of 2 litres/minute (aim for SpO<sub>2</sub> 90-95%).
- In the case of apnoea or if RR < 20/minute: perform bag and mask ventilation ([Section 10.2.1](#)).
- Check blood glucose and/or treat for hypoglycaemia ([Section 10.3.4](#)).
- While awaiting transfer:
  - Keep neonate warm in a room at 23-25 °C wrapped in a blanket or under an infant warmer, and cover the head with a cap.
  - Closely monitor temperature, respiratory rate and SpO<sub>2</sub>.
  - Start treatment for neonatal infection ([Section 10.3.3](#)).
  - Ensure routine neonatal care ([Section 10.1](#)).
  - Start or continue feeding ([Appendix 4](#)). Only if necessary, compliment feeds with a nasogastric tube and/or IV fluids ([Appendix 5](#)).

 In the case of severe respiratory distress, abdominal distension, or coma, do not feed the neonate by mouth. Start IV fluids if possible ([Appendix 5](#)).

## 10.3.3 Neonatal infection

### Neonates suspected to have severe neonatal infection

Danger signs may indicate an underlying severe infection which requires transfer to a neonatal unit and antibiotic therapy.

While awaiting transfer to a neonatal unit, start antibiotic therapy:

- The first line treatment is the combination of **ampicillin IV + gentamicin IM**. 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 + gentamicin IM**.
- If meningitis is suspected, do not use procaine benzylpenicillin.
- If the infection is cutaneous in origin, replace the ampicillin with **cloxacillin IV**.<sup>a</sup>
- Total treatment duration is 7 to 10 days according to clinical response. Gentamicin should be stopped after 5 days of treatment.

**Table 10.5 - Antibiotic dosages**

Antibacterial	Birth weight	
	≤ 2000 g	> 2000 g
<b>ampicillin</b> IV/IM injection	50 mg/kg every 12 hours If meningitis: 100 mg/kg every 12 hours	50 mg/kg every 8 hours If meningitis: 100 mg/kg every 8 hours
<b>gentamicin</b> IM injection	3 mg/kg every 24 hours	5 mg/kg every 24 hours
<b>procaine benzylpenicillin<sup>(a)</sup></b> IM injection	50 000 IU/kg every 24 hours If meningitis: do not administer.	
<b>cloxacillin</b> IV infusion	25 mg/kg every 12 hours	25 mg/kg every 8 hours

(a) Do not administer **procaine benzylpenicillin** by IV route.

## Prophylactic treatment for asymptomatic neonates with risk factors for infection

In asymptomatic neonates (absence of danger signs) in whom the assessment for risk factors for neonatal infection at birth was positive ([Section 10.1.1, Clinical examination and assessment of risk factors](#)):

- Administer antibiotics for 48 hours<sup>[1]</sup> : **ampicillin** IV + **gentamicin** IM or **procaine benzylpenicillin** IM + **gentamicin** IM. See [Table 10.5](#) for dosage.
- Monitor for danger signs ([Section 10.3.1](#)). If the neonate presents at least one danger sign, treat as suspected severe infection as below.
- If the neonate has not presented any of the danger signs during the first 48 hours, stop the antibiotics and keep under observation for 24 to 48 hours.
- If the neonate has not presented any of the danger signs during the observation period or during clinical examination for discharge: send home. In this case, tell the parents which signs require immediate consultation.

**Note:** neonates born at home, seen for the first time after 72 hours of age and present no signs of infection, do not need prophylactic antibiotics even if a maternal risk factor is identified.

## 10.3.4 Hypoglycaemia

Hypoglycaemia is common in neonates but often asymptomatic or presents with non-specific signs. Recurrent or persistent hypoglycaemia can lead to neurological sequelae.

### Diagnosis

- Blood glucose < 2.5 mmol/l or < 45 mg/dl.

- Blood glucose is measured on a sample of capillary blood taken from the lateral aspect of the heel using a lancet or 24G needle.

Always check blood glucose:

- In neonates at risk of hypoglycaemia ([Section 10.1.1, Clinical examination and assessment of risk factors](#))
- In neonates presenting with one of these signs:
  - Hypothermia
  - Irritability or tremors
  - Bradypnoea or apnoea or cyanosis
  - Hypotonia or poor response to stimulation or impaired consciousness
  - Seizures

## Management

### Moderate hypoglycaemia (2 to 2.4 mmol/litre or 35 to 44 mg/dl) and asymptomatic

- Feed neonate immediately (preferably breast milk).
- If no milk is available, give 5 ml/kg of **10% glucose** PO over 5 to 10 minutes.
- Check blood glucose after 30 minutes:
  - If it is normal ( $\geq 2.5$  mmol/litre or  $\geq 45$  mg/dl), ensure the neonate feeds regularly and check blood glucose again before each feed until there are 3 consecutive normal results.
  - If it remains  $< 2.5$  mmol/litre or  $< 45$  mg/dl), treat as recurrent hypoglycaemia.

### Severe hypoglycaemia (< 2 mmol/litre or < 35 mg/dl) or symptomatic or recurrent

- Give 5 ml/kg of **10% glucose** PO or via gastric tube over 5 to 10 minutes, or if IV line already in place, give 2 ml/kg of **10% glucose** slow IV (2 to 3 minutes).
- Check blood glucose after 30 minutes:
  - If it is normal ( $\geq 2.5$  mmol/litre or  $\geq 45$  mg/dl), ensure the neonate feeds regularly, recheck blood glucose after 30 minutes and then before each feed until there are 3 consecutive normal results.
  - If it is  $< 2.5$  mmol/litre or  $< 45$  mg/dl, or the neonate is still symptomatic, give a second dose of **10% glucose** (5 ml/kg PO or 2 ml/kg IV) and transfer to a neonatal unit. While awaiting transfer, start a continuous infusion of **10% glucose** (80 ml/kg/24 hours) if possible and continue to monitor blood glucose.

**Note:** only if it is impossible to give an infusion or place a gastric tube, 1 ml/kg of 50% glucose can be administered sublingually.

## 10.3.5 Jaundice

Neonatal jaundice is generally harmless, but severe jaundice can cause acute encephalopathy, potentially leading to neurological sequelae and death.

### Diagnosis

- Yellow colouring of the skin and sclerae due to increased levels of bilirubin in the blood. 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 neonate's skin and looking to see if it is yellow immediately after the pressure is removed.
- Assess criteria for transfer to a neonatal care unit:

**Table 10.6 - Criteria for transferring neonates with severe jaundice to neonatal unit**

<b>Age</b>	<b>Criteria for transfer</b>
<b>Day 1</b>	Any visible jaundice
<b>Day 2</b>	< 1500 g or risk factors <sup>(b)</sup> : any visible jaundice > 1500 g: moderate jaundice (head, chest, lower body, thighs)
<b>Day 3 or later</b>	< 1500 g or risk factors <sup>(b)</sup> : extensive jaundice (head, chest, lower body, arms, thighs, lower leg) > 1500 g: very extensive jaundice (head, chest, lower body, arms, thighs, lower leg, hands and feet)

(b) Risk factors include:

- ABO or Rh factor incompatibility between mother and neonate.
- Inadequate milk intake (dehydration, weight loss).
- G6PD deficiency: consider if severe jaundice in family history or in prevalent regions (sub-Saharan Africa, Arabic peninsula and parts of Asia/Mediterranean).
- Neonatal infection
- Cephalohaematoma/bruising

## Management

### Neonate does not have criteria for transfer

- Put neonate on breast 8 to 12 times per day.
- Monitor extent of jaundice for 12 to 18 hours.
- If all well the neonate can be discharged. Give mother routine discharge advice ([Section 10.6](#)) and specific advice regarding the jaundice: to return if stools become pale and urine becomes dark or jaundice prolonged beyond 2 weeks.

### Neonate needs to be transferred

- Put neonate on breast 8 to 12 times per day for first few days if able to breastfeed. Supplement with expressed breast milk or infant formula if necessary. Use gastric tube if oral intake is not possible.
- Begin treatment for infection, if present ([Section 10.3.3](#)).

## 10.3.6 Seizures

Seizures in neonates are often subtle, featured as any unusual repetitive or stereotypic movement ([Section 10.3.1](#)).

- Check blood glucose and/or treat for hypoglycaemia ([Section 10.3.4](#)).
- Treat with **phenobarbital** IV if the seizure lasts more than 3 minutes, or recurs (> 2 to 3 episodes in one hour), or is associated with cardiorespiratory disturbance:
  - First dose: 20 mg/kg by slow IV infusion over 30 minutes. Phenobarbital should never be administered as a rapid direct IV injection. Phenobarbital may be given IM (undiluted) if there is no IV access.
  - If seizures persist 30 minutes after, administer a second dose of **phenobarbital** 10 mg/kg by slow IV infusion over 30 minutes. If still no IV access, give the second dose of phenobarbital 10 mg/kg (undiluted) IM at least 60 minutes after the first IM dose.
- Do not give more than 40 mg/kg in total.
- Any neonate that required treatment with phenobarbital should be transferred to a neonatal care unit.
- Monitor the neonate closely while awaiting transfer. Ensure ventilation equipment is available as there is a risk of respiratory depression.

## Footnotes

- (a) 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 not possible, by slow IV injection over at least 5 minutes).

## References

1. World Health Organization. Pocket book of hospital care in children. Guidelines for the management of common childhood illnesses, second edition, 2013.  
[http://www.who.int/maternal\\_child\\_adolescent/documents/child\\_hospital\\_care/en/](http://www.who.int/maternal_child_adolescent/documents/child_hospital_care/en/)

# 10.4 Specific care when the mother has a transmissible infection

## 10.4.1 Syphilis

- Look for signs of syphilis in all neonates of mothers in case of positive syphilis test and/or suspected maternal syphilis infection:
  - 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.
- Verify that the mother received an adequate treatment for syphilis at least one month before delivery (see Chapter 4, [Section 4.2.1](#)).
- Based on the findings, administer one of the following treatments:

Criteria	Treatment
Neonate has clinical signs of syphilis or Mother did not receive adequate treatment during pregnancy	<b>benzylpenicillin IV:</b> D1 to D7: 50 000 IU/kg (= 30 mg/kg) every 12 hours  D8 to D10: 50 000 IU/kg (= 30 mg/kg) every 8 hours  or <b>benzylpenicillin procaine IM:</b> D1 to D10: 50 000 IU/kg (= 50 mg/kg) every 24 hours
Neonate has no clinical signs of syphilis and Mother received adequate treatment during pregnancy	<b>benzathine benzylpenicillin IM:</b> 50 000 IU/kg (= 37.5 mg/kg) single dose

- In addition to "standard" precautions, use "contact" precautions (gloves and protective gown) at each contact with the neonate during the first 24 hours after starting the treatment.

## 10.4.2 Genital gonococcal and/or chlamydial infection

Neonates of mothers with purulent cervical discharge at the time of delivery may be asymptomatic or may present with symptomatic conjunctivitis.

- For neonates with symptomatic conjunctivitis (whether the mother is symptomatic or not) or born to mothers who were symptomatic at the time of delivery (even if they are asymptomatic):
  - Clean each eye with 0.9% sodium chloride at least 4 times daily until discharge disappears.
  - Administer at birth a single dose of **ceftriaxone** IM: 50 mg/kg; max. 125 mg (or **cefotaxime** IM: 100 mg/kg if ceftriaxone is contraindicated).
- If the conjunctivitis persists 48 hours after the ceftriaxone injection, administer :  
**azithromycin** PO: 20 mg/kg once daily for 3 days (or, if azithromycin is not available, **erythromycin** PO: 12.5 mg/kg 4 times daily for 14 days)
- If the symptoms appear after 7 days of life, administer simultaneously ceftriaxone IM + azithromycin or erythromycin PO, as above.

## 10.4.3 Genital herpes

Neonates of mothers who have active genital herpes lesions at the time of delivery may present with neonatal herpes.

The neonate is usually asymptomatic at birth. The symptoms appear sometime within the first 4 weeks of life (usually between 7 and 14 days of life).

- Look for signs of neonatal herpes:
  - Vesicular lesions on skin, mouth and/or eyes (only in 45% of neonates).
  - Cerebral involvement: encephalitis and seizures.
  - Non-specific signs of disseminated infection (irritability, lethargy, fever, poor feeding).
- Management depends on the neonate's risk at birth:

Criteria for risk of herpes infection	Treatment <sup>[1]</sup>
<p><b>High</b></p> <p>Neonate with signs of herpes OR Mother has primary genital herpes lesions at the moment of delivery OR Mother has genital herpes lesions at the moment of delivery and it is unknown whether it is a primary or recurrent infection OR Mother with recurrent genital herpes lesions at the moment of delivery WITH at least one of the following risk factors:</p> <ul style="list-style-type: none"> <li>• rupture of membranes <math>\geq</math> 6 hours before delivery (even if caesarean section)</li> <li>• birth weight <math>&lt;</math> 2000 g or preterm <math>\leq</math> 37 weeks</li> <li>• neonatal skin laceration or maternal HIV infection</li> </ul>	<p>Immediately apply one dose of <b>3% aciclovir</b> eye ointment in each eye at birth.<sup>(a)</sup> Refer to neonatal care unit for IV aciclovir treatment.</p>
<p><b>Low</b></p> <p>Neonate is asymptomatic AND Mother has recurrent genital herpes lesions at the moment of delivery AND Absence of risk factors in previous column.</p>	<p>Immediately apply one dose of <b>3% aciclovir</b> eye ointment in each eye at birth.<sup>(a)</sup> Observe for 5 days:</p> <ul style="list-style-type: none"> <li>• If the neonate becomes symptomatic: refer to neonatal care unit for IV aciclovir treatment.</li> <li>• If the neonate remains asymptomatic: discharge; ask parents to seek urgent attention if symptoms appear.</li> </ul>

(a) In this case, wait 12 hours before applying tetracycline eye ointment ([Section 10.1.1, Preventive treatments](#)).

- In addition to "standard" precautions, use "contact" precautions (gloves and protective gown) at each contact with the neonate for 24 hours after the start of treatment.

## 10.4.4 Hepatitis B infection

The neonate is asymptomatic.

Hepatitis B vaccine should be given to the neonate at birth, regardless of the mother's serological status ([Section 10.1.1, Vaccinations](#)).

## 10.4.5 HIV infection

The neonate is asymptomatic.

Antiretroviral prophylaxis should be started immediately after birth: refer to the PMTCT guides.

For breastfeeding: see [Appendix 3, Section 3.7](#).

## 10.4.6 Active tuberculosis

For all neonates born to mothers with active tuberculosis at birth:

- Do not administer BCG.
- Administer preventive therapy with **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 neonate (breastfeeding, etc.), but observe the rules for transmission prevention.

For more information, refer to the guide [Tuberculosis](#), MSF.

## References

1. Neonatal herpes simplex virus infection: Management and prevention, Gail J Demmler-Harrison, UpToDate, Literature review current through: Oct 2013, last update: Mar 7, 2013.

# 10.5 Care of the low birth weight neonates (< 2500 g)

Low birth weight indicates prematurity (less than 37 weeks) or intrauterine growth restriction or a combination of the two.

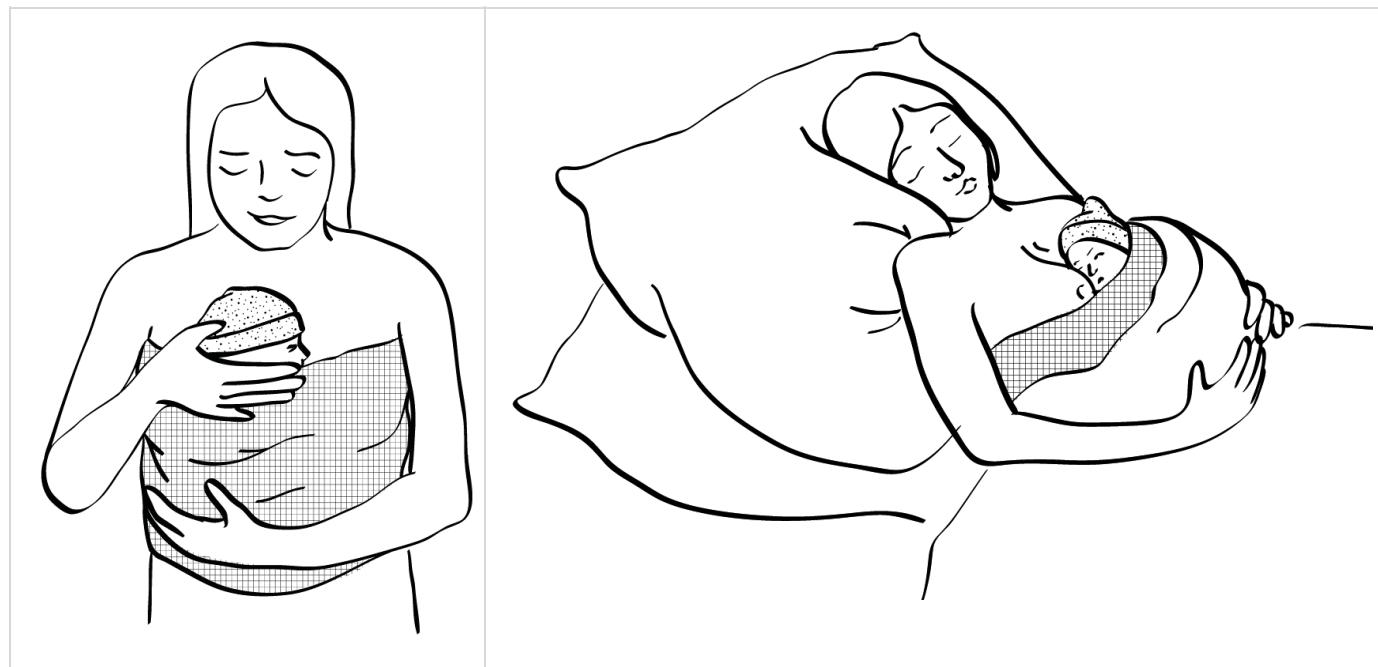
Low birth weight neonates, whether preterm or not, are at significant short-term risk of hypothermia, hypoglycaemia, apnoea, respiratory distress, jaundice, infection, anaemia, dehydration and feeding problems, and at significant long-term risk of poor psychomotor development.

Neonates who are sick or who weigh less than 1500 g should be referred to a neonatal care unit whenever possible.

Neonates 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 - Kangaroo care



The Kangaroo mother care<sup>a</sup> is a method of caring for neonates 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 neonates less than 2500 g (prematurity and/or intrauterine growth restriction).

The neonate is placed vertically against the mother's chest (may wear nappy and socks); the mouth should always be able to reach the nipple. Keep the neonate in position using a cloth.

If needed, use a blanket to keep the mother and neonate warm.

When the mother is sleeping, her bust should be raised and the neonate should be monitored.

The objectives of the Kangaroo care are:

- To keep the neonate 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 neonate's stress.
- To reduce episodes of apnoea and bradycardia in preterm neonates.

**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 neonate's head to reduce heat loss.
- Make sure that the room temperature is between 23-25 °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 neonate using a cup/spoon ([Appendix 3](#), [Section 3.2](#) and [Section 3.3](#)).
- If sucking is ineffective and the swallowing reflex is poor or absent, express the milk and feed the neonate using a gastric tube ([Appendix 3](#), [Section 3.2](#) and [Section 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<sup>b</sup> ).
  - At the same time, continue to stimulate the mother's milk production (breast pump and the "supplementary nursing" technique, [Appendix 3](#), [Section 3.5](#)).
- In all cases, try putting the neonate to the breast periodically to test if breastfeeding is effective or not.
- In the event of regurgitation:
  - Administer each meal very slowly.
  - Hold the neonate tilted slightly head-up.
- In the event of vomiting, abdominal distension, blood in the stool or greenish, foul-smelling stool, stop feeding and call the doctor immediately.
- Very low birth weight neonates (< 1500 g) have a high risk of developing acute necrotising enterocolitis with early oral feeding. For the first 48 hours, give a 10% glucose IV continuous

- infusion ([Appendix 5](#)). If the neonate is clinically stable, very small amounts of breast milk of 10 ml/kg per day can be started on D1 while awaiting transfer to a neonatal care unit.
- If it is not possible to administer an IV infusion or to transfer to a neonatal care unit, give expressed breast milk and 10% glucose together orally ([Appendix 4](#)).

## 10.5.4 Monitoring

Same monitoring as for a neonate > 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 the event of hypoglycaemia, see [Section 10.3.4](#).

## Footnotes

- (a) For more information: World Health Organization. Kangaroo mother care: a practical guide. 2003. <http://apps.who.int/iris/bitstream/handle/10665/42587/9241590351.pdf?sequence=1>
- (b) 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 ([Section 10.3.3](#) and [Section 10.4](#)) and risk factors for neonatal infection ([Section 10.1.1, Assessment for risk factors for neonatal infection](#)).
- Healthy neonate: good breastfeeding on demand, normal respiration and temperature, etc.
- Weight > 1500 g.

AND

- Preventive treatments and BCG, hepatitis B and polio (0) vaccines administered ([Section 10.1.1](#)).
- Clinical record filled out (including discharge weight).
- Postnatal visit appointment (Chapter 11, [Section 11.3](#)) given.
- Single use 3 g sachets of **7.1% chlorhexidine digluconate** given to complete 7 days of cord care at home in settings with harmful practices (e.g. application of milk, soil, honey, butter, dung on the cord stump). Show the mother how to apply the product on the cord.

AND

## **Information for the mother**

- Breastfeeding: Appendix 3.
- Care for the baby:
  - Wash the baby with soap and water once daily, and immediately dry with a towel or cloth to avoid the baby getting cold.
  - Cord care: clean with soap and water each time it is soiled, rinse well and dry then let it uncovered. Do not apply any harmful substances on the cord. The cord falls between the fifth and fifteenth day after birth.
  - Kangaroo care if weight < 2500 g (Section 10.5.1).
  - Lay baby on the back.
  - Use a mosquito net day and night when the baby sleeps.
  - Keep the baby away from sick (contagious) children and adults.
  - Wash hands before and after caring for the baby.
- Danger signs requiring a consultation:
  - Difficulty with or unable to breastfeed properly.
  - Abnormal movements
  - Trouble breathing
  - Abnormal colouring
  - Redness or purulent discharge from the umbilicus
  - Fever

# **Chapter 11: Postpartum period**

[11.1 Normal postpartum events](#)

[11.2 Postpartum care for the mother](#)

[11.3 Postnatal consultations](#)

[11.4 Postpartum complications](#)

[11.5 Contraception](#)

# **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 6 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 3 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 post-partum 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<sup>[1]</sup> after delivery.

## 11.2.1 In the maternity hospital

Following the immediate postpartum (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 daily.
- Uterine involution.
- Vaginal bleeding.
- Perineal tear/episiotomy scar.
- Urination and bowel movement.
- 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.
- Care of the neonate (Chapter 10, [Section 10.6](#)).
- Breastfeeding ([Appendix 3](#)).
- Maternal 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 several occasions),
  - headache with visual disturbance or nausea and vomiting; seizures,
  - difficult or rapid breathing,
  - fever,
  - significant abdominal pain,
  - foul-smelling vaginal discharge,
  - urinary leakage,
  - hot, red, painful breast,
  - emotional instability, depression, etc.
- 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 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 concerned at the maternity hospital and in postpartum period. See Chapter 4, [Section 4.11.2](#).

## 11.2.2 Upon discharge

- If there is no clinical anaemia, continue iron + folic acid supplementation for 3 months<sup>[1]</sup> (Chapter 1, [Section 1.2.5](#)). In case of anaemia, see Chapter 4, [Section 4.1](#).
- Give vitamin A (**retinol** PO: 200 000 IU single dose) in countries where night blindness is a public health problem (follow national recommendations).
- Schedule an appointment for the postnatal consultation ([Section 11.3](#)).
- Verify that information and advice were given.

## References

1. World Health Organization. WHO recommendations on postnatal care of the mother and newborn. 2013. [http://www.who.int/maternal\\_child\\_adolescent/documents/postnatal-carerecommendations/en/](http://www.who.int/maternal_child_adolescent/documents/postnatal-carerecommendations/en/)

# 11.3 Postnatal consultations

## 11.3.1 Timing of postnatal consultations

Two postnatal consultations, for the mother and neonate, should be offered within the first 6 weeks after delivery:

- The first within the first week, especially for women who delivered at home ([Section 11.3.2](#) and [Section 11.3.3](#)). For patients who delivered in a health care facility and stayed there for more than 24 hours, the discharge consultation for the mother and neonate is considered the first postnatal consultation.

AND

- The second within 4 to 6 weeks for a routine clinical examination and to address any potential complications.

If the neonate weighs less than 2000 g, a weekly consultation is recommended for the first month, and then at 6 weeks.

## 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 and odour of lochia.
- Inquire about urination and bowel movement. In the event of urine leakage, look for potential fistula (Chapter 7, [Section 7.2.5](#)).
- Check for breast lesions.
- Look for signs of anaemia. If there is no clinical anaemia, continue iron + folic acid supplementation for 3 months (Chapter 1, [Section 1.2.5](#)). In the event of clinical anaemia, see Chapter 4, [Section 4.1](#).
- If malnutrition is present ( $MUAC \leq 230 \text{ mm}$ ), place the woman into a therapeutic feeding programme. In situations where food is scarce, food supplementation is recommended for all breast-feeding women even in absence of signs of malnutrition.
- 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 provide contraceptive if desired ([Section 11.5](#)).
- Administer vitamin A if indicated; only if not done after delivery ([Section 11.2.2](#)).

- Complete tetanus vaccination if necessary.
- Give information and advice: signs requiring immediate consultation ([Section 11.2.1](#)), hygiene, breastfeeding, use of insecticide-treated mosquito nets for mother and neonate.

## 11.3.3 For the neonate

- Repeat full clinical examination including:
  - Vital signs, danger signs, signs of neonatal infection (Chapter 10, [Section 10.3.1](#)), signs of infection transmissible from mother (Chapter 10, [Section 10.4](#)).
  - Weight, height, any abnormalities (Chapter 10, [Section 10.1.1, Routine clinical examination](#)).
- Check haemoglobin if any signs of anaemia (pallor of conjunctivae, palms of the hands and soles of the feet).
- Refer to neonatal care unit if:
  - Danger signs/signs of infection (start treatment while waiting for transfer)
  - Haemoglobin < 10 g/dl
- Evaluate risk factors for neonatal infection (Chapter 10, [Section 10.3.2](#)). Note that home delivery is, in itself, a (minor) risk factor for neonatal infection.
- Assess breastfeeding: attachment to breast, frequency/interval between feeds ([Appendix 3](#)), hydration status.
- Check if routine care was provided at birth. If the neonate was born at home and/or did not receive routine care at birth (Chapter 10, [Section 10.1](#)), complete the following:
  - 1 - Cord care
    - Clean cord with soap and water if soiled, then dry.
    - Apply **7.1% chlorhexidine digluconate**.
    - In settings where harmful practices to the cord are common, continue treatment at home as indicated in [Section 10.6](#).
  - 2 - Other routine care
    - Tetracycline eye ointment (if neonate seen within 7 days after birth).
    - Vitamin K<sub>1</sub>.
    - Routine vaccinations: BCG, hepatitis B monovalent, polio 0.
    - Provide vitamin D supplement until age 6 months (Chapter 10, [Section 10.1.1](#)).
    - Ensure antiretroviral prophylaxis where necessary (Chapter 10, [Section 10.4](#)).

## 11.3.4 Postnatal care card

Register all relevant information on an individual postpartum 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 retained placenta and/or endometritis.

In case of suspected retained placenta:

- Digital curettage or manual vacuum aspiration or extremely cautious instrumental curettage, with antibiotic coverage ([Chapter 9](#)).
- Antibiotherapy for 5 days:  
**amoxicillin/clavulanic acid** PO (dose expressed in amoxicillin):  
Ratio 8:1: 3000 mg daily (2 tablets of 500/62.5 mg 3 times daily)  
Ratio 7:1: 2625 mg daily (1 tablet of 875/125 mg 3 times daily)  
or  
**amoxicillin** PO: 1 g 3 times daily + **metronidazole** PO: 500 mg 3 times daily

## 11.4.2 Infectious complications

Look for an infection in patients with fever higher than 38 °C for more than 48 hours.

### Postpartum endometritis and salpingitis

#### Clinical features

- Fever, usually high
- Abdominal and/or pelvic pain, foul-smelling or purulent vaginal discharge
- Uterus enlarged, soft, painful when mobilized; open cervix; swelling in the posterior fornix

#### Management

- Admit to inpatient department; administer antibiotherapy:  
**amoxicillin/clavulanic acid** IV (dose expressed in amoxicillin): 1 g every 8 hours + **gentamicin** IM: 5 mg/kg once daily  
or  
**ampicillin** IV: 2 g every 8 hours + **metronidazole** IV: 500 mg every 8 hours + **gentamicin** IM: 5 mg/kg once daily  
Continue this treatment 48 hours after resolution of fever and other clinical signs<sup>[1]</sup>.
- For early, minor forms (no fever, minor pain), outpatient treatment is possible with:

**amoxicillin/clavulanic acid** PO (dose expressed in amoxicillin) for 5 to 7 days:

Ratio 8:1: 3000 mg daily (2 tablets of 500/62.5 mg 3 times daily)

Ratio 7:1: 2625 mg daily (1 tablet of 875/125 mg 3 times daily)

- Look for retained placenta and perform uterine evacuation 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.

### Clinical features

Abdominal guarding or spasm, ileus, pelvic mass

### Management

- Laparotomy or, in case the abscess is confined to the Pouch of Douglas, colpotomy to drain the abscess.
- Same antibiotic therapy 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 4.2.3](#)).

**Note:** in case of fever, systematically test for malaria in endemic areas.

## 11.4.3 Breast-related complications

### Cracked nipples

#### Clinical features

- Nipple erosion and intense pain when starting to nurse.
- No fever (except when associated with lymphangitis).

### Management

- Clean with soap and clean water before and after each feeding; dry carefully.
- Observe the neonate while nursing, and correct the position if necessary. Cracked nipples are often caused by incorrect latching onto the breast.

### Breast engorgement

#### Clinical features

Bilateral pain 2 to 3 days after childbirth; firm, painful breasts.

## Management

- Cold or warm compresses (before nursing); more frequent nursing.
- Gentle manual expression ([Appendix 3](#)) before nursing, if the neonate cannot latch onto the overly distended breast or after nursing to finish emptying the breast. Engorgement subsides in 24 to 48 hours.

## Lymphangitis

### Clinical features

- Unilateral pain, 5 to 10 days after childbirth. Local inflammation, red, hot painful with no fluctuation.
- High fever (39-40 °C); enlarged axillary lymph node.
- No pus in the milk collected on a compress.

## Management

- Empty the breast by nursing the neonate 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, [Appendix 7](#)).

## Breast infections (mastitis, abscess)

### Clinical features

- Mastitis:
  - Firm, red, painful, swollen area of one breast associated with fever.
  - Axillary lymph node may be enlarged.
  - Purulent discharge from the nipple.
- Breast abscess: fluctuant, tender, palpable mass.

## Management

- Temporarily stop nursing on the affected side. Carefully express all milk from the infected breast (manually).
- Routine analgesia (paracetamol PO, [Appendix 7](#)); cold or warm compresses.
- Antibiotherapy with activity against staphylococci may prevent progression to breast abscess (**cloxacillin** PO: 1 g 3 times daily for 7 days).
- Breast abscess: urgent drainage as the abscess can quickly spread, and antibiotherapy as above.

## 11.4.4 Urine leakage

### Clinical features

Look for a possible vesicovaginal fistula, especially after a prolonged labour.

## Management

- 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 foetal 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 2 weeks.

It is characterised by mood swings, crying, irritability, anxious worrying centred on the neonate, 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

Postpartum depression develops in the first 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 child (or, on the contrary, a feeling of indifference), feeling incompetent as a mother, and feelings of guilt (or even aggressive thoughts toward the child) 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 child (depression can have repercussions for the child'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). Refer to the [Clinical guidelines](#), MSF.

**Note:** postpartum depression is more frequent after a stillbirth or intrauterine foetal death.

### Postpartum psychosis

This occurs less frequently and is characterised by the onset of psychotic symptoms after childbirth. Symptoms include irritability, major 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. Refer to the [Clinical guidelines](#), MSF.

## References

1. World Health Organization. Managing Complications in Pregnancy and Childbirth, 2017.  
<https://apps.who.int/iris/bitstream/handle/10665/255760/9789241565493-eng.pdf;jsessionid=28797ACA5A26CA683EAD63F667EA7107?sequence=1>

# 11.5 Contraception

Contraceptive methods should be chosen based on the preference of the woman and potential medical contra-indications identified through clinical history and examination.

The essential clinical examinations are:

- For hormonal contraception: blood pressure. Oestroprogestogens, also called combined oral contraceptives (COCs), are contra-indicated in women with hypertension ( $\geq 140/90$  mmHg). Progestogen-only injectables are contra-indicated in women with severe hypertension ( $\geq 160/100$  mmHg).
- For an intrauterine device (IUD): speculum and digital vaginal examination. Placement of an IUD is contra-indicated in case of active genital infection. It is performed after the infection has been treated.

In all cases, exclude pregnancy (perform pregnancy test if in doubt).

No laboratory testing is required for prescribing contraceptives.

The effectiveness of contraceptives is measured by the number of unintended pregnancies for every 100 women within the first year of correct regular use of contraception.

**Table 11.1** Contraceptive failure rates<sup>a</sup>

This table shows the effectiveness of contraceptives from most to least effective with typical use.

Methods	Unintended pregnancies per 100 women
<b>Progestogen implants</b> Etonogestrel (ETG) or levonorgestrel (LNG)	0.05%
<b>Levonorgestrel IUD (LNG-IUD)</b>	0.2%
<b>Copper IUD (Cu-IUD)</b>	0.8%
<b>Progestogen-only injectable</b> Medroxyprogesterone (DMPA)	6%
<b>Progestogen-only pills (POP)</b> Levonorgestrel (LNG) or desogestrel	9%
<b>COC</b> Ethinylestradiol (EE) + levonorgestrel (LNG)	9%

To make a contraceptive choice, women should be advised and informed about the different methods available and their effectiveness.

## 11.5.1 Main contraceptive methods

Contraception can be started at any time (according to woman's wishes), as long as it is reasonably certain that she is not pregnant. The woman should be informed that the protection may take a few days and that condoms must be used during this period<sup>[1]</sup>.

Additional contraception (condoms) is not required if the method is started:

- With a Cu-IUD.
- Within 5 days of the start of her period if the woman uses a POP or a COC.
- Within 7 days of the start of her period if the woman uses a progestogen implant or a LNG-IUD or a progestogen-only injectable.
- Within 7 days of a first or second trimester abortion, for any method of contraception.
- Within 28 days postpartum, whether the woman is breastfeeding or not; for any method of contraception.
- After 28 days up to 6 months postpartum if the conditions for lactational amenorrhoea ([Section 11.5.2](#)) are met, for any method of contraception.

Outside of these conditions, the delay in protection is 2 days for a POP and 7 days for a progestogen implant, a LNG-IUD, a progestogen-only injectable or a COC.

Contraceptives can be used immediately after childbirth (or abortion) and during breastfeeding, except for COCs which can be started at least 21 days after childbirth if the woman is not breastfeeding and at least 6 weeks after childbirth if the woman is breastfeeding.

All these methods are reversible. Return of fertility is prompt after stopping (or removing) contraception, with the exception of progestogen-only injectables.

## Hormonal contraception

### Progestogen implants

One (or two) rods inserted under the skin of the upper arm, under local anaesthesia.

- Protection: 3 years for ETG; 5 years for LNG. After this period the implant must be replaced if this method of contraception is still desired. It may be removed at anytime by a health professional if the contraception is no longer desired.
- Specifics to underline: effectiveness does not depend on compliance; bleeding may occur at any time (irregular) or there may be no monthly bleeding (amenorrhoea); the implant is discreet but palpable under the skin.

### Progestogen-only injectable

One injection every 13 weeks. There are 2 forms: DMPA-IM administered by IM route by a health professional and DMPA-SC for self-injection by SC route.

- Protection: 3 months.

- Specifics to underline: no daily administration; discreet method (no evidence of contraception); self-administration possible (DMPA-SC); long delay in return to fertility (on average 5 months after stopping injections, sometimes up to 1 year<sup>[1]</sup>); bleeding may occur at any time (irregular) or there may be no monthly bleeding (amenorrhoea).

## **Oral contraceptives**

POP

One tablet every day at the same time, without interruption, including during menstruation.

- Protection: ceases as soon as the contraceptive is stopped.
- Specifics to underline: effectiveness depends on compliance (risk of forgetting the pill); respect of precise time pill should be taken (no more than 3 hours late for LNG and 12 hours for desogestrel); bleeding may occur at any time (irregular) or there may be no monthly bleeding (amenorrhoea).

COC

One tablet every day, preferably at the same time, without interruption, including during menstruation (for 28-day pack with 21 active tablets of EE + LNG and 7 inactive tablets of iron salts)<sup>b</sup> .

- Protection: ceases as soon as the contraceptive is stopped.
- Specifics to underline: effectiveness depends on compliance (risk of forgetting the pill).

For more information on hormonal contraceptives, including contra-indications, drug interactions, precautions, refer to the guide [Essential drugs](#), MSF.

## **Intrauterine device**

Device inserted in the uterus within 48 hours after childbirth. If not inserted within 48 hours, delay insertion for 4 weeks<sup>[1]</sup> .

Can be used by women who have not had children.

There are 2 types available: hormonal IUDs that release levonorgestrel and copper IUDs.

- Protection: 5 years for a LNG-IUD; 10 years for a Cu-IUD.
- After this period the IUD should be changed if this method of contraception is still desired. It can be removed at any time by a health professional if this contraception is no longer desired.
- Specifics to underline: effectiveness does not depend on compliance; bleeding may occur at any time (irregular) or there may be no monthly bleeding (amenorrhoea) with LNG-IUD; prolonged bleeding and cramping particularly in the first few months with Cu-IUDs; IUD strings may be felt by the partner.

## **11.5.2 Other methods**

### **Condoms**

Condoms (male and female) are used for protection against sexually transmitted infections and also as a temporary method of contraception. They are sometimes used simultaneously with another type of contraception. Their effectiveness depends on consistent correct use with each act of intercourse. The contraceptive failure rate is high (18% for male condoms and 21% for female condoms).

### **Lactational amenorrhea method**

Breastfeeding is an effective (98%) temporary method of contraception but only if all 3 following conditions are met: 1) the mother's bleeding has not returned, 2) exclusive breastfeeding day and night, 3) infant is under 6 months old.

## Sterilisation

Tubal ligation is an irreversible surgical procedure. It is performed in certain cases (e.g. if a subsequent pregnancy carries life-threatening risks for the woman and she desires permanent contraception) during a surgical procedure or caesarean section. Written patient consent is required before performing the intervention.

## 11.5.3 Special situations

### HIV infection

Condom use helps prevent HIV transmission to a partner, reinfection by other strains of the HIV virus if the partner is HIV-positive, and transmission of other sexually transmitted infections. HIV-positive patients should systematically use condoms.

To prevent an unintended pregnancy, another effective method of contraception must also be used.

### Treatment with liver enzyme inducers

Liver enzyme inducers reduce the effectiveness of implants and oral contraceptives<sup>[2]</sup>. For women taking liver enzyme inducers (rifampicin, rifabutin, efavirenz, nevirapine, lopinavir, ritonavir, phenobarbital, phenytoin, carbamazepine, griseofulvin, etc.): recommend an IUD or a progestogen-only injectable.

### Emergency contraception

Every woman should be informed about and have access to emergency contraception. It should be used as soon as possible within 5 days or 120 hours after unprotected or inadequately protected sex (forgotten pill or condom breaking, etc.).

There are three possible options:

**levonorgestrel** PO: 1.5 mg single dose (3 mg single dose in women taking an enzyme inducer<sup>[2]</sup>)

or **ulipristal acetate** PO: 30 mg single dose

or a Cu-IUD

#### Notes:

- There is no contra-indication for oral emergency contraceptives.
- For women taking liver enzyme inducer(s), use levonorgestrel (3 mg) or a Cu-IUD.
- Placement of the IUD is contra-indicated in case of active genital infection<sup>c</sup>.

## **Footnotes**

- (a) For more information see: Centres for Disease Control and Prevention. Effectiveness of Family Planning Methods.  
[https://www.cdc.gov/reproductivehealth/contraception/unintendedpregnancy/pdf/Contraceptive\\_methods\\_508.pdf](https://www.cdc.gov/reproductivehealth/contraception/unintendedpregnancy/pdf/Contraceptive_methods_508.pdf)
- (b) If using 21-day pack: one tablet daily for 21 days, followed by a tablet-free interval of 7 days.
- (c) For more information see: World Health Organization. Medical eligibility criteria for contraceptive use, fifth edition 2015.  
[https://apps.who.int/iris/bitstream/handle/10665/181468/9789241549158\\_eng.pdf?sequence=1](https://apps.who.int/iris/bitstream/handle/10665/181468/9789241549158_eng.pdf?sequence=1)

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1. World Health Organization. Family Planning - A global handbook for providers, 2018.  
<https://apps.who.int/iris/bitstream/handle/10665/260156/9780999203705-eng.pdf?sequence=1>
2. FSRH. Clinical Guidance: Drug Interactions with Hormonal Contraception, 2018.  
<https://www.fsrh.org/standards-and-guidance/documents/ceu-clinical-guidance-drug-interactions-with-hormonal/>

# **Chapter 12: Termination of pregnancy**

[12.1 Care before termination of pregnancy](#)

[12.2 Medication abortion](#)

[12.3 Aspiration](#)

# 12.1 Care before termination of pregnancy

This chapter describes termination of pregnancy (ToP) for intrauterine pregnancies up to 22 weeks LMP.

## 12.1.1 Information and counselling

The decision to end a pregnancy belongs to the patient. Her decision 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 a confidential environment.

Prior to the ToP, ensure information and counselling:

- Listen to the patient: thoughts, feelings, situation, needs and concerns.
- Discuss ToP methods: description, advantages and disadvantages, follow-up.
- Discuss post-abortion contraception options (Chapter 11, [Section 11.5](#)).

Staff are required to respect the confidentiality of the consultation, the examination and the procedure.

The patient's consent for ToP should be clearly expressed.

## 12.1.2 History and examination

In case of doubt perform a pregnancy test. No other laboratory test is routinely required.

- Estimate the gestational age (date of last menstrual period and/or uterine size by bimanual examination or abdominal palpation); routine ultrasound is not recommended.
- Look for current problems and treat accordingly: sexually transmitted infection (e.g. abnormal vaginal discharge), signs of ectopic pregnancy, pelvic pain, fever, severe anaemia, etc.
- Take medical and obstetric history: look for contra-indication to ToP and/or subsequent contraception methods.
- In rare cases where an intrauterine device (IUD) is in place, it should be removed if possible.

## 12.1.3 Choosing a method

### Before 13 weeks LMP

There are 2 methods: medication abortion and aspiration. Instrumental curettage must not be used.

**Table 12.1** - Comparison between the 2 methods

	<b>Medication abortion</b>	<b>Aspiration</b>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Non-invasive method.</li> <li>• Can be done at home.</li> <li>• No antibiotic prophylaxis required.</li> </ul>	<ul style="list-style-type: none"> <li>• Immediate result.</li> <li>• No absolute contra-indications.</li> <li>• An IUD can be inserted at the end of the procedure.</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• No immediate result (takes hours to days).</li> <li>• Heavy bleeding and cramping as the pregnancy is expelled.</li> <li>• Aspiration required in the event of failure.</li> </ul>	<ul style="list-style-type: none"> <li>• Invasive method.</li> <li>• (Low) risk of uterine perforation or cervical laceration.</li> <li>• Antibiotic prophylaxis required.</li> </ul>

The choice of the method depends on the woman's preference and the feasibility in a given context. In most cases, medication abortion is preferred. Aspiration is also a valid and safe method that should be used when medication abortion is contra-indicated (coagulation disorders) or has failed or, when in a given the context, medication abortion is not an option.

### **Between 13 and 22 weeks LMP**

Only medication abortion can be provided.

# **12.2 Medication abortion**

Medication abortion is a safe and effective method of ToP. The risk of severe complications is less than 0.1% and the success rate is 97-98%.

The combination mifepristone + misoprostol is more effective than misoprostol used alone and reduces the number of misoprostol doses needed, thus reducing its adverse effects. Misoprostol, however, is an effective and safe option even when used alone.

## **12.2.1 Precautions**

- Coagulation disorders: MVA is preferred, if medication abortion is performed it must be carried out under observation.
- Chronic adrenal failure and severe uncontrolled asthma: use misoprostol alone.
- In case of 2 or more previous uterine scars, given the risk of uterine rupture:
  - Preferably use the combined regimen mifepristone + misoprostol, as fewer numbers of misoprostol doses are required.
  - From 13 to 22 weeks LMP: admit patient for observation; reduce the dose of misoprostol to 200 micrograms; respect a minimum interval of one day between mifepristone and misoprostol.

**Note:** mifepristone and misoprostol are not indicated for the termination of an ectopic or molar pregnancy.

## **12.2.2 Protocol**

<b>Before 13 weeks LMP</b>	<b>Between 13 and 22 weeks LMP</b>
<p><b>mifepristone</b> PO: 200 mg single dose Then 1 to 2 days later: <b>misoprostol</b> sublingually or vaginally: 800 micrograms<sup>[1]</sup></p> <p>If expulsion has not occurred within 24 hours, give a second dose of 800 micrograms of misoprostol.</p> <p>If mifepristone is not available or contra-indicated: <b>misoprostol</b> sublingually or vaginally: 800 micrograms every 3 hours (even if bleeding starts after the first or second dose); max. 3 doses.<sup>[2]</sup></p>	<p><b>mifepristone</b> PO: 200 mg single dose Then 1 to 2 days later: <b>misoprostol</b> sublingually or vaginally: 400 micrograms every 3 hours until foetal and placental expulsion<sup>[2]</sup></p> <p>If mifepristone is not available or contra-indicated: give misoprostol alone as above.</p>

## AND

<p>An analgesic or a combination of analgesics: <b>ibuprofen</b> PO: 800 mg every 8 hours (max. 2400 mg daily); start with misoprostol and continue as needed after expulsion, up to 3 days max.</p> <p>If needed, add: <b>codeine</b> PO: 30 to 60 mg every 6 hours (max. 240 mg daily) or <b>tramadol</b> PO: 50 to 100 mg every 6 hours (max. 400 mg daily).</p> <p>Use one of these 2 drugs alone if ibuprofen is contra-indicated.</p>
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### Notes:

- All these doses may be used in adults and adolescents over 12 years.
- Depending on the patient's specific constraints, mifepristone and misoprostol can be taken simultaneously.
- In the event of nausea/vomiting (not routinely): **metoclopramide** PO: 5 mg per dose for women < 60 kg; 10 mg per dose for women > 60 kg. The interval between each dose of metoclopramide should be at least 6 hours.

## 12.2.3 Patient care

### Before 13 weeks LMP

- Medication abortion is performed on an outpatient basis. A single visit is organized to provide information and counselling on ToP and the medication used for that purpose as well as on contraception and the specific method chosen by the patient.

- Mifepristone is usually given under direct observation but it is not mandatory. The woman can choose to take all medications at home.
- Misoprostol is taken at home 1 to 2 days later (4 tablets of 200 micrograms for the first dose). Bleeding and cramping are expected to start within 3 hours. In the vast majority of cases this treatment is successful. If expulsion has not occurred within 24 hours, a second dose (4 tablets of 200 micrograms) should be taken. Women can choose come back in consultation to take the misoprostol rather than taking it home.
- If misoprostol only regimen is used, provide the patient with the total number of doses (4 tablets of 200 micrograms every 3 hours; a total of 12 tablets).
- Ibuprofen is given to the patient to be taken once cramping starts. Provide quantity to cover 3 days of treatment.
- All contraceptive methods can be started that same day (implant is inserted or injection given during the consultation, oral contraceptive is given for a minimum of 3 months) except the IUD which can only be inserted after expulsion.

### **Between 13 and 22 weeks LMP**

- Due to an increased risk of complications, admit patient for observation after 12 weeks LMP, however, between 13 and 16 weeks LMP the woman can choose to take the treatment at home, unless there is a risk of uterine rupture ([Section 12.2.1](#)).
- As gestational age increases, expulsion takes more time and is more painful (ensure pain management accordingly).
- The foetus is more developed and is usually stillborn. In exceptional cases, transient spontaneous breathing and/or movements may be observed. This may be emotionally difficult for both the woman and medical staff.
- The disposal of the dead foetus must be handled discreetly and respectfully.
- For women 13-16 weeks LMP who chose to take the treatment at home, provide necessary information and counselling as above, including considerations regarding the disposal of the foetus.
- For misoprostol, give sufficient doses to ensure treatment for 24 hours (2 tablets of 200 micrograms every 3 hours; a total of 16 tablets). Advise the woman to stop misoprostol as soon as expulsion has taken place.

## **12.2.4 Patient information**

Before administering medications, the patient should be informed that:

- Medical abortion is effective and safe. Only 2 out of 100 women will need vacuum aspiration to end the pregnancy. Complications are rare.
- 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).
- During abortion, she will experience cramping, bleeding, expulsion of blood clots, and between 13 and 22 weeks LMP, expulsion of the foetus and placenta.

- Most often there will be no cramping and bleeding after taking mifepristone. Cramping and bleeding start 1 to 3 hours after taking misoprostol and usually slow down within 24 hours. They should not exceed 48 hours. Light bleeding may last up to 1 month.
- The abortion will be usually completed within 24 to 48 hours.
- Misoprostol, especially when several doses are taken, can cause nausea, diarrhoea, chills and fever that should not persist longer than 24 hours after taking the medication.
- Severe pain, heavy bleeding (soaking 2 pads per hour for 2 consecutive hours), foul smelling discharge and fever lasting more than 24 hours are signs requiring immediate medical attention.
- Menstrual periods will resume within 4 to 8 weeks but fertility returns rapidly; ovulation can occur as early as 10 days post-abortion. It is recommended to start contraception immediately.

## **12.2.5 Patient follow-up**

- No routine post-abortion consultation is required.
- The woman is encouraged to come back at any time if she has concerns, complications or questions.
- The woman is invited to return for contraception if she did not start a method immediately at the time of the abortion.

In the event of incomplete abortion, see Chapter 2, [Section 2.1.3](#).

In the event of ectopic pregnancy, see Chapter 2, [Section 2.2.3](#).

In the event of ongoing pregnancy before 13 weeks LMP, perform a vacuum aspiration (Chapter 9, [Section 9.5](#)).

## **References**

1. World Health Organization. Medical management of abortion, 2019.  
<https://apps.who.int/iris/bitstream/handle/10665/278968/9789241550406-eng.pdf?ua=1>
2. IPAS. Clinical Updates in Reproductive Health. April 2019.  
<https://ipas.azureedge.net/files/CURHE19-april-ClinicalUpdatesInReproductiveHealth.pdf>

# 12.3 Aspiration

Vacuum aspiration (either manual or electric) is the alternative to medication abortion.

## 12.3.1 Precautions

- Purulent cervicitis or pelvic infection:
  - delay aspiration if possible, until antibiotic treatment (Chapter 9, [Section 9.6.6](#)) has been completed.
  - if aspiration cannot be delayed, start antibiotic treatment before starting 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

Chapter 9, [Section 9.5.3](#).

## 12.3.3 Technique

- Follow precautions common to all intrauterine procedures (Chapter 9, [Section 9.1.1](#)).
- Start antibiotic treatment in case of infection if the abortion cannot be delayed. For antibiotherapy, see Chapter 9, [Section 9.6.6](#).
- For antibiotic prophylaxis, cervix preparation (if necessary), premedication, preparation of equipment, paracervical block and the procedure, see Chapter 9, [Section 9.5.4](#).

*Note:* if the patient desires an IUD as her method of contraception, it can be inserted after aspiration, as long as no pelvic infection is present.

## 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 ([Appendix 7](#)).
- The patient can go home if the vital signs are stable, if she can walk and she has been given the following information:
  - Cramps continue for a few days.
  - Bleeding lasts for 8 to 10 days.
  - Menstrual periods will resume within 4 to 8 weeks.
  - Fertility returns rapidly; ovulation can occur as early as 10 days post-abortion. Begin contraception that same day (Chapter 11, [Section 11.5](#)).

- Personal hygiene: cleansing with soap and clean water once daily; no vaginal douches.
- Seek immediate medical attention in case of severe pain or heavy bleeding, foul smelling discharge or fever.

## **Post-abortion consultation**

- No routine post-abortion consultation is required.
- The woman is encouraged to come back at any moment in case of concerns, complications or questions.
- The woman is invited to return for contraception if she did not start a method immediately at the time of the abortion.

### **12.3.5 Complications**

See Chapter 9, [Section 9.6.6](#).

# Appendices

[Appendix 1. Antenatal care card](#)

[Appendix 2. Intrauterine balloon tamponade](#)

[Appendix 3. Breastfeeding](#)

[Appendix 4. Daily amounts required for feeding](#)

[Appendix 5. Intravenous maintenance fluids for sick neonates](#)

[Appendix 6. Postnatal care card](#)

[Appendix 7. Pain management in pregnant or lactating women](#)

# **Appendix 1. Antenatal care card**

[Antenatal care card.pdf](#)

# **Appendix 2. Intrauterine balloon tamponade**

## **2.1 Indication**

Postpartum haemorrhage due to uterine atony, when uterotronics fail to control bleeding.

An intrauterine balloon is used to reduce intrauterine bleeding and avoid haemostasis hysterectomy.

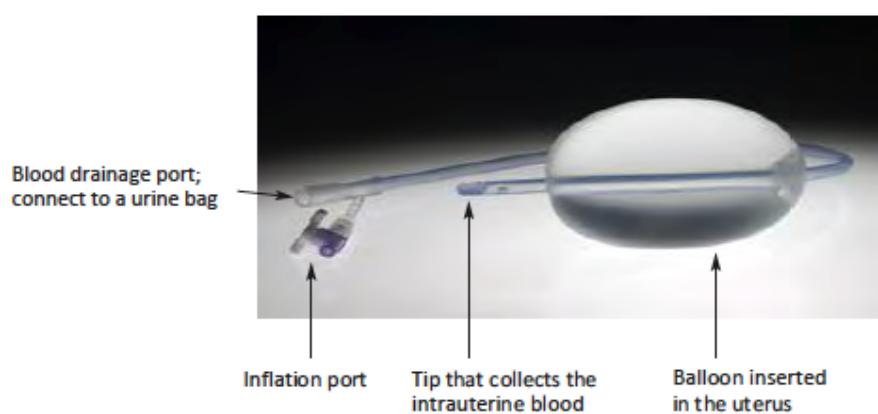
In a BEmONC facility, an intrauterine balloon can be used to stabilize the patient before referring her to a CEmONC facility.

## **2.2 Contra-indications**

- Uterine rupture
- Purulent infection of the vagina, cervix or uterus

## **2.3 Balloon catheter placement**

- Assess the need for analgesia/anaesthesia.
- Apply antiseptic solution (10% povidone 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 withatraumatic 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, 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 (max. 60 IU total dose) in 1 litre of Ringer lactate or 0.9% sodium chloride over 8 hours (42 drops/minute).
- Antibiotic treatment: **ampicillin IV 1 g + metronidazole IV infusion 500 mg or amoxicillin/clavulanic acid IV** (dose expressed in amoxicillin) 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, SpO<sub>2</sub> (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 tamponade 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 neonate 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 neonate has a good swallowing reflex: the milk can then be given by cup, spoon or syringe ([Section 3.3](#)).
- If the neonate cannot swallow effectively or at all: the milk is given with a nasogastric tube ([Section 3.4](#)) to prevent aspiration and exhausting the neonate.

If sucking is ineffective, check for hypoglycaemia (Chapter 10, [Section 10.3.4](#)) and danger signs (Chapter 10, [Section 10.3.1](#)).

If the neonate 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 neonate to the breast early, within an hour of birth.
- Correct and comfortable positioning of mother and neonate. Proper latch-on allows effective sucking and reduces complications (cracks): the neonate 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 neonate feeds).
- Maintaining exclusive breastfeeding (unless medically contra-indicated).
- Breastfeeding on demand at least 8 times daily day (at least every 3 hours).
- Good hydration (at least 3 litres daily) and a caloric intake > 2500 kcal daily for the mother, as these directly affect the amount of milk produced.
- Nipple care, washing with clean water before nursing.
- An organisation that allows the mother and neonate to stay together 24 hours a day.
- Help with maintaining lactation even if the mother has to be separated from her neonate (preventing milk production from stopping due to lack of stimulation).

Do not stop breastfeeding if:

- The neonate 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 neonate immediately after expressing the milk (by cup or nasogastric tube).

If the neonate 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<sup>a</sup>.

Warm the milk (water bath) to body temperature for the next feeding.

If no refrigerator is available, the milk can be stored in a clean container (covered) at room temperature for up to 4 hours if the ambient temperature is ≤ 22 °C or up to 1 hour if the ambient temperature is > 22 °C.

## 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 feed.

### **Technique**

The mother should (with help from a carer):

- Measure out the volume of milk needed according to the neonate's age and weight ([Appendix 4](#)).
- Hold the neonate in a half-seated or upright position on her lap.
- Place the cup/spoon gently against the neonate'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 neonate's lips.
- Let the neonate take the milk at his own pace; never pour the milk into the mouth.
- Stop feeding when the neonate closes the mouth and is no longer interested in feeding.

If the neonate coughs or regurgitates multiple times, or is not able to take a sufficient quantity it means he/she does not yet have a sufficient swallow reflex. In this case, the neonate should be fed using a nasogastric tube until a later time.

## 3.4 Administering the milk by nasogastric tube

### Indications

- Preterm or birth weight < 1500 g: poor sucking, limited or no coordination between sucking and swallowing, tire rapidly.
- Neonates with respiratory distress: risk of aspiration, tire rapidly.
- Sick neonates with little or no sucking and/or hypotonia.
- Neonates with cleft palate, particularly when the cleft is very wide.

### Feeding

Before each feed:

- Aspirate the gastric contents and use pH test to verify that the gastric tube is in the correct position.
- Check for signs of feed intolerance (vomiting, distended or tender abdomen, bloody stools). If present, assess gastric aspirate appearance and volume:
  - If the aspirate is clear or milky and < 3 ml/kg: re-inject the aspirate slowly and feed the planned amount. Re-evaluate aspirate before next feed.
  - If the aspirate is clear or milky and  $\geq 3$  ml/kg: reinject the aspirate slowly and feed planned amount minus the volume of the residual. Re-evaluate aspirate before next feed. Continue feeds but do not increase feed volume until aspirate volume is < 3 ml/kg.
  - If the aspirate is green, bloody, or fetid: do not re-inject the aspirate; stop the feeding, look for danger signs (Chapter 10, [Section 10.3.1](#)) and necrotizing enterocolitis (blood in stools and painful abdominal distension). Insert an IV line for maintenance fluid therapy ([Appendix 5](#)), start antibiotic therapy before transferring the neonate to a neonatal care 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 neonate 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 breast-feeding when milk production is less than the daily amount needed by the neonate,  
or
- In neonates who have difficulty suckling at the breast.

It consists of giving expressed breast milk or 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 neonate 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 neonate may need 2 or 3 days to adjust to the technique. If, for the first few days, the neonate 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)**

<b>Situation</b>	<b>Management</b>
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 neonate's chart.
Breastfeeding with inadequate amount of breast milk (amount of milk produced less than neonate's daily requirements)	<ul style="list-style-type: none"> <li>• Stimulate milk production by frequent breastfeeding (8 times daily).</li> <li>• Use a breast pump and the "supplementary nursing" technique.</li> </ul>
Ineffective sucking but good swallowing reflex	<ul style="list-style-type: none"> <li>• Express the milk with a breast pump or by hand.</li> <li>• Administer the milk using a cup, spoon or syringe.</li> </ul>
Ineffective sucking and poor or no swallowing reflex	<ul style="list-style-type: none"> <li>• Express the milk with a breast pump or by hand.</li> <li>• Feed breast milk via a nasogastric tube.</li> </ul>

## 3.7 Breastfeeding in HIV-infected women

To reduce the risk of HIV transmission, mothers should receive long-term antiretroviral therapy.

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.

### Footnotes

- (a) Managing newborn problems: a guide for doctors, nurses, and midwives. World Health Organization. 2003. <https://www.who.int/publications/i/item/9241546220>

# **Appendix 4. Daily amounts required for feeding**

## **Birth weight $\geq 2500$ g**

	<b>Total (ml/kg/day)</b>	<b>Breast milk</b>
<b>D1</b>	60	8 x 23 ml
<b>D2</b>	80	8 x 30 ml
<b>D3</b>	100	8 x 38 ml
<b>D4</b>	120	8 x 45 ml
<b>D5</b>	140	8 x 53 ml
<b>D6</b>	160	8 x 60 ml
<b>D7</b>	160-180	8 x 60-68 ml
<b>D8 and after</b>	160-200*	8 x 60-75 ml

\* Up to 220 ml/kg may be given, if necessary for growth.

## **Birth weight 1500 g - < 2000 g**

	<b>Total (ml/kg/day)</b>	<b>Breast milk</b>
<b>D1</b>	60	8 x 17 ml
<b>D2</b>	80	8 x 23 ml
<b>D3</b>	100	8 x 28 ml
<b>D4</b>	120	8 x 34 ml
<b>D5</b>	140	8 x 40 ml
<b>D6</b>	160	8 x 45 ml
<b>D7</b>	160-180	8 x 45-51 ml
<b>D8 and after</b>	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**

	<b>Total (ml/kg/day)</b>	<b>Breast milk</b>
<b>D1</b>	60	8 x 13 ml
<b>D2</b>	80	8 x 18 ml
<b>D3</b>	100	8 x 22 ml
<b>D4</b>	120	8 x 26 ml
<b>D5</b>	140	8 x 31 ml
<b>D6</b>	160	8 x 35 ml
<b>D7</b>	160-180	8 x 35-39 ml
<b>D8 and after</b>	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, neonates with a birth weight < 1500 g should receive 10% glucose in continuous IV infusion for the first 48 hours of life ([Appendix 5](#)). If the neonate is clinically stable, very small amounts of breast milk of 10 ml/kg per day can be started on D1 while awaiting transfer to a neonatal care unit.

If it is not possible to administer an IV infusion or to transfer to a neonatal care unit, give expressed breast milk and 10% glucose together orally as per the tables below.

	<b>Total (ml/kg/day)</b>	<b>Breast milk</b>	<b>10% glucose</b>
<b>D1</b>	80	12 x 5 ml	12 x 4 ml
<b>D2</b>	100	12 x 7 ml	12 x 4 ml
<b>D3</b>	120	12 x 10 ml	12 x 4 ml
<b>D4</b>	140	12 x 14 ml	12 x 2 ml
<b>D5</b>	160	12 x 18 ml	–
<b>D6</b>	160-180	12 x 18-21 ml	–
<b>D7</b>	160-200	12 x 18-23 ml	–
<b>D8 and after</b>	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**

	<b>Total (ml/kg/day)</b>	<b>Breast milk</b>	<b>10% glucose</b>
<b>D1</b>	80	12 x 5 ml	12 x 3 ml
<b>D2</b>	100	12 x 6 ml	12 x 3 ml
<b>D3</b>	120	12 x 8 ml	12 x 3 ml
<b>D4</b>	140	12 x 11 ml	12 x 2 ml
<b>D5</b>	160	12 x 15 ml	–
<b>D6</b>	160-180	12 x 15-17 ml	–
<b>D7</b>	160-200	12 x 15-19 ml	–
<b>D8 and after</b>	160-200*	12 x 15-19 ml	–

\* Up to 220 ml/kg may be given, if necessary for growth.

# Appendix 5. Intravenous maintenance fluids for sick neonates

Where feasible, start IV maintenance fluids in sick neonates that need to be nil by mouth or are unable to feed sufficiently by mouth, while awaiting transfer to a neonatal care unit.

**10% glucose** IV infusion: 60 to 80 ml/kg daily for ages D1 and D2

**1/5 0.9% sodium chloride + 4/5 10% glucose** IV infusion: 100 ml/kg daily for age D3

Birth weight/Age	D1	D2	D3
	<b>10% glucose</b>	<b>10% glucose</b>	<b>1/5 0.9% sodium chloride + 4/5 10% glucose</b>
≥ 3500 g	9 ml/hour	12 ml/hour	15 ml/hour
3000 g - < 3500 g	8 ml/hour	11 ml/hour	13 ml/hour
2500 g - < 3000 g	7 ml/hour	9 ml/hour	11 ml/hour
2000 g - < 2500 g	5 ml/hour	7 ml/hour	9 ml/hour

**Example:** for a 2 day old neonate with a birth weight of 2750 g, give **10% glucose** IV at 9 ml/hour, then from age D3, change to **1/5 0.9% sodium chloride + 4/5 10% glucose** IV given at 11 ml/hour.

# **Appendix 6. Postnatal care card**

[Postnatal care card.pdf](#)

# **Appendix 7. Pain management in pregnant or lactating women**

Analgesics		Pregnancy		Breastfeeding
		0-5 months	From 6 <sup>th</sup> month	
Level 1	<b>paracetamol</b> PO 1 g every 6 to 8 hours (max. 4 g daily) <b>paracetamol</b> IV < 50 kg: 15 mg/kg every 6 hours (max. 60 mg/kg daily) ≥ 50 kg: 1 g every 6 hours (max. 4 g daily)	first choice	first choice	first choice
	<b>ibuprofen</b> PO 200 to 400 mg every 6 to 8 hours (max. 1200 mg daily)	avoid	contra-indicated	possible Treatment must be as short as possible (≤ 5 days). Respect contra-indications.
	<b>acetylsalicylic acid (aspirin)</b> PO	avoid	contra-indicated	avoid
Level 2	<b>codeine</b> PO 30 to 60 mg every 4 to 6 hours (max. 240 mg daily)	possible	The neonate may develop withdrawal symptoms, respiratory depression and drowsiness in the event of prolonged administration of large doses at the end of the third trimester. Closely monitor the neonate.	Use with caution, for a short period (2-3 days), at the lowest effective dose. Monitor the mother and the neonate: in the event of excessive drowsiness, stop treatment.
	<b>tramadol</b> PO 50 to 100 mg every 4 to 6 hours (max. 400 mg daily)	possible	The neonate may develop drowsiness when the mother receives tramadol at the end of the third trimester and during breast-feeding.	

	<b>tramadol</b> IM, slow IV or infusion 50 to 100 mg every 4 to 6 hours (max. 600 mg daily)		Administer with caution, for a short period, at the lowest effective dose, and monitor the neonate.
<b>Level 3</b>	<b>morphine</b> PO immediate release (MIR) 10 mg every 4 hours, to be adjusted in relation to pain intensity <b>morphine</b> PO sustained release (MSR) The daily dose is determined during the initial treatment with immediate release morphine (MIR). If treatment is initiated directly with MSR: 30 mg every 12 hours, to be adjusted in relation to pain intensity <b>morphine</b> SC, IM 0.1 to 0.2 mg/kg every 4 hours <b>morphine</b> IV 0.1 mg/kg administered in fractionated doses (0.05 mg/kg every 10 minutes) every 4 hours if necessary	possible	The neonate may develop withdrawal symptoms, respiratory depression and drowsiness when the mother receives morphine at the end of the third trimester and during breast-feeding. Administer with caution, for a short period, at the lowest effective dose, and monitor the neonate.

