Obstetrics in remote settings

Practical guide
for non-specialized health care professionals

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Obstetrics in remote settings

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Foreword

This manual is intended for non-obstetricians working in remote settings where medical resources are lacking. The goal is to overcome the fundamental threat of pathology—that is, save the mother, protect her from any functional sequelae of the pregnancy, and deliver the child in the best possible conditions.

The manual is not meant to teach diagnosis and management to those unfamiliar with them; that requires several years of specialized study based mainly on practical experience. Rather, it presents the concepts most likely to help those practicing in difficult conditions.

We thought it necessary to discuss certain techniques, like symphysiotomy, which are now considered outdated. Conversely, some things, like X-ray pelvimetry, were deliberately omitted—not for the sake of leaving things out, but because they were not considered applicable.

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

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

Comments should be addressed to:

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

How to use this manual

Organisation

There are two easy ways to find information in this manual:

– The ***table of contents*** at the beginning of the manual with the number and title of each chapter, their subsections and page numbers.

– An ***alphabetical index*** at the end of the manual.

Names of drugs

The International Non-proprietary Name (INN) of drugs is used in this manual.

Abbreviations used

Units

kg = kilogram
g = gram
mg = milligram
µg = microgram
UI = international unit
M = million
ml = millilitre
dl = decilitre

Administration route

PO = per os - oral
IM = intramuscular
IV = intravenous
SC = subcutaneous

Drugs

AQ = amodiaquine
AS = artesunate
MQ = mefloquine
SP = sulfadoxine + pyrimethamine

Table of contents

CHAPTER 1

The diagnosis and monitoring of a normal pregnancy

Diagnosing pregnancy

Signs

– The first sign of pregnancy is amenorrhea, associated with an enlarged uterus (Figure 1).
Rule out other causes of amenorrhea: physiological (breastfeeding), medical (contraception, up to 3 months after stopping), endocrinological (e.g. thyroid problems), psychological, etc.

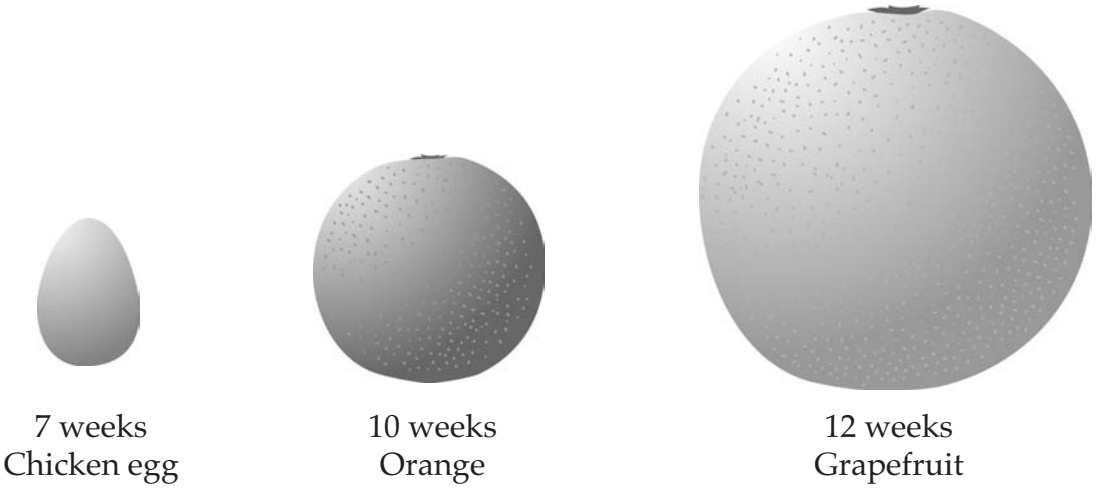


Figure 1
Size of the uterus during the first trimester of pregnancy

– Other signs:
  • gastrointestinal disturbances (nausea and vomiting in early pregnancy)
  • urinary frequency
  • drowsiness
  • breasts: tenderness, increased size, increased vascularisation, swollen areolae
  • increased skin pigmentation (linea nigra, darker nipples, "pregnancy mask")

Clinical examination

Digital vaginal examination with abdominal palpation, bladder empty (this examination must be culturally acceptable):

– Softened cervix (6 weeks)

– Abdominal palpation: the hand on the abdomen feels a globular, soft uterine fundus above the symphysis pubis

– Noble's sign: the finger in the vagina cannot enter the lateral cul-de-sac; the uterus occupies the cul-de-sac.

– Hegar's sign (Figure 2): when placed on the cervical isthmus, the fingers in the vagina can easily make contact with those on the abdomen, because the uterus is hypermobile and tips forward.

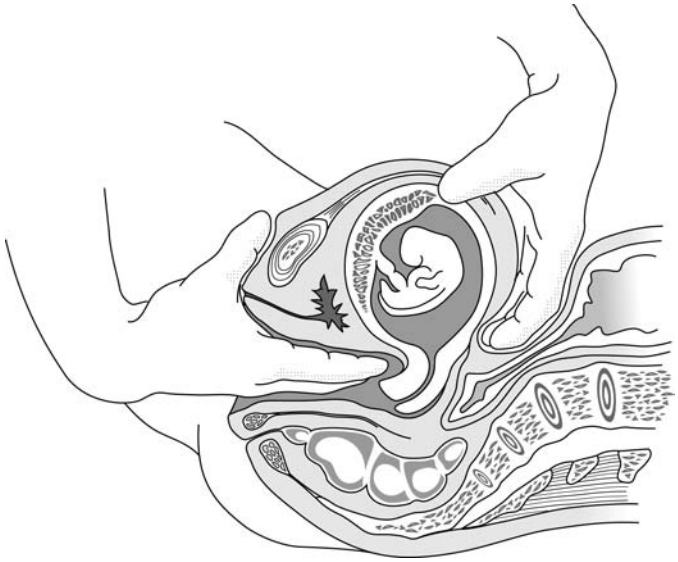
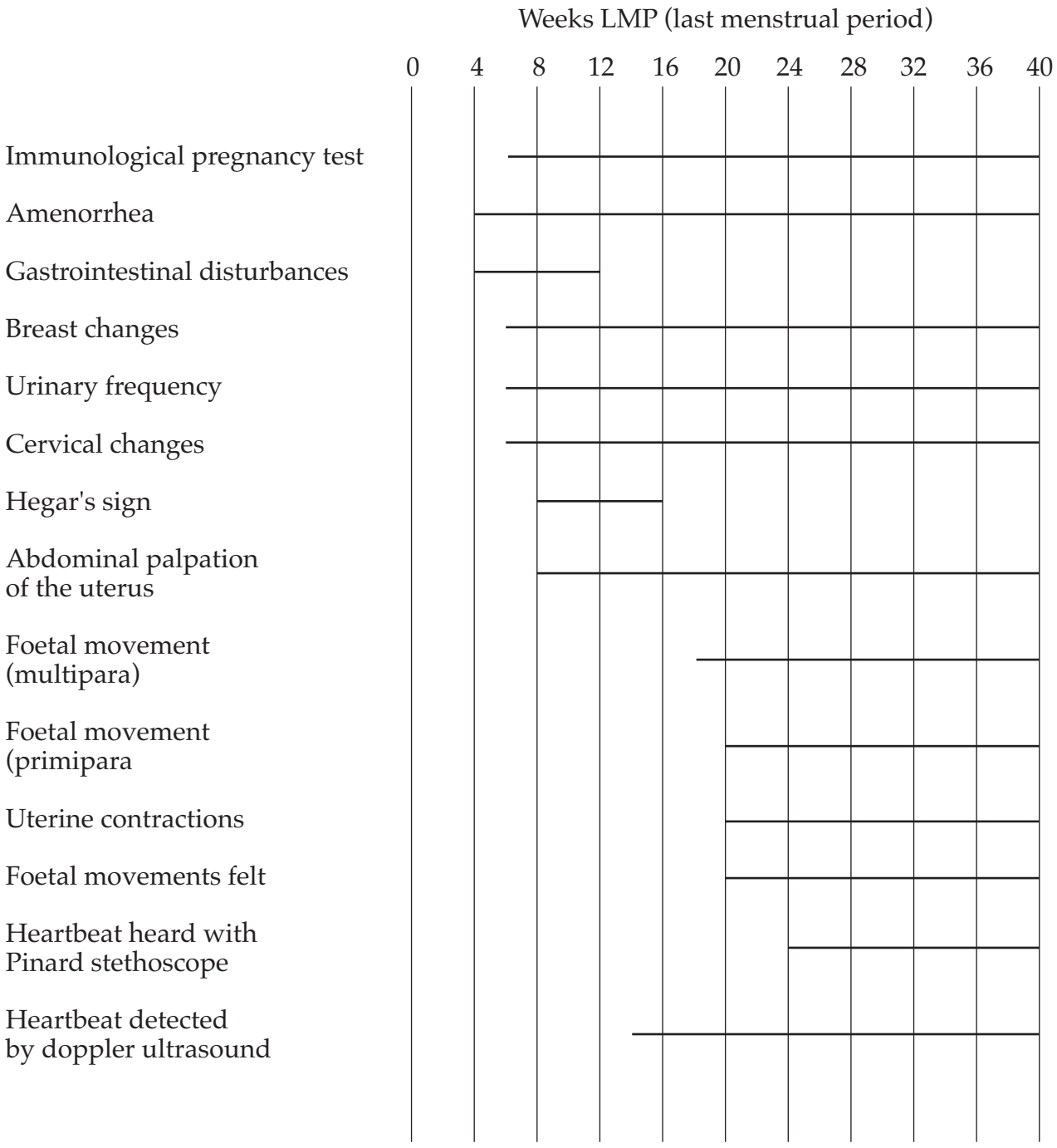


Figure 2
8 weeks: Hegar's sign

Pregnancy testing

A pregnancy test is not systematically indicated. It is indicated:
– when ectopic or molar pregnancy is suspected,
– for early diagnosis of pregnancy with a view to abortion.

Timetable of pregnancy signs



Antenatal visits

Objectives of antenatal monitoring

– Screening for and management of coexisting diseases: hypertension, anaemia, malaria, syphilis, urinary tract infection, HIV infection, malnutrition, vitamin deficiencies, etc.
– Screening for and management of complications: uterine scar, abnormal presentation, premature rupture of membranes, multiple pregnancy, vaginal bleeding
– Prevention of anaemia, maternal and neonatal tetanus, malaria, and mother-to-child HIV transmission
– Advice and preparation for childbirth

Schedule of antenatal visits

For uncomplicated pregnancies

Ideally, there should be 4 antenatal visits:

Visit 1: first trimester, or before the end of the 4th month
Visit 2: second trimester
Visit 3: at the beginning of the third trimester
Visit 4: during the 9th month

There is no advantage to increasing the number of routine visits if the woman's history is unremarkable and no problems have been found.
Quite often, the patient does not come in until the second trimester. In this case, make an effort to see the patient at least twice prior to delivery.

For complicated pregnancies

The number of antenatal visits may be increased depending on the problems found (see page 20).

Content of antenatal consultations

1. Interview (first visit)

– Social context: family situation, work, living conditions
– Obstetric and surgical history:
  • number of pregnancies
  • obstetrical accident
  • abortion, spontaneous or not
  • children, living and dead
  • caesarean section
  • forceps or vacuum extraction
  • vesicovaginal or rectovaginal fistula

– Medical history and ongoing treatment:
  Hypertension, diabète, asthme, épilepsie, cardiopathie, infection par le HIV, etc.

2. Estimated date of delivery (first visit)

– Try to be as accurate as possible:
  • *in weeks since last menstrual period (weeks LMP)*: measured from the first day of the last menstrual period; 40 or 41 weeks LMP total (calculation varies from one country to another)
  • *in months*: subtract 3 months from the date of the last menstrual period, add one year plus 14 days (date of last period + 14 days + 9 months)
– Compare these results to those of the clinical examination, because women may not be certain of the date of the last menstrual period.

3. Clinical examination

First visit

– Blood pressure (seated patient, at rest), weight
– Height (short women only)
– Look for pelvic tenderness, contractions, fever, signs of urinary tract infection, vaginal discharge or bleeding, anaemia, oedema, etc.
– Palpate the uterus, determine the presentation (depending on the term of pregnancy), look for abdominal scar
– Measure the fundal height, between the upper edge of the symphysis pubis and the uterine fundus. For gestational age between 4 and 7 months, the expected fundal height can be estimated by multiplying the gestational age in months by 4; for example, at 4 months, estimated height = 16 cm (Figure 3).

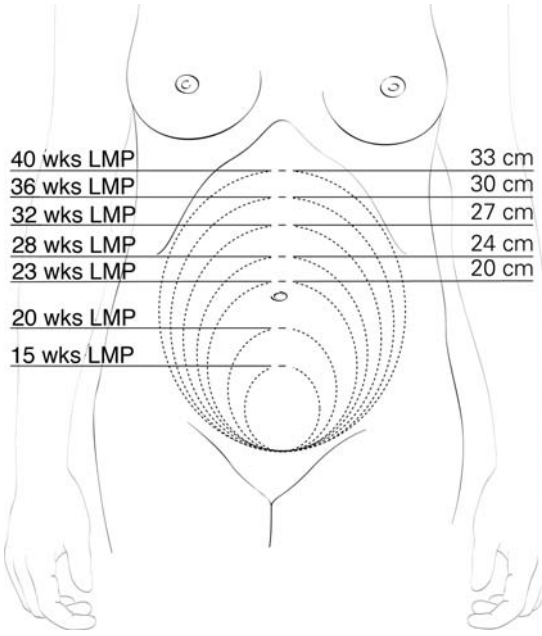


Figure 3
Size of the uterus as a function of the number of weeks since the last menstrual period

– Listen for heartbeat
– Examine the perineum, if possible, to look for scarring, narrowing, or mutilation.
– A vaginal examination is not routinely done. Perform a vaginal examination only if there is doubt about the pregnancy diagnosis, or if there is a suspicion or history of uterine pathology.

Subsequent consultations

– Blood pressure, weight, oedema
– Look for pelvic tenderness, contractions, fever, signs of urinary tract infection, vaginal discharge, bleeding, etc.
– Measure the fundal height.
– Check for foetal heartbeat and movement

Final consultation near the due date

– Blood pressure, weight, oedema
– Look for pelvic tenderness, contractions, fever, signs of urinary tract infection, vaginal discharge, bleeding, etc.
– Measure the fundal height. Near the due date, it is between 32 and 35 cm (Figure 4).

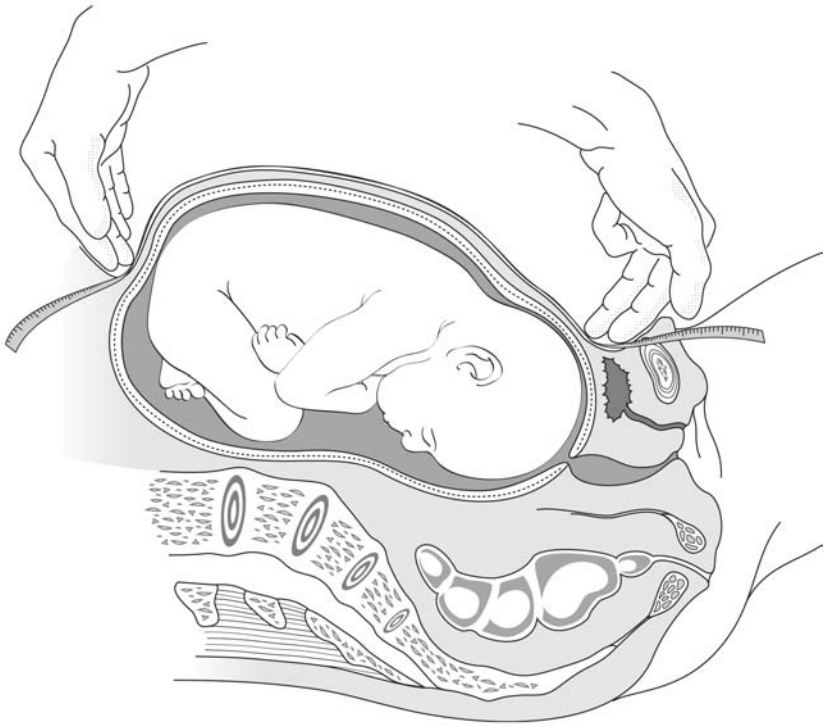


Figure 4
Measuring the fundal height

– Determine the presentation of the foetus

By palpation:
- Cephalic pole: round, hard, regular, ballotable between the hands, separated from the rest of the body by the indentation of the neck, beyond which can be felt the projection of the shoulder.
- The pelvic pole: soft; larger and less regular than the cephalic pole; no neck indentation.

Types of presentation:
- Cephalic: the head is lowermost (head-down or head-first position)
- Breech: the head is in the uterine fundus
- Transverse: the 2 poles lie in each of the mother's sides

Close to the due date, the latter two presentations require special obstetrical arrangements (see page 20).

Be careful with high presentations: this might indicate a transverse presentation, placenta praevia and other obstacle, or a narrow pelvis.

– Exploration along 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.
– Auscultation of the foetal heartbeat
  In the umbilical region, along the foetal back, at shoulder level.
  It should be regular, rapid (120-160/minute), and not synchronized with the mother's pulse.
– Pelvic exam (desirable near the due date)
  • Cervix: often posterior, reached with the fingertips. Normally closed in primiparas. In multiparas, the external os is generally open.
  • Lower segment: the part of the uterus that develops, during pregnancy, between the body of the uterus and the cervix; flared and thin, allowing the presentation to be felt.
  • Presentation: cephalic (hard and regular), breech (soft and irregular). A transverse presentation cannot be felt with the fingers.
  • Position of presentation relative to the superior pelvic strait: a high, mobile presentation in multiparas prior to labour; a fixed presentation—that is, cannot be pushed back—in the primipara in early labour.
  • Evaluation of the bony pelvis: small if it is possible for the fingers to reach the top of the sacrum (promontory) and/or follow the lateral edges of the pelvis along their entire length (Figure 5). If the woman has a limp, look for asymmetry.
    A small pelvis increases the risk of obstructed labour and foetopelvic disproportion but does not, alone, justify scheduling a caesarean. It calls for close monitoring of labour with a partogram (the foetopelvic relationship will be evaluated during labour), and delivery in a surgical facility, so that a caesarean can be performed, if needed.

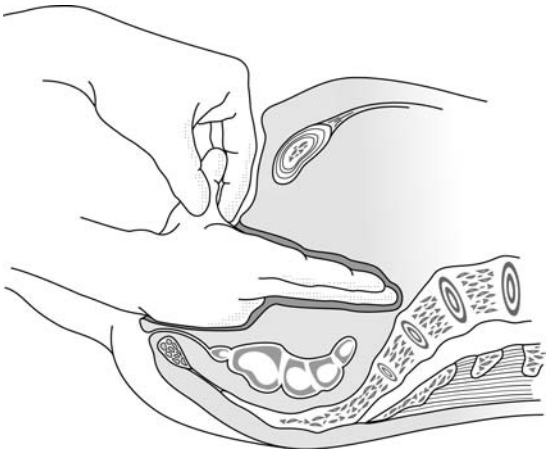


Figure 5
Measuring the distance from the sacral promontory to the lower edge of the symphysis pubis. If the fingers can reach the sacral promontory, the pelvis is small.

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).

4. Prevention and routine screening

Maternal and neonatal tetanus

– Pregnant women not vaccinated against tetanus in childhood or adolescence should receive at least 2 doses of tetanus vaccine (TT) before giving birth:
  • the first dose should be administered at the first visit,
  • the second dose should be administered at least 4 weeks after the first dose, and at least 2 weeks before the presumed delivery date.
– After the birth, continue according to the schedule below to a total of 5 doses. Once given, these 5 doses confer lifelong protection.

Vaccination schedule for women who are pregnant or of childbearing age (WHO)

Dose	When to give	Level of protection
TT1	At the first contact with medical services *or as early as possible during pregnancy*	0%
TT2	At least 4 weeks after TT1 *and no later than 2 weeks before delivery*	80%
TT3	At least 6 months after TT2 *or during the next pregnancy*	95%
TT4	At least 1 year after TT3 *or during subsequent pregnancy*	99%
TT5	At least 1 year after TT4 *or during subsequent pregnancy*	99%

Anaemia

Pregnancy exacerbates anaemia through iron deficiency, and anaemia increases the risk of intrauterine growth retardation.

– When possible, measure haemoglobin at the first antenatal visit.
– If haemoglobin concentration is over 11 g/dl or if there are no clinical signs of anaemia (no pallor of the palms, conjunctivae, or tongue), treatment includes:
  1) iron + folic acid supplement, using 200 mg **ferrous sulfate** (65 mg elemental iron) + 400 µg **folic acid** PO: 1 or 2 tablets/day as a single dose or in 2 divided doses, depending on the prevalence of anaemia. Women should be treated for a total of 3 months. In general, the treatment is divided into three one-month series.
  2) after the start of the 2nd trimester, presumptive treatment of malaria in endemic areas, to be repeated at least once (see *Malaria*, below).
  3) after the start of the 2nd trimester, anthelmintic treatment in endemic areas: **albendazole** PO: 400 mg or **mebendazole** PO: 500 mg as a single dose.
– If haemoglobin concentration is below 11 g/dl or if there are clinical signs of anaemia (pallor of the palms, conjunctivae, tongue): see page 47.

Malaria

– Perform a rapid test at each visit, even if clinical signs are absent.

– If the test is positive, treat according to the local resistance to antimalarials (see page 63).

– If the test is negative, in high-risk malaria-endemic regions where *P. falciparum* is still sensitive to sulfadoxine-pyrimethamine (SP), a presumptive intermittent treatment at curative dose may be administered at regular intervals, as follows:

No known HIV infection	Administer 2 treatments during pregnancy: 1st treatment after the start of the 2nd trimester 2nd treatment after the start of the 3rd trimester Allow at least one month between the 2 treatments.
In cases of known HIV infection, or if HIV status is not known but the prevalence of HIV in the area is high.	Administer 4 treatments rather than 2: 1st treatment after the start of the 2nd trimester 2nd, 3rd and 4th treatment: before childbirth Allow at least one month between any 2 treatments.
In HIV+ women receiving cotrimoxazole prophylaxis	Do not administer intermittent treatment with SP.

  This treatment can reduce the consequences of malaria (maternal anaemia, low birth weight). The dose of **SP** for each treatment is 3 tablets as a single dose.

– In all cases, use an insecticide-treated mosquito net.

Syphilis

Syphilis screening is essential, and is done at the first visit, as early as possible in pregnancy. Use a rapid test (Determine®, RPR). Any woman who tests positive should be treated immediately (see page 61).

Urinary tract infection

At each visit, look for symptomatic urinary tract infection or asymptomatic bacteriuria. Perform a dipstick test. Any woman who tests positive (presence of leukocytes AND nitrites), whether symptomatic or not, should be treated immediately (see page 61).

HIV infection

The antenatal visit can be an opportunity for voluntary testing (i.e., after informing the patient and obtaining her consent). HIV screening is useful if prevention of mother-to-child transmission and treatment of the mother can be offered to those testing positive (see page 67).

Vitamin and micronutrient deficiencies

– Vitamin K1:
  For women being treated with an enzyme inducer (rifampicin, phenobarbital, phenytoin, carbamazepine), it is recommended to administer **phytomenadione** PO in the 15 days preceding the expected date of delivery (10 mg/day).

This preventive treatment does not eliminate the need to administer vitamin K to the child at birth for prevention of hemorrhagic disease of the newborn (see page 177).

– Vitamin D:
Some national protocols may include administration of vitamin D to prevent neonatal hypocalcaemia:
colecalciferol (vitamin D3) or **ergocalciferol** (vitamin D2) PO: 100,000 IU in the 6th or 7th month of pregnancy (two 50,000 IU tablets or capsules as a single dose)

– Vitamin A:
Administration of vitamin A during pregnancy is not indicated (unless there is a confirmed deficiency, i.e. clinically detectable xerophthalmia).
A single dose of retinol is administered *after delivery* in areas where vitamin A deficiency is endemic (see page 188).

– Iodine:
Iodine deficiency during pregnancy increases the risk of miscarriage, preterm birth, severe mental and growth retardation in the child, and neonatal or infant death. Iodine supplementation is necessary in areas where iodine deficiency is endemic. Check national recommendations.

Malnutrition

In situations where food is scarce, supplementation is recommended for all pregnant women throughout their entire pregnancy.
In the event of malnutrition, the woman should be admitted into a therapeutic feeding centre.

5. Complicated pregnancies

The term "complicated" pregnancies refers to pregnancies where the risks to mother or newborn are increased due to some pathology or specific obstetric history. They call for higher level antenatal monitoring and/or special medical/surgical arrangements for delivery.

Situations requiring higher level monitoring

In the following situations, risks are mainly increased during pregnancy, but not particularly during delivery:
– History of preterm delivery or multiple miscarriages (risk of recurrence). Advise rest.
– History of unexplained prenatal intrauterine foetal death
– Progressive associated pathology, for example, upper urinary tract infection (risk of preterm delivery), anaemia (possible exacerbation), etc.

Situations that call for special precautions during delivery

In these situations, risks are mainly increased during delivery itself, but not particularly during the pregnancy.

Arrange for delivery in a maternity hospital with an operating room if:
– History of uterine surgery (risk of uterine rupture). For women who have had a prior caesarean, find out why and, if possible, the technique used.
  • If there is a history of uterine rupture, severe vesico-vaginal fistula, myomectomy, perforated uterus, vertical (classical) uterine incision, or more than 2 caesarean births, routinely schedule a caesarean at 39 weeks LMP.

  - If the only history is a prior lower segment caesarean, another caesarean is not routinely indicated (although it is not excluded).
- History of symphysiotomy (risk for another obstructed labour)
- History of third degree tear (risk of recurrence)
- Breech or transverse presentation at term: routine caesarean for transverse presentation if version fails; possible caesarean for breech presentation.

Arrange for delivery in a maternity hospital if:
- History of intrapartum intrauterine foetal death or death in the first day of life (risk of recurrence)
- History of haemorrhage during a prior delivery (risk of recurrence, maternal death). Administer oxytocin systematically after delivery.
- History of forceps or vacuum delivery (risk of recurrence)
- Height less than 1.40 m, depending on ethnicity (risk of foetopelvic disproportion)
- Primipara (risk of obstructed labour)
- Limp, hip dislocation, polio sequelae with frank pelvic asymmetry (risk of obstructed labour)
- Grand multiparity (risk of uterine rupture, uterine atony, uterine atony-related haemorrhage). Administer oxytocin systematically after delivery.

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

Situations requiring higher level monitoring during pregnancy AND special precautions during delivery

- History of abruptio placentae, severe preeclampsia, eclampsia (secondary aspirin prophylaxis, see pages 40, 51, 52).
- Preeclampsia (risk of eclampsia, coagulopathy, maternal death, abruptio placentae, intrauterine growth retardation, intrauterine foetal death)
- Haemorrhage (risk of preterm delivery, foetal distress, intrauterine foetal death, anaemia, or maternal death)
- Severe anaemia (risk of intrauterine growth retardation, prematurity, neonatal anaemia, increased vulnerability in the event of haemorrhage). Transfusion should be available in the event of severe anaemia during the 3rd trimester.
- Multiple pregnancy (risk of obstructed labour, preterm delivery, hypertension, diabetes, intrauterine growth retardation, postpartum haemorrhage). Advise rest.
- Premature rupture of membranes (risk of infection, preterm delivery, intrauterine foetal death)

6. Advice and preparation for delivery

There are two approaches: group sessions, or individual sessions during antenatal visits.

Group sessions

The advantage of the group approach is that it brings women together, encourages exchanges between them, and promotes the use of available services. These group sessions are often part of the national health program.

Topics to tackle in group sessions:
- The importance and objectives of antenatal visits
- Danger signs during pregnancy and delivery, and the importance of quickly seeking medical care

– The use of insecticide-treated mosquito nets
– Information on HIV, screening tests and prevention of mother-to-child transmission, if available.
– The use of the "birth kit,"[1] if this kit is used in the area
– The importance of the postnatal visit
– Timing births and family planning

Individual sessions

Individual sessions have a more direct impact on the immediate future (for example, planning with the woman where the birth will take place). They allow you to reinforce the messages delivered in the group sessions, supplement them with advice specially tailored to the woman's specific medical and social situation, and strengthen the woman's trust in the medical unit and its staff.

Topics to tackle during individual sessions:
The choice of topics depends on the stage of pregnancy and the woman's specific circumstances. All the topics addressed in the group sessions are worth discussing again in the individual sessions.
– Advice specifically tailored to the woman's concerns and any problems detected.
– Danger signs during pregnancy and delivery, and the importance of quickly seeking medical care.
– Planning for the delivery. Emphasize the importance of giving birth in a hospital setting to women who require special precautions.
– Family planning and timing of births, especially for grand multiparas and women at obstetrical risk.

[1] Individual kit given to women delivering at home. It contains a plastic drape to spread out on the floor, soap (for cleansing the mother's genital area and midwife hand washing), a thread and razor blade for tying and cutting the cord, and possibly a cloth for drying the newborn.

7. Example of a pregnancy monitoring card (front/back)

DELIVERY

Date: 25 September 2006
Location: home
Type of delivery: vaginal, cephalic

MOTHER

Perineum: intact
Third stage of labour: normal, rapid
Treatment received: none

CHILD

Sex: female
Birth weight: ?
Name: XXXXXXX
Treatment received at birth: none

POSTNATAL VISIT

Date: 27 September 2006

EXAM - MOTHER

TA 120/60, T° 37,5 °C
perineum, breasts, conjunctivae = OK
lochia normal

Treatment:
iron/folic acid 1 tab/day x 1 month
vitamin A 200,000 IU single dose
Does not want contraception

EXAM - CHILD

weight 3200 g, exam normal
breast-fed

Treatment:
cord care, vitamin K1, ophthalmic tetracycline

Vaccination:
BCG, polio (0), hepatitis B (1)

PREGNANCY MONITORING CARD

Name: XXXXXXXXX
Address: camp 2

Age: 28 yrs Height: > 1.50 m

Live births: 3
Living: 2 Dead: 1 (meningitis at 6 months)
Stillbirths: 1
Abortions or miscarriages: 2
Gestation*: 7 Parity**: 4

Last menstrual period:
1st week of January 2006?
Due date: mid-october 2006

Medical / surgical history:
tuberculosis in 2000 (treated, cured)

Obstetric history:
postpartum haemorrhage (cause?) for 2nd delivery (stillbirth)

Tetanus vaccination:
TT1 november 2003
TT2 january 2004
TT3 8 april 2006

Others:
hasn't heard from her husband since March 2006

* number of pregnancies, including the current pregnancy
** number of prior deliveries

Date	8 April 06	1 July 06	12 August 06	9 September 06		
Term in weeks LMP or months	14 weeks LMP	26 weeks LMP	32 weeks LMP	36 weeks LMP		
Weight	56 kg	58 kg	61 kg	62 kg		
BP	100/60	110/70	110/60	120/70		
Signs and symptoms	burning on urination T° 37 °C	–	–	a few contractions		
Fundal height	just above pubis	22 cm	27 cm	30 cm		
Foetal movement	–	+	+	+		
Foetal heartbeat	–	+	+	+		
Presentation	–	–	breech	cephalic		
Lab tests	urine: WBC ++ nitrites ++ paracheck (-) syphilis test (-)	urine (-) paracheck (-)	urine (-) paracheck (-)	urine (-) paracheck (-)		
Preventive treatment	iron/folic acid 1 tab/day x 1 month TT3	iron/folic acid 1 tab/day x 1 month albendazole 400 mg single dose SP dose 1 (3 tabs)	iron/folic acid 1 tab/day x 1 month ergocalciferol 100,000 UI single dose SP dose 2 (3 tabs)	iron/folic acid 1 tab/day x 1 month		
Therapeutic treatment	fosfomycin-trometamol 3g single dose	–	–	–		
Mis.	cystitis, no upper UTI signs, return in 3 days if no improvement	see again ++ for	not certain to come presentation	to centre for delivery, given birth kit and advice		

CHAPTER 2

Bleeding during pregnancy

Bleeding during the first half of pregnancy

Look for pregnancy in any case of vaginal bleeding in a woman of childbearing age (see Chapter 1 for the diagnosis of pregnancy).

The two diagnoses to firstly consider during the first half of pregnancy are *abortion* and *ectopic pregnancy*.

Abortion

Spontaneous or induced interruption of pregnancy before the end of the sixth month. Induced abortions are often clandestine: consider the possibility of local infection, perforation, and tetanus.

The main differential diagnosis, in a context of amenorrhea, is ectopic pregnancy, examination and follow-up are therefore essential.

1. Diagnosis

– Light bleeding, pelvic pain, closed cervix: threatened abortion

– More or less severe bleeding, pelvic pain, uterine contractions, expulsion of the embryo and membranes or products, open cervix: incomplete abortion

2. Management

Threatened abortion

– Look for foreign bodies or vaginal wound consistent with induced abortion; remove foreign bodies, clean the wound; update tetanus immunization.

– Place the patient on rest. Either the threat of abortion recedes, or abortion is inevitable.

– Treat pain if necessary: oral paracetamol or antispasmodic.

Incomplete abortion

– In all cases:
  • take pulse and BP, assess the severity of bleeding;
  • treat pain: oral or injectable anti-inflammatory or antispasmodic;

- tetanus prophylaxis:

	Spontaneous abortion or Induced abortion under medical supervision	**Self-induced, non-medical abortion, with wound or foreign body**
Non immunized or Immunization status unknown	Begin immunization against tetanus	Begin immunization against tetanus + Human tetanus immunoglobulin
Incompletely immunized	Tetanus booster	Tetanus booster + Human tetanus immunoglobulin
Fully immunized ***Last booster dose:*** **< 5 years** **5 to 10 years** **> 10 years**	 No prophylaxis No prophylaxis Tetanus booster	 No prophylaxis Tetanus booster Tetanus booster + Human tetanus immunoglobulin

– In the event of vaginal wound, remove foreign bodies and clean.

– If bleeding is heavy:
  - Monitor pulse, BP, bleeding;
  - Insert an IV line, administer Ringer lactate;
  - Prepare for a possible transfusion (determine patient's blood group and identify potential donors). If transfusion is necessary, only use blood that has been screened (at least for HIV-1, HIV-2, hepatitis B and C).

– For septic abortion (fever, abdominal pain, tender uterus, foul-smelling discharge), add:
  amoxicillin-clavulanic acid (**co-amoxiclav**) IV: 6 g amoxicillin/day divided in 3 injections administered 8 hours apart
  + **gentamicin** IM: 5 mg/kg once daily
  Continue for 48 hours (until the fever disappears), then change to **co-amoxiclav** PO: 3 g/day in 3 divided doses, to complete 5 days of treatment.
  or
  ampicillin IV: 6 g/day divided in 3 injections administered 8 hours apart
  + **metronidazole** IV: 1.5 g/day divided in 3 infusions administered 8 hours apart
  + **gentamicin** IM: 5 mg/kg once daily
  Continue for 48 hours (until the fever disappears), then change to **amoxicillin** PO: 3 g/day in 3 divided doses + **metronidazole** PO: 1.5 g/day in 3 divided doses, to complete 5 days of treatment.

– Depending on the stage of pregnancy:

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

Between 10 and 12 weeks LMP:
Uterine evacuation is usually required due to retained debris, which can cause bleeding and infection. If uterine evacuation is necessary, there are three options:

- Instrumental methods:
  - manual vacuum aspiration (page 161)
  or
  - curettage (page 165).
  Aspiration under local anaesthesia is the method of choice. It is technically easier to perform, less traumatic and less painful than curettage.
  Obstetrical units should have aspiration equipment available; physicians and midwives should know how to use it.
- Medical method:
  The use of **misoprostol** (600 μg PO as a single dose) may avoid surgical intervention. There is, however, a risk of failure that increases as the pregnancy progresses. Treatment success (that is, an empty uterus) must be verified in the days after the drug is taken. If the medical method fails, the use of an instrumental method is unavoidable.

Beyond 12 weeks LMP:
Be patient; leave the amniotic sac intact and allow labour to take its course. The placenta is usually expelled with the foetus. Part of the placenta may be retained. If examination of the placenta leaves any doubt, or in the event of haemorrhage, rapidly perform digital curettage after the expulsion. If delayed, this procedure becomes impossible due to retraction of the cervix. At that point, instrumental curettage–with its significant risk of uterine perforation–becomes necessary (see page 165).

– Afterward, provide iron supplementation or, in case of anaemia, therapeutic treatment.

Ectopic pregnancy

Implantation of the fertilized egg outside of the uterine cavity, usually in the fallopian tube (Figures 6 and 7), less frequently in the ovary or abdomen. Predisposing factors are history of peritonitis or pelvic infection.

Figure 6: *Tubal pregnancy*

Figure 7: *Ampullary pregnancy*

Three clinical presentations:
– haematosalpinx: accumulation of blood in the fallopian tube;
– haematocele: progressive bleeding with haematoma formation in the Pouch of Douglas (Figure 8), haemodynamic parameters preserved;
– haemoperitoneum: bloody effusion into the peritoneal cavity secondary to rupture of the fallopian tube and its blood vessels. This is the clinical picture seen most commonly in rural areas.

A pregnancy test is only valuable if it is positive; a negative result does not rule out the diagnosis.

1. Diagnosis

Haematosalpinx

– A few weeks of amenorrhea, then vaginal bleeding or menstrual irregularity, pelvic pain.
– Vaginal examination: painful adnexal mass, slightly enlarged uterus.
– Differential diagnosis: salpingitis (although moderate fever may also be present in ectopic pregnancy), ovarian cyst (twisted or ruptured), abortion (although clots may also be expelled in ectopic pregnancy).

Haematocele

– Amenorrhea, then vaginal bleeding, pelvic tenderness, urinary frequency and dysuria (due to compression of the bladder), fainting, possible fever.
– Vaginal examination: pelvic mass with ill-defined borders and uneven consistency, which pushes the uterus forward, forcing the cervix up against the symphysis pubis, exquisite pain in the Pouch of Douglas.
– Blackish blood may be seen upon puncture of the Pouch of Douglas.

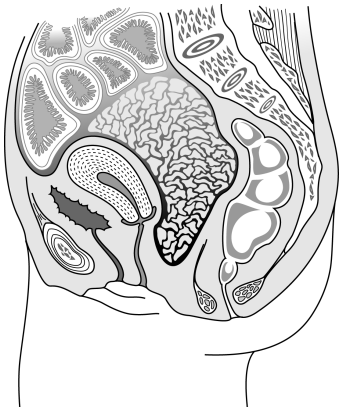


Figure 8
Haematoma in the Pouch of Douglas

Haemoperitoneum

– Amenorrhea or menstrual irregularity, vaginal bleeding.
– Shock: pallor, thirst, thready pulse, BP very low or unmeasurable.
– Distended, tender abdomen, exquisite pain in the Pouch of Douglas, painful adnexal mass.
– Ultrasound: intraperitoneal effusion, empty uterus.
– If ultrasound is not available and there is still some doubt, there are two other diagnostic procedures that can be used: culdocentesis (Pouch of Douglas puncture) and diagnostic peritoneal lavage.

2. Diagnostic procedures

Culdocentesis (Figure 9)

- General (ketamine) or local (lidocaine 1%) anaesthesia.
- Swab the perineum, vagina and cervix with polyvidone iodine.
- Grasp the posterior lip of the cervix with Pozzi forceps, while an assistant depresses the posterior wall of the vagina with a speculum.
- Puncture the posterior vaginal cul-de-sac using a large calibre needle held as close to horizontal as possible, and aspirate with a 20-ml syringe.
- An aspirate containing non-clotting blood is indicative of intraperitoneal bleeding.

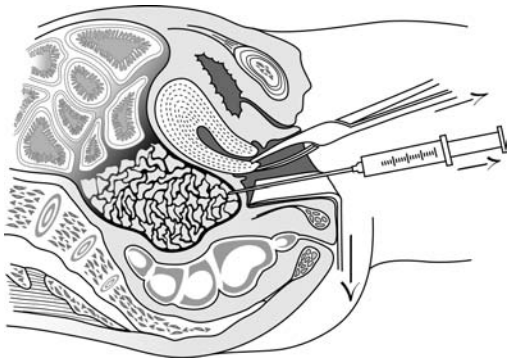


Figure 9
Puncture of the posterior vaginal cul-de-sac

Diagnostic peritoneal lavage (contraindicated in cases where there is scarring from a prior laparotomy)

- Insert a urinary catheter.
- Swab the umbilical region with polyvidone iodine.
- Position a sterile aperture drape.
- Use a local anaesthetic to numb the skin and subcutaneous tissue at a point 1 cm below the umbilicus along the midline.
- Make a small incision with the scalpel, down to the fascia.
- With a quick motion, insert the trocar (Figure 10) vertically just deep enough to pierce the wall, then withdraw the guiding needle and push the plastic canula in toward the pelvis. If no trocar is available, use the largest, longest catheter available.

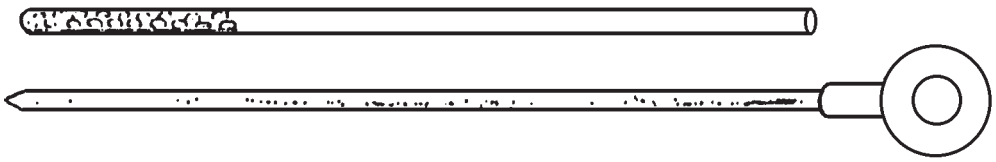


Figure 10
Trocar for diagnostic peritoneal lavage

- Connect the device to the Ringer Lactate infusion, and administer the solution over a period of 10 to 15 minutes. To ensure correct diffusion of the fluid, change the patient's position (Figure 11).

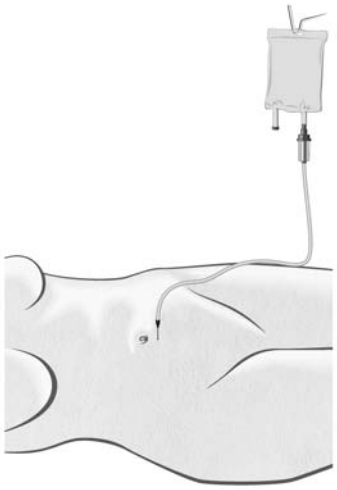


Figure 11
Intraperitoneal injection of Ringer Lactate

– Collect the effluent, letting it drain by gravity back into the bag:
  • If the effluent is clear, there is no haemoperitoneum: remove the trocar, close the skin and monitor the patient.
  • If the effluent comes back pinkish, despite changes in the position of the trocar and the patient, disconnect the infusion, secure the trocar to the skin, and cover it with a sterile dressing. Repeat the lavage as needed, depending on changes in the patient's clinical condition under supervision.
  • If the effluent is frankly bloody, haemoperitoneum is confirmed: perform emergency laparotomy.

3. Management

– Take pulse and BP, assess the severity of bleeding.
– Insert an IV line, administer Ringer lactate;
– Prepare for a possible transfusion (determine patient's blood group and identify potential donors). If transfusion is necessary, only use blood that has been screened (at least for HIV-1, HIV-2, hepatitis B and C).
– Quickly transfer the patient to a surgical centre for emergency laparotomy.
– If bleeding is heavy and there are no donors, autotransfusion may be considered. The blood is collected during diagnostic peritoneal lavage or laparotomy.
  During peritoneal lavage: without letting air into the tubing, connect a blood collection bag containing citrate solution to the apparatus to salvage the blood from the haemoperitoneum.
  During laparotomy: a surgeon in an isolated setting should prepare a sterile container containing a ladle and a glass bottle equipped with a rubber stopper. Instead of aspirating the haemoperitoneal blood, collect it with the ladle, then filter it through a sterile compress placed over the glass bottle to remove any clots. Next, transfer the blood into a blood collection bag containing citrate solution. To pour the blood into the bag, first disinfect, then open, the bottom of the bag using a sterile blade. Fill it, reclose the bag, and transfuse the patient.
  If infection is suspected (for example, in cases of uterine rupture), autotransfusion is absolutely contraindicated.

Molar pregnancy (hydatidiform mole)

Pathological pregnancy due to cystic degeneration of the placenta, common in Asia and North Africa. 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 (Figure 12).

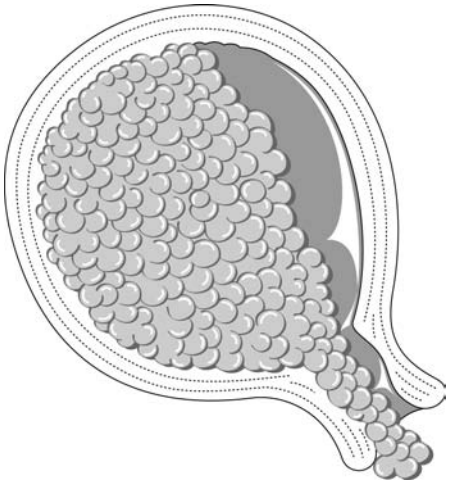


Figure 12
Mole

1. Diagnosis

Before abortion

– Spontaneous bleeding of variable severity.
– Uterus that is larger and softer than expected for gestational age.
– No foetal heartbeat, movements, or poles at five months.
– Nausea and vomiting.
– Possible oedema, proteinuria, or hypertension if the pregnancy is advanced.
– Occasionally: expulsion of vesicles during bleeding episodes; enlarged ovaries, weight loss, mild jaundice.

Abortion

Slow, fragmentary, incomplete, and occasionally accompanied by heavy bleeding with expulsion of vesicles.

2. Management

– Take pulse and BP, assess the severity of the bleeding.
– Insert an IV line, administer Ringer lactate.
– Prepare for a possible transfusion (determine patient's blood group and identify potential donors). If transfusion is necessary, only use blood that has been screened (at least for HIV-1, HIV-2, hepatitis B and C).
– Evacuate the mole using suction, digital curettage, or careful instrumental curettage after injection of oxytocin to reduce the risk of perforation (the uterine wall is thin and weakened). No debris should remain after uterine evacuation. See Chapter 8.
– Give oral or injectable contraceptive for at least one year.

– Subsequent follow-up (beginning 3 months after treatment):
  • Pregnancy test every month for 3 months, then every other month for a year. If positive, perform another uterine evacuation.
  • If bleeding recurs: uterine evacuation, transfusion.

In about 10% of patients, the mole develops into persistent trophoblastic disease or choriocarcinoma, which require chemotherapy and/or hysterectomy.

Cervicitis

1. Diagnosis

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

2. Management

Treat the cervicitis (see *Gonorrhoea*, page 61).
It can also be a more serious condition (dysplasia, cancer).
During pregnancy, the cervix can present an extremely worrying appearance. Do not be overalarmed, or hastily conclude that it is cancer. If in doubt, see the patient again 3 months after delivery to re-examine the cervix.

Functional bleeding in early pregnancy

This is a diagnosis of exclusion.

1. Diagnosis

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

2. Management

Rest; no medication indicated.

Bleeding during the second half of pregnancy

There are three conditions that can quickly become life-threatening to both mother and child: *placenta praevia*, *abruptio placentae*, and *uterine rupture*.

These situations require hospitalization in a surgical setting, even if:
– a complete uterine rupture leaves very little time;
– difficult transport conditions might exacerbate the bleeding, especially when labour has started.

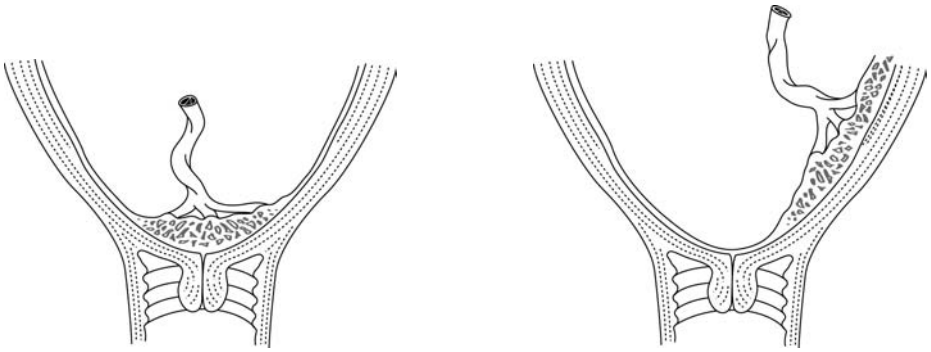
For transport, the woman should be infused and accompanied by family members who are potential blood donors.

No matter what the cause of the bleeding, ultrasound (when available) is useful for verifying:
– foetal vitality;
– the position of the placenta (to confirm or rule out placenta praevia).
On the other hand, even in the hands of an experienced professional, ultrasound rarely allows visualization of placental abruption, and it is not useful in diagnosing uterine rupture

Placenta praevia

Abnormal implantation of the placenta in the lower uterine segment, rather than in the uterine fundus. Even under good circumstances (possibility of transfusion, high quality surgical setting), mother and foetal mortality is high.

There are three types of placenta praevia:
– *Complete* placenta praevia (Figure 13a), in which the placenta completely blocks the internal cervical os;
– *Partial* placenta praevia, in which the placenta partially blocks the internal cervical os.
In either of these cases, vaginal delivery is not possible.
– *Marginal* placenta praevia (Figure 13b), in which the placenta touches, but does not overlap, the internal os.



13a: *Complete* **13b**: *Marginal*

Figures 13
Placenta praevia

1. Diagnosis

In a woman more than 5 months pregnant:

– Sudden, bright red bleeding associated with uterine contractions (not always felt by the patient).
– The foetus often presents high, pushed up by the placenta; the uterus is soft.
– Foetal heartbeat usually heard.
– Careful examination with a speculum shows blood flowing from the cervical os.
– **The vaginal exam must be done with extreme care** to avoid triggering catastrophic haemorrhage.
  Exam may reveal displacement of the cervix and deformation of the lower uterine segment by the placenta praevia.
  Rather than the hard foetal presentation, one feels a spongy mass.
  If possible, try to determine whether the placenta covers the entire cervix, or only part.
  Once the diagnosis is established, do not perform another vaginal exam.
– If ultrasound is available, vaginal exam can be avoided.

2. Management

– Take pulse and BP, assess the severity of the bleeding.
– Insert an IV line, administer Ringer lactate.
– Depending on the severity of bleeding, prepare for a possible transfusion (determine patient's blood group and identify potential donors). If transfusion is necessary, only use blood that has been screened (at least for HIV-1, HIV-2, hepatitis B and C).

If labour has not yet started and bleeding is light:

Rest and monitoring

If labour has not yet started and bleeding is heavy:

Try a tocolytic agent to reduce contractions and bleeding. At the same time, arrange transfer to a surgical setting: if heavy bleeding persists, caesarean section is indicated regardless of the placenta's position.
Be careful of the risk of exacerbating the bleeding if transport conditions are difficult.

If labour has started:

– Complete placenta praevia and/or heavy bleeding: caesarean section.
– Marginal placenta praevia and light bleeding: attempt vaginal delivery; rupture the membranes as soon as they are accessible, in such a way that the foetal head compresses the placenta and cuts off the bleeding.
  Be careful of postpartum haemorrhage, which is especially common in this context. Do not hesitate to remove the placenta manually and explore the uterine cavity; then give oxytocin routinely by injection.

If prompt surgery is not possible, there are two extraordinary options to consider:
– If the placenta completely covers the cervix and the foetus is dead, attempt–with full dilation–manual delivery of the placenta, shearing it from the uterine surface with the side of the hand; then deliver the dead foetus, using a vacuum extractor if necessary.
– Induce or augment labour with oxytocin, to dilate the cervix and allow access to the membranes.

Abruptio placentae

Haematoma that forms between the placenta and the uterine wall as a result of premature separation of the normally implanted placenta, prior to foetal expulsion. This triggers clotting disorders in the mother, with a risk of severe secondary haemorrhage.
Emergency uterine evacuation (vaginal or caesarean) is needed to save the lives of the mother and foetus, no matter what the stage of pregnancy.

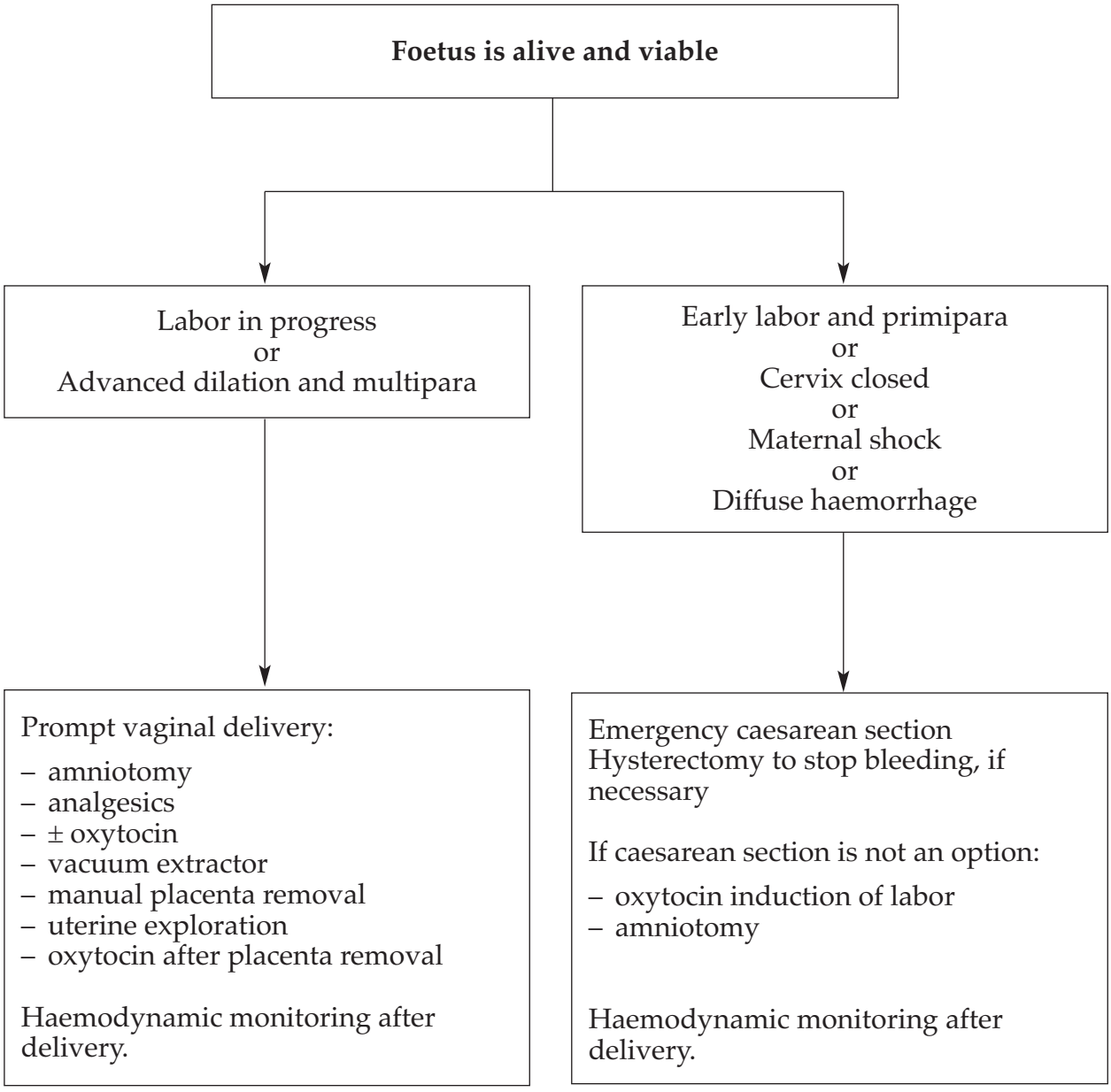
1. Diagnosis

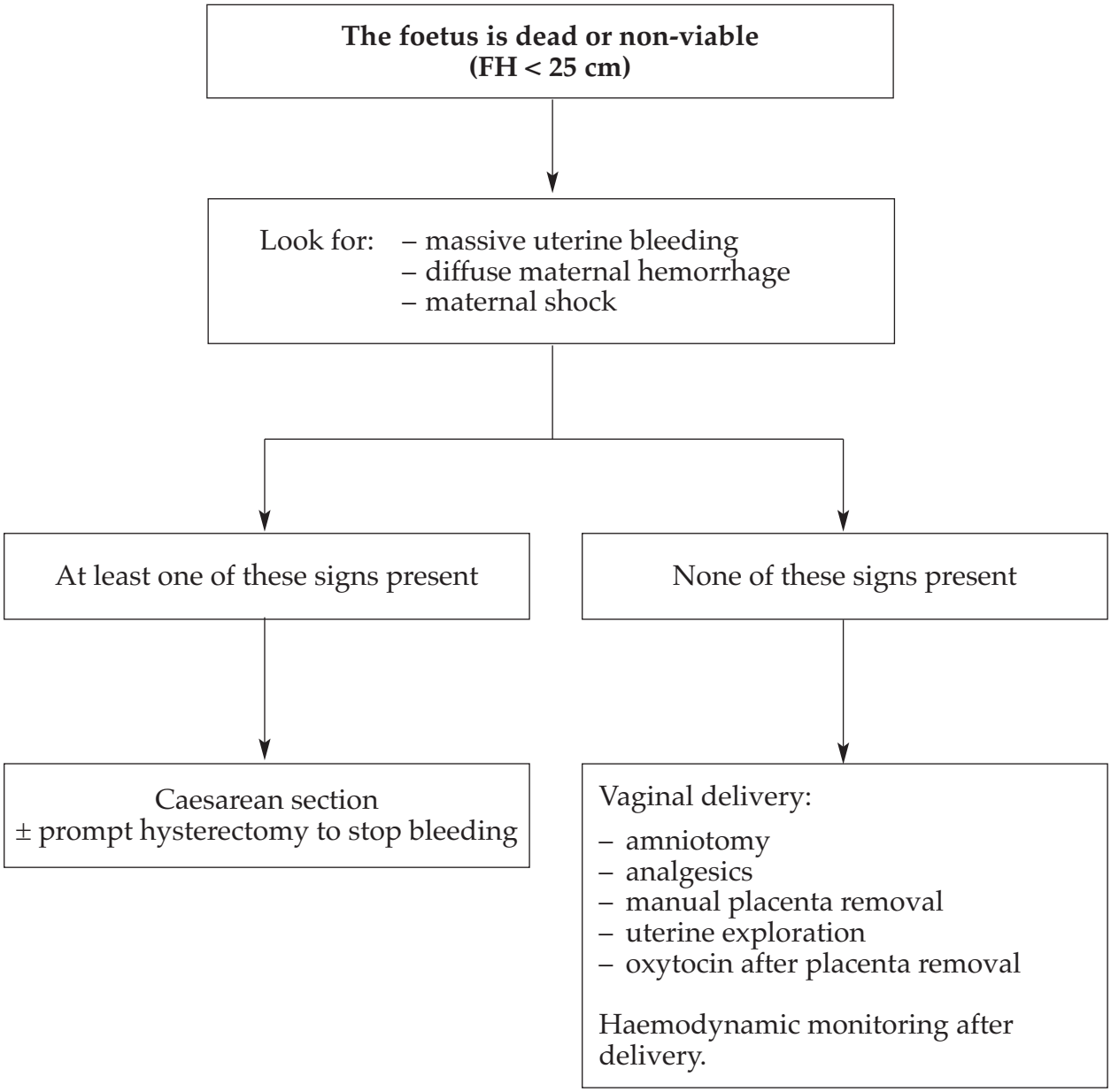
– Sudden, severe, continuous abdominal pain;
– Sudden, light, blackish bleeding;
– Shock: pulse rapid or weak, BP very low or unmeasurable;
– Uterus in spasm, feels hard, “woody”;
– Foetal heart sounds often absent;
– When the membranes rupture, the fluid is uniformly red.

This clinical picture often occurs in a context of pre-eclampsia. Sometimes the picture is incomplete: there may be no bleeding or uterine spasm, or the foetus may be alive.

2. Management

– Take pulse and BP, assess the severity of bleeding.
– Insert an IV line, administer Ringer lactate.
– Prepare for a possible transfusion (determine patient's blood group and identify potential donors). If transfusion is necessary, only use blood that has been screened (at least for HIV-1, HIV-2, hepatitis B and C).
– Do not prescribe salbutamol to relax the uterine spasm.
– Evacuation to a surgical centre is usually necessary.
– In all cases, remove the placenta manually, explore the uterine cavity, then give oxytocin.
– Transfuse whole blood in cases of intractable postpartum haemorrhage (the absence of clots indicates a clotting disorder).
– If haemorrhage persists, consider surgery to stop the bleeding.


Foetus is alive and viable
Labor in progress
or
Advanced dilation and multipara
Early labor and primipara
or
Cervix closed
or
Maternal shock
or
Diffuse haemorrhage
Prompt vaginal delivery:
– amniotomy
– analgesics
– ± oxytocin
– vacuum extractor
– manual placenta removal
– uterine exploration
– oxytocin after placenta removal
Haemodynamic monitoring after delivery.
Emergency caesarean section
Hysterectomy to stop bleeding, if necessary
If caesarean section is not an option:
– oxytocin induction of labor
– amniotomy
Haemodynamic monitoring after delivery.


The foetus is dead or non-viable
(FH < 25 cm)
Look for:
– massive uterine bleeding
– diffuse maternal hemorrhage
– maternal shock
At least one of these signs present
None of these signs present
Caesarean section
± prompt hysterectomy to stop bleeding
Vaginal delivery:
– amniotomy
– analgesics
– manual placenta removal
– uterine exploration
– oxytocin after placenta removal
Haemodynamic monitoring after delivery.

3. Prevention during subsequent pregnancies

There exists a prophylactic treatment to reduce the risk of recurrence during the next pregnancy: **acetylsalicylic acid** PO, 100 mg/day, starting at 12 weeks LMP and continuing until 36 weeks LMP. If this treatment is feasible, recommend that the woman come in as soon as the next pregnancy begins. There is no point in starting this treatment after 20 weeks LMP.

Uterine rupture

Tear in the uterine wall, in most cases during labour. Uterine rupture can normally be avoided by monitoring the progress of labour, and vigilant, rational use of oxytocin.

1. Circumstances in which uterine rupture occurs

– After prolonged labour, especially with dystocia in primiparas.
– Grand multiparas (> 6 deliveries).
– When excessive amounts of oxytocin are used to "force" the uterus.
– Prior history of uterine surgery: caesarean section, especially classical (Figure 14); uterine perforation; myomectomy. A single prior low transverse caesarean section (transverse incision in the lower uterine segment) is not in itself an indication for another caesarean. The delivery must, however, take place in a surgical facility under close supervision.
  More than two caesarean sections, a classical caesarean section (uterine incision into the upper segment), or previous uterine rupture are indications for a planned caesarean section (at around 39 weeks LMP), due to the high risk of uterine rupture.

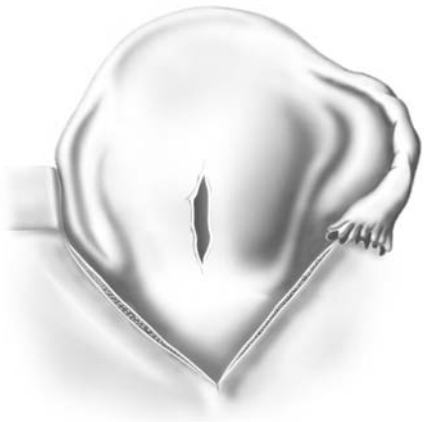
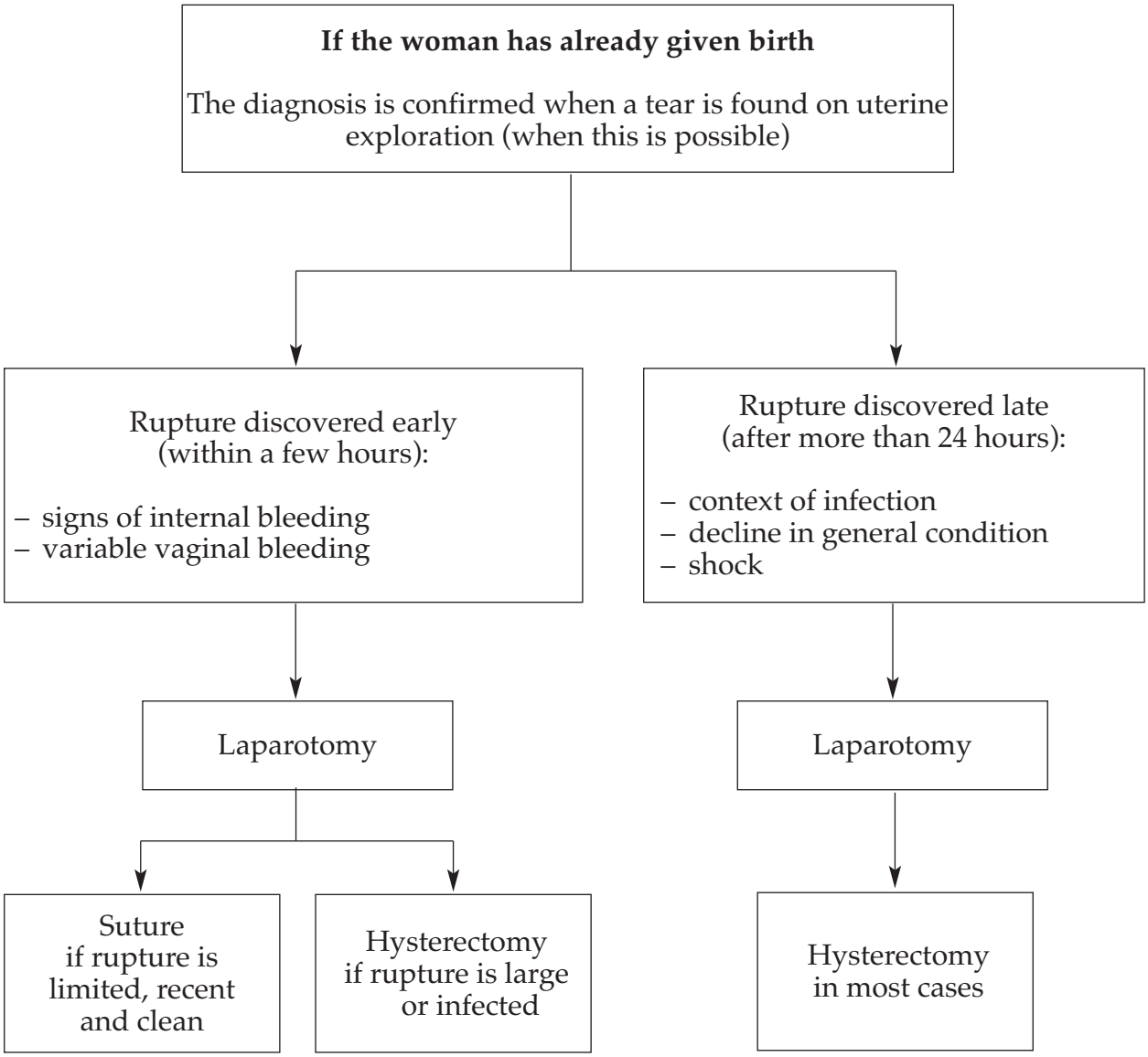
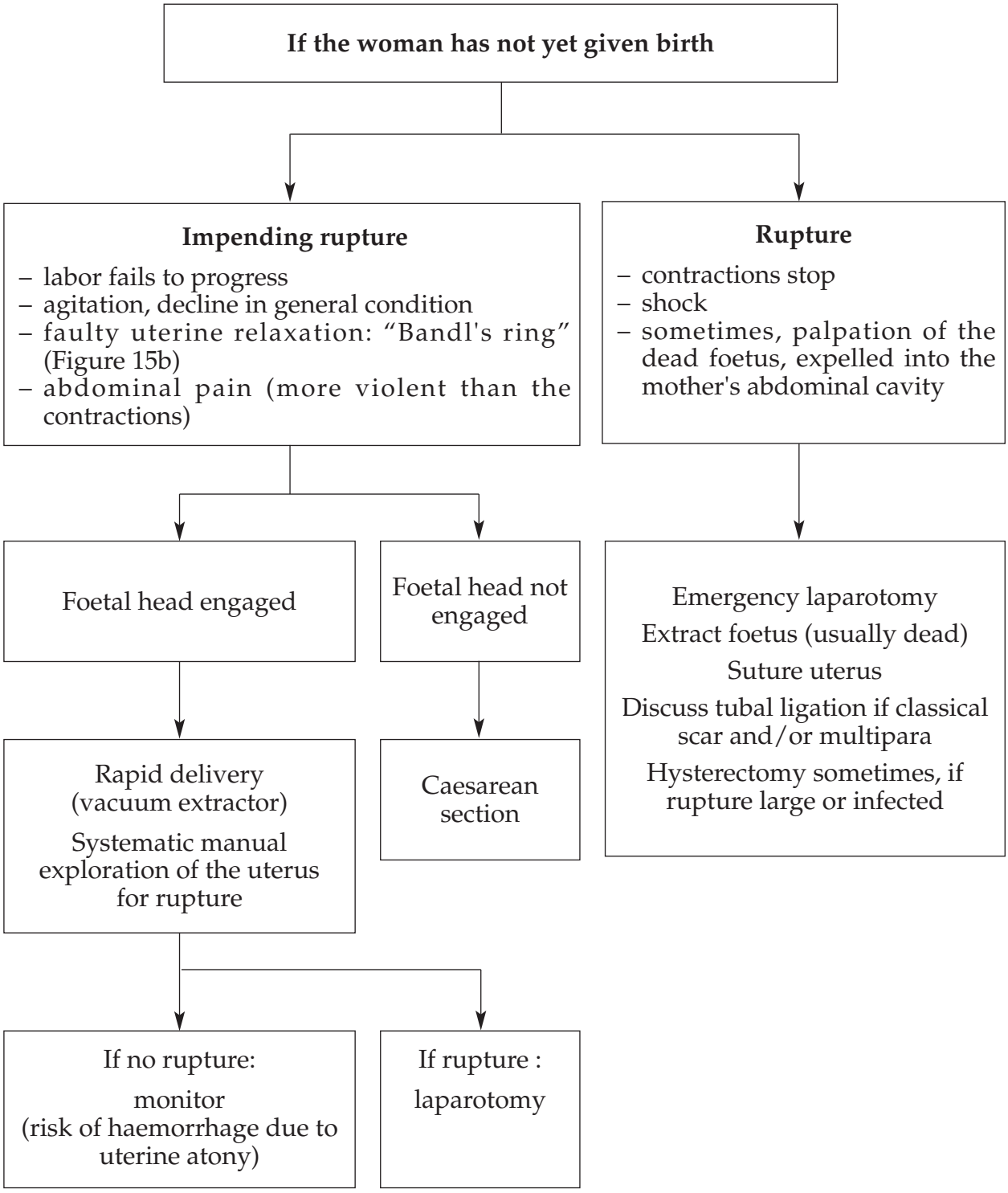


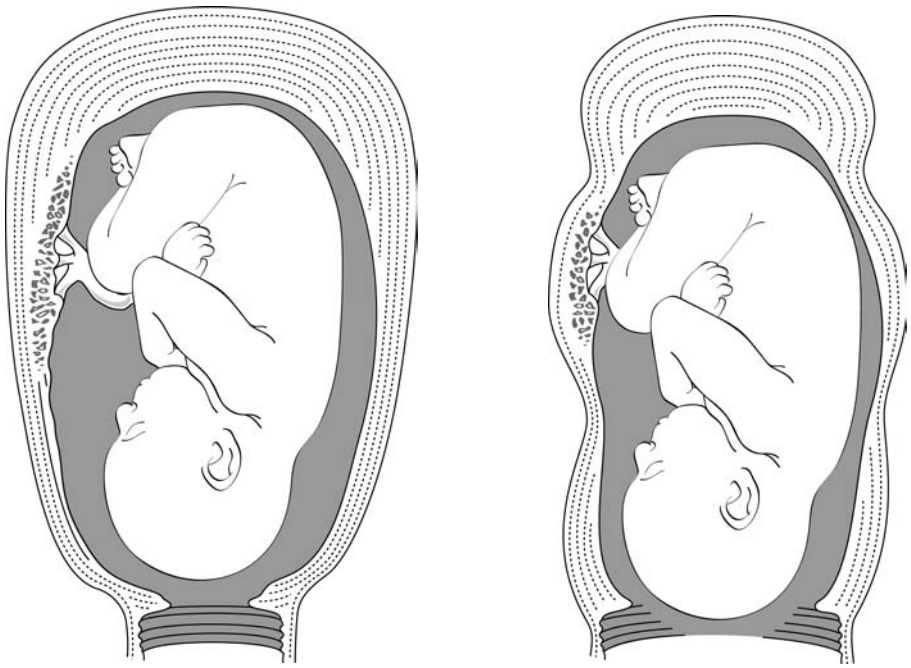
Figure 14
Uterine rupture commonly occurs at classical caesarean section scar

2. Diagnosis and management

A rupture may be diagnosed during labour or after delivery.


If the woman has already given birth
The diagnosis is confirmed when a tear is found on uterine exploration (when this is possible)
Rupture discovered early (within a few hours):
– signs of internal bleeding
– variable vaginal bleeding
Rupture discovered late (after more than 24 hours):
– context of infection
– decline in general condition
– shock
Laparotomy
Laparotomy
Suture if rupture is limited, recent and clean
Hysterectomy if rupture is large or infected
Hysterectomy in most cases


If the woman has not yet given birth
Impending rupture
– labor fails to progress
– agitation, decline in general condition
– faulty uterine relaxation: "Bandl's ring" (Figure 15b)
– abdominal pain (more violent than the contractions)
Rupture
– contractions stop
– shock
– sometimes, palpation of the dead foetus, expelled into the mother's abdominal cavity
Foetal head engaged
Foetal head not engaged
Emergency laparotomy
Extract foetus (usually dead)
Suture uterus
Discuss tubal ligation if classical scar and/or multipara
Hysterectomy sometimes, if rupture large or infected
Rapid delivery (vacuum extractor)
Systematic manual exploration of the uterus for rupture
Caesarean section
If no rupture:
monitor
(risk of haemorrhage due to uterine atony)
If rupture :
laparotomy



15a: *Uterine wall during contraction*

15b: *Impending rupture: hourglass uterus "Bandl's ring"*

Figures 15
Abdominal palpation of uterine contour for diagnosis of impending rupture

For the laparotomy, a subumbilical midline incision is preferable (better exposure), sometimes with periumbilical extension.

If the rupture is complete–that is, if it involves the full thickness of the uterine wall and the uterus has essentially burst, the rupture is several hours old, and amniotic infection is apparent–perform interadnexal subtotal hysterectomy.

If the rupture is complete but the tear is well-defined, limited, recent, does not involve significant bruising of surrounding tissue, and there is no apparent amniotic infection, attempt repair. The tear is usually in the lower segment, anterior and low. To extract the child, enlarge the tear as for a caesarean section. Before suturing the uterine muscle, it may be necessary to neaten the edges of the tear. Depending on the extent of the lesions and the obstetrical history, discuss tubal ligation.
For a lateral lower segment rupture, dissect the broad ligament to look for damage to the uterine artery, which must be sutured.

If the rupture is incomplete, that is, subperitoneal, the peritoneum is elevated by a haematoma that must be dissected. Check the integrity of the bladder.

Causes of bleeding during the 2nd half of pregnancy (summary)

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

CHAPTER 3

Pregnancy-related pathologies and pathological pregnancy

Iron deficiency anaemia

Anaemia is defined as a haemoglobin level below 11 g/dl (below 10.5 g/dl from the 6th month of pregnancy).

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

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

Diagnosis

– Pallor of the conjunctivae, mucous membranes, palms, and the soles of the feet; fatigue, dizziness, tachycardia, heart murmur
– If possible, measure haemoglobin.
– Signs of serious illness: intense pallor, lethargy, dyspnoea, haemoglobin < 7 g/dl

Treatment

For anaemia, 3-month curative treatment:

ferrous sulphate (65 mg elemental iron tablet) PO: 2 or 3 tab/day in 2 or 3 divided doses
+ **folic acid** (5 mg tablet) PO: 1 tab/day as a single dose
or, failing that:
ferrous sulphate + **folic acid** (combination tablet containing 65 mg elemental iron + 400 µg folic acid) PO: 2 to 3 tab/day in 2 or 3 divided doses

In endemic areas, add:
– Anthelmintic treatment, from the 2nd trimester on (see page 18)
– Presumptive (see page 19) or curative (see page 63) malaria treatment.

For severe anaemia in the 3rd trimester:

Arrange for delivery in a facility capable of proper monitoring and active management of the delivery of the placenta or manual removal/uterine exploration in case of postpartum haemorrhage, or transfusion.

Given the risk of haemorrhage and rapid decompensation during delivery, discuss transfusion beforehand with any woman whose haemoglobin is < 7 g/dl, even if anaemia is relatively well-tolerated.

As with any transfusion, verify blood group and Rhesus compatibility and perform pre-transfusion donor testing (HIV-1, HIV-2, hepatitis B and C, plus syphilis and malaria in endemic areas).

Preventive treatment

The demand for iron increases during pregnancy, justifying routine iron supplementation (see page 18).

Pregnancy-induced hypertension and pre-eclampsia

Normally, blood pressure (BP) goes down during pregnancy. In a pregnant woman, hypertension (HBP) is defined as BP ≥ 140/90 mmHg. The BP should be checked several times, with the woman seated and at rest.

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

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

Pre-eclampsia refers to HBP accompanied by proteinuria during pregnancy. Pre-eclampsia carries a significant risk of foetal growth retardation, foetal distress, foetal death, placental abruption and eclampsia.

The goal of antihypertensive treatment is to prevent the maternal complications of severe hypertension. Treatment is administered when BP is 180/110 mmHg or higher; the objective is to lower it to about 140/90 mmHg. Antihypertensive treatment does not improve the foetal prognosis.

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

Clinical signs of pre-eclampsia

– Usually, elevated BP with diastolic BP constantly ≥ 90 mmHg
– Proteinuria (≥ ++ on dipstick test); dark urine, low output
– Oedema (legs, hands) that appears suddenly or rapidly worsens

Clinical signs of severe pre-eclampsia

– Diastolic BP ≥ 110 mmHg persistently elevated in spite of treatment
– Proteinuria > 3.5 g/day (≥ +++ on dipstick test)
– Oliguria (urine output < 400 ml/day or < 30 ml/hour)
– Hyperreflexia
– Epigastric pain, nausea, vomiting
– Significant oedema, facial oedema, pulmonary oedema
– Intense headaches not relieved by paracetamol
– Buzzing in the ears, visual disturbances

Management of isolated HBP

– Rest and monitoring: BP, weight; look for oedema and proteinuria
– Measure the fundal height (risk of foetal growth retardation)
– Normal sodium and caloric intake
– In the event of proteinuria developing, treat as for pre-eclampsia.
– Do not stop uterine contractions if they occur; let the woman deliver.

– If diastolic BP ≥ 110 mmHg, antihypertensive treatment:
methyldopa PO:
500 to 750 mg/day in 2 or 3 divided doses for 2 days, then increase if necessary, in 250 mg increments every 2 to 3 days, until an effective dose is reached, usually about 1.5 g/day. Do not exceed 3 g/day.

or
atenolol PO:
50 to 100 mg once daily in the morning
If the mother is taking atenolol, monitor the newborn for at least 72 hours after birth (risk of hypoglycaemia, bradycardia and respiratory distress).

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

Diuretics and ACE inhibitors (captopril, enalapril, etc.) are contraindicated.

Management of mild pre-eclampsia

Before 37 weeks LMP

– Rest and monitoring: BP, weight, oedema, proteinuria at least once a week
– Measure the fundal height (risk of foetal growth retardation)
– Normal sodium and caloric intake
– Do not stop uterine contractions if they occur; let the woman deliver.
– If diastolic BP ≥ 110 mmHg, attempt to reduce it using oral antihypertensive treatment: **methyldopa** or **atenolol**, as above. In the event of treatment failure, these drugs can be given together. Do not stop treatment abruptly. Diuretics and ACE inhibitors (captopril, enalapril, etc.) are contraindicated.

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

After 37 weeks LMP

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

Management of severe pre-eclampsia

– Delivery imperative within 24 hours, either vaginally or by caesarean section, depending on the state of the cervix.
– Insert an IV line.
– Attempt to reduce the risk of eclampsia until delivery with **magnesium sulfate**:
IV protocol:
Start with a loading dose of 4 g administered by IV infusion in 0.9% sodium chloride over 15 to 20 minutes.
Then, administer a maintenance dose of 1 g/hour by continuous infusion; continue treatment for 24 hours after delivery.

or
IV/IM protocol:
Start with a loading dose of 4 g administered by IV infusion in 0.9% sodium chloride over 15 to 20 minutes.
Then administer 10 g IM (5 g in each buttock), followed by 5 g every 4 hours (change sides with each injection). Continue this treatment for 24 hours after delivery.

There is a risk of potentially lethal overdose. Verify the concentrations written on the ampoules. Do not administer unless calcium gluconate is on hand.

Monitor:
- Patellar reflex, BP, pulse and respiratory rate every 15 minutes for the first hour of treatment.
- Urine output every hour (insert urinary catheter).

Signs of magnesium overdose: diminution, then disappearance, of the patellar reflex (early sign), hypotension, arrhythmia, respiratory depression (< 12 breaths/minute).

If there are no signs of overdose, continue monitoring every hour.

If there are signs of overdose: stop magnesium sulfate and administer the antidote (**calcium gluconate**, 1 g IV).

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

– If diastolic BP ≥ 110 mmHg: **methyldopa** or **atenolol**, as above.

If the oral route is impossible, use **hydralazine**:
The dose is adjusted according to changes in blood pressure. HBP is controlled when diastolic BP is between 90 and 100 mmHg. Diastolic BP should not go below 90 mmHg. When administering, monitor the mother's BP and pulse and the foetal heart rate.
IV infusion protocol:
- Dilute 100 mg (5 ampoules of hydralazine) in 500 ml of 0.9% sodium chloride or Ringer Lactate to obtain a 200 µg/ml solution.
- The initial dose is 200 to 300 µg/minute; the maintenance dose is 50 to 150 µg/minute
- Administer by increasing the rate up to 20 drops/minute (maximum 30 drops/minute), monitoring the BP every 5 minutes.
- As soon as the hypertension is controlled, gradually reduce the rate (15 drops/minute, then 10, then 5) until stopping infusion. Stopping abruptly can trigger a hypertensive crisis.

or
Slow IV protocol:
Inject 5 mg by slow IV (over 2 minutes) and monitor BP for 20 minutes. If the diastolic BP remains ≥ 110 mmHg, repeat the injection. Continue repeating if necessary, waiting 20 minutes between each injection; do not exceed 4 injections or 20 mg.
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.

In the event of hypotension, use Ringer Lactate solution to bring the diastolic BP back up to ≥ 90 mmHg.

Notes:
- If anaesthesia is necessary, avoid ketamine. Whenever possible, use spinal anaesthesia.
- Oxytocin may be used in pre-eclampsia, but requires BP monitoring: drops and elevations in BP have been described in rare cases.
- Ergometrine and methylergometrine are contraindicated.
- Pre-eclampsia can appear up to 48 hours after delivery, and on rare occasions even later.

Secondary prophylaxis for severe pre-eclampsia

There exists a prophylactic treatment to reduce the risk of recurrence during the next pregnancy: **acetylsalicylic acid** PO, 100 mg/day, starting at 12 weeks LMP and continuing until 36 weeks LMP. If this treatment is feasible, recommend that the woman come in as soon as the next pregnancy begins. There is no point in starting this treatment after 20 weeks LMP.

Eclampsia

Convulsions during the third trimester of pregnancy, most commonly in a context of pre-eclampsia. Eclampsia can also occur after delivery.
Consider other causes of convulsions, such as meningitis and cerebral malaria (increased incidence in pregnant women).

Management

- Protect against injury, maintain airway, place in recovery position.
- Seizures: **magnesium sulfate**[1], see page 49. Continue treatment for 24 hours after delivery or 24 hours after the last seizure, whichever was more recent.
- Nursing care, hydration; monitor urine output (insert urinary catheter).
- Oxygen: 4 to 6 litres/minute
- Antihypertensive treatment if diastolic BP ≥ 110 mmHg (see pages 49 and 50).
- Delivery imperative within 12 hours, either vaginally or by caesarean section, depending on the state of the cervix and the condition of the foetus.

Secondary prophylaxis for eclampsia

There exists a prophylactic treatment to reduce the risk of recurrence during the next pregnancy: **acetylsalicylic acid** PO, 100 mg/day, starting at 12 weeks LMP and continuing until 36 weeks LMP. If this treatment is feasible, recommend that the woman come in as soon as the next pregnancy begins. There is no point in starting this treatment after 20 weeks LMP.

[1] If magnesium sulfate is not available, use diazepam: 10 mg rectally or by slow IV, then 40 mg in 500 ml of 5% glucose administered over 24 hours.
For IV or rectal administration, dilute the diazepam in enough 5% glucose or 0.9% sodium chloride to make 10 ml of solution.
When administering by IV, ventilation equipment must be immediately available.

Abnormally large uterus

Fundal height greater than the presumed gestational age. The possible causes are: incorrect due date, multiple pregnancy, a large-for-gestational-age (LGA) foetus, polyhydramnios, or molar pregnancy.

Management

– Verify the due date (date of last menstrual period)

– Perform diagnostic ultrasound, if possible

– Twin pregnancy (page 110), polyhydramnios (page 54), molar pregnancy (page 33).

– LGA foetus:
  • prepare for foetopelvic disproportion and possible caesarean in a surgical setting
  • risk of obstructed and prolonged labour
  • risk of shoulder dystocia
  • risk of a perineal tear at delivery
  • risk of postpartum haemorrhage: always administer oxytocin after delivery

Polyhydramnios

Excess amniotic fluid (more than 2 litres at term), generally reflecting a severe foetal abnormality.
There are two clinical situations:
– In the second trimester: acute polyhydramnios
– In the third trimester: chronic polyhydramnios

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

Wait until labour begins. Let the abortion/delivery take its course; rupture the membranes as soon as possible.

Chronic polyhydramnios

Diagnosis

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

Management

– Do nothing during the pregnancy but monitor.
– Look for diabetes and treat if found.
– Amniotomy carries risk of cord prolapse.
– Examine the newborn for foetal malformation.

In acute and chronic polyhydramnios:

– Do not puncture or drain off the amniotic fluid during pregnancy: risk of infection.
– Use of oxytocin during labour is dangerous, because the over-distended uterus might rupture.
– Risk of postpartum haemorrhage: administer oxytocin routinely after delivery.

Premature rupture of membranes

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

Differential diagnosis

– Urinary incontinence
– Expulsion of the mucus plug
– Leucorrhoea

Risks

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

Management

– Look for a prolapsed cord (page 85).
– Look for a predisposing maternal cause (e.g. urinary tract or vaginal infection) and treat it.
– Rest and monitoring: temperature, pulse, BP, uterine contractions, foetal heartbeat, appearance of amniotic fluid (discoloured, purulent).
– Vaginal exams: as few as possible, and always with sterile gloves.
– Antibiotic therapy:

  1) **Mother** (routinely)

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

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

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

2) **Newborn**

Asymptomatic, non-premature newborn and no maternal infection:
No immediate antibiotic therapy; monitor for 48 hours.

Asymptomatic, premature newborn and/or maternal infection:
ampicillin IV: 100 to 150 mg/kg/day divided in 3 injections for at least 3 days; then **amoxicillin** PO: 50 to 75 mg/kg/day in 3 divided doses, to complete 7 to 10 days of treatment
+ **gentamicin** IM: 5 mg/kg/day in one or two injections for 3 days
If the newborn remains asymptomatic, the treatment can be discontinued after 3 days.

Symptomatic newborn:
ampicillin IV: 100 to 150 mg/kg/day divided in 3 injections, for a minimum of 3 days, then **amoxicillin** PO: 50 to 75 mg/kg/day in 3 divided doses, to complete 10 days of treatment
+ **gentamicin** IM: 5 mg/kg/day in one or 2 injections, for at least 3 days and at most 5 days.

– If there are uterine contractions:
  • Before 34 weeks LMP: tocolytic agent, provided there are no signs of intra-amniotic infection.
  • Beyond 34 weeks LMP, the risk of infection is greater than the risk of preterm birth: do not administer tocolytics.

– For ruptures occurring in the 7th and 8th month, transfer the mother, if possible, to a facility where the premature infant can receive intensive care.

– Prepare the foetus for preterm birth:
After 26 weeks LMP (fundal height greater than about 22 cm) and before 34 weeks LMP (fundal height less than about 28 cm), help pulmonary maturation—except in cases of severe, uncontrolled maternal infection—with **dexamethasone** IM: 6 mg every 12 hours for 48 hours.

Threatened preterm delivery

Regular uterine contractions and cervical changes before 37 weeks LMP.

Causative factors

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

Management

– Always look for malaria (rapid test) and urinary tract infection (dipstick test); treat the apparent causes.
– Let the woman deliver:
  • If she is > 34 weeks LMP and her waters have broken.
  • If labour is too far along to be stopped (cervix effaced, 4 cm dilation), no matter what the gestational age.
  • If the mother's life is threatened (very poor general condition, pre-eclampsia, eclampsia, abruptio placentae, etc.), no matter what the gestational age.
  • If the foetus is dead, after several checks to verify the absence of foetal heartbeat and movements.
– Otherwise, try to stop the contractions:
  • Strict bed rest in a medical setting. Bed rest alone is enough in mild forms (contractions without cervical changes).
  • Tocolytics:
    nifedipine PO (short-acting capsule): 10 mg to be repeated every 15 minutes if uterine contractions persist (maximum 4 doses or 40 mg), then 20 mg every 6 hours or, failing that,
    salbutamol IV infusion: dilute 5 mg (ten 0.5 mg ampoules) in 500 ml of 5% glucose or 0.9% sodium chloride, to obtain a 10 µg/ml solution.
    Start the infusion at a rate of 15 to 20 µg/minute (30 to 40 drops/minute).
    If contractions persist, increase the rate by 10 to 20 drops/minute every 30 minutes until contractions stop. Do not exceed 45 µg/minute (90 drops/minute.).
    Maintain the effective rate for one hour after contractions stop, then reduce the rate by half every 6 hours.
    Monitor the mother's pulse regularly, and reduce the rate in the event of maternal tachycardia (> 120 beats/minute).

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

Do not combine nifedipine and salbutamol.

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

– Prepare the foetus for preterm birth:
After 26 weeks LMP (fundal height greater than about 22 cm) and before 34 weeks LMP (fundal height less than about 28 cm), help pulmonary maturation—except in cases of severe, uncontrolled maternal infection—with:
dexamethasone IM: 6 mg every 12 hours for 48 hours

Preterm delivery

– Delivery is usually rapid and often breech.
– Avoid aggressive treatment (drugs or procedures), but above all, avoid a long labour. Expulsion should be rapid: possible episiotomy, even if the child is small; vacuum extraction is contraindicated-if possible, use forceps if instrument extraction is required.
– Provide for a good warming system and newborn resuscitation. Beware of hypothermia and hypoglycaemia.

Preventing preterm delivery

– Treat infections and other disorders during pregnancy.
– Rest for women with predisposing factors: twin pregnancy, polyhydramnios, previous preterm delivery, tired grand multipara.

Intrauterine foetal death

Foetal death during the 2nd or 3rd trimester of pregnancy, outside of labour.

Diagnosis

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

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

Management

– If the mother has no life-threatening disorder:
  • Treat any maternal disorders (anaemia, malaria, etc.).
  • If it is certain that the foetus is dead, induce labour.
  • If there is any uncertainty, see the woman again at regular intervals (for example, once a week) and wait for labour to start on its own; this generally occurs within 15 to 20 days of foetal death.
– If the mother has a life-threatening disorder:
  Urgently induce labour in the event of eclampsia, placenta praevia, abruptio placentae, intra-amniotic infection, severe maternal disease (e.g., congestive heart failure).
– If the amniotic sac has been ruptured for more than 12 hours: antibiotic therapy (see page 55)
– Induction of labour:
  misoprostol vaginally: 200 µg every 6 hours until labour begins. Two to three doses are usually sufficient.
  Misoprostol is contraindicated in cases of prior caesarean section or grand multiparity. If misoprostol is contraindicated or not available, **mifepristone** PO can also be used: 600 mg once daily for 2 days.
– 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, if culturally acceptable (see page 169). 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).
– Do a manual exploration of the uterus if there is retained placenta or the least sign of bleeding (coagulation disorders), under cover of routine antibiotic prophylaxis: **ampicillin** or **cefazolin** IV, 2 g as a single dose.

Bacterial infections

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

Meningitis

– In an epidemic context:
ceftriaxone IM: 100 mg/kg as a single dose (4 g maximum)
Administer a second dose after 24 to 48 hours in the following cases:
  • failure to regain consciousness since admission, or Glasgow Coma Scale score < 11 at 24 hours, or < 13 at 48 hours;
  • onset or worsening of neurological signs after admission;
  • recurrent, persistent convulsions;
  • axillary temperature above 38.5°C at 48 hours.

– In a non-epidemic context:
ceftriaxone IM: 2 g once daily for 5 to 7 days
or, failing that:
ampicillin IV: 12 g/day divided in 3 injections administered 8 hours apart, then **amoxicillin** PO: 6 g/day in 2 or 3 divided doses, to complete 7 days of treatment

Typhoid

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

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

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

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

Shigellosis

ceftriaxone IM: 1 g once daily for 3 to 5 days

[2] 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.

Gonorrhoea

Gonorrhoea can cause premature rupture of membranes, preterm delivery, and neonatal conjunctivitis, which can be fulminant.

Suspect gonorrhoea in the event of urethral or vaginal discharge. Use a speculum to look for purulent discharge from the cervix. Quite often, gonorrhoea is associated with chlamydial infection.

Treat the mother simultaneously for gonorrhoea and chlamydia: **cefixime** PO 400 mg as a single dose + **azithromycin** PO 1 g as a single dose. The sexual partner should receive the same treatment.

For the newborn infant of an infected mother, at the time of birth:
ceftriaxone IM: 50 mg/kg as a single dose; up to a maximum dose of 125 mg

Syphilis

Syphilis screening is essential and should be performed routinely at the first prenatal visit, as early as possible in pregnancy.

Syphilis can cause spontaneous abortion, polyhydramnios, intrauterine death, and congenital syphilis.

For the mother:

benzathine benzylpenicillin IM: 2.4 MIU as a single dose (half-dose in each buttock); same treatment for the sexual partner.
In a penicillin-allergic patient, use **erythromycin** PO: 2 g/day in 2 or 4 divided doses, for 14 days

For the newborn:

– No treatment if the mother was treated more than 30 days before childbirth.
– If the mother was treated less than 30 days before childbirth:
  benzathine benzylpenicillin IM: 75 mg/kg (or 100,000 IU/kg) as a single dose
– If the newborn is symptomatic, treat for congenital syphilis.

Cystitis

Increase fluid intake: at least 1.5 litres per day

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

Pyelonephritis

Hospitalize; bed rest required due to risk of preterm delivery
Increase fluid intake: at least 1.5 litres per day

In the absence of signs of serious illness:

ceftriaxone IM: 1 g once daily for at least 3 days, then **cefixime** PO: 400 mg/day in 2 divided doses to complete 14 days of treatment

If signs of serious illness are present, or failure after 48 hours of treatment:

ceftriaxone[3]: 1 to 2 g once daily by IM injection (1 g in each buttock if the dose is 2 g), or by slow IV injection (over 3 minutes) or by infusion (over 30 minutes)
+ **gentamicin**: 5 mg/kg once daily by IM or slow IV injection (over 3 minutes) or by slow infusion (over 30 minutes) for a maximum of 5 days

In the event of uterine contractions before 37 weeks LMP:

nifedipine or, failing that, **salbutamol** for 48 hours (see page 57)

[3] 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.

Parasitic infections

Malaria

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

Artemisinin derivatives (artesunate, artemether) may be administered in the 2nd and 3rd trimesters, but data regarding their use in the first trimester is limited. Nevertheless, in case of life-threatening malaria or uncontrolled hypoglycaemia on IV quinine, the mother's survival takes precedence over the potential teratogenic risk.

Doxycycline is contra-indicated at any time during pregnancy and mefloquine is contra-indicated during the first trimester.

Uncomplicated falciparum malaria during the 1st trimester

quinine PO: 30 mg/kg/day in 3 divided doses for 7 days
In areas where reduced sensitivity to quinine appears, combine quinine with **clindamycin** PO: 20 mg/kg/day in 2 divided doses for 5 days

Uncomplicated falciparum malaria during the 2nd and 3rd trimesters

sulfadoxine-pyrimethamine (**SP**) combined with **artesunate** (**AS**):
SP (500 mg + 25 mg tab): 3 tab as a single dose on D1
AS (50 mg tab): 4 tab once daily on D1, D2, D3

or
amodiaquine (**AQ**) combined with **artesunate** (**AS**):
AQ (153 mg base tab): 4 tab once daily on D1, D2, D3
AS (50 mg tab): 4 tab once daily on D1, D2, D3

or
mefloquine (**MQ**) combined with **artesunate** (**AS**):
MQ (250 mg tab): 4 tab on D1 and 2 tab on D2
AS (50 mg tab): 4 tab once daily on D1, D2, D3

or
co-artemether (20 mg artemether + 120 mg lumefantrine tab):
8 tab/day in 2 divided doses on D1, D2, D3

If none of these artemisinin-based combinations (ACT) are available:
quinine PO: 30 mg/kg/day in 3 divided doses for 7 days
In areas where reduced sensitivity to quinine appears, combine quinine with **clindamycin** PO: 20 mg/kg/day in 2 divided doses for 5 days

Complicated falciparum malaria during the 1st trimester

quinine IV infusion (dosage is expressed in quinine dihydrochloride):
Loading dose: 20 mg/kg diluted in glucose solution, administered over 4 hours.
Then 5% glucose to keep the vein open over the next 4 hours.
Then maintenance dose: 10 mg/kg every 8 hours by infusion over 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 within the previous 24 hours. Start with 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 swallow, change to the oral route with **quinine** PO to complete 7 days of treatment or with a complete curative treatment of 3 days with one of the following ACT: **AS**+**SP** or **AS**+**AQ**.

Complicated falciparum malaria during the 2nd and 3rd trimesters

artemether IM (anterolateral aspect of the thigh):
3.2 mg/kg on the first day followed by 1.6 mg/kg once daily until the patient can swallow. Then, change to oral route with a complete curative treatment of 3 days with one of the following ACT: **AS**+**SP** or **AS**+**AQ** or **AS**+**MQ** or **co-artemether**.
Do not use the combination AS+MQ if the patient developed neurological signs during the acute phase.

or
artesunate IV (or IM if IV is no feasible): 2.4 mg/kg on admission then at 12 hours and 24 hours, then once daily. As soon as the patient can swallow, change to oral route with an ACT, as for artemether.

or
if no artemisinin derivative is available, **quinine** IV, as above.

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

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

Amoebiasis

The disease is worsened by pregnancy. There is a risk of postnatal transmission to the newborn.
The diagnosis should be established by microscopic examination of fresh stools. If the result of the examination is positive:
secnidazole PO: 2 g as a single dose
or
tinidazole PO: 2 g once daily for 3 days
or
metronidazole PO: 1.5 g/day in 3 divided doses for 5 to 7 days

Giardiasis

Like amoebiasis, giardiasis can be severe: dysenteric syndrome, profuse bloody diarrhoea with dehydration.
The diagnosis should be established by microscopic examination of fresh stools. If the result of the examination is positive:
secnidazole PO: 2 g as a single dose
or
tinidazole PO: 2 g as a single dose
or
metronidazole PO: 2 g once daily for 3 days

Ascariasis and ancylostomiasis

For symptomatic infection or infection proven by faecal exam:
albendazole PO: 400 mg as a single dose
Do not administer during the 1st trimester of pregnancy.
In the event of ancylostomiasis, treat the associated anaemia (iron + folic acid).

Viral infections

Genital herpes

If mother has visible 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:

– Local disinfection (polyvidone iodine)
– Pain management: **paracetamol** PO, 3 g/day in 3 divided doses
– Antiviral treatment: **aciclovir** PO, 400 mg 3 times per day for 7 days; in immunocompromised patients, continue the treatment until clinical resolution

For the child:

– If the mother has active infection at the time of birth: monitor the newborn (risk of keratitis, disseminated herpes infection, herpes encephalitis, etc.).
– Systematic prophylactic treatment for herpes keratitis with **aciclovir** 3% ophthalmic ointment: a single application in each eye at birth. Clean the eyes with 0.9% sodium chloride; apply aciclovir; wait 12 hours before applying ophthalmic tetracycline for prevention of gonococcal neonatal conjunctivitis.

Hepatitis B

For the mother:

No specific treatment; no special obstetric measures.

For the child:

– Hepatitis B vaccination
  In areas where there is a high probability of perinatal transmission: one dose at birth, at 6 weeks, and at 14 weeks.
  If perinatal transmission is unlikely: one dose at 6, 10 and 14 weeks
– Specific immunoglobulin for the prevention of hepatitis B, if available and the mother's status is known to be positive.

Hepatitis E

Hepatitis E carries a very high mortality rate for pregnant women (20% during the 3rd trimester). It can also cause spontaneous abortion, preterm delivery, and intrauterine foetal death.

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

There is no specific curative treatment. Prevention (water, hygiene, sanitation) is the only protection against the disease.

HIV infection

With no intervention, the risk of mother-to-child transmission is on the order of 20 to 45% for HIV-1, and 0 to 4% for HIV-2. There are several ways to reduce mother-to-child HIV transmission: antiretroviral therapy (ART), reducing the number of traumatic obstetrical procedures, elective caesarean section, and replacement feeding.

Antiretroviral therapy

The following protocols are examples. In all cases, check national recommendations and refer to specific guidelines.

1. Pregnant HIV+ woman receiving effective ART prior to pregnancy

– For the mother
Continue antiretroviral treatment. If the treatment includes efavirenz (teratogenic risk), replace it with nevirapine as early as possible, in the 1st trimester.
If the treatment includes stavudine (d4T) and didanosine (ddI), it is advisable to change at least one of these two drugs, because the combination is not recommended. If possible, replace stavudine with zidovudine.

– For the child
zidovudine (syrup): 8 mg/kg/day in 2 divided doses for 7 days

With this treatment, the HIV transmission rate is less than 2% if the child is fed artificially immediately from birth.

2. Pregnant HIV+ woman not receiving ART prior to pregnancy, requiring treatment herself (WHO clinical stage 3 or 4, or stage 1 or 2 with CD4 < 200)

– For the mother
Beginning at 12 weeks LMP: triple therapy with **zidovudine** (or **stavudine**) + **lamivudine** + **nevirapine**[4] (do not use efavirenz), lifelong treatment.

– For the child
zidovudine (syrup): 8 mg/kg/day in 2 divided doses for 7 days
If the mother's treatment began less than one month before childbirth, continue giving the infant zidovudine for one month.

4 HIV-2 is naturally resistant to nevirapine. Use a regimen that contains a protease inhibitor.

3. Pregnant HIV+ woman not needing triple therapy herself

– For the mother
zidovudine PO: 600 mg/day in 2 divided doses. Begin at 28 weeks LMP, or as soon as possible after that.
When labour begins: one dose of **zidovudine** 600 mg + **nevirapine** 200 mg
Continue **zidovudine** 600 mg/day in 2 divided doses + **lamivudine** 300 mg/day in 2 divided doses for 7 days after childbirth.

– For the child
nevirapine (syrup): 2 mg/kg as a single dose within 72 hours after birth
+ **zidovudine** (syrup): 8 mg/kg/day in 2 divided doses for 7 days
+ **lamivudine** (syrup): 4 mg/kg/day in 2 divided doses for 7 days

If the mother's treatment began less than one month before childbirth, continue giving the infant zidovudine for one month.

4. Pregnant HIV+ woman for whom treatment could not be started during pregnancy

– For the mother
When labour begins: one dose of **zidovudine** 600 mg + **nevirapine** 200 mg
Then, **zidovudine** + **lamivudine**: 600 mg + 300 mg/day in 2 divided doses for 7 days after childbirth.

– For the child
zidovudine (syrup): 8 mg/kg/day in 2 divided doses for one month + **nevirapine** (syrup): 2 mg/kg as a single dose within 72 hours of birth.

5. Pregnant woman needing triple therapy herself, when not available

If possible, follow instructions for case #3, failing that, for case #4.

Other measures

– It is also important to keep traumatic obstetric procedures that facilitate transmission of the virus to an absolute minimum:
  • keep the membranes intact as long as possible
  • avoid episiotomy and instrument extraction (vacuum extractor, forceps) if possible

– In certain situations, where the context allows, an elective caesarean section (prior to commencement of labour or rupture of membranes), under antiretroviral cover, can reduce mother-to-child transmission. It is absolutely imperative to consider the risk of a caesarean section against the benefit of this intervention.

Feeding

Breastfeeding is one of the ways that HIV is transmitted. The additional risk conferred by this feeding method is in the order of 12%, which represents one third to one half of the overall transmission rate. There is a risk of transmission as long as breastfeeding lasts.
Mastitis and/or cracked nipples increase the risk: prevent them, look for them, and actively treat them.

Whenever possible, replacement feeding should be encouraged and supported (provided the caretaker has access to clean water, continuous availability of infant formula, and knows how to prepare the milk correctly). Otherwise, recommend exclusive breastfeeding with rapid weaning at 6 months. Mixed feeding (breast milk plus other liquids, including water, other milks, or solid food) carries the greatest risk of viral transmission. This method is therefore highly inadvisable; it is very important to explain this to the mother.

CHAPTER 4

Normal delivery and usual procedures for various problems

Normal delivery

⚠ *The risk of HIV transmission to personnel during delivery necessitates the wearing of sterile gloves, protective eyewear and a mask for all procedures, no matter how simple—including normal deliveries, including mothers with whom you believe there is no risk, and including emergencies.*

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 dilatation (Figure 16):
  - in the primipara, the cervix will first efface, then dilate,
  - in the multipara, effacement and dilatation occur simultaneously.

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

The three stages of labour

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

1) Latent phase: from the start of labour to 4 cm of dilatation. Whilst its duration will vary depending on the number of prior deliveries, it should not last more than 8 hours.
2) Active phase: from 4 cm to complete dilatation. The cervix dilates at an average of 1 cm/hour. The time to dilate varies with the number of previous deliveries. As a rule, it does not last longer than 6 to 8 hours in multiparas, 12 hours in primiparas.

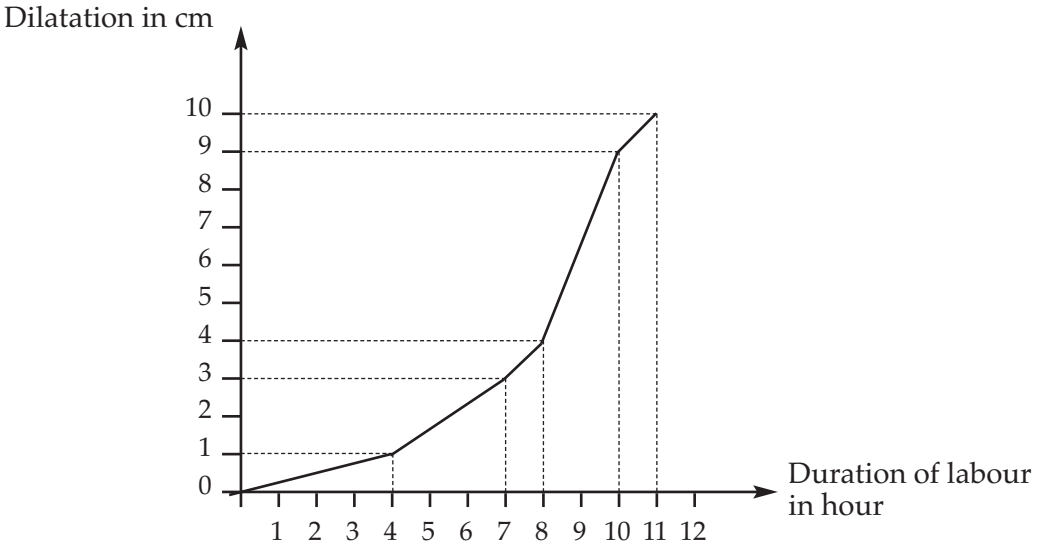


Figure 16: *Dilatation curve in the primipara (in the multipara, the curve is shifted to the left)*

Second stage: delivery of the infant
Begins after engagement, at full dilatation.

Third stage: delivery of the placenta (see Chapter 7)

Dilatation and descent of the foetus

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.
- The uterus should relax between contractions.

General condition of the patient

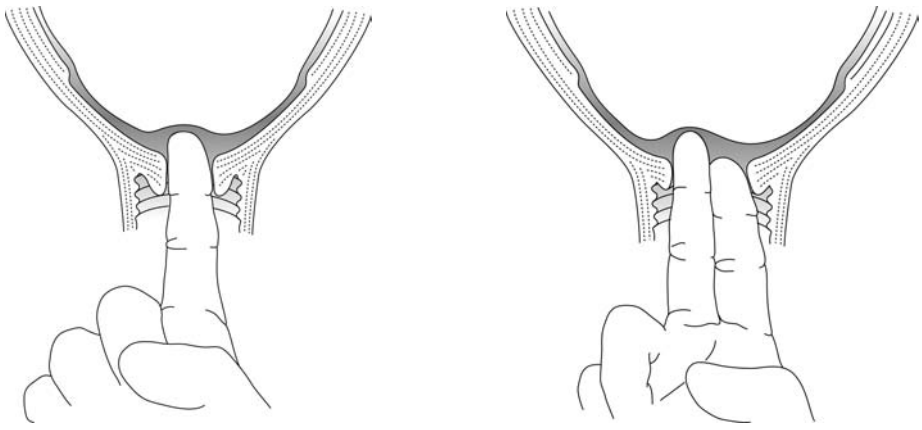
- Monitor the pulse, BP and temperature at regular intervals.
- Ask the patient to wash herself when labour starts, and to empty her bladder regularly.
- Encourage the patient to move about freely during labour; position changes and walking around can help relieve the pain.

Foetal heartbeat

Check every 30 minutes during the active phase, and every 5 minutes during delivery, or as frequently as possible.
It is often difficult to hear the fœtal heartbeat during contractions. The best time is immediately after the end of a contraction. Listen to and count them for at least one whole minute.
More than 180 beats per minute continuously, or less than 100 beats per minute (especially after a uterine contraction) may indicate foetal distress.

Dilatation

- The cervix should remain soft, and dilate progressively. Dilatation progresses at an average rate of one cm per hour, and should be checked by vaginal exam every 2 to 4 hours (Figures 17).
- Failure of dilatation to progress between two vaginal exams is a warning sign.
- Action may be taken when dilatation has not progressed for two hours, and must always be taken if it has not progressed for 4 hours: amniotomy, oxytocin infusion, caesarean section, depending on the circumstances.



17a: 1 finger = 1.5 cm **17b**: 2 fingers = 3 to 3.5 cm

Figures 17: *Estimating cervical dilatation*

Amniotic sac (bag of waters)

– The amniotic sac bulges during contractions and usually breaks spontaneously after 5 cm of dilatation or at full dilatation during delivery. Immediately after rupture, perform a vaginal exam and check the foetal heart rate in order to identify a potential prolapse of the umbilical cord (see page 85).
– Note the colour of the amniotic fluid: clear, blood-stained, or meconium-stained (greenish).
  Meconium staining by itself, without abnormal foetal heart rate, is not diagnostic of foetal distress, but does require increased monitoring—in particular, a vaginal exam every two hours. Action must be taken if dilatation fails to progress after 2 hours.

Fœtal progression

– At each vaginal exam, in addition to dilatation, check the presentation, the position and the degree of foetal descent.
– Look for signs that the fœtal head is engaged:
  On vaginal exam, the presenting part prevents the examiner's fingers from reaching the sacral concavity (Figures 18 and 19). 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 20).

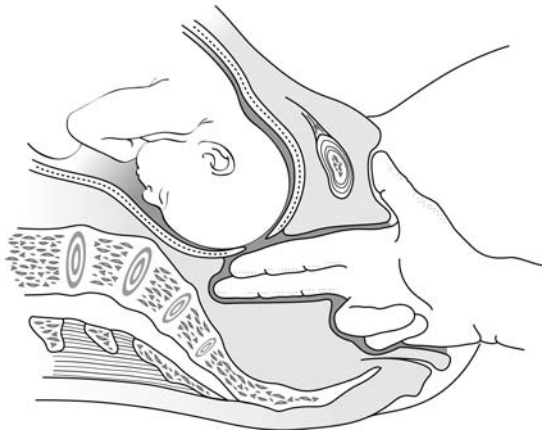


Figure 18: *Presenting part not engaged:*
fingers in the vagina can reach the sacral concavity

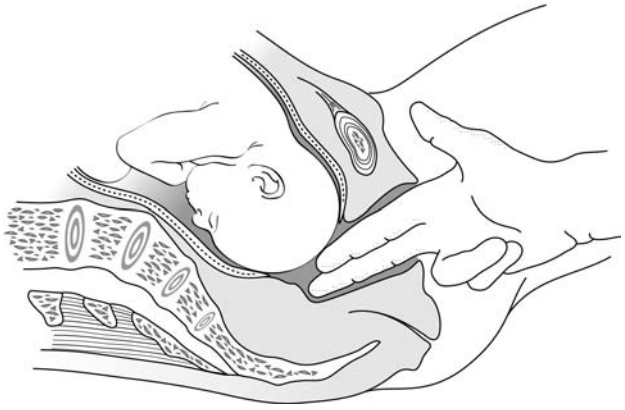
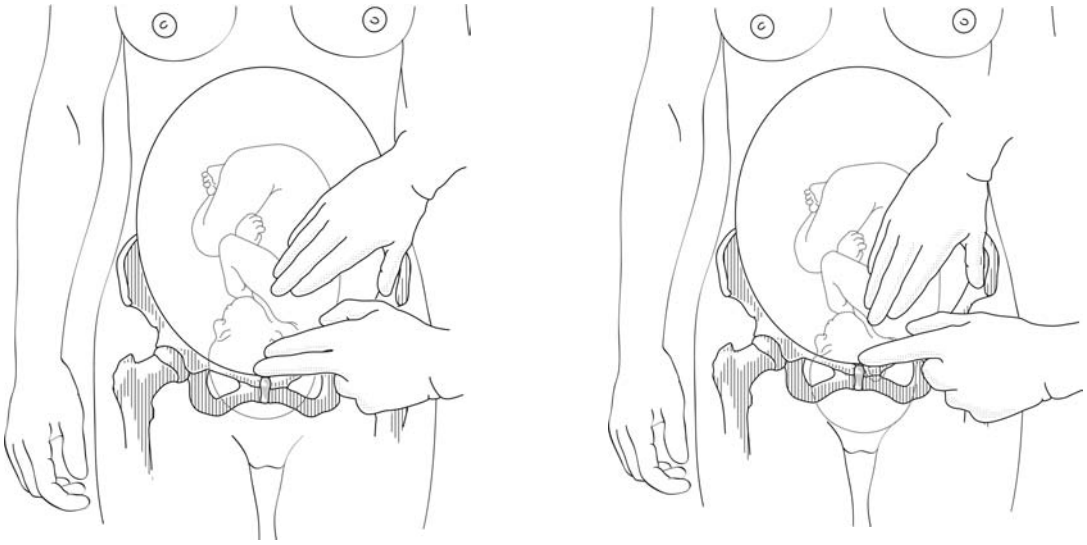


Figure 19: *Presenting part engaged:*
fingers in the vagina cannot reach the sacral concavity (if caput absent)



20a: *Head not engaged: the shoulder is more than 2 finger widths above the symphysis*

20b: *Head engaged: the shoulder is less than 2 finger widths above the symphysis*

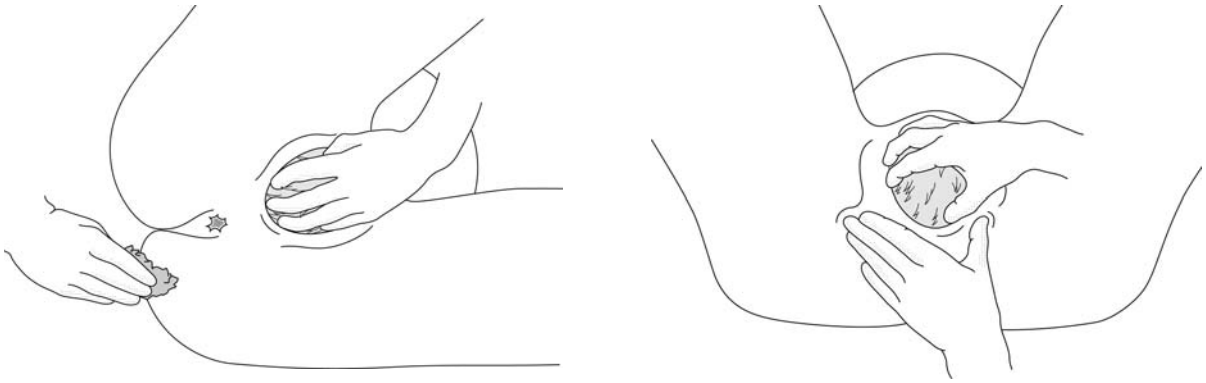
Figures 20: *Diagnosing engagement*

– Use reference points on the fœtal 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.

Delivery of the foetus

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

If there is a traditional delivery position, the mother is multiparous, and examination has not revealed any risk for the mother or child, it is better to use this position (squatting, laying on the side, etc.). It is completely possible to assist a delivery in a woman on her back, on her left side, squatting, or suspended (Figures 21).



21a: *Laying on left side*

21b: *Laying on back*

Figures 21: *Delivery positions*

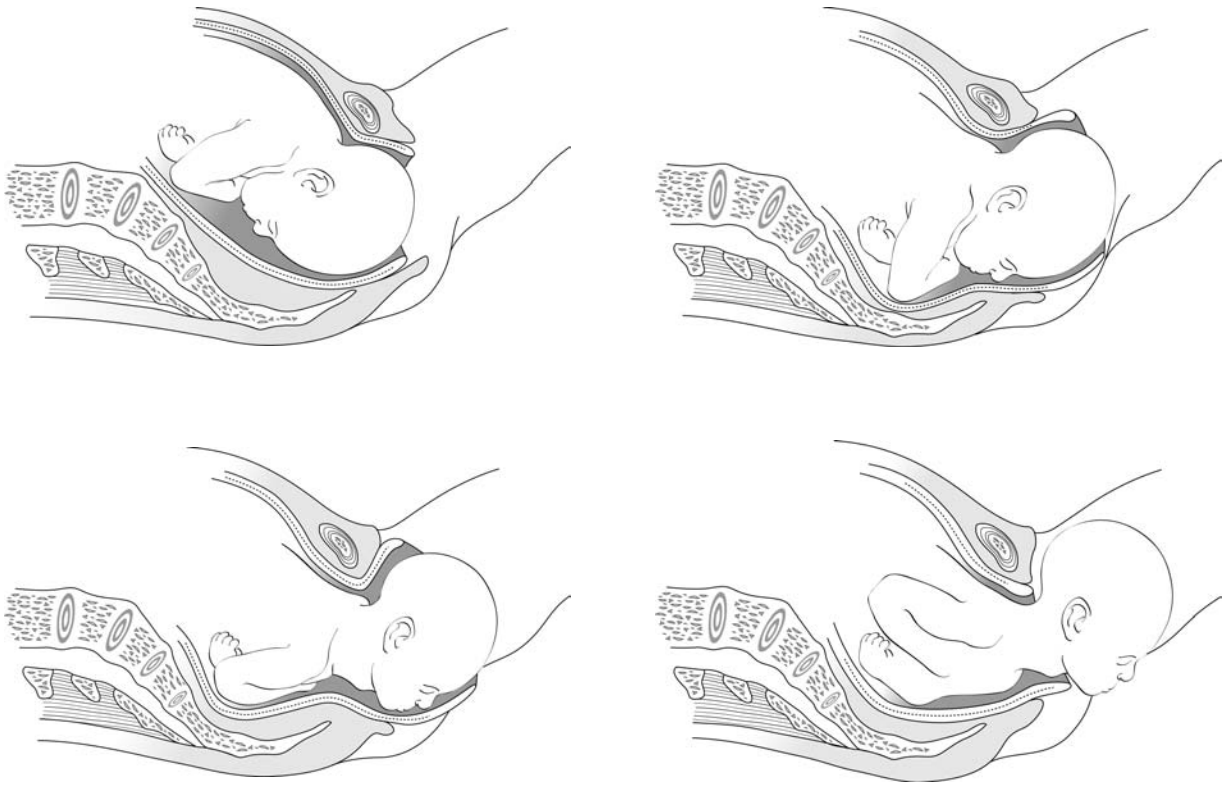
Cleanse the genital area and perineum with polyvidone iodine scrub (or with soap) then rinse off.

The bladder should be emptied, naturally if possible. In cases of urinary retention only, catheterize using sterile technique (sterile gloves, sterile disposable catheter).

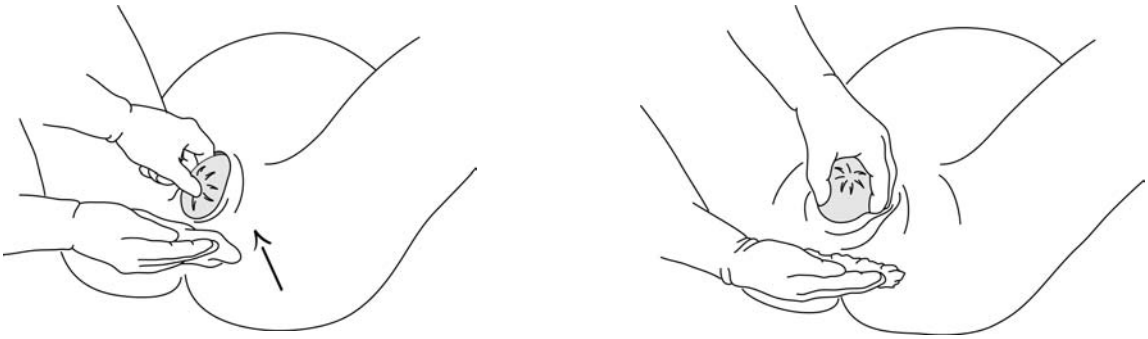
Expulsive effort should be directed, and started when the patient is fully dilated and feels the urge to push. She should push during the uterine contraction. Pushing may be done either with held breath (Valsalva manoeuvre; after a deep inhalation, glottis closed, abdominal muscles and diaphragm contracted, 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 be monitoring the foetal heartbeat.

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, his occiput pivoting against the symphysis (Figures 22). The head goes into slight extension. The birth attendant must guide this motion and prevent any abrupt expulsive movement, with the left hand supporting the occiput. The right hand can support the chin through the perineum. Cover the anal area with a compress (Figures 23).
During this final phase—an active one for the birth attendant—the woman should stop all expulsive efforts and breathe deeply. With the left hand, the birth attendant controls the extension of the head and moves it slightly side-to-side, in order to gradually free the parietal protuberances; if necessary, the chin can be lifted with the right (Figure 24).



Figures 22
The different stages of occiput-anterior delivery



Figures 23
Progressive delivery of the head

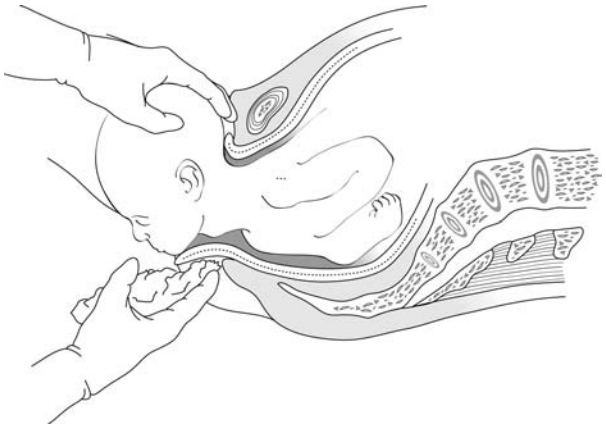


Figure 24
Bringing the perineum under the chin

At the moment of delivery, the perineum is extremely distended. Controlling the expulsion can help reduce the risk of a tear. Routine episiotomy is not indicated. In an occiput-posterior delivery (infant looking up), where perineal distension is at a maximum, episiotomy may be helpful (Figure 25).

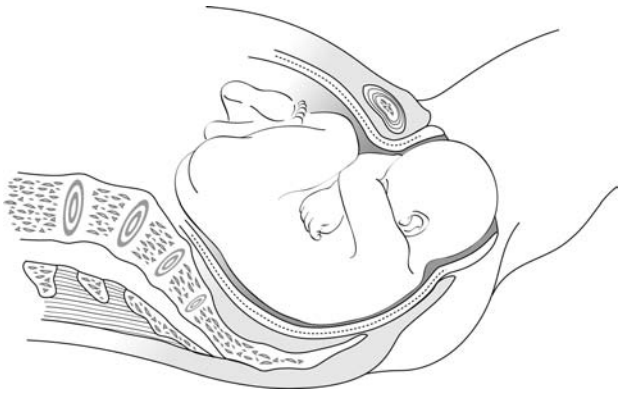


Figure 25
Occiput-posterior delivery

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. The head is then lifted upward to deliver the posterior shoulder (Figures 26 and 27).
To reduce the risk of perineal tears, control the delivery of the posterior shoulder.

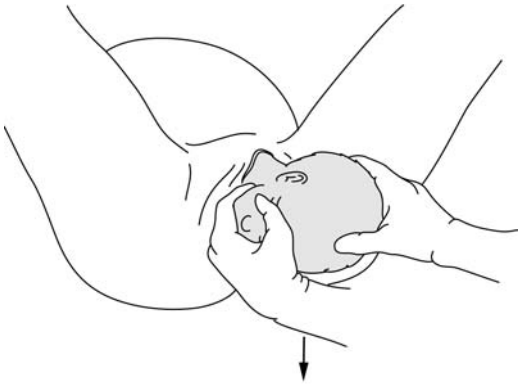


Figure 26: *Delivery of the anterior shoulder: exert downward traction until the shoulder appears*

Figure 27: *Delivery of the posterior shoulder: smooth upward traction*

The newborn normally cries immediately. Place the newborn on his mother's chest, administer immediately oxytocin to mother; clamp and cut the cord between two forceps; then pick up the infant in a clean drape and, using a sterile compress, gently clear his mouth of any mucus and dry him quickly.
Then deliver the placenta (see Chapter 7).
At the same time, monitor the mother's vital signs: pulse, BP, respiratory rate, consciousness, blood loss.

The partograph

The partograph is a tool for monitoring and managing labour. It is used for recording all the elements being monitored, to make it easier to detect possible abnormalities. It is designed to be used at any level of care.
Its central feature is a graph used to record the progress of cervical dilatation, as determined by vaginal exam. This graph allows rapid identification of abnormal slowing of labour.
The partograph also includes other aspects of labour: foetal heart rate, spontaneous or artificial rupture of the membranes, the colour of the amniotic fluid, maternal vital signs (BP, temperature) and administration of any drugs (oxytocin, antibiotics, etc.).
The partograph begins with the active phase of labour.

The WHO partograph has two diagonal lines: an alert line and an action line.

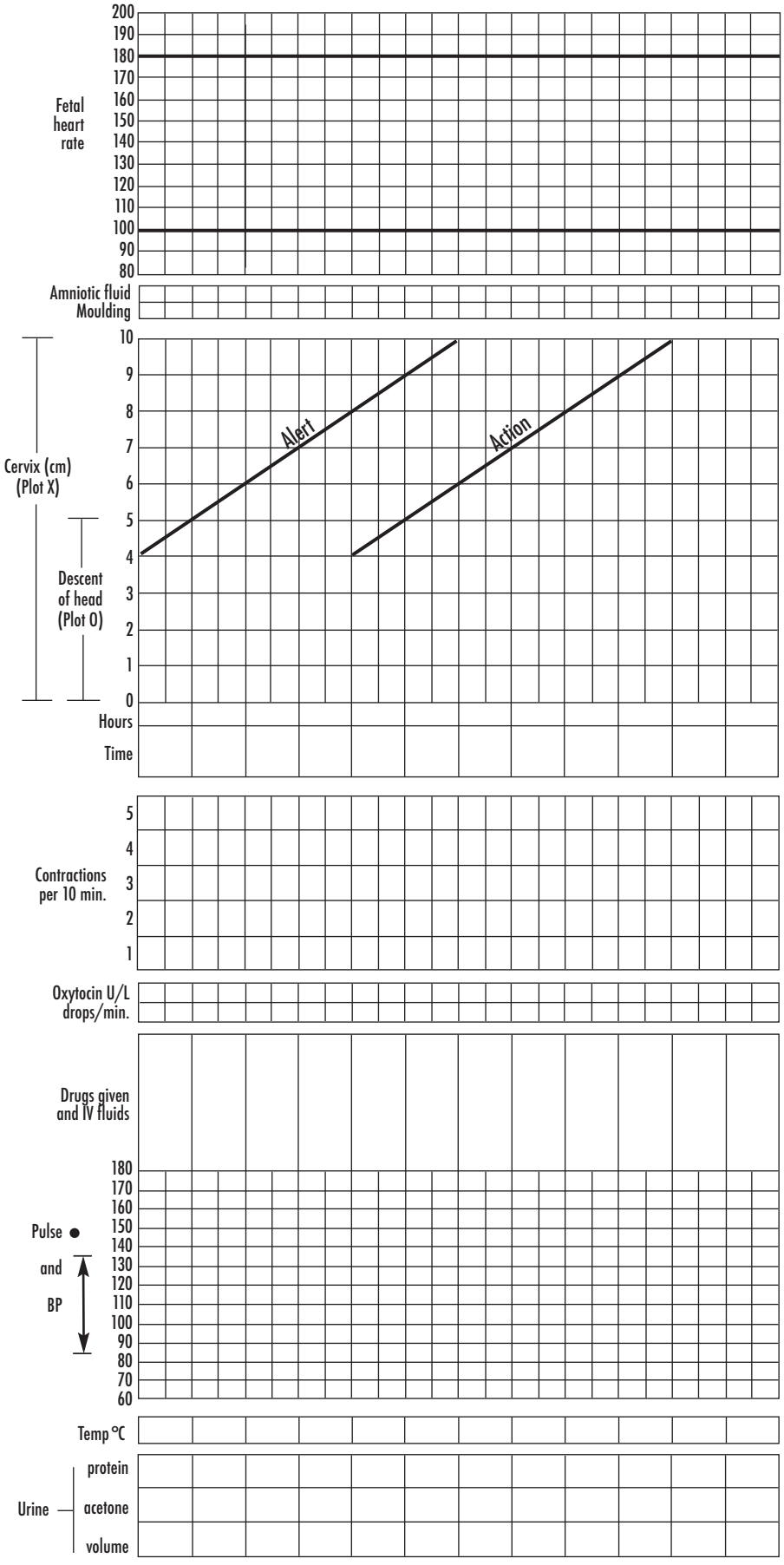
The **alert line** goes from 4 to 10 cm and corresponds to an average dilatation rate of 1 cm per hour. If the labour curve crosses to the right of this line, this means that the dilatation is slow (less than 1 cm/hour).
The **action line** is located 4 hours to the right of the alert line. If the dilatation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

If the woman is at a health centre, transfer to the hospital must be considered if the alert line is crossed.
If the woman is in the hospital, either immediate intervention or, at a minimum, closer monitoring, is required.
The action line marks the critical point at which you must begin to make decisions (see *Dystocia*, page 117).

The WHO partograph

Name | Gravida | Para | Hospital number

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



Sample delivery monitoring card (front and back)

Date: 25 september 2006	
Name: XX	Age: 24 years
Address: XXXXXX	
Gestation: 4	Parity: 2
Abortions: 1 Stillbirths: 0	
Live children: 2	Deceased: 0 Age/cause:
Last menstrual period: end december 2005 ?	Presumed gestation: 38-39 weeks

PAST HISTORY

Medical: 0

Surgical: D+C (post abortion)

Obstetric: PPH (1st child)

CURRENT PREGNANCY

Antenatal consultations: 2

TTV: TT3 on 15/8/05

INITIAL EXAMINATION

Date and time: 25 september 2006 - 10:00

General condition: nil of note

Presenting complaint: irregular contractions since yesterday, stronger this morning, small discharge yesterday evening?

PB: 12/7 Pulse: 85 T° : 37.5°C

Height: > 1,50 m Weight: 69 kg

Oedema: feet Conjunctiva: pale

Other investigations

■ Hb 8 g/dl ■ Albuminuria negative ☐ paracheck ☐ other

Uterine height: 33 cm Presentation: cephalic

FHR: 130 Contractions: 1 to 2/10 min

Vaginal examination

Cervix: 4 cm, shortened, central

Membranes: ruptured; clear amniotic fluid

Presentation: cephalic, applied

Pelvis: seems adequate (2nd infant 3.9 kg)

MANAGEMENT PLAN

Anaemia —> active 3rd stage with systematic oxytocin

In active labour —> commence partogram

Membranes ruptured > 12 hrs —> give antibiotic prophylaxis, monitor T°

Patient's name: XXXX

Time	10h			13h		15h										
Duration (in hours)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Cervix Dilatation in cm 10																
9																
8																
7							Delivery	Placenta delivery								
6																
5																
4																
3																
2																
1																
Presentation (type, station)	cephalic applied					engaged										
Membranes Amniotic fluid	ruptured clear			cloudy		meconium-stained										
FHR	130	140	135	140	140	120	90 deceleration									
Uterine contractions (frequency in 10 min)	1-2	1-2	2	2-3	2-3	2										
Maternal vital signs	12/7 37.5°			12/7 37.5°												
Medications	amoxi 2 g			amoxi 1 g												

Delivery by: XXXX Time and hour: 15:30 on 25/9/06 after 15 minutes of pushing

3rd stage (normal, manual removal of placenta, manual evacuation of uterus, haemorrhage, treatment): 15:45, 10 IU oxytocin given, normal

Perineum (intact/episiotomy/tear/suture): intact

Anaesthesia: nil

Post partum monitoring (BP, loss): every 30 minutes, NAD

17:30: BP 110/50, pulse 90, well contracted uterus, loss OK, discharge from labour ward

Newborn: Sex: M Weight: 3800 g Apgar 1 mn: 6 Apgar 5 mn: 10 Resuscitation: suction and stimulation

Artificial rupture of the membranes (amniotomy)

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

Indications

– To speed up dilation
– To speed up delivery once the cervix is fully dilated
– As an adjunct to oxytocin for induction of labour (see Chapter 6).
– To try to stop the bleeding during labour in cases of marginal placenta praevia (be careful not perforate the placenta).

Precautions

– With polyhydramnios (risk of cord prolapse): re-examine after amniotomy to make sure that the cord did not end up below the head.
– Use sterile technique (infection risk as a result of opening the amniotic cavity to microbes).

Contraindications

Absolute
– Complete placenta praevia
– Transverse presentation

Relative
– Dilation less than 4 cm, contractions irregular (false labour).
– Breech presentation prior to full dilation.
– HIV+ patient prior to full dilation (keep the amniotic sac intact as long as possible to reduce the risk of mother-to-child transmission).

Technique (Figure 28)

– Lithotomy position
– Sterile gloves, disinfection of the perineum and vagina (polyvidone iodine).
– With one hand, prepare access to the sac (hand well into the cervix). With the other hand, slide the amniohook between the fingers of the first hand—which spreads the vagina and the cervix and guides the tip—and make a small cut in the sac as it bulges during a contraction. Let the fluid drain slowly, then use a finger to enlarge the opening.

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

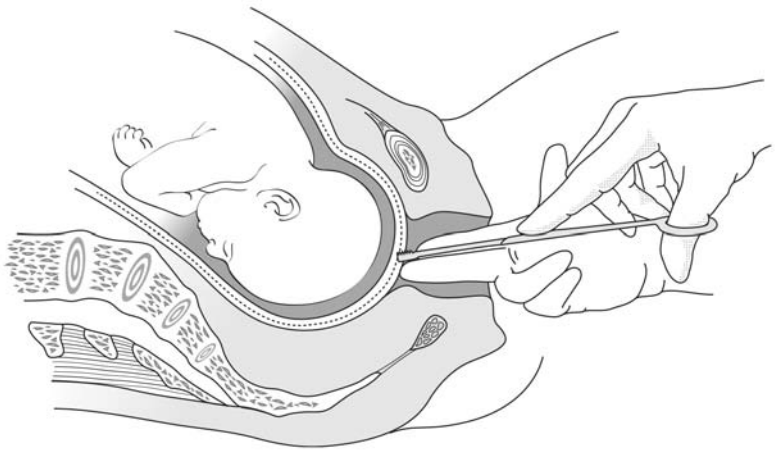


Figure 28
Amniotomy

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 during contractions causes foetal distress and rapid foetal death (Figures 29 and 30).

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 heartbeat is slow and irregular.

Management

Foetus is dead or nonviable *(extremely premature)*

No specific intervention; delivery; no caesarean section

Foetus is alive

Obstetric emergency, deliver immediately:
– The woman in knee-chest (Figure 31) or Trendelenburg (dorsal decubitus, head down) position to take the pressure off the cord.
– With one hand inserted into the vagina, push the presenting part toward the uterine fundus to relieve pressure on the cord, and hold until caesarean section.
– Caesarean section, holding the presenting part off of the cord via the vagina until extraction. Check for a foetal heartbeat right before the procedure. If heartbeat is no longer heard, it is better to let vaginal delivery proceed (the infant is already dead).
– If the presenting part is engaged and the cervix fully dilated, it will not be possible to push the presenting part back; perform vaginal extraction quickly: instrument extraction (vacuum extractor or forceps) or total breech extraction.

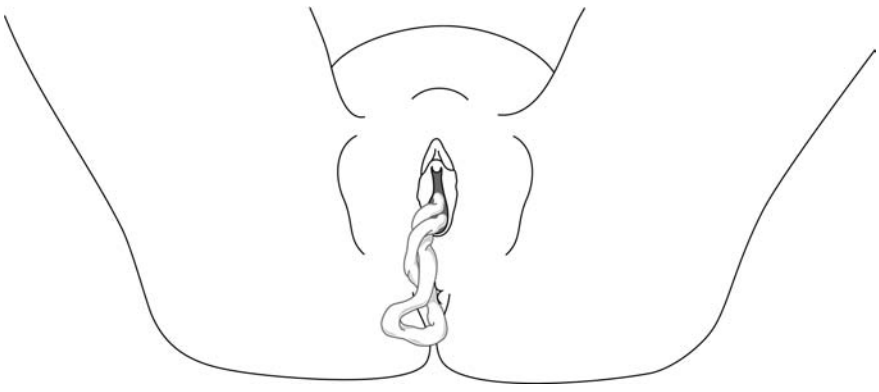


Figure 29
Cord coming out of the vaginal opening

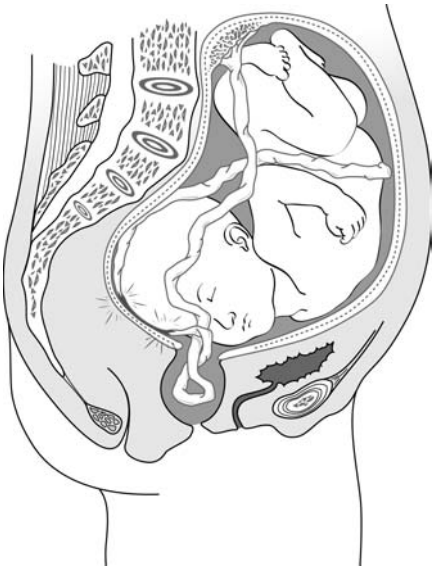


Figure 30
Compression of the cord by the presenting part

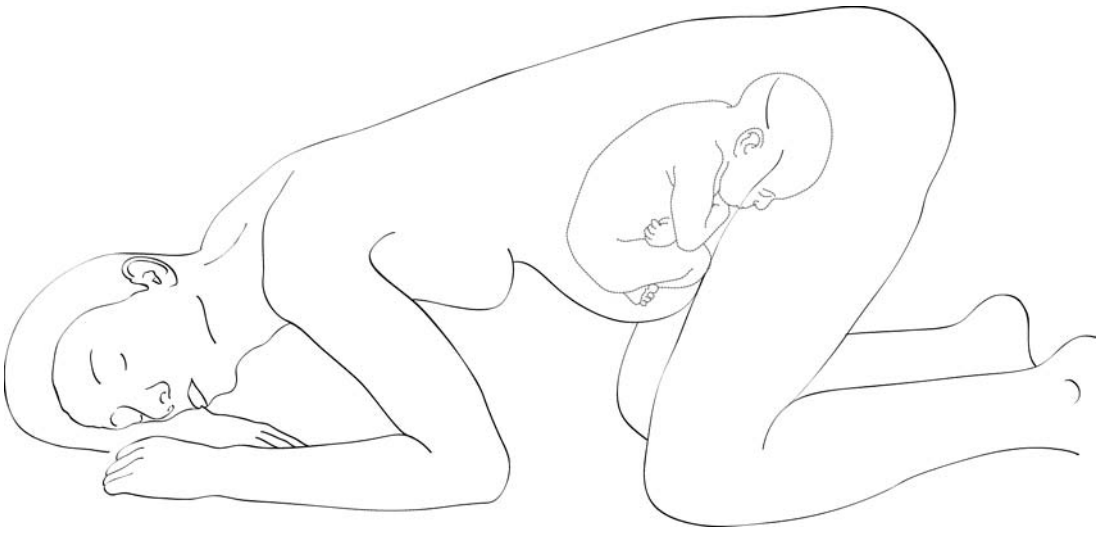


Figure 31
Knee-chest position

Nuchal cord

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

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

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

If the loop is tight and/or has several turns, clamp the cord with two Kocher forceps and cut between the two forceps (Figure 32). Unwind the cord, complete the delivery and resuscitate the newborn, if necessary.

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

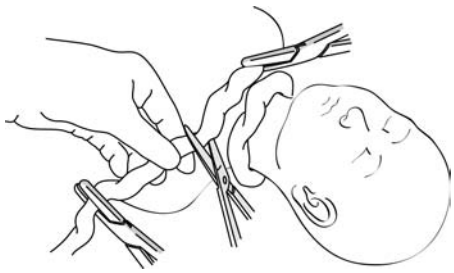


Figure 32
Tight nuchal cord; cut between two forceps as soon as the head is delivered

Vacuum extraction

Flexion and traction device for facilitating delivery of the foetus.

There are various models, but all have:
– A metal or plastic suction cup, which must be sterile.
– 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.

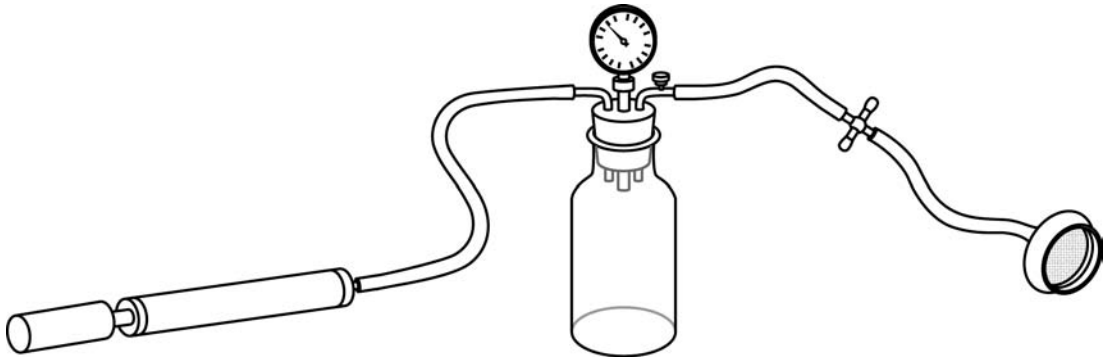


Figure 33
One model of vacuum extractor

Conditions for vacuum extraction

– Full dilatation
– Vertex presentation, head engaged
– Amniotic sac ruptured
– Bladder empty

Indications

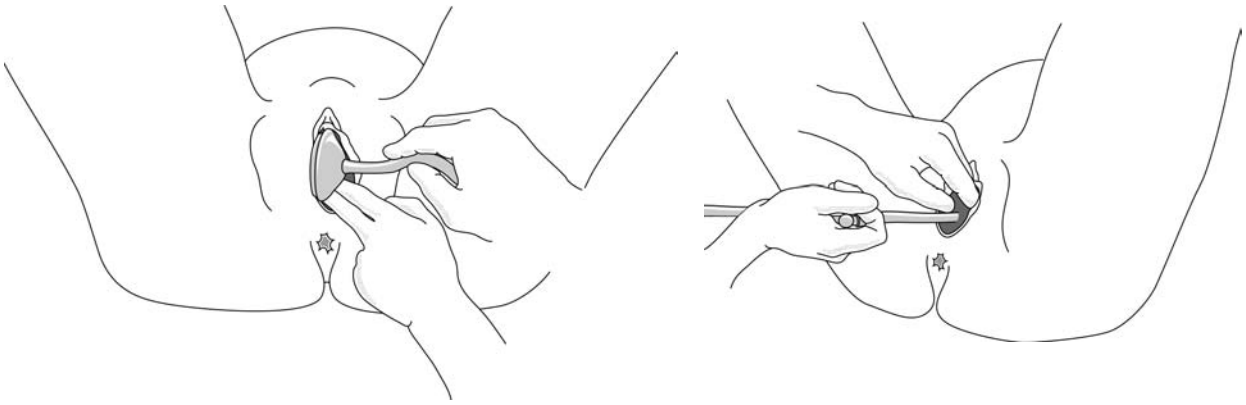
– Failure to progress (insufficient or ineffective expulsive effort) with prolonged delivery (more than 30 to 45 minutes).
– Foetal distress (profound slowing in foetal heart rate) during delivery.
– Perineum unable to stretch enough (combine with episiotomy)
– Borderline foetopelvic disproportion (combine with symphysiotomy).

Contraindications

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

Technique

– Woman in the lithotomy position, hips and knees flexed.
– Swab the perineum and the vagina with polyvidone iodine; empty the bladder (sterile catheter).
– Prepare the sterile part of the instrument (the cup), using sterile gloves.
– Insert the cup into the vagina (Figures 34) and apply it to the scalp, as close as possible to the posterior fontanelle—that is, anteriorly for occiput anterior presentations.
– With the left hand holding the cup, circle the cup with one finger of the right 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).

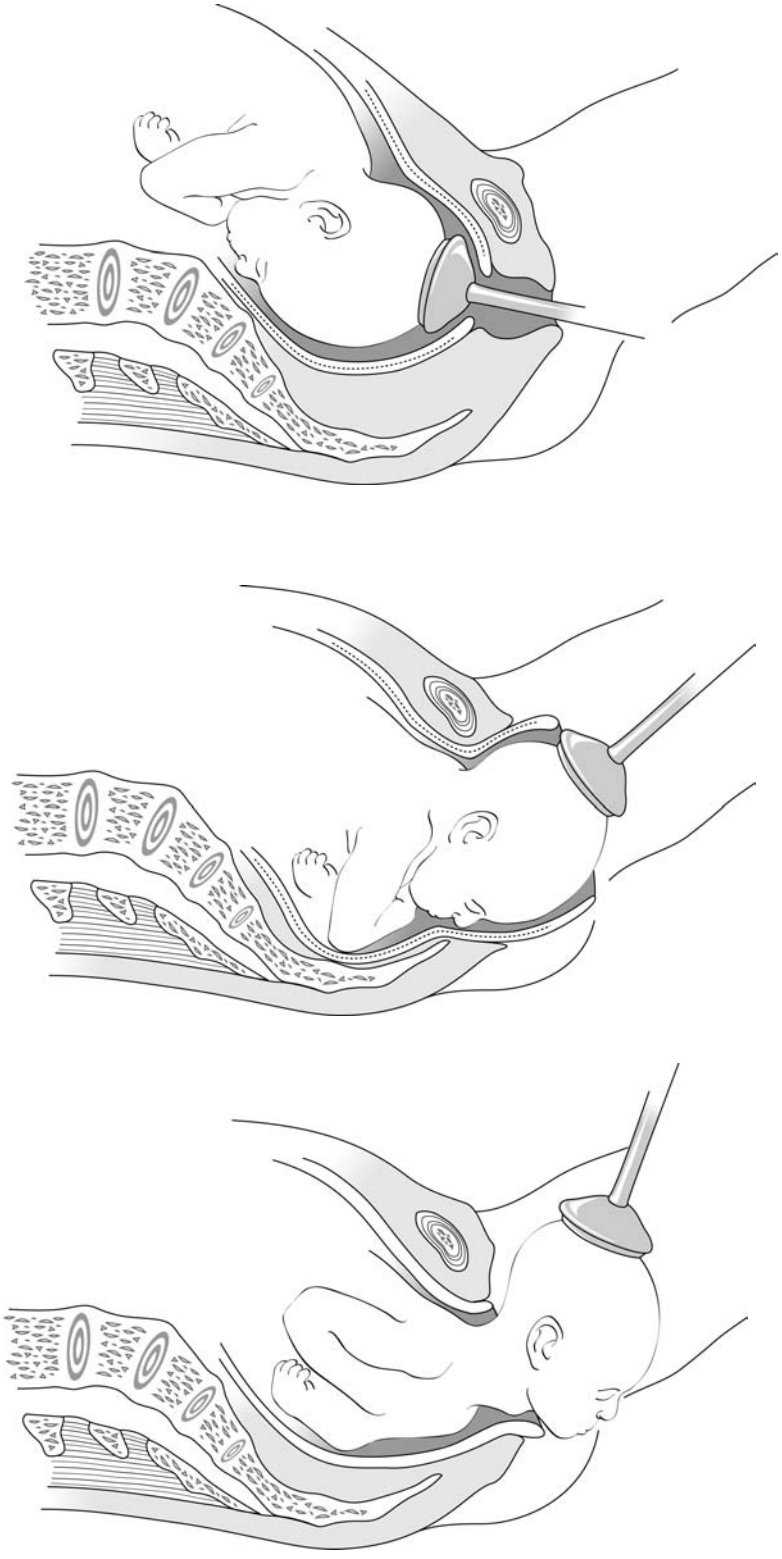


Figures 34
Inserting the cup into the vagina

– Have an assistant connect the cup to the vacuum system.
– Hold the cup to the infant's head with the left hand.
– Pump until the negative pressure reaches 0.2 kg/cm^2. Check again for trapped vaginal or cervical tissue, then pump to reach a negative pressure of at most 0.8 kg/cm^2.
Sit on a small foot rest or kneel; this gives a good traction angle and helps to stay balanced. The traction, applied with the dominant hand, should be perpendicular to the plane of the cup.
– Traction should be applied in sync with the uterine contractions and the pushing, which the patient should continue. Stop pulling the moment the uterine contraction stops. The direction of traction varies according to the head's progress: first downward, then horizontal, then increasingly vertical (Figure 35).
– If the cup is positioned incorrectly or the traction too sudden, the cup can come loose. If this happens, re-apply it.
– When the left hand is able grasp the foetus' chin, turn off the suction, remove the vacuum extractor and finish the delivery in the normal fashion.
– While episiotomy is not routine, it can be useful, especially if the perineum is too resistant or too distended.

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

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



Figures 35
Vacuum extractor traction: axis varies depending on the progress of the head

Symphysiotomy

Partial incision of the ligaments of the symphysis pubis such that the two pubic bones separate by about 2 cm, allowing enough room for passage of an entrapped, live foetus. This procedure is always done in combination with episiotomy and instrument extraction.
This life-saving technique can be useful in situations where a prompt caesarean is not feasible.

Indications

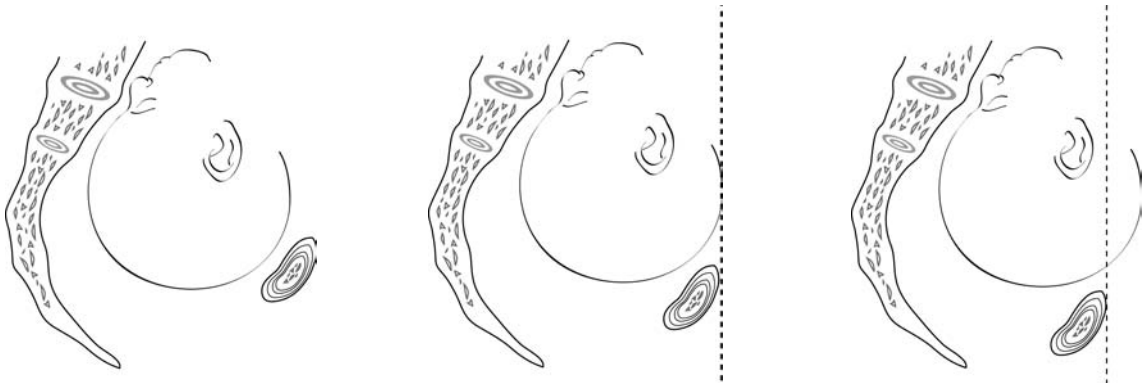
– Head engaged and arrested for more than an hour, and vacuum extraction alone has been proven or is likely to fail.
– Foeto-maternal disproportion due to a pelvis that is slightly too narrow: after the trial of labour has failed and the head has descended by at least 3/5 of its height into the pelvic cavity.
– Breech presentation with retention of the aftercoming head.

Conditions for symphysiotomy

– Membranes ruptured, full dilation.
– The foetal head is not palpable above the symphysis pubis, by more than 2/5 (Figure 36).

Contraindications

– Head not engaged.
– Brow presentation
– Foetus dead (in this case, perform a destructive delivery)
– Cervix not sufficiently dilated
– Severe cephalopelvic disproportion, with head above the symphysis by more than 2/5 (Figures 36).



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

Figures 36: *Position of the foetal head*

Equipment

– Scalpel, suturing equipment, delivery set with episiotomy scissors
– Vacuum extractor
– Indwelling urinary catheter
– Sterile drape and gloves
– Antiseptic (polyvidone iodine), needed for local anaesthesia

Technique

– Patient in lithotomy position, hips and knees flexed; abduction supported by two assistants who maintain an angle of less than 90° between the patient's thighs (Figure 37).
– Strict asepsis: shave, swab a wide area of the pubic and perineal region with polyvidone iodine.
– Place a sterile aperture drape over the symphysis.
– Place an indwelling urinary catheter, which allows location of the urethra throughout the procedure.
– Local anaesthesia: 10 ml **lidocaine** 1%, infiltrating the skin and subcutaneous tissues superior, anterior, and inferior to the symphysis, along the midline, down to the ligament. Infiltrate the episiotomy region as well.
– With the index and middle fingers of the left hand inserted into the vagina, push the urethra to the side (Figures 38 and 39). Place the index finger in the groove formed by the cartilage between the two pubic bones, in such a way that it can feel the scalpel's movements.
  The catheterized urethra must be pushed out of scalpel's reach.
– Incision:
  • Locate the upper edge of the symphysis.
  • Introduce the scalpel 1 cm below this point, perpendicular to the skin, exactly on the midline.
  • Cut down until the cartilage: it should feel elastic; if it feels bony, gently withdraw the blade and recheck the location.
  • First tilt the blade toward the top, use a small back-and-forth motion, always along the midline, and in that way section 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 (Figure 40). The procedure is complete when the finger in the vagina can be inserted between the two pubic bones. Do not cut the vagina.
  • One or two stitches suffice to close the wound after delivery.
– Perform an episiotomy; use a vacuum extractor to deliver the infant
– After the birth, have the mother rest on her side (avoid forced abduction of the thighs). Bed rest for 7 to 10 days, no heavy work for 3 months.
– If there was blood in the urine during catheterization, the foetal head probably compressed and injured the bladder wall: leave the catheter in place for at least 3 days after the haematuria resolves. Otherwise, remove it immediately.
– Routine treatment for pain.

Complications

- Bleeding at the site of the wound: compression bandage.
- Local wound infection: daily dressings, antibiotics:
  amoxicillin PO: 2 g/day in 2 divided doses for 5 days, for example
- Stress incontinence: uncommon and temporary.
- Gait problems: prevented through bed rest.
- Injury to the urethra or bladder: leave the catheter in place for 6 to 10 days and consult a specialist.
- Osteitis: extremely rare if rigorous sterile technique has been followed.

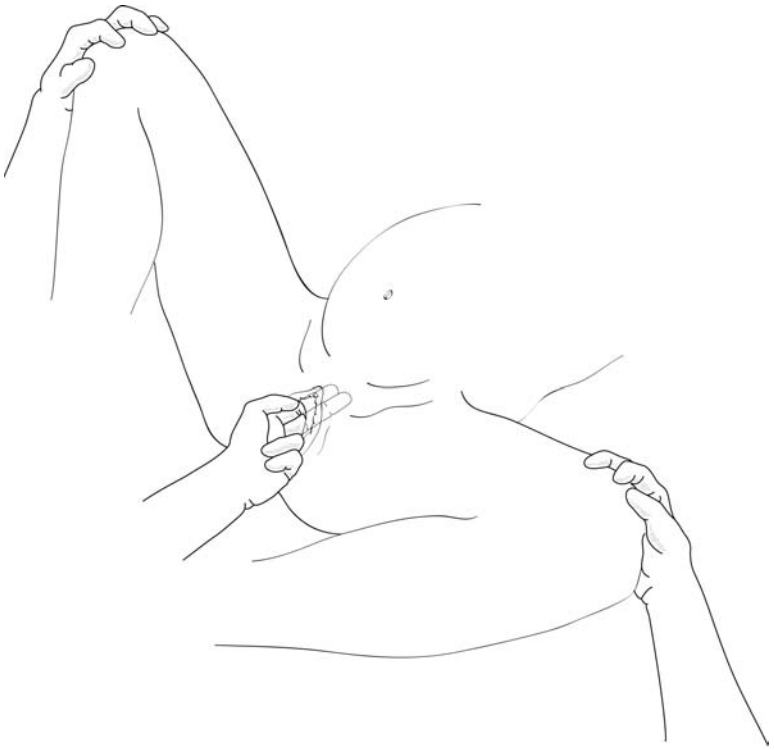


Figure 37
Supported lithotomy position

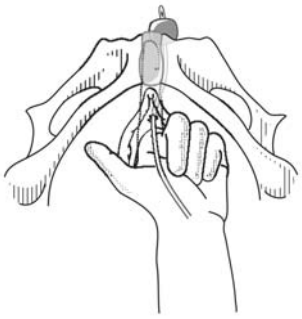


Figure 38
Finger in the vagina pushing the urethra out of the way

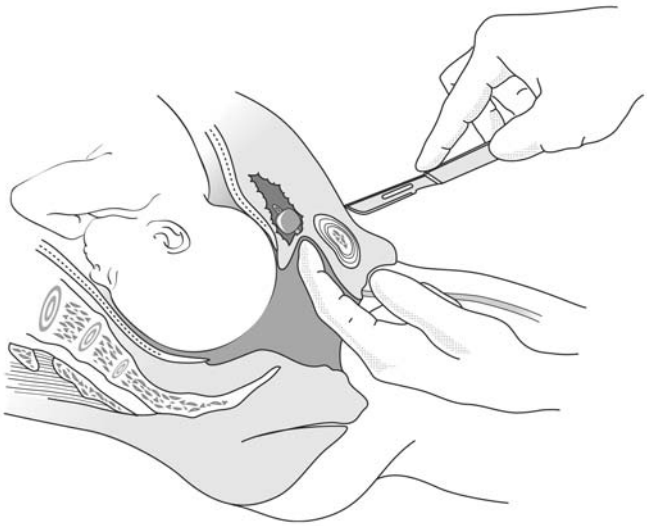


Figure 39
Finger in the vagina pushing the head and urethra out of the way

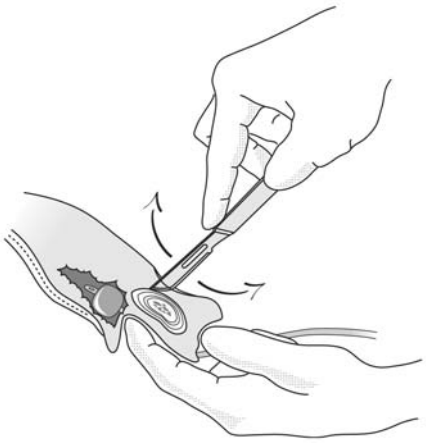


Figure 40
Scalpel moves back and forth toward the top, then toward the bottom

Episiotomy

Cutting the perineum.

Indications

There is no indication for a routine episiotomy.

Episiotomy is considered in the following situations:

- Delivery is taking more than 30 minutes, especially if foetal heart rate slows, when completion of the delivery is being obstructed by the perineum.
- Occiput posterior, face, or breech delivery, particularly in a primipara.
- In combination with symphysiotomy or forceps delivery, sometimes with vacuum extraction.
- Oedematous or scarred perineum that does not stretch properly.
- 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—while it may not completely prevent tearing—may be necessary.
- Infibulation: see page 100.

Technique

- Swab the perineum with polyvidone iodine.
- Administer local anaesthesia by infiltration with 10 ml **lidocaine** 1%.
- 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 41).
- The episiotomy can be done to the right or the left, depending on whether the operator is right- or left-handed.
- The scissors used for the episiotomy, now contaminated, should be put aside immediately. They must not be used for other procedures, like cutting the cord (this is why all delivery sets must include 2 pairs of scissors).

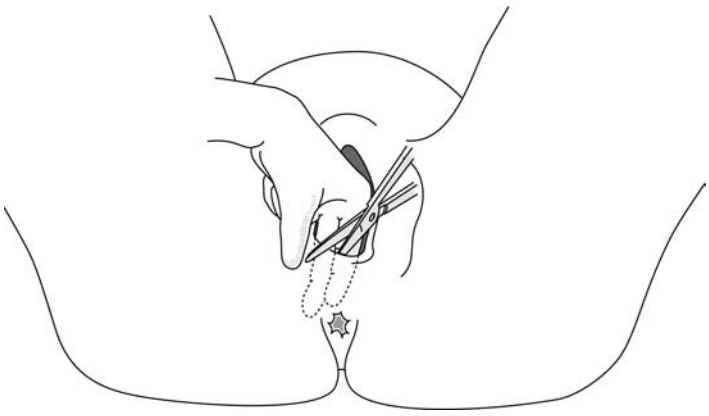


Figure 41: *Cutting the perineum*

Perineal repair

Sometimes the perineum tears during delivery, resulting in vulvovaginal lesions that are superficial (a first-degree tear), or deeper, affecting the muscle tissue (a 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 the sphincter can be recognized by the loss of the anus' radial appearance. 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.

Equipment

– Suture set containing sterile scissors, dissecting forceps and needle holder
– Antiseptic (polyvidone iodine), needed for local anaesthesia
– One or two Dec3 (2-0) absorbable sutures.
– A rapidly absorbable suture for closing the skin or, failing that, a non-absorbable Dec3 (2-0) suture.
– Sterile drape and gloves.
– If needed, make a tampon from sterile gauze tied together with a thick thread; this is inserted into the vagina to absorb the endo-uterine bleeding (Figure 42). The pull string, visible at the vulva, prevents forgetting the tampon when the procedure is over. Ordinary compresses may be used in place of this tampon.

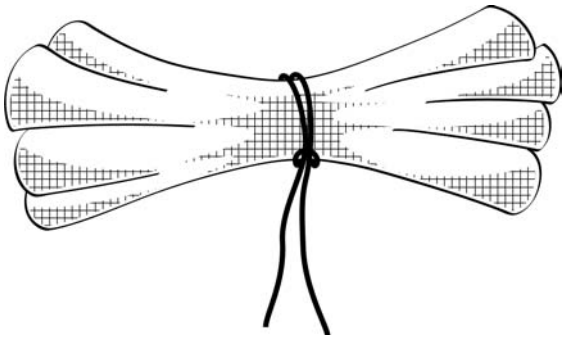


Figure 42
Tampon made of compresses tied together with a pull string

Technique

– The perineum should not be sutured until after the placenta is delivered.
– Swab the perineum and vagina with polyvidone iodine.
– Position a sterile aperture drape.

– Assess the size and number of tears. If episiotomy was performed, check to make sure it did not tear further, and look for other tears. If necessary, use vaginal retractors to expose the entire vaginal wall.
– Use lidocaine 1% local anaesthesia in all the involved tissues except the rectal mucosa. General anaesthesia may be necessary for extensive tears.

Superficial vulvar (first-degree) tears

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

Episiotomy or simple second-degree perineal tears

– Locate the mucocutaneous junction of the commissure and place a first stitch there, without tying, to obtain good apposition of the edges. Use the left hand as well (Figure 43).

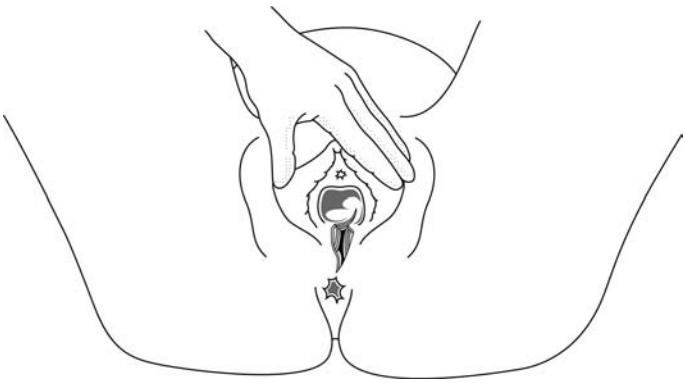


Figure 43
Suturing a perineal tear. Use the left hand to get a good view of the wound

– 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 44).

Figure 44
Suturing the mucosa

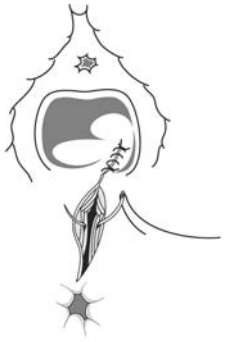


Figure 45
Suturing the muscle

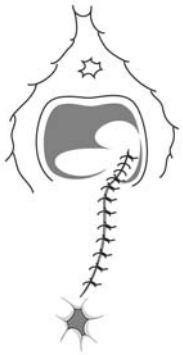


Figure 46
Suturing the skin

– Next, suture the muscle layer with two or three absorbable figure-of-eight sutures (Figure 45).

– 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 46). Because the tissues will be oedematous in the days following the birth, avoid tying the knots too tight. Do a rectal exam to make sure that no stitches can be felt in the rectum. Remove compresses from inside the vagina.

Rupture of the anal sphincter

– A tear in the muscular ring can result in retraction of the two torn ends of the muscle, now hidden in the tissues. Insert a finger into the rectum to locate the two ends.
– Suture the sphincter with two or three absorbable figure-of-eight or horizontal mattress sutures (Figure 47).
– Continue in the same sequence as in the preceding case.

Figure 47
Suturing the anal sphincter

Tear in the rectal mucosa

– Protect the wound from faecal material by placing a compress in the rectum (as with the vaginal tampon, do not forget to remove it).
– Swab with polyvidone iodine.
– Suture the rectal mucosa, going from high to low, using absorbable, interrupted stitches knotted on the rectal surface (Figures 48).
– Continue in the same sequence as in the preceding case.

Figures 48
Suturing the rectal mucosa

Post-operative care

– In all cases, the vulva should be cleansed with soap and water and dried each time the patient urinates or defecates, at least twice daily.
– For nonabsorbable sutures: remove the stitches between the 5th and 8th day.
– Routine analgesia: paracetamol and/or ibuprofen (especially if there is perineal oedema). A short course (5 days) of ibuprofen can be prescribed in nursing women.
– For third- and especially fourth-degree tears, recommend a fibre-free diet (no fruits or vegetables) for two weeks, if possible. If necessary, give a laxative to prevent passage of hard stools over the sutured rectal mucosa.
– No antibiotics are needed for an episiotomy or perineal tear. For fourth-degree tears, administer **metronidazole** PO: 1.5 g/day in 3 divided doses for 5 days.

Deinfibulation

Infibulation refers to excision (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 interferes with the ability to monitor cervical dilation and with the normal childbirth process. Deinfibulation, performed during pregnancy or labour, is essential for the birth of the child.
There is a risk of associated perineal tears during delivery. While episiotomy may not completely prevent tearing, it may be necessary.

Equipment

– Suture set containing sterile scissors, dissecting forceps and needle holder
– Antiseptic (polyvidone iodine), needed for local anaesthesia
– One or two Dec3 (2-0) absorbable sutures.
– Sterile drape and gloves.

Technique

– Ask the patient to urinate.
– Administer local anaesthesia.
– Clean and swab the perineum and vagina with polyvidone iodine.
– Insert one finger of the left hand in the opening in the vulva to protect the urethra.
– With the right hand, use scissors to cut the midline anterior strip of scar tissue; this allows access to the vagina and urethra.
– Ensure hemostasis with a continuous absorbable Dec3 (2-0) suture along each edge.
– Women should never be reinfibulated after childbirth.

CHAPTER 5

Special deliveries

Breech presentation

– Presentation of the feet or buttocks of the foetus. If this occurs on its own—that is, in the absence of any other anomaly—it is not, strictly speaking, a dystocic presentation.
– Any anomaly accompanying a breech presentation and diagnosed in time should prompt delivery in a surgical setting, in case a caesarean is deemed necessary (e.g. placenta praevia).
– In a *complete breech* presentation, the legs are tucked, and the foetus is in a crouching position (Figure 49).
– In a *frank breech* presentation, the legs are raised in front of the torso, with the feet near the head (Figure 50).

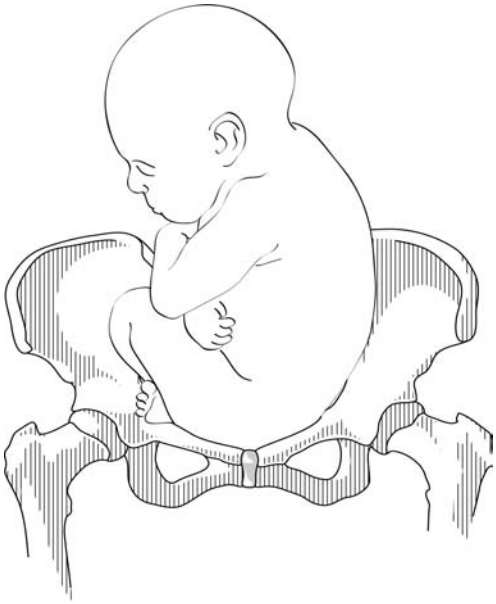


Figure 49
Complete breech

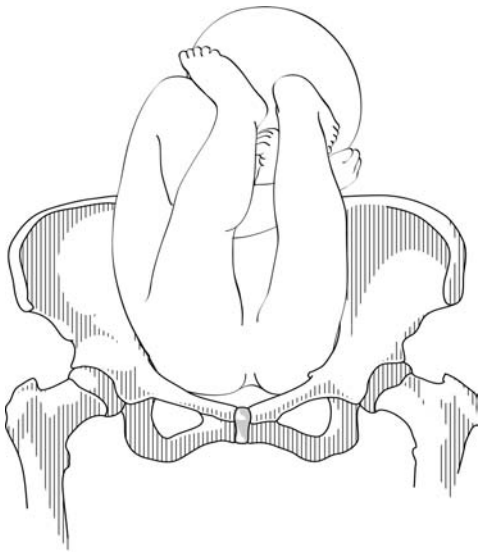
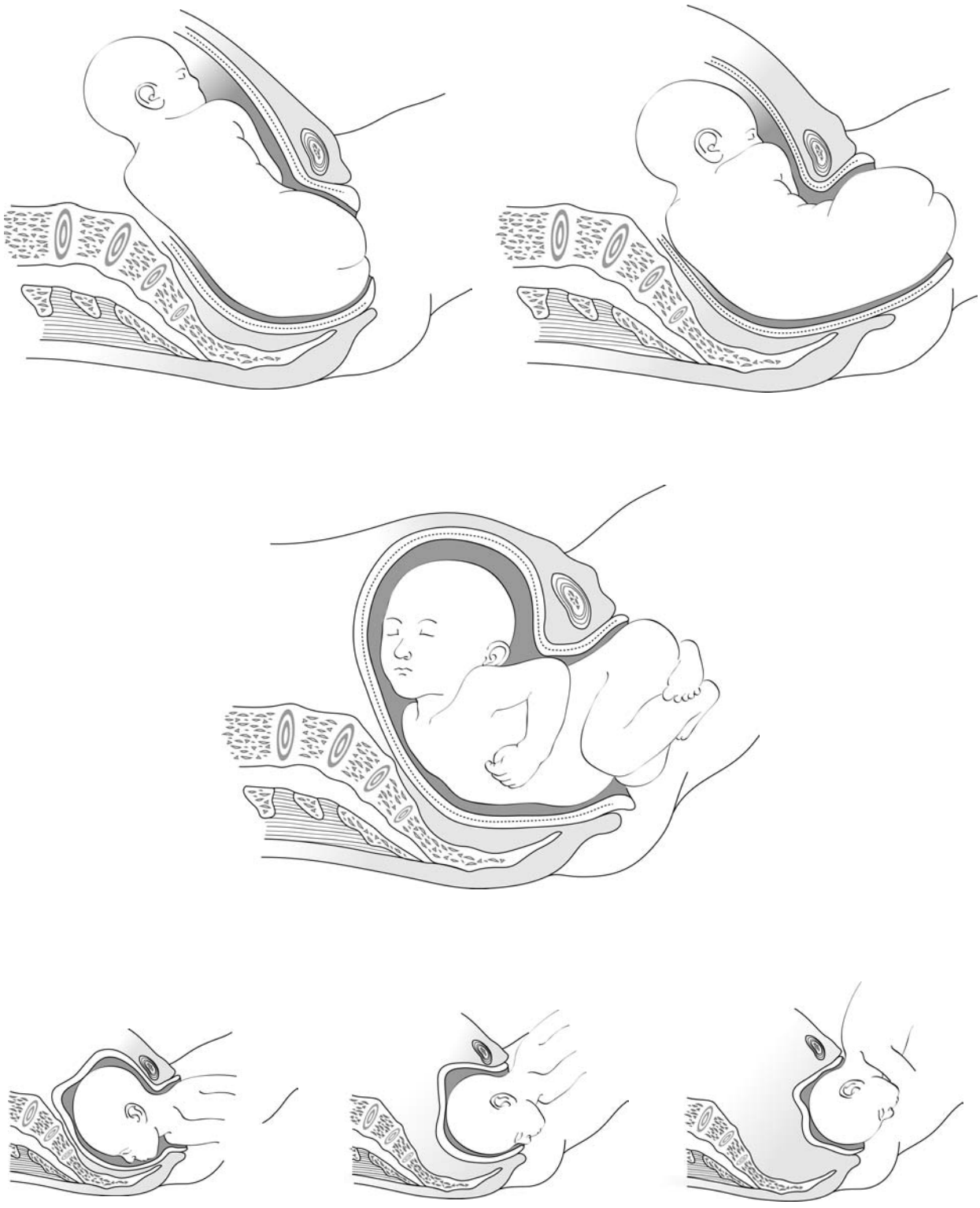


Figure 50
Frank breech

Diagnosis

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



Figures 51
Breech delivery

Management

During labour

– Do not rupture the membranes.

– Monitor labour every hour: the cervix must dilate steadily by 1 cm/hour. If the dilation fails to progress satisfactorily, transfer the mother to a facility equipped for caesarean section.

– Presence of meconium or meconium-stained amniotic fluid is not necessarily a sign of foetal distress.

At delivery

– Routine episiotomy at expulsion for primiparous women, and when there is any concern in a multiparous women. Episiotomy is performed when the perineum is sufficiently distended by the infant's buttocks.

– If contractions are of good quality, dilation is progressing, and the foetal heart rate is regular, an expectant approach is best.

– The infant delivers *unaided*, as a result of the mother's pushing. He is simply supported by the birth attendant's hands, with no traction, or by a table placed below the level of the mother's perineum (Figure 52). Do not pull on his 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.
Avoid handling him until the tips of his shoulder blades appear, however, so that you don't trigger the respiratory reflex before his head is delivered.

– Monitor the position of the infant's back and do not let it rotate posteriorly. If this happens, turn him by the hips to return his back to an anterior position (rare occurrence).

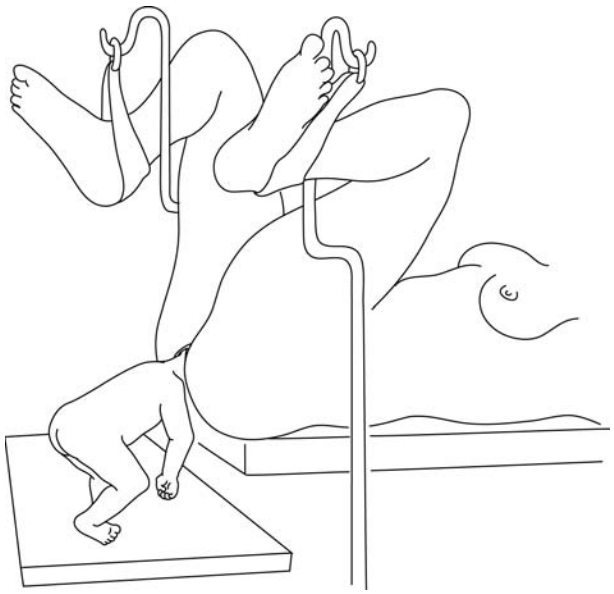


Figure 52

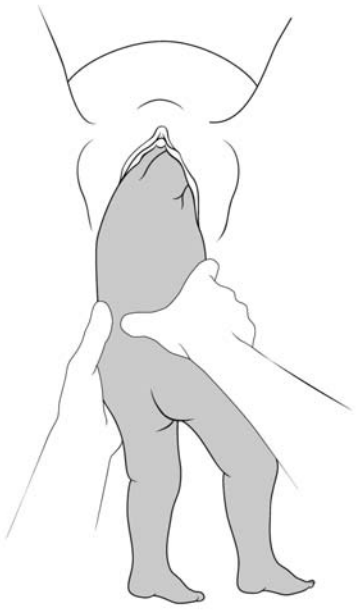
– The shoulders can become lodged and hold back the infant's chest and head, for example, if the arms are raised as the shoulders pass through the mother's

pelvis. There are two methods for lowering the arms so that the shoulders can descend:

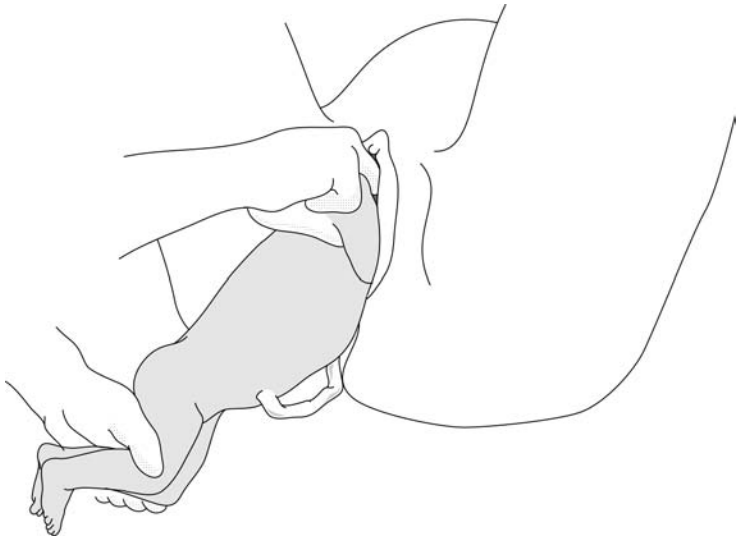
Method 1: Lovset's manoeuvre (Figures 53)

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

53a: *Turning the infant to bring down the anterior shoulder*



53b: *Downward traction and descent of shoulders along the midline (sacral-pubic) axis.*



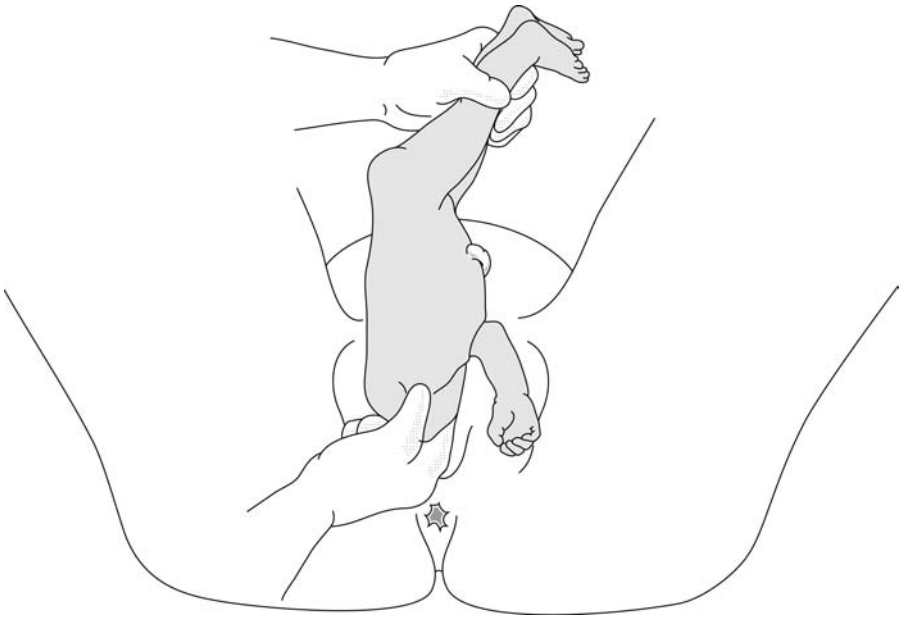
53c: *Delivering the anterior shoulder*

Figures 53: *Delivering the shoulders*

Method 2 (Figures 54), in case the previous method fails:

- Turn the infant 90° (his back to the right or to the left).
- Pull him downward: insert one hand along his back to look for the anterior arm. With your thumb in his armpit and middle finger along his arm, bring down the arm (Figure 54a).
- Lift him upward by the feet in order to deliver the posterior shoulder (Figure 54b).

54a: *Bringing down the anterior arm*

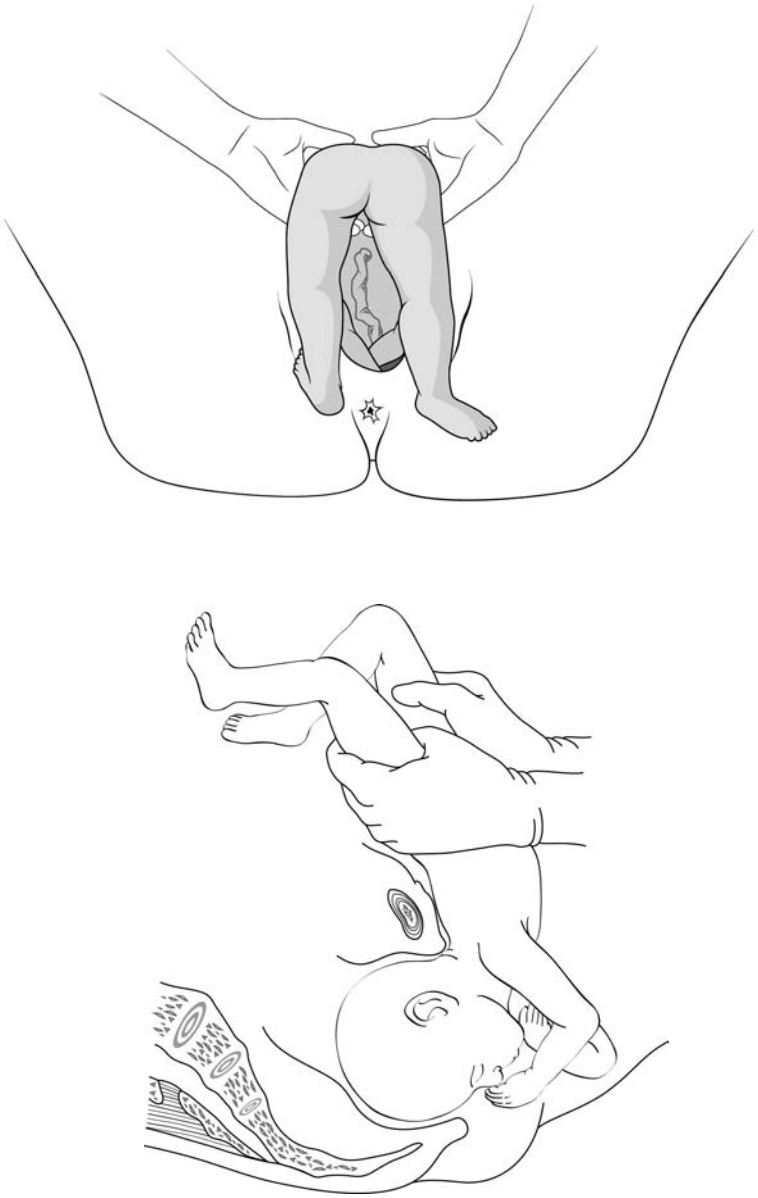


54b: *Delivering the posterior shoulder*

Figures 54: *Raised arms*

– The foetus's head is bulkier than his 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.

Bracht's manoeuvre (Figures 55):
- After the arms are delivered, the foetus is grasped by the hips and lifted with two hands toward his mother's stomach, without any traction, the neck pivoting around the symphysis.
- Having an assistant apply suprapubic pressure facilitates delivery of the aftercoming head.

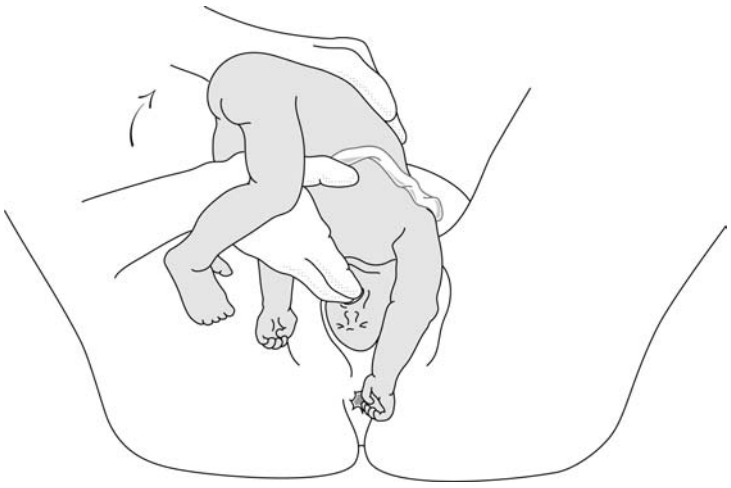


Figures 55
Bracht's manoeuvre

Mauriceau manoeuvre, in case the previous method fails (Figures 56):
- Infant's head occiput anterior.
- Kneel to get a good traction angle: 45° downward.
- Support the infant on the right hand and forearm, then insert the index and middle fingers gently into the infant's mouth, to the base of the tongue.
- Spread index and middle fingers of the left hand and place them on either side of the infant's neck.
- With the left hand, lower the infant's head to bring the subocciput under the symphysis (Figure 56a).
- Then, using gentle pressure on the floor of his mouth, tip his head and with a sweeping motion bring his back up toward the mother's abdomen, pivoting his occiput around her symphysis pubis (Figure 56b).
- Suprapubic pressure on the infant's head along the pelvic axis helps delivery of the head.
- As a last resort, symphysiotomy can be combined with the Mauriceau manoeuvre.

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

56a: *Step 1*
Infant straddles the birth attendant's forearm; the head, occiput anterior, is lowered to bring the occiput in contact with the symphysis.



56b: *Step 2*
The infant's back is tipped up toward the mother's abdomen.

Figures 56: *Mauriceau manoeuvre*

Twin pregnancy

Simultaneous development of two foetuses in the uterine cavity.

Diagnosis

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

Management during pregnancy

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

Management during delivery

Delivering the first twin

When the cord is cut, leave a clamp on the placenta side, as there may be an anastomosis with the second twin's circulation.

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 orientation by placing hands laterally on either side of the uterus. This is done to prevent the foetus from assuming a transverse lie in the uterus, which is now too large for him.
– If the presentation is normal, await spontaneous delivery.
– If contractions have not resumed after 30 minutes, administer an escalating-dose oxytocin infusion (see page 126) to speed up the birth of the second twin.

Delivering the second twin

– Easy if presentation is longitudinal (vertex or breech).

– For a transverse lie, attempt external version (see page 131). If this fails and conditions are favourable (full dilation, soft uterus), perform internal version (see page 133) to bring the foetus to a breech position, then perform total breech extraction (see page 112).

Delivering the placenta

– After both infants have been born, even if they have separate placentae, administer systematically:
  • **oxytocin**: 5 to 10 IU by IM or IV injection
  • antibioprophylaxis if internal manoeuvres were performed: **ampicillin** or **cefazolin** slow IV: 2 g as a single dose

– 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 for retained products.

Total breech extraction

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

– When equipment permits (an operating theatre nearby), prepare for a caesarean section in case the total extraction fails.

– **This technique requires extensive experience in obstetrical manoeuvres.**

Contraindication

– Scarred uterus

Technique

– Proceed slowly; it may be necessary to pause periodically to allow the uterus to re-soften.

– Empty bladder; general anaesthesia.

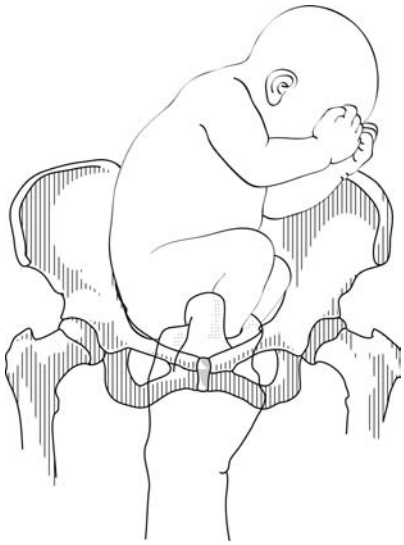
– Insert a hand into the uterus and bring down one foot.

– 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 is the foot is down).

– Delivering the foot:

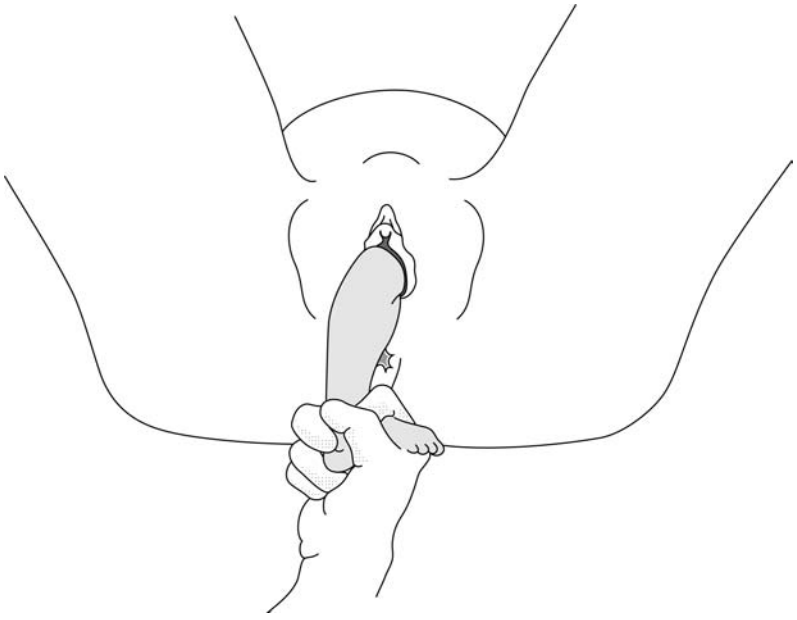
Complete breech (Figures 57a and 57c)
- Grasp one or both ankles with your hand, index and middle finger straddling the back of the foot.
- Apply gentle traction to bring the leg to the vulva.

Frank breech (Figures 57b and 57c)
- 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.



57a: *Grasping one or both feet in the complete breech*

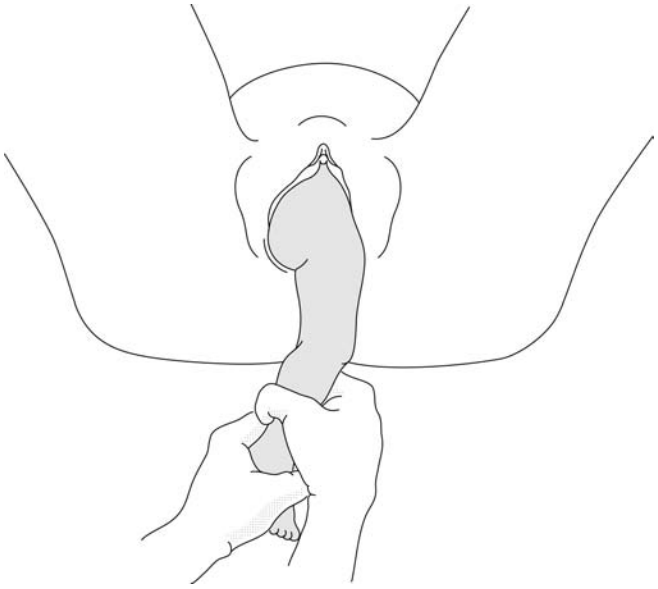
57b: *Grasping the anterior foot in the frank breech*



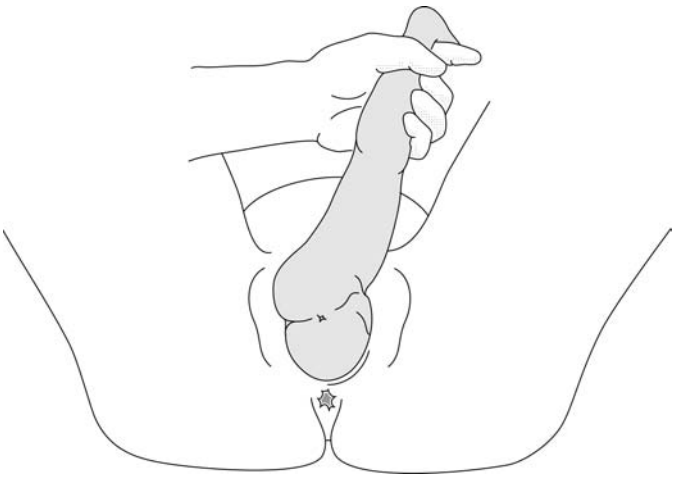
57c: *Bringing one foot down*

Figures 57: *Total breech extraction*

– Delivering the breech (Figures 58)
  • Apply gentle, continuous, downward traction on the leg to deliver the anterior hip, the infant's back anteriorly.
  • Once the anterior hip has been delivered, pull gradually upward to deliver the posterior hip.
  • Once the pelvis is out, with thumbs on the loins, take hold of the hips and pelvis with the other fingers. Pull the pelvis downward, keeping the back anterior, until the tips of the shoulder blades are seen.
– Deliver the shoulders and head: see Lovset and Bracht manoeuvres, pages 106 to 108.
– Explore the uterus to rule out uterine rupture.
– Systematic antibioprophylaxis after clamping the cord: **ampicillin** or **cefazolin** slow IV, 2 g as a single dose.



58a: *Downward traction to delivery the anterior hip*



58b: *Upward traction to deliver the posterior hip*

Figures 58: *Delivery of the breech in a total breech extraction*

CHAPTER 6

Malpresentations and labour dystocia

Obstructed labour

Excessively long dilation or delivery. This can be due either to foetopelvic disproportion (mechanical dystocia) or to inadequate contractions (dynamic dystocia).

Obstructed labour cannot be diagnosed until the cervix is dilated more than 4 cm. Before that point, it is usually a question of false labour.

The two main dangers are prolonged obstructed labour and foetal distress.

Diagnosis

– Dilation progresses less than 1 cm/hour during the active phase
or
– Foetus is not yet engaged more than 2 hours after the cervix is fully dilated
or
– Delivery (the period from when pushing starts at complete dilation to the birth of the infant) is longer than 1 hour

Management

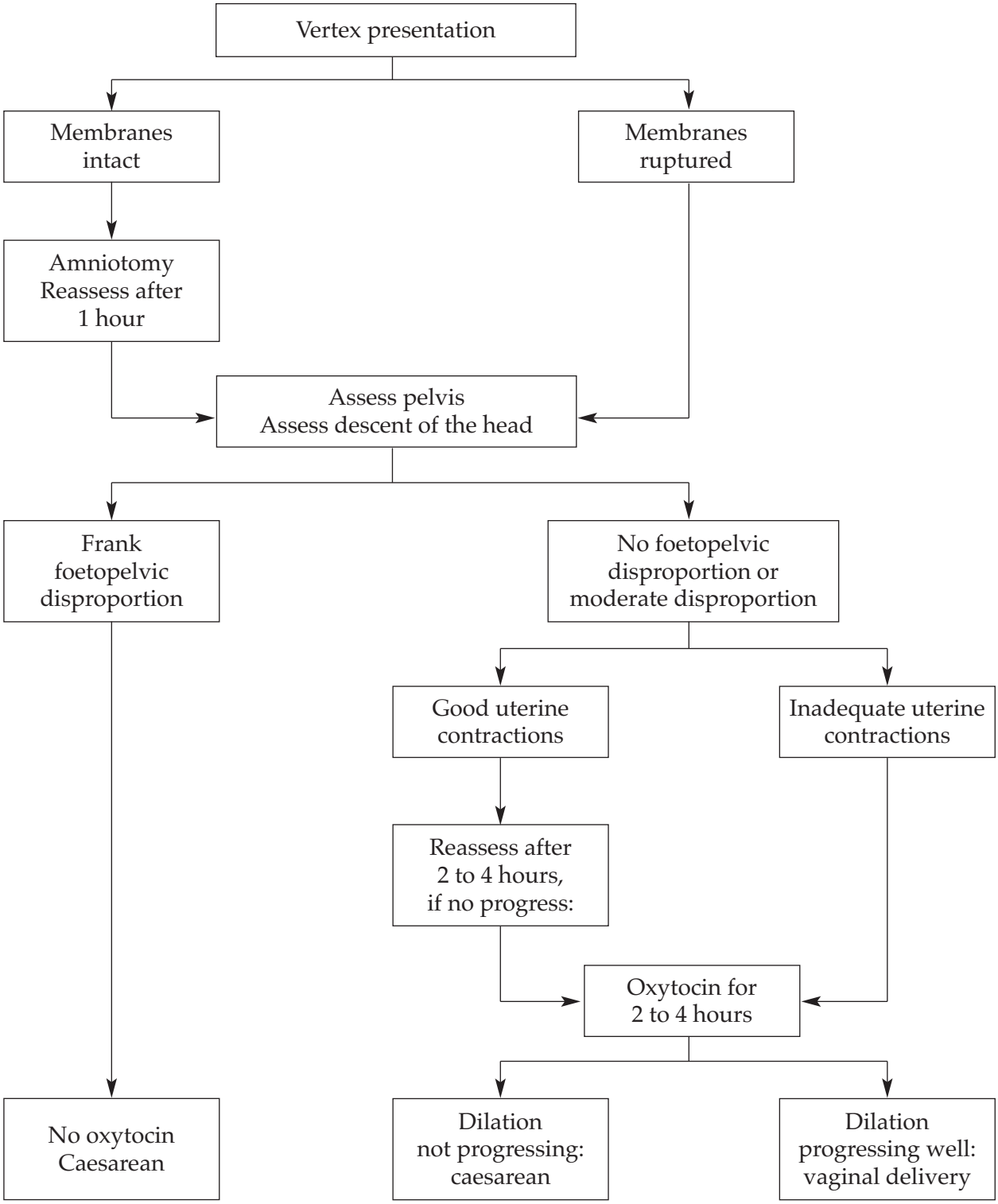
See the decision trees on the pages below.

Due to the risk of uterine rupture, oxytocin cannot be used in cases of frank foetopelvic disproportion—particularly with a pelvis that can be fully explored by vaginal exam.

In case of foetal distress (prolonged deceleration of the foetal heartbeat to less than 100 bpm after each uterine contraction):
– Prior to complete dilation, or at complete dilation with presenting part not engaged: consider caesarean section earlier than in the decision trees.
– At complete dilation, with the presenting part engaged: instrument extraction.
In either case, do not use—or stop, if already using—oxytocin.

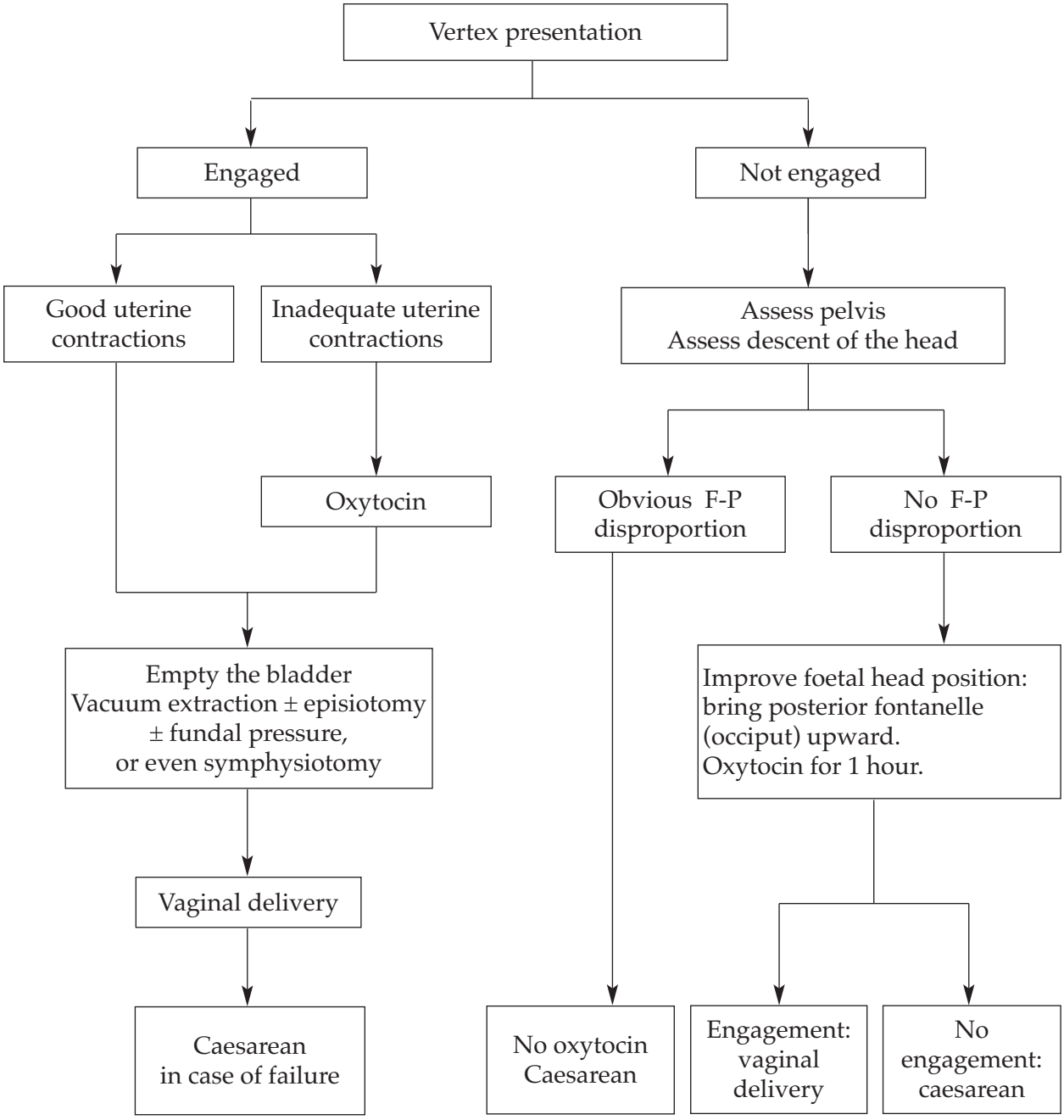
If the foetus is dead, avoid caesarean section whenever possible. Allow more time for dilation and engagement. Discuss destructive delivery.

Management of protracted cervical dilation
(crossing of the partogram action line
or more than 4 hours at the same dilation)



For other presentations, see *Breech presentation* (page 103), *Transverse lie and shoulder presentation* (page 128), *Face presentation* (page 135), or *Brow presentation* (page 138).

Management of protracted foetal descent at complete dilation
(no engagement after 2 hours of complete dilation or no delivery after 1 hour of complete dilation despite good expulsive efforts)



For other presentations:
Breech presentation: caesarean section or, in rare cases, manoeuvre (do not attempt any manoeuvres on a non-engaged breech); shoulder, chin-posterior face, or brow presentation: caesarean section.

Prolonged obstructed labour

Complication arising when labour lasts more than 24 hours, sometimes several days.

Diagnosis

– Dehydration
– Possible hypovolemic shock; may be quite marked
– Patient dazed, anxious, agitated, in pain
– Uterus in state of imminent rupture (pathological retraction ring, hourglass shape)
– Amniotic infection: fever, foul-smelling amniotic fluid
– Bladder distended
– On vaginal exam:
  • cervix oedematous
  • 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

Aetiology

– Foetopelvic disproportion (including malpresentations and praevia obstructions)
– Pushing with an incompletely dilated cervix

Complications

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

Management

– Insert an IV line using a large calibre catheter, fluid resuscitation (Ringer Lactate or 0.9% sodium chloride).
– Insert a urinary catheter, if it is possible without damaging the urethra (otherwise, insert suprapubic catheter). Relieving the bladder distension is sometimes enough to produce delivery. In case of bladder injury (compression > 48 hours, urine red on catheterization), leave a suprapubic or urethral catheter in place for 5 days.

– Depending on the cause of the obstruction and the medical equipment available:
  • caesarean section if an operating room is available,
  • symphysiotomy, vacuum extraction and episiotomy if the foetus is still alive,
  • destructive delivery if the foetus is dead.

– Routine antibiotic therapy:
  amoxicillin-clavulanic acid (**co-amoxiclav**) IV: 6 g amoxicillin/day divided into 3 injections administered 8 hours apart
  + **gentamicin** IM: 5 mg/kg once daily
  Continue this treatment for 48 hours (until fever disappears), then change to oral route (**co-amoxiclav** PO: 3 g/day in 3 divided doses)
  or
  ampicillin IV: 6 g/day divided into 3 injections administered 8 hours apart
  + **metronidazole** IV: 1.5 g/day in 3 infusions administered 8 hours apart
  + **gentamicin** IM: 5 mg/kg once daily
  Continue this treatment for 48 hours (until fever disappears), then change to oral route (**amoxicillin** PO: 3 g/day in 3 divided doses + **metronidazole** PO: 1.5 g/day in 3 divided doses).

– There is a significant risk of uterine atony (postpartum haemorrhage) due to failure of the uterus to retract: remove the placenta manually, then administer oxytocin.

Induction of labour

Triggering labour artificially before it begins naturally.

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

Indications

– Induction of labour is indicated in situations where continuing the pregnancy would be harmful to the mother and/or foetus: pre-eclampsia and eclampsia, abruptio placentae, marginal placenta praevia where surgical delivery is not an option, intrauterine foetal death, prolonged rupture of membranes (more than 12 hours) after 37 weeks LMP, chorioamnionitis, etc.

– For each indication, weigh the potential risks of continuing the pregnancy against the risks of inducing labour for the mother and the infant.

Note: while prolonged pregnancy (over 42 weeks LMP) is traditionally considered an indication for inducing labour, in practice this indication is not used, due to the frequent uncertainty about the due date.

Methods

Labour can be induced by:

– Stripping of membranes: during the vaginal exam, if the cervix is open, insert one finger into the internal os and separate the membranes with a circular motion. This can encourage the start of labour, or at least cervical ripening, in the following hours or days.

– Artificial rupture of membranes (amniotomy), which induces or strengthens uterine contractions.

– Administration of oxytocin.

– Administration of prostaglandins (e.g. misoprostol).

Conditions

The choice of induction method will depend 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 known as the Bishop score.

The Bishop score
(the higher the score, the riper the cervix)

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

– A cervix is considered ripe, that is, favourable to induction, if this 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), induction will take a long time, require high doses of oxytocin, and perhaps fail. In this instance, ripen the cervix by administering a prostaglandin (e.g. misoprostol) before using oxytocin to induce contractions.
  However, given the significant potential risks of misoprostol—namely, uterine hypertony and foetal distress—and limited (or absent) foetal monitoring, its indication is restricted to the following situations:
  • intrauterine foetal death,
  • maternal indication for termination of pregnancy and non-viable foetus,
  • severe pre-eclampsia or eclampsia, with no possibility of performing a caesarean section.

The use of oxytocin during labour

Indications

– Induction of labour
– Correction of a dynamic dystocia: delayed dilation in a woman in labour, with arrest for more than 2 hours, due to ineffective uterine contractions. The cervix must be dilated more than 3-4 cm, and effacement in progress. The membranes must have been ruptured.
– Contractions fail to resume 20 to 30 minutes after the birth of a first twin.

Risks of using oxytocin during labour

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

Contra-indications to the use of oxytocin during labour

Absolute
– Obvious foetopelvic disproportion, including malpresentation (brow, transverse)
– Complete placenta praevia
– Spontaneous uterine hypertony
– Foetal distress
– Two or more prior caesarean sections
– Prior classical (vertical) caesarean section
– Prior caesarean section where the type of incision (classical or transverse) is not known
– Absence of medical indication

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

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

Conditions for oxytocin use

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

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

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

Use of oxytocin (see also page 213)

Indications	Precautions before administration	Technique	Monitoring during administration
During labour			
Induction of labour	– On vaginal exam, assess cervical dilation and effacement, and engagement. – The harder and more closed the cervix and the higher the station, the harder induction will be. – Verify the absence of foetal distress.	– Dilute 5 IU oxytocin in 500 ml. – Start at 5 drops/min, then increase by 5 drops/min every 30 min, until contractions are effective (3 contractions of more than 40 seconds in 10 min). On average, 20 drops/min results in satisfactory uterine contractions. Do not exceed 60 drops/min. – Once the infant has delivered: • use the existing IV line to administer the appropriate dose of oxytocin for prevention of postpartum haemorrhage, • let the current infusion finish.	– Appearance and quality of contractions, uterine relaxation – Foetal heart rate – General condition of the mother – Cervical dilatation Rupture the membranes as soon as possible. If the woman has not gone into labour after 8 hrs: stop the drip and start again the next day, if delivery is not urgent.
Correction of dynamic dystocia	– Cervix at least 3-4 cm on vaginal exam – Membranes ruptured – No foetopelvic disproportion	Identical to induction (see above)	– Resumption or augmentation of contractions, uterine relaxation – Foetal heart rate – General condition of the mother – Cervical dilatation
No contractions 20 to 30 minutes after the birth of first twin	– Verify that presentation is vertical (not transverse).	– Start or resume oxytocin infusion. – Identical to induction, but increase more rapidly: 5 drops every 5 min.	Identical monitoring (see above)
Outside of labour			
Haemorrhage due to uterine atony	– First, manually remove the placenta, if needed. – Routine manual uterine exploration	10 IU by IV infusion in 500 ml of Ringer Lactate or 0.9% sodium chloride at a rate of 80 drops/min. At the same time, give 5 to 10 IU by slow IV push; repeat if necessary until the uterus becomes firm and contracted; do not exceed 60 IU total.	– Pulse, BP, blood loss – Uterine retraction
After caesarean section		5 or 10 IU by slow IV injection	– Uterine retraction
Prevention of postpartum haemorrhage	Verify that there is no 2nd twin.	5 or 10 IU, IM or IV, after or before the 3rd stage, depending on staff expertise	

Shoulder dystocia

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

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

Management

– Hyperflexion of the mother's thighs.

– Suprapubic pressure: have an assistant press firmly just above the symphysis pubis, to try to reduce the diameter of the shoulders and help them engage.

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

– If this fails and the infant is alive, consider symphysiotomy.

– After these manoeuvres, carefully examine the vagina, 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.

Transverse lie and shoulder presentation

A transverse lie constitutes an absolute foetopelvic disproportion, and delivery by natural means is impossible.

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

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 59 and 60). Vaginal exam reveals a nearly empty true pelvis, or a shoulder with—sometimes—an arm prolapsing from the vagina (Figure 61).

Figure 59
Dorsoinferior (back down) left shoulder presentation

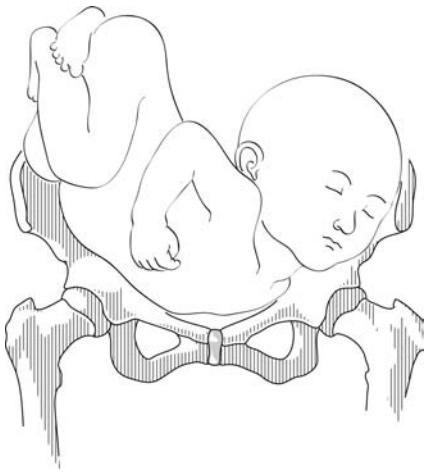


Figure 60
Dorsosuperior (back up) left shoulder presentation

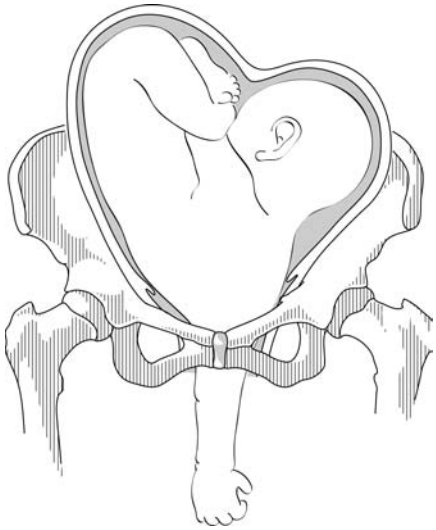


Figure 61: *Neglected shoulder presentation*

Aetiology

– Grand multiparity
– Uterine malformation
– Twin pregnancy
– Prematurity
– Placenta praevia
– Foetopelvic disproportion

Management

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

1. At term

Singleton pregnancy

– External version 4 to 6 weeks before delivery.
– If this fails, caesarean section is imperative: arrange to have the woman admitted to a surgical facility before labour begins.

Twin pregnancy

– External version is contraindicated.
– If the first twin (T1) is in a transverse lie (unusual): schedule a caesarean section.
– If the second twin (T2) is in a transverse lie: plan delivery in a surgical setting. There is no strict indication for caesarean section; deliver T1, then perform external and/or internal version on T2.

2. During labour, in a surgical setting

The foetus is alive and the membranes intact

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

The foetus is alive and the membranes ruptured

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

The foetus is dead

Avoid caesarean section; attempt first external, then internal, version; if these fail, attempt destructive delivery if dilation is over 5 cm; otherwise, caesarean section.

3. During labour, in a remote setting, without a surgical option

The foetus is alive and the membranes intact

– Attempt external version as early as possible.
– If this fails, wait for complete dilation and then, rupture the membranes.
– In order to perform version under the proper conditions, administer general or spinal anaesthesia, depending on what is possible.
– Perform an external version combined with an internal version, perhaps using various positions (Trendelenburg or knee-chest).

The foetus is alive and the membranes ruptured

– Complete dilation:
  • Put the woman into the knee-chest position.
  • Between contractions, push the foetus back and try to engage his head.
  • Vacuum extraction and symphysiotomy at the slightest difficulty.
– Incomplete dilation: Trendelenburg position and watchful waiting until complete dilation.

The foetus is dead

Attempt external or internal version. Otherwise, destructive delivery.

External version

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

This procedure requires experience and finesse (risk of foetal distress or death and uterine rupture). Afterward, the woman requires rest and close monitoring.

Conditions

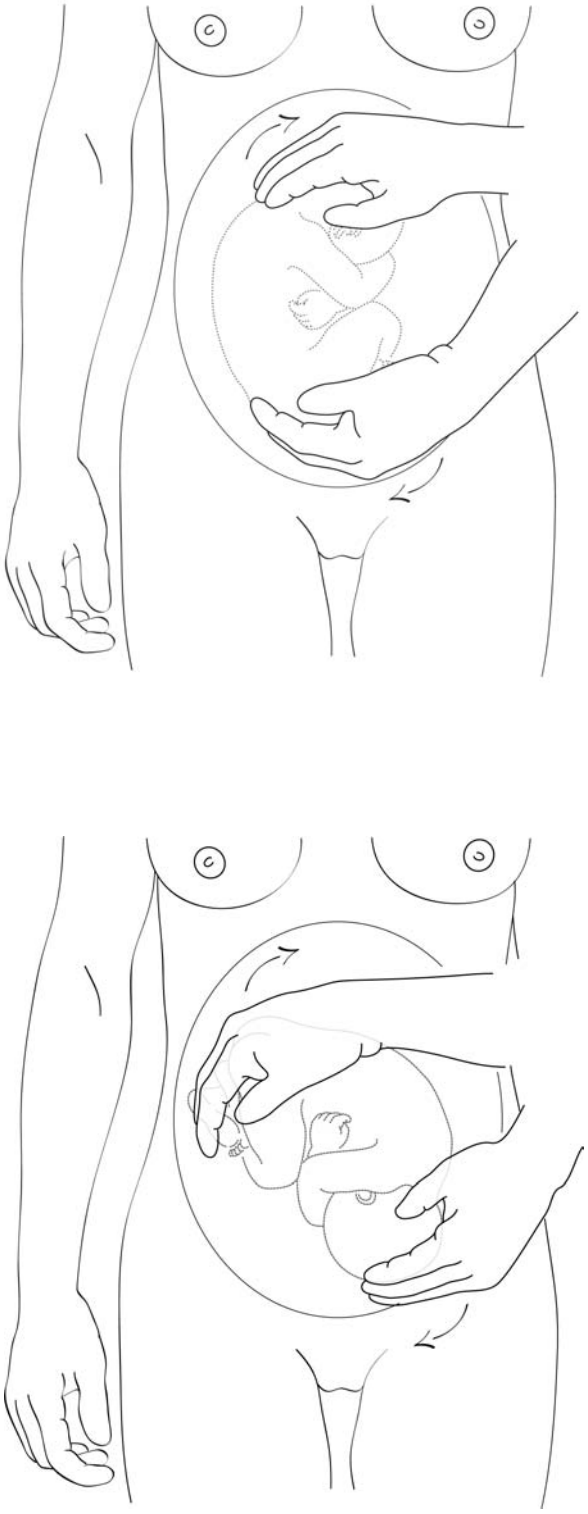
– Pregnancy near term (37 weeks LMP)
– Prior to labour, or at the very start of labour
– Relaxed uterus
– No obstacle to vaginal delivery
– Membranes intact

Contraindications

– Placenta praevia
– Prematurity
– Foetal distress
– Scarred uterus
– Twin pregnancy

Technique

– Woman lying on her back, legs half bent, bladder empty
– Perform when the uterus is not in contraction
– First, push back the breech, 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 62).
– Monitor the foetal heart rate after each attempt, and stop if the rate slows.



Figures 62
Version to convert a breech presentation to a cephalic presentation

Internal version

Manual intrauterine procedure to convert one presentation to another, usually a transverse lie into a breech.
This manoeuvre should be performed with extreme caution, as there is a significant risk of uterine rupture.

Indications and conditions

– Shoulder presentation during labour, at complete dilation with the uterus not retracted.

– Delivery of a 2nd twin in cephalic presentation or transverse lie: version to bring the foetus into the breech position and allow a total breech extraction (see page 112).

– Conditions necessary in all cases: normal pelvis, presenting part not engaged, bladder empty.

Technique

– Strict asepsis: swab perineum with polyvidone iodine, use sterile gloves

– General anaesthesia

– 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 or both feet firmly, without haste but not too slowly, since a prolonged manoeuvre might cause the uterus to contract (Figure 63a).

– Pull the foot (or feet) gently to the vaginal opening (Figure 63b).

– The delivery then continues as a breech delivery, ending with a total extraction if a twin, or normally, if not.

– Manually explore the uterus after delivery of the placenta (to look for uterine rupture), and give routine antibioprophylaxis (**ampicillin** or **cefazolin** IV: 2 g as a single dose).

Figure 63a: *Catch hold of one or both feet*

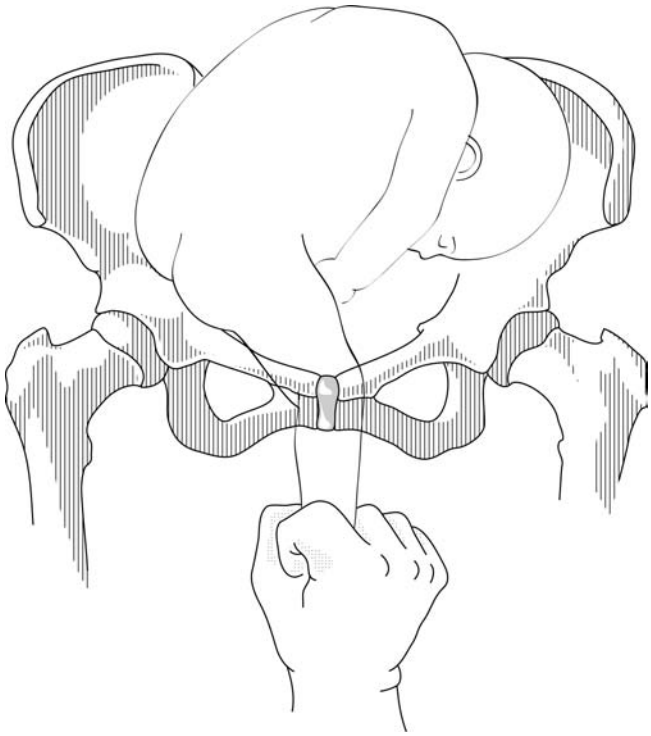


Figure 63b: *Bring the foot down to the vaginal opening*

Figures 63
Internal version

Face presentation

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 exam:
No suture or fontanelle can be felt; orbits, nose, mouth, ears and chin palpable. Palpation of the chin is essential to confirm the diagnosis.

Management

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

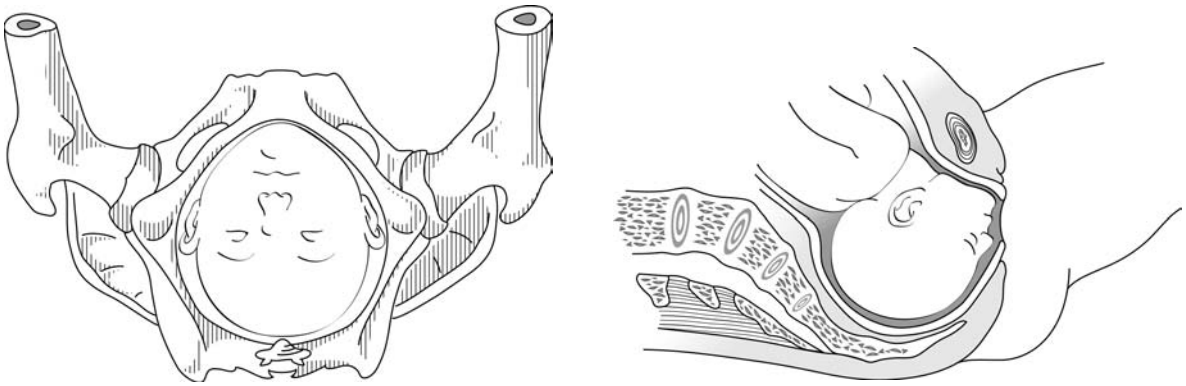
If the chin is anterior

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 64), given the maximum amount the perineum can stretch.

If instrument extraction is necessary, use forceps (vacuum extraction is contra-indicated for a live infant).



Figures 64
Chin anterior: delivery possible

If the chin is posterior

Vaginal delivery is not possible (Figure 65). A caesarean section must be arranged.

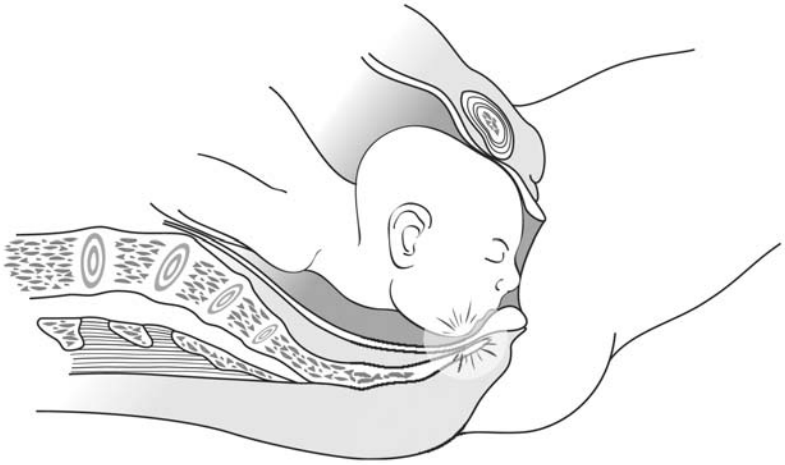
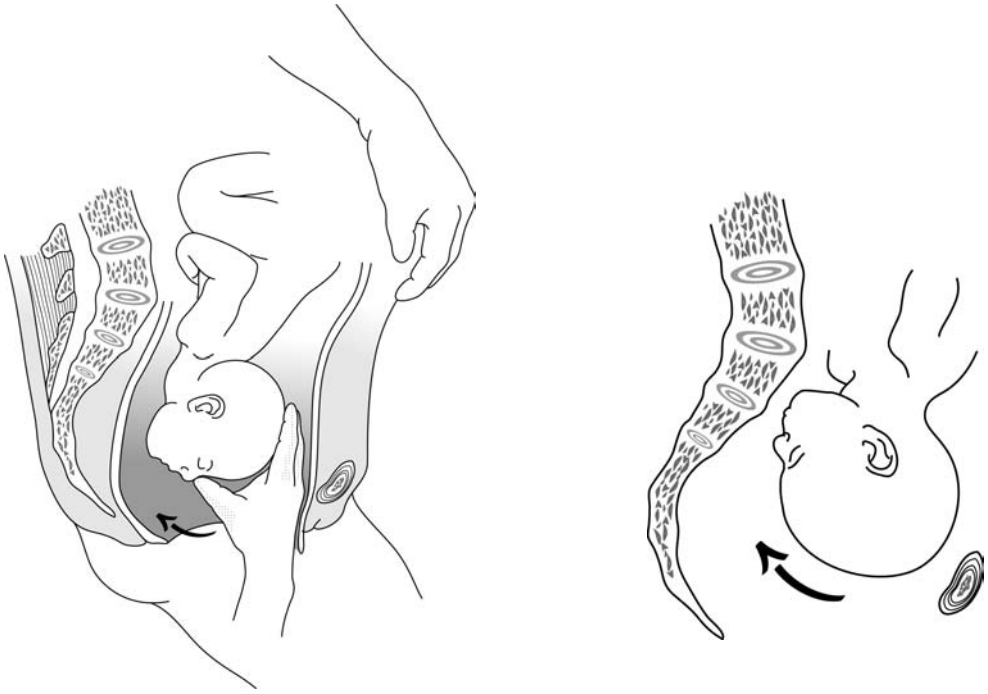


Figure 65
Chin posterior: impaction

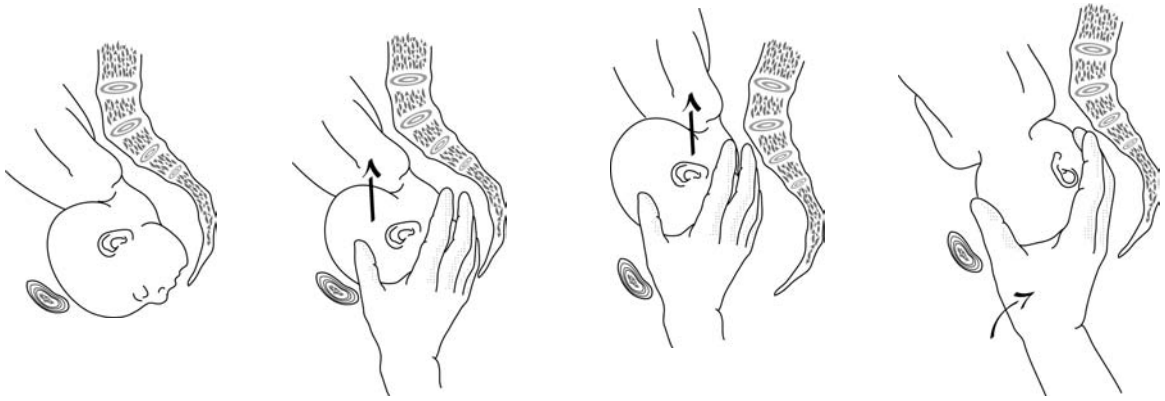
If caesarean section is not an option, attempt the following manoeuvres:

– Flex the head to obtain a eutocic, 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 66).



Figures 66
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 67).



Figures 67
Rotation manoeuvre to bring the chin anteriorly

– Version: internal podalic version, then total breech extraction (Figure 68).

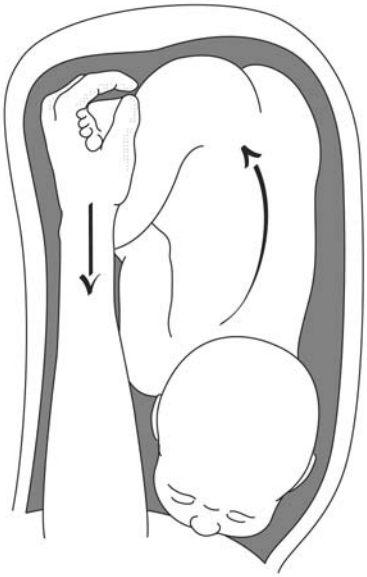


Figure 68
Internal podalic version

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

Brow presentation

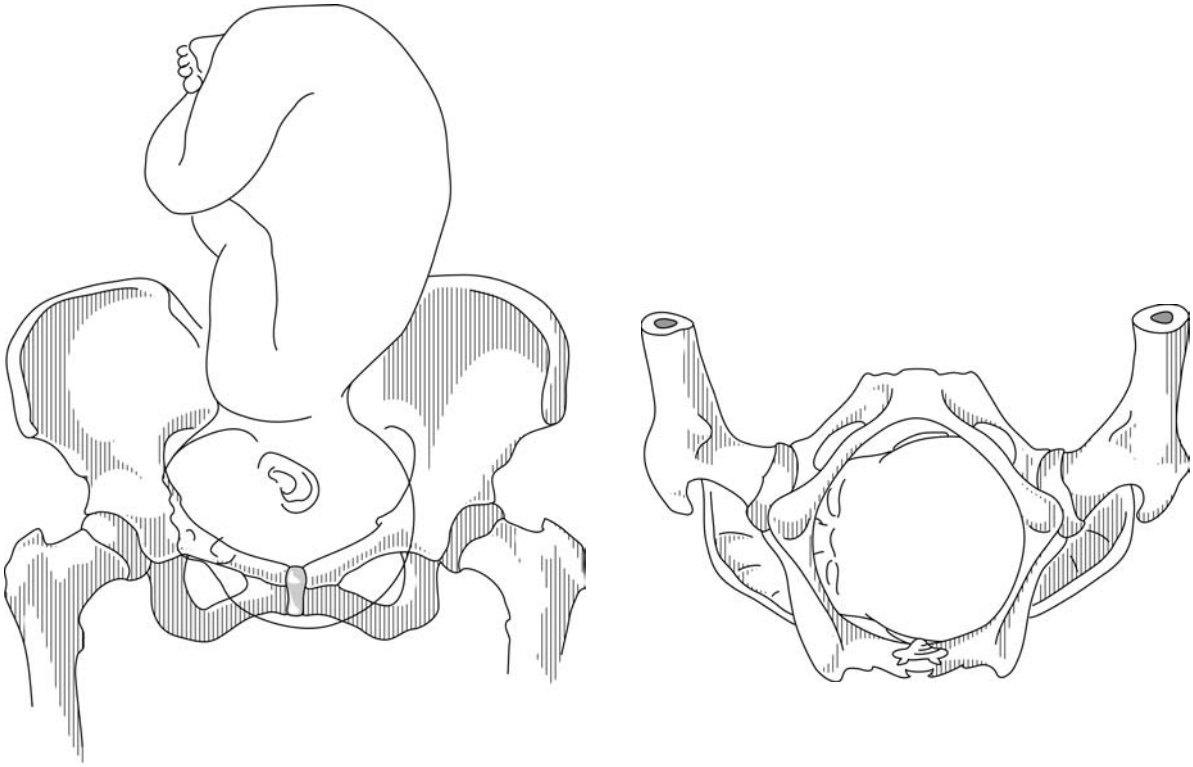
Brow presentation constitutes an absolute foetopelvic disproportion, and vaginal delivery is impossible (except with preterm birth or extremely low birth weight).

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

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 exam the brow, orbits, anterior fontanelle and, occasionally, the eyes and bridge of the nose are palpable (Figures 69). 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 69
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.

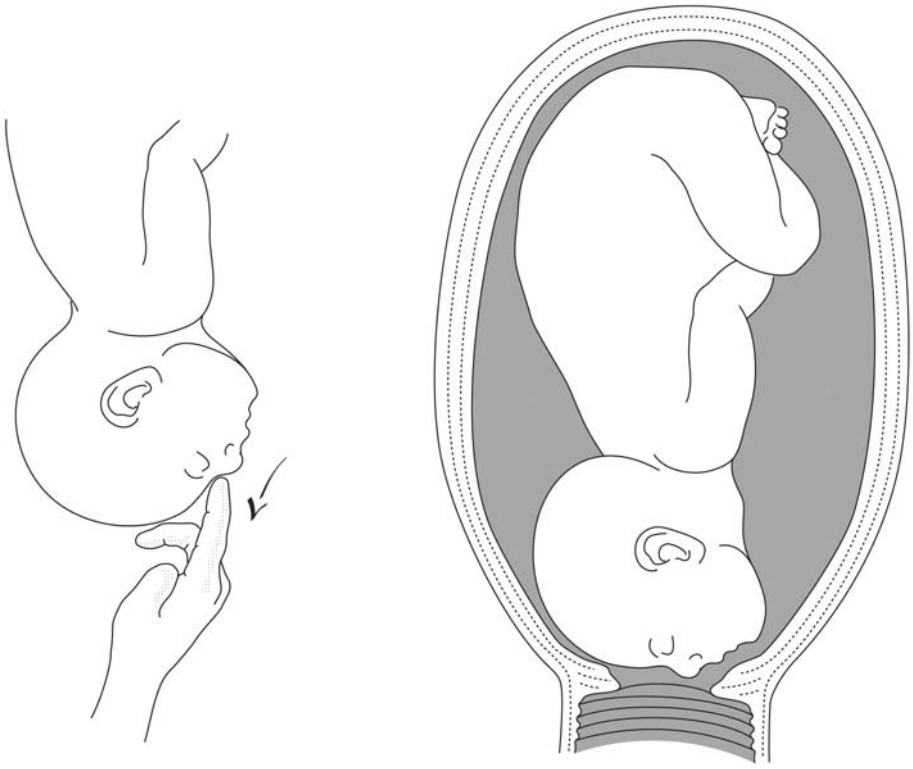
Management

If the foetus is alive

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

– As a last resort, if caesarean section is impossible, attempt two manoeuvres:
  • Convert the brow presentation to a face presentation: using general anaesthesia and strict asepsis, between contractions, insert the fingers through the cervix and move the head, encouraging deflexion (Figures 70).
  • Attempt internal podalic version.

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



Figures 70
Manoeuvre to convert brow to face presentation

If the foetus is dead

Perform a destructive delivery is the cervix is sufficiently dilated; otherwise, caesarean section.

CHAPTER 7

Third stage of labour

Normal third stage of labour

The third stage of labour—that is, expulsion of the placenta—is the final phase of childbirth.

Description

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

Conduite à tenir

– Normally, the placenta delivers spontaneously.
– The birth attendant should check:
  • the length of the rest period, which should not be more than 30 to 45 minutes. If it is, the placenta should be removed manually (see page 158);
  • the pulse and BP, the volume of blood from the vagina (about every 15 minutes for the first hour, then every 30 minutes for the next hour);
  • that the uterus retracts and remains retracted;
  • that the entire placenta has been expelled.
– Traction manoeuvres—particularly on the cord—can lead to a tearing of the placenta and, afterwards, retention of placental fragments (with the attendant risk of haemorrhage and infection). They should be avoided by those not appropriately trained.
– Abdominal palpation can be used to determine whether the placenta has separated, by pressing down on the abdomen just above the pubic bone. If the cord does not retract when pressure is applied, the placenta has separated (Figure 71).

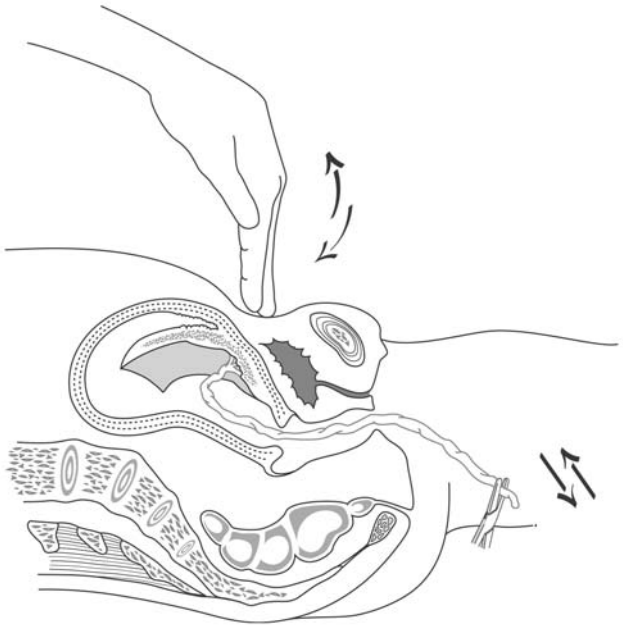


Figure 71
Placental separation has occurred if the cord fails to retract with abdominal pressure

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

Examining the placenta

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

Examining 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.

Examining the maternal surface of the placenta

Regular, bright red cotyledons. If you see any holes, any roughened or depressed areas, or any deep cuts that fail to line up when the cotyledons are brought together, you should suspect that part of the placenta has been retained, and perform uterine exploration to extract it.

Routine prevention of postpartum haemorrhage

Active management of the third stage of labour is recommended to reduce blood loss and the risk of haemorrhage.

Oxytocin should be used in all women, or at the very least in high-risk women, i.e.:
– women whose labour has been long or difficult;
– women whose uterus is distended (large foetus, polyhydramnios) or infected;
– multiparas (more than 4 deliveries);
– cases of placenta praevia;
– women with a history of postpartum haemorrhage.

Use of oxytocin prior to delivery of the placenta (active third stage management)

Administration of oxytocin *before* delivery of the placenta AND *immediately* after the birth of the infant hastens separation of the placenta, facilitates its delivery and helps prevent postpartum haemorrhage.

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

Then clamp and cut the cord, and deliver the placenta with controlled cord traction (during a contraction with counter pressure to the uterus).

When oxytocin is used prior to delivery of the placenta, there is, in theory, a risk of retained placenta. For this reason, delivery personnel who administer oxytocin immediately after delivery of the infant must be able to perform manual removal of the placenta, should it be necessary. If these conditions are not met, oxytocin should be administered *after* placental expulsion—which must be complete—to encourage uterine retraction, even though this is slightly less effective than administering it immediately after the birth and before expulsion of the placenta.

Use of oxytocin after delivery of the placenta

Immediately after delivery of the placenta, check to make sure it is complete, to rule out the possibility of retained fragments. Then administer:

oxytocin IM or IV: 5 IU or 10 IU (that is, an entire 5 or 10 IU ampoule).

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

Postpartum haemorrhage

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

Delay in treatment leads to haemorrhagic complications with massive, diffuse coagulopathy-related bleeding. Therefore, close delivery room monitoring (pulse, BP, blood loss) is crucial for two hours postpartum, in order to rapidly identify and treat haemorrhage.

Possible causes

– Retained placenta: the entire placenta or a fragment of the placenta remains in the uterus.
  Very rarely, 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.
– Uterine atony after delivery of the placenta: the placenta has been expelled, but the uterus fails to retract. There is uterine inertia; the uterus gets larger, spreads, and becomes soft. Overdistension of the uterus, prolonged labour, and infection all contribute to uterine atony.
– Wounds: uterine rupture; cervical, vaginal and vulvar lacerations; episiotomy that is bleeding
– Coagulation disorders (may be both the cause and the result of haemorrhage)
– Uterine inversion

Management

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

Immediately

– Ask for help.
– Insert an IV line, draw blood for typing, and infuse Ringer Lactate or 0.9% sodium chloride or a plasma substitute (polygeline or modified fluid gelatine).
– Arrange blood typing of potential donors for possible transfusion.
– If systolic BP < 90 mmHg, elevate the legs (keep, or replace, the patient's feet in the delivery table stirrups).
– Monitor pulse, BP, blood loss.
– Perform uterine massage to expel any clots and aid uterine contraction.

– Immediately remove the placenta manually if it has not yet delivered.
– Manually explore the uterus to remove any clots or placental debris (permits proper retraction of the uterus), and check to make sure the uterus has not ruptured (for uterine rupture, see page 40).

Perform manual placenta removal and manual uterine exploration under anaesthesia. Do not proceed without anaesthesia unless rapid anaesthesia is impossible.
Also give routine antibioprophylaxis (**ampicillin** IV or **cefazolin** IV: 2 g as a single dose).

– Uterotonic injections to correct uterine atony:
oxytocin: 5 to 10 IU by IV push, and at the same time, start an IV infusion with 10 IU oxytocin in 500 ml of Ringer Lactate or 0.9% sodium chloride, to be administered over 2 hours.
or, if oxytocin is not available, **methylergometrine** IM: 0.2 mg
– Inspect the birth canal: check for injury to the cervix or vagina using a speculum or retractors. Suture lacerations or episiotomy, if present.

Then
– Continue monitoring (pulse, BP, blood loss). Bleeding should diminish and the uterus remain firm.
– Measure haemoglobin.
– Catheterize to facilitate uterine retraction.

If bleeding persists

– Make sure that all procedures (manual placenta removal, uterine exploration, birth canal inspection, oxytocics, and urinary catheterization) have indeed been performed.

– Repeat uterotonic injection:
oxytocin: 5 to 10 IU by IV push, and add 10 IU to the oxytocin drip already in progress.

or, if oxytocin is not available, repeat **methylergometrine** IM: 0.2 mg/injection; do not exceed 5 injections.

If the atony (soft, non-retracted uterus) persists more than 20 minutes after the second oxytocic injection: **misoprostol** 1000 µg rectally (five 200 µg tablets).

– Add mechanical measures
  • at a minimum, massage the uterus every 15 minutes for 2 hours

plus, if needed, one of the following procedures:
  • compress the uterus with both hands through the abdominal wall, if it is still large and atonic (Figure 72).
  • compress the uterus between fingers in the vagina and a hand on the abdomen (Figure 73).
  • compress the uterus between the fist and a hand on the abdomen (Figure 74).
  • apply pressure to the abdominal aorta (just above the umbilicus) until the femoral pulse is no longer palpable, and hold until bleeding is controlled.

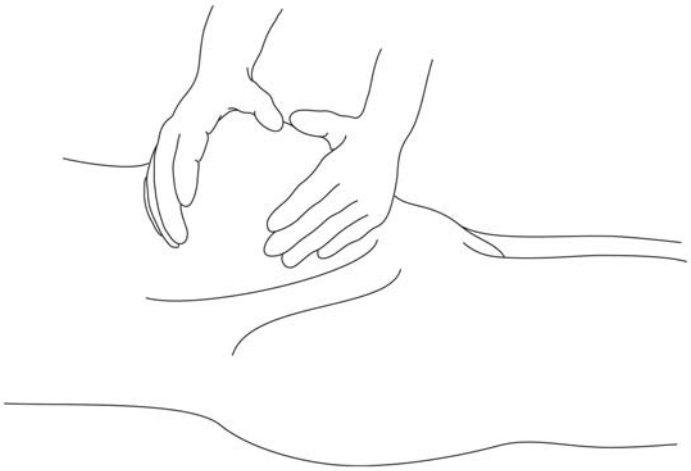


Figure 72
Bimanual compression of the uterine body

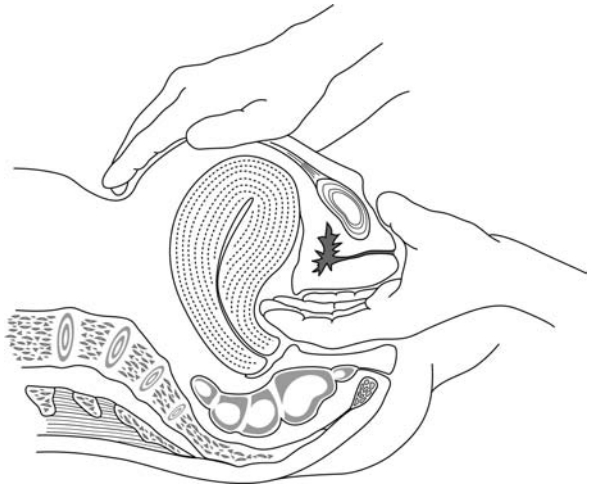


Figure 73
Uterine compression through the vagina

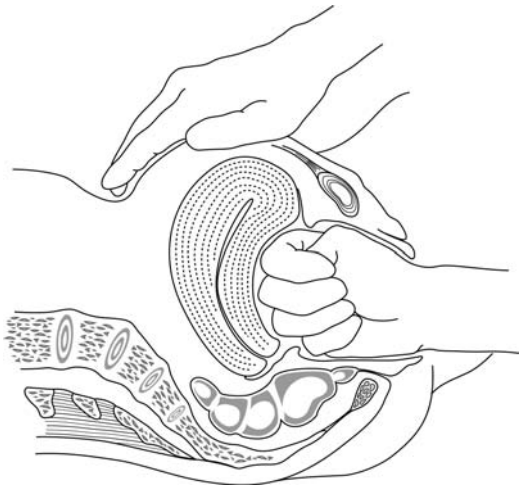


Figure 74
Uterine compression through the vagina

– Transfuse if blood loss was heavy (> 1500 ml) and/or if clots are no longer forming (use blood that has been screened at least for HIV-1, HIV-2, hepatitis B and C).
– Arrange to have the patient transferred for surgery if the situation is not controlled. While waiting, put a bend in the uterine vessels to stop the bleeding: place four forceps (the least traumatic possible) around the cervix and pull the cervix to the vaginal opening while pushing the uterine fundus with a hand on the abdomen. Pulling the uterus to the vaginal opening puts a bend in the uterine arteries. Applying torsion to the cervix with forceps also puts a bend in the cervicovaginal arteries.
– Further surgical procedures might include:
  • Stepwise ligation of the uterine blood supply (round ligaments, utero-ovarian arteries, uterine arteries)
  • Uterine compression suture
  • Subtotal hysterectomy
– After the acute episode:
  ferrous sulfate + **folic acid** PO: 2 to 3 tab/day in 2 to 3 divided doses for 3 months

Delayed detection of postpartum haemorrhage

Combination of foul-smelling bleeding, fever, a uterus that is soft and larger than expected, general deterioration, anaemia.

It is usually caused by retained placenta or blood clots, with secondary infection. Hospitalize.

– Administer antibiotics immediately:
  amoxicillin-clavulanic acid (**co-amoxiclav**) IV: 6 g amoxicillin/day divided into 3 injections administered 8 hours apart
  + **gentamicin** IM: 5 mg/kg once daily
  Continue this treatment for 48 hours (until fever disappears), then change to **co-amoxiclav** PO: 3 g/day in 3 divided doses, to complete 5 days of treatment.
  or
  ampicillin IV: 6 g/day divided into 3 injections administered 8 hours apart
  + **metronidazole** IV: 1.5 g/day divided into 3 injections administered 8 hours apart
  + **gentamicin** IM: 5 mg/kg once daily
  Continue this treatment for 48 hours (until fever disappears), then change to **amoxicillin** PO: 3 g/day in 3 divided doses + **metronidazole** PO: 1.5 g/day in 3 divided doses, to complete 5 days of treatment.
– Explore the uterus when cervical dilation permits, otherwise perform digital curettage (see page 160) or instrumental curettage with the widest curette available (see page 165) and administer a uterotonic agent (oxytocin or, if unavailable, methylergometrine).

Uterine inversion

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

Diagnosis

– Shock of mixed (vagal and hypovolaemic) origin

– Usually, sudden pain and haemorrhage

– Uterine fundus not apparent on abdominal palpation, protrudes into the vagina, or protrudes from the vaginal opening (Figures 75 to 77).

Management

– Treat the shock and the bleeding: Ringer Lactate or 0.9% sodium chloride or plasma substitute; transfusion of pre-tested blood (at least for HIV-1, HIV-2, hepatitis B and C) if immediately life-threatening.

– Empty the bladder

– Administer general anaesthesia

– Swab the perineum with polyvidone iodine

– Progressively compress the uterus, then reduce the inversion by pushing the uterus back up (Figures 78) through the cervix, toward the umbilicus, to return it to its normal position. Use the other hand, placed on the abdomen, to hold the uterus in place.

– Next, explore the uterus (gently, to avoid recurrence) in order to remove any clots. If the placenta has not detached, do not perform manual removal until after reducing the inversion.

– Routine antibioprophylaxis (**ampicillin** IV or **cefazolin** IV: 2 g as a single dose).

– Routine injection of a uterotonic agent: **oxytocin** IM or IV: 5 or 10 IU or, if unavailable, **methylergometrine** IM: 0.2 mg

If manual reduction of the uterus fails, consider abdominal surgery: reduction, or even delayed hysterectomy after necrosis develops.

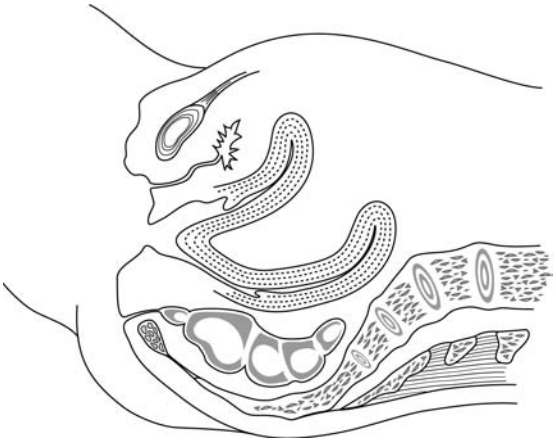


Figure 75
The inverted uterus does not reach the vaginal opening

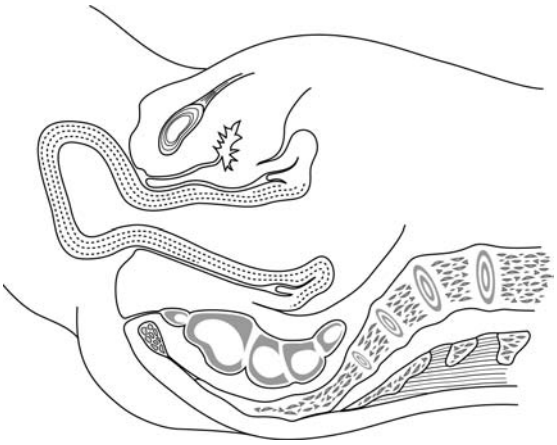


Figure 76
The inverted uterus protrudes through the vaginal opening

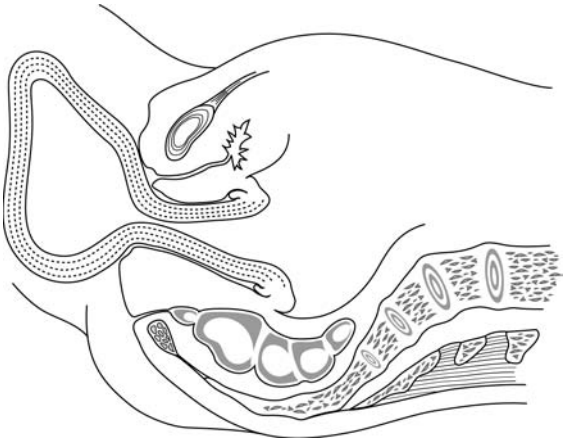
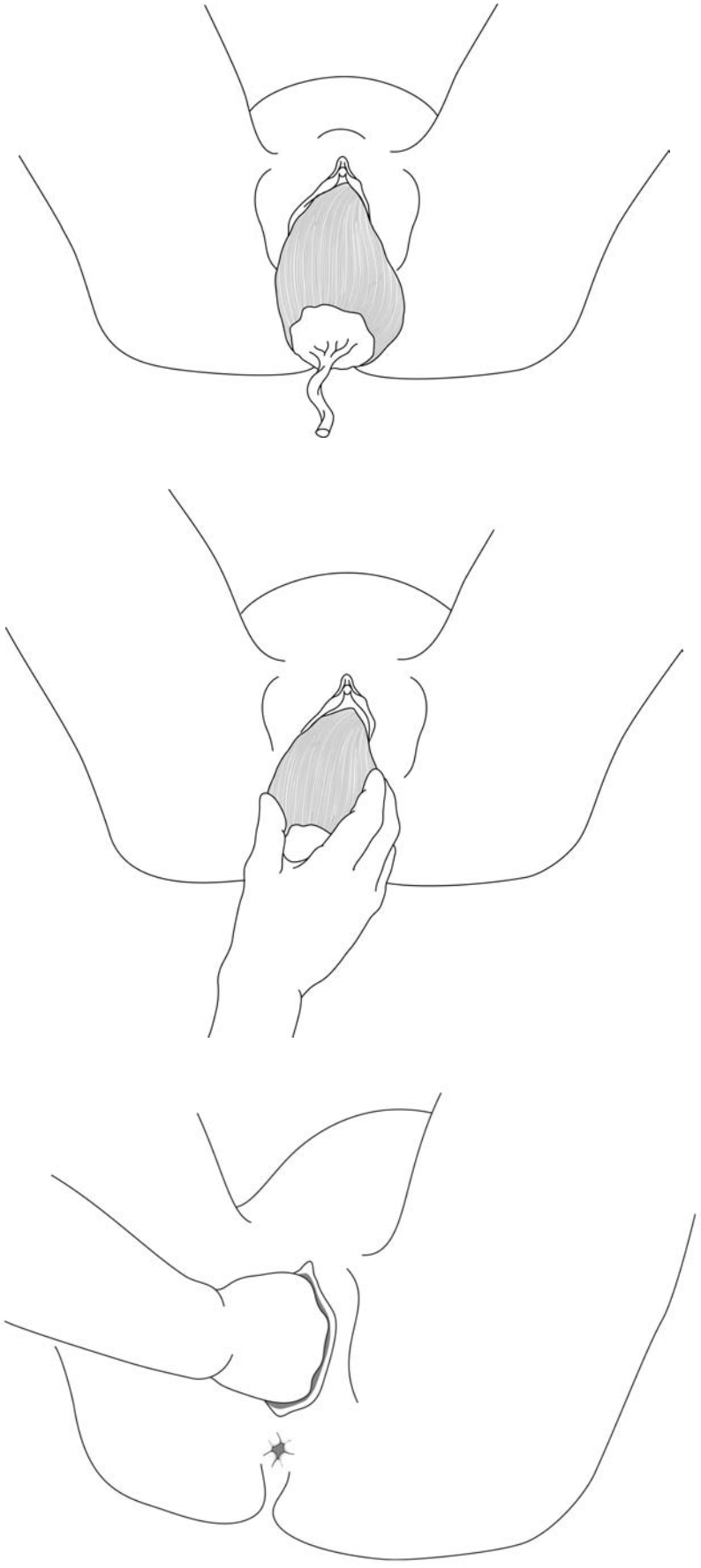


Figure 77
The uterus is totally invaginated and totally protrudes through the vaginal opening



Figures 78
Manual reduction of the inverted uterus

Cervical or vaginal tears

Tears that occur during delivery. More common in cases of cervical oedema, large foetus, or instrument extraction (forceps or vacuum extractor).

Diagnosis

Postpartum haemorrhage where the uterus is tonic or oxytocic treatment ineffective. 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.

Management

- Insert an IV line (large gauge catheter) and infuse Ringer Lactate or 0.9% sodium chloride or a plasma substitute.
- General or spinal anaesthesia is often needed to get proper exposure.
- An assistant is usually needed to present the tissues using retractors. Good lighting is essential.
- Swab the perineum with polyvidone iodine.
- Gently pull the cervix toward the outside using atraumatic forceps (ring forceps, for example) and assess the extent of the tears.
  - Small tear, minimal bleeding: should heal spontaneously with no suturing and without complications.
  - On rare occasions, the tear bleeds heavily and requires a few Dec3 (2-0) absorbable figure-of-eight sutures in a single layer. Begin at the point farthest from the cervical os (Figure 79).
  - The vaginal walls should also be sutured in the event of a laceration that bleeds.
  - If the tear extends up to the uterus (lower segment), transfer the patient to a specialized surgical setting for laparotomy.

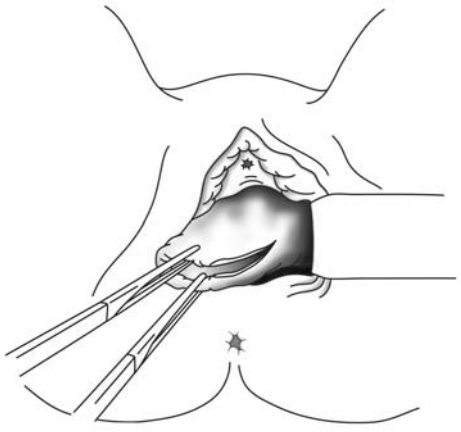


Figure 79
Cervical tear

CHAPTER 8

Intrauterine procedures

Precautions common to all intrauterine procedures

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

Precautions to take when performing intrauterine procedures

Empty the bladder

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

Asepsis

Sterile precautions are mandatory.
– Cleanse/swab with polyvidone iodine (allow to dry).
– Use sterile drapes and compresses.
– Wear sterile gloves. For manual procedures, use uterine exploration gloves (long cuffs).

Anaesthesia

Perform all procedures under anaesthesia.
A procedure is done without anaesthesia on two conditions: it is a life-threatening emergency (e.g. postpartum haemorrhage due to retained placenta) and anaesthesia cannot be done immediately.
Local anaesthesia (paracervical block) with premedication may be used for MVA, and possibly for instrumental curettage.

Protection of personnel

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

Specific precautions for manual procedures

For all manual intrauterine procedures, add:
– Antibioprophylaxis (right before the procedure):
ampicillin IV or **cefazolin** IV: 2 g as a single dose
AND
– A uterotonic agent (right after the procedure) to improve uterine retraction:
oxytocin IM or IV: 5 to 10 IU (or, if unavailable, **methylergometrine** IM: 0.2 mg).

Manual removal of the placenta

Indications

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

Technique (Figure 80)

Empty patient's bladder, if necessary; patient in lithotomy position; general anaesthesia; prophylactic antibiotics; vaginal disinfection with polyvidone iodine; at a minimum, a sterile drape under the patient's buttocks; sterile gloves with long cuffs.

– Cup the fundus with the left hand and hold it down.
– Advance the right hand, fully pronated, directly to the fundus and locate the cleavage plane between the uterine wall and the placenta with the fingertips. In other words, this hand is inserted all the way up to the forearm in the genital tract.
– Once the cleavage plane has been located, use the side of the pronated hand like a spoon to detach the placenta and bring it out.
– Immediately reinsert the hand to perform uterine exploration.
– Routinely administer a uterotonic agent (see *Preventing postpartum haemorrhage*, table on page 126).

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

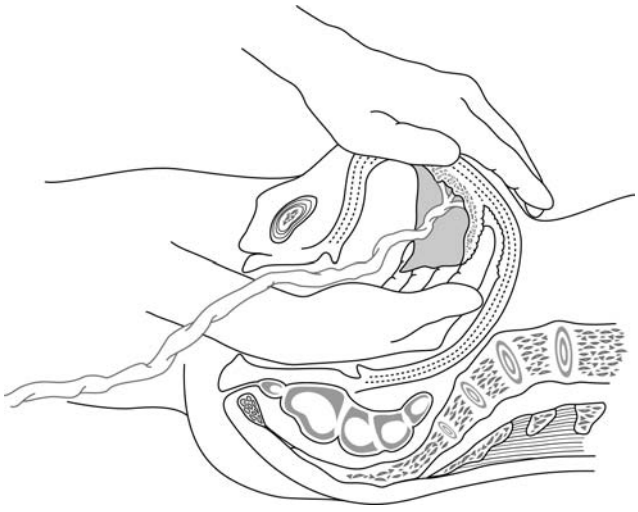


Figure 80
Left hand on the fundus; fingers of the right hand inserted into the cleavage plane between the uterus and the placenta; detach the placenta using the side of the hand.

Uterine exploration

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

Indications

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

Note: in the event of postpartum haemorrhage, rule out vaginal or cervical tear by speculum exam, especially if the placenta appears complete and the uterus is well-contracted (page 153).

Technique

Same preparation and precautions as for manual removal of the placenta.

– Systematic uterine exploration: two faces, two sides, one fundus, two horns. Use the fingers to search for placental debris and remove by hand.
– Routine administration of a uterotonic agent (see page 157).
– Ensure uterine retraction using abdominal massage: when the uterus retracts it resembles a firm ball.

Digital curettage

Use of the fingers to remove placental fragments or blood clots detected late after an abortion or delivery, when insufficient cervical dilation renders uterine exploration impossible.

Indications

– Delayed detection of haemorrhagic abortion or retained placenta, where uterine exploration cannot be performed.
– The cervix must be sufficiently open to allow insertion of one finger, two if possible.

Technique (Figure 81)

– Same preparation and precautions as for manual removal of the placenta.
– Insert the index finger, and the middle finger if possible, into the uterine cavity; cup the uterus through the abdomen with the left hand.
– Systematically explore and remove any remaining fragments.
– Routinely administer a uterotonic agent (see page 157).

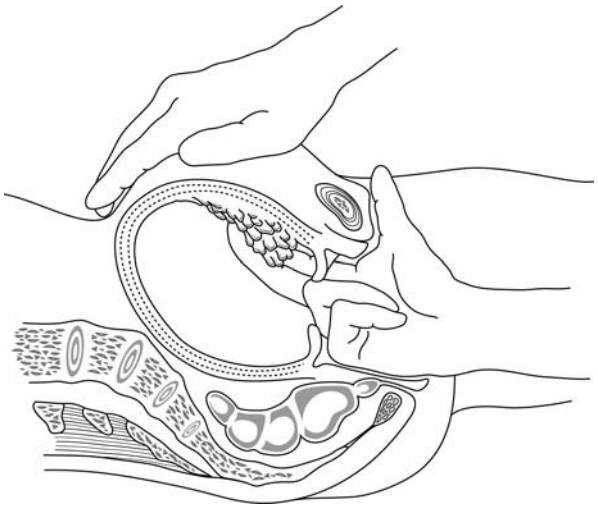


Figure 81
Systematic exploration of the uterus with two fingers

Manual vacuum aspiration (MVA)

Evacuation of the uterine contents using suction

Indications

– Incomplete abortion before 12 weeks LMP
– Termination of pregnancy before 12 weeks LMP
– Molar pregnancy before 12 weeks LMP

Contraindications

Absolute

– Pregnancy beyond 12 weeks LMP

Relative

– Purulent cervicitis and pelvic infection: administer antibiotics, then wait 48 hours before doing the procedure.
– Coagulation disorders: risk of haemorrhage. MVA must be performed in a facility where emergency surgery and transfusion are available.

Equipment

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

All the equipment is *autoclavable*, except the cannulae, which are *strictly single use*.

– For the procedure:
  • 1 sterile drape for laying out the sterile equipment
  • 1 aperture drape to place over the patient's vulva
  • polyvidone iodine scrub solution or, if unavailable, ordinary soap
  • polyvidone iodine 10% dermal solution
  • sterile compresses and gloves
  • absorptive pad to place under the patient's buttocks
  • 1 bright light
– For local anaesthesia:
  • long sterile needle (either 22G LP or 21G IM)
  • lidocaine 1% (without epinephrine) + sterile syringe and needle

Risks and problems

– Vagal reaction
– Incomplete evacuation of the uterus due to cannula that is too small, or to interrupted suction.
– Uterine perforation
– Haemorrhage
– Pelvic infection
– Air embolism (very rare; can occur when the plunger of the syringe is pushed while the cannula is still inside the uterine cavity).
– Haematometra: cervical spasm prevents the escape of intrauterine blood in the hours following the procedure. The uterus becomes distended and extremely sensitive. Treat by re-evacuating the uterus, administering an oxytocic, and massaging the uterus.

Technique

Preparing the cervix

Preparation consists of opening the cervix in order to prevent traumatic cervical dilation.
This is unnecessary for incomplete spontaneous abortions, if the cervix is sufficiently open. Useful only when terminating a pregnancy (or a molar pregnancy, if the cervix is closed):
misoprostol PO or vaginally: 400 μg as a single dose, 3 hours before the procedure

Premedication

1 hour before the procedure: **atropine** SC (1 mg) + **diazepam** PO (10 mg)
1/2 hour before: **paracetamol** PO (500 mg) + **codeine** PO (30 to 60 mg) or **ibuprofen** PO (400 mg)

Preparing and positioning the patient

– No routine antibiotic prophylaxis (except when terminating a pregnancy, **doxycycline** PO 200 mg as a single dose or **azithromycin** PO 1 g as a single dose can be given 1 hour before the procedure).

– Have the patient urinate.
– Place the patient in the lithotomy position with an absorptive pad under her buttocks.
– Cleanse the vulva and perineum with polyvidone iodine scrub (or, if unavailable, ordinary soap). Rinse and dry. The perineum should be clean, but not shaved.
– Swab with 10% polyvidone iodine solution.
– Position a sterile aperture drape.

Preparing the equipment

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

Paracervical block

– Insert the speculum; disinfect the cervix and vagina with polyvidone iodine solution.
– Local anaesthesia: inject the anterior cervix with 2 ml **lidocaine** 1%.
– Place the Museux or Pozzi forceps on the location where the cervix was numbed, 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.
  Administer 4 injections, 2 to 3 ml lidocaine 1% each, at 4 different locations around the cervix, 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 the size of the uterus. Dilation should be smooth and gradual:

– With the left hand, pull the forceps attached to the cervix, in order to bring the cervix and the uterine body into the best possible alignment.
– With the right 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.
– Do not insert the dilator too far. A discontinuity felt upon penetration of the internal cervical os indicates that there is no need to advance the dilator any farther. This discontinuity will not necessarily be felt however, so do not desperately search for it as a sign that the internal os has been passed. It can be assumed that the internal os has been penetrated when the dilator has been inserted to a length of 5 cm beyond the external os.

Aspiration

– Attach the prepared (i.e. under vacuum) sterile syringe to the chosen cannula.
– Maintain traction on the cervix with the left hand.

– With the right hand, gently insert the cannula into the uterine cavity. Rotating the cannula while applying gentle pressure facilitates insertion. Slowly and cautiously push the cannula into the uterine cavity until it touches the fundus.
– Release the valves on the syringe to perform the aspiration. The contents of the uterus should be visible through the syringe (blood and the whitish products of conception).
– Hold the syringe by the tube (not the plunger) once a vacuum has been established in the syringe and the cannula has been inserted into the uterus; otherwise, the plunger can go back in, pushing the aspirated tissue or air back into the uterus.
– Carefully (risk of perforation) suction all areas of the uterus, gently rotating the cannula back and forth 180°. Take care not to break the vacuum by pulling the cannula out of the uterine cavity.
– If the first syringe becomes full, close the valves, disconnect the syringe from the cannula, and replace it with another syringe. Or, empty the contents of the first syringe, 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 red-pink foam, with no tissue, in the syringe. It is also possible to assess the emptiness of the uterus by passing the cannula over the surface of the uterus: if the surface feels rough, or it feels as if the uterus is contracting around the cannula, assume that the evacuation is complete.
– Detach the syringe, then remove the cannula, forceps and speculum.

Examining the aspirated contents

To confirm that the uterus has been completely 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.

Patient follow-up

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

Instrumental curettage

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

Indications

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

Equipment

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

Technique (Figure 82)

Preparing the cervix

Preparation consists of opening the cervix, in order to prevent traumatic cervical dilation. This is unnecessary for incomplete spontaneous abortions, if the cervix is sufficiently open.
misoprostol PO or vaginally: 400 µg as a single dose, 3 hours before the procedure

Premedication and anaesthesia

Instrumental curettage is more painful than MVA, and general anaesthesia may be justified (otherwise, use a combination of sedation and local anaesthesia by paracervical block).

Preparing and positioning the patient

– Identical to that for MVA (see page 162).
– Insert the speculum and administer the paracervical block as for MVA (see page 163).
– Apply cervical traction with the Pozzi—or better, Museux—forceps.

Antibioprophylaxis

In the event of incomplete 2nd trimester abortion or after childbirth (**ampicillin** IV or **cefazolin** IV: 2 g as a single dose).

Dilation

Dilate the cervix if the cervical canal is not wide enough to allow insertion of the curette. Dilation should be smooth and gradual:

– With the left hand, pull the forceps attached to the cervix, in order to bring the cervix and the uterine body into the best possible alignment.
– With the right 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.
– Do not insert the dilator too far. A discontinuity felt upon penetration of the internal cervical os indicates that there is no need to advance the dilator any farther. This discontinuity will not necessarily be felt however, so do not desperately search for it as a sign that the internal os has been passed. It can be assumed that the internal os has been penetrated when the dilator has been inserted to a length of 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 anteverted or retroverted).

Curettage

– Choose the largest available 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 it over the entire uterine surface.

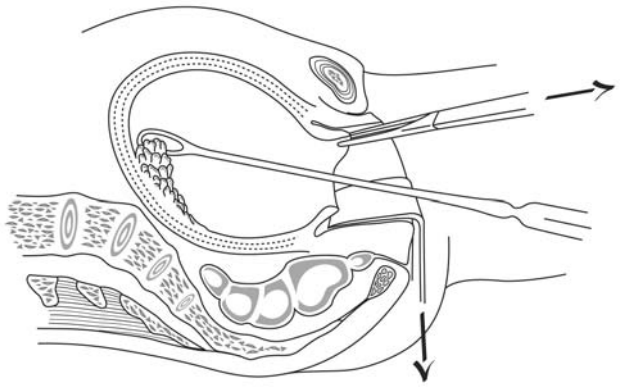


Figure 82
Curettage

Patient follow-up

After abortion

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

After childbirth

– Routine administration of a uterotonic agent (see page 157).

Complications

Persistent bleeding

– Look for vaginal or cervical lacerations, which are common with clandestine abortions
– Incomplete evacuation of the uterus: start over
– Uterine atony: uterotonics

Rupture of the uterine isthmus or **perforation of the uterus** (Figures 83 and 84)

– Tearing of the inferior segment or perforation by the dilators or the curettes: bleeding, instrument goes in too far, pain

– Possible associated bladder injury and, perhaps, subsequent fistula, if the bladder was not emptied prior to curettage. If this happens, insert a urinary catheter immediately and leave in place for 7 days; this usually allows the bladder to heal.

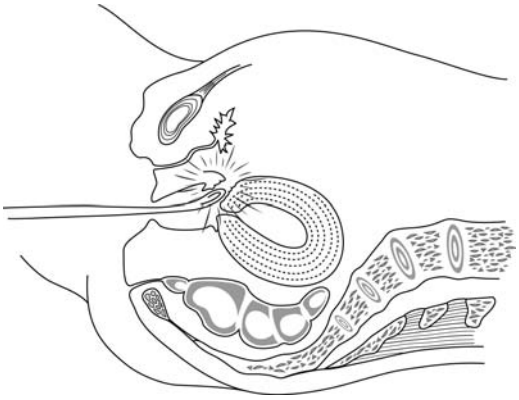


Figure 83
Rupture of the isthmus

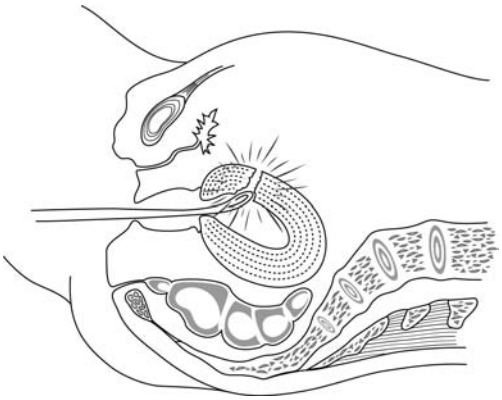


Figure 84
Perforation of the uterus with the curette

Treatment is rest plus antibiotics:
amoxicillin-clavulanic acid (**co-amoxiclav**) PO: 2 g amoxicillin/day in 2 divided doses for 7 days
or **amoxicillin** PO: 2 g/day in 2 divided doses + **metronidazole** PO: 1.5 g/day in 3 divided doses, for 7 days
Monitor for peritoneal signs (pain, guarding) in the following days. Appearance of these signs necessitates laparotomy for investigation of possible lesions of the abdominal organs.

Infections

– Endometritis, salpingitis, pelvic peritonitis, and septicaemia must be prevented by strict asepsis, non-traumatic procedures and prophylactic antibiotics in post-childbirth and 2nd trimester abortion (see page 166) cases.

– In the febrile patient with active pelvic infection:
  • start antibiotics:
  amoxicillin-clavulanic acid (**co-amoxiclav**) IV: 6 g amoxicillin/day divided into 3 injections administered 8 hours apart
  + **gentamicin** IM: 5 mg/kg once daily
  Continue this treatment for 48 hours (until fever disappears), then change to **co-amoxiclav** PO: 3 g/day in 3 divided doses, to complete 5 days of treatment.
  or
  ampicillin IV: 6 g/day divided into 3 injections administered 8 hours apart
  + **metronidazole** IV: 1.5 g/day divided into 3 infusions administered 8 hours apart
  + **gentamicin** IM: 5 mg/kg once daily
  Continue this treatment for 48 hours (until fever disappears), then change to **amoxicillin** PO: 3 g/day in 3 divided doses + **metronidazole** PO: 1.5 g/day in 3 divided doses, to complete 5 days of treatment.
  • perform extremely careful curettage (increased risk of uterine perforation) 24 to 48 hours after starting antibiotics.

Destructive delivery

Destructive operation whose aim is to reduce the bulk of a dead foetus in order to facilitate vaginal delivery when a mechanical problem prevents this from occurring normally. The goal is to avoid caesarean section and its attendant risks.

Precautions

All indications for destructive delivery are considered with respect to:
– the practitioner's experience and skill;
– the risk of trauma and infection associated with a difficult procedure on a fragile uterus and an infected cavity (risk of uterine rupture, damage to maternal soft tissue with subsequent fistulae);
– acceptance, by both patient and staff, of a procedure that might be psychologically traumatizing.

Some practitioners prefer to perform a caesarean for a dead foetus, rather than mutilate it. With caesarean section, however, there is a significant risk to the mother's life and function, particularly when it is done in a remote rural setting.
Foetal demise is not in itself justification for a caesarean. Caesarean section is only indicated for death in utero in exceptional circumstances: when it is combined with a non-self-resolving mechanical obstacle (for example, transverse presentation with impacted shoulder), and destructive delivery is impossible or the uterus has ruptured.

Conditions

– Make certain that the foetus is dead (absence of heartbeat on foetal Doppler or ultrasound, if available).
– Establish that there is a mechanical obstacle to vaginal delivery, due to size and/or presentation.
– Complete, or nearly complete, dilatation allowing sufficient access to the presenting part.
– Inform the patient and, possibly, her family.
– Perform the destructive delivery in the operating room, under conditions of strict asepsis, and under general anaesthesia.
– Practitioner with obstetrical experience.
– Urinary catheterization is mandatory. If urine is red, suspect bladder injury and leave the catheter in place for 7 days.
– After the extraction of the foetus, always check:
  • the uterine cavity (uterine exploration under antibiotic protection, see page 157)
  • the vaginal walls (use vaginal retractors, available in the curettage set, to get adequate exposure).
– Routine administration of a uterotonic agent following the procedure (see page 157).

Craniotomy (cephalic presentation)

Operation that consists of puncturing the cranial cavity at the top or base of the skull or at the face, in order to reduce the bulk of the foetal head, which is preventing delivery (as with hydrocephalus, for example).

Equipment

– Smellie perforator or, if unavailable, Dubois cephalotomy scissors (Figures 85 and 86).

Figure 85
Smellie perforator

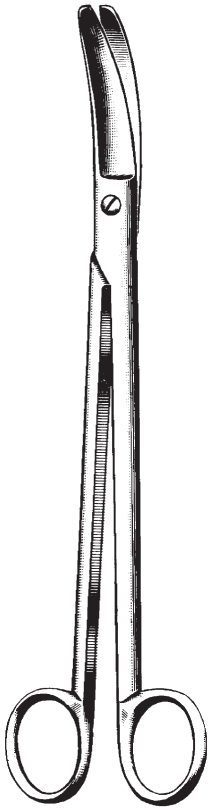


Figure 86
Dubois cephalotomy scissors

Technique (Figure 87)

– Have an assistant rest both palms on the head of the foetus and apply pressure down toward the pelvis.
– Insert the left hand, shaped like a channel, in the vagina, in contact with the head of the foetus.
– Using the right hand, slide the perforator along the channel formed by the left hand (to protect the vagina) until it makes contact with the head of the foetus.
– The perforation should be made in the centre, to protect the mother's soft tissues. If the foetus is hydrocephalic, the bone is thin and easy to perforate. In other cases, the perforation must be done in a fontanelle.

– Once the cerebrospinal fluid spills out, the volume of the head should decrease and delivery should be easy; if not, perform cranioclasis.

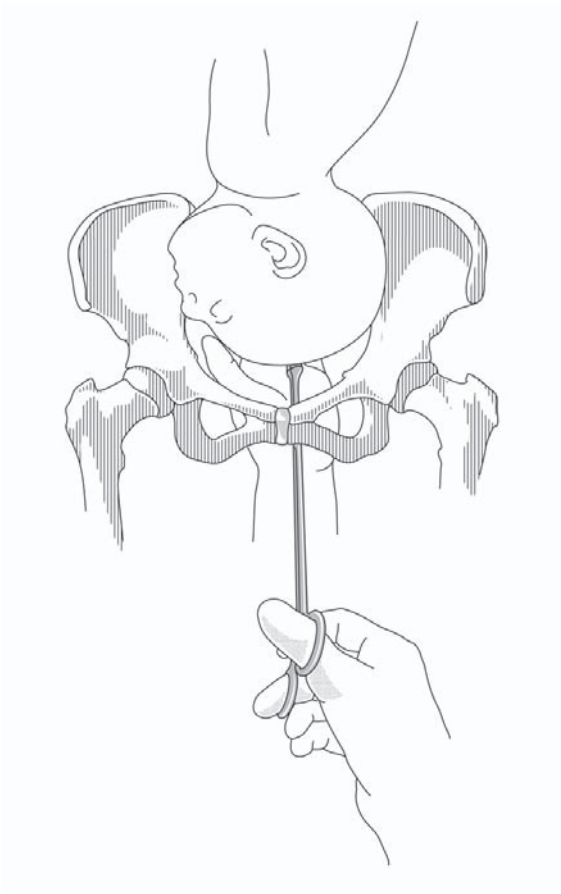


Figure 87
Embryotomy with the Smellie perforator

Cranioclasis

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

Equipment

Braun cranioclast (Figure 88)

Technique

– Insert the cranioclast's solid jaw into the opening made by the perforator. Place the hollow jaw against the skull, curved toward the face.
– The two jaws are adjusted with the screw. Extract the head in the most favourable orientation.

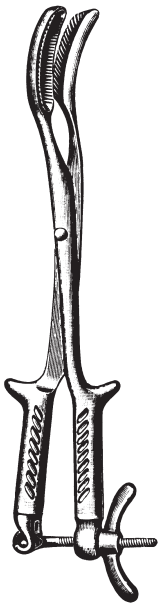


Figure 88
Braun cranioclast

Craniotomy for retention of the aftercoming head (breech delivery)

Equipment

Smellie perforator

Technique (Figure 89)

– Have an assistant rest both palms on the head of the foetus and apply pressure down toward the pelvis.
– Pull the body of the foetus out and down to gain access to the occiput.
– Introduce the perforator behind the mastoid bone, rotating it to penetrate the bone. Once the skull is perforated, use the instrument to cut up the brain matter.
– Withdraw the perforator and apply traction to the trunk.

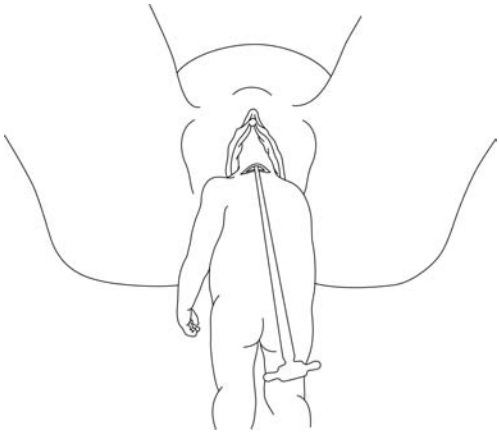


Figure 89
Craniotomy for retention of the aftercoming head

Decapitation for transverse presentation

A procedure that poses a high risk to maternal tissues; indicated when caesarean section is impossible for a dead infant in a transverse presentation.

Equipment

Large curved scissors

Technique (Figure 90)

– Slide the left hand behind the foetus and encircle the neck with the thumb and index finger like a necklace.
– Slide the closed scissors into the channel formed by the left hand, keeping them flat against the hand. It is imperative to approach the neck from 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.

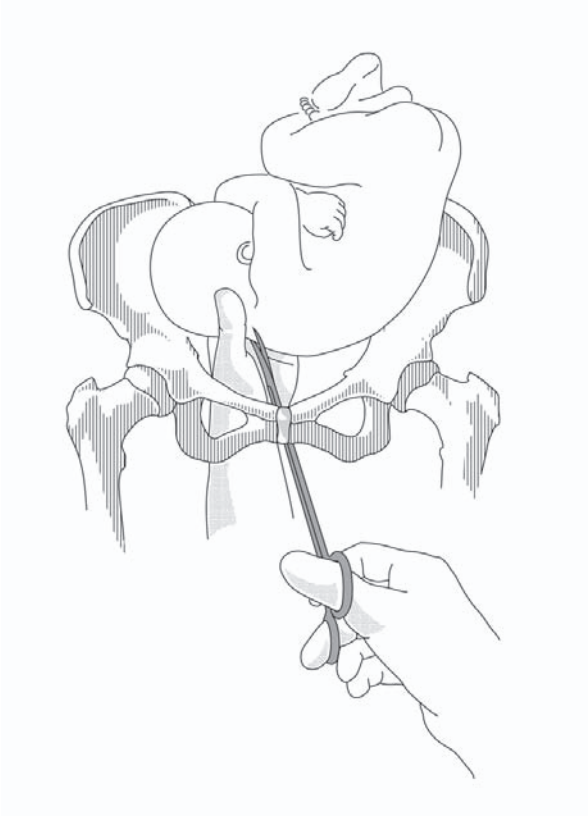


Figure 90
Decapitation using scissors

CHAPTER 9

Infant care

Initial care of the newborn

Anticipate need for resuscitation at every birth.

– Clamp the cord 10 cm from the umbilicus using two Kocher forceps, and cut between the two forceps (use sterile scissors, not those used for episiotomy, if performed).
– Assess immediately and rapidly the infant in order to commence resuscitation if necessary.
The signs (**cry, respirations, colour, muscle tone, heart rate**) should be evaluated simultaneously.
– Two situations may present:

1. The infant is doing well

He breathes spontaneously, cries, has good muscle tone and responds when stimulated, becomes pink rapidly[1]; his heart rate (HR) is above 100 beats/minute (bpm)[2].

Routine care

– *Immediately:*
  • Dry the newborn with a clean, dry cloth; do not bathe him (risk of hypothermia); wrap him in a clean, dry cloth; keep him warm against the mother's body or if this is not possible, in a blanket.
  • Clear the airway by *wiping* mouth and nose gently. Do not routinely suction the nose and the oropharynx (risk of bradycardia, laryngeal spasm), except in the event of obvious obstruction.
  Meconium-stained amniotic fluid is not an indication for systematic aspiration if the infant is responsive (spontaneous breathing and good tone).
  • Tie the cord 3 cm from the umbilicus with sterile thread (double ligature). Clean the umbilicus with a sterile compress and 0.9% sterile sodium chloride; dry and protect with a dry compress.
– *Within the first 2 hours:*
  • Weigh the infant, take his temperature, and record on the monitoring sheet.
  • Gently clean the eyes with a sterile compress and 0.9% sodium chloride. Apply **1% tetracycline** ophthalmic ointment to each eye.
  • Administer **phytomenadione** (**vitamin K**) to prevent haemorrhagic disease of the newborn : either a single 1 mg IM dose in the thigh, or 2 mg PO.
  If using the oral route, a second 2 mg dose must be given 4 to 7 days after birth and then, if the infant is breastfeeding, a third 2 mg dose 4 weeks after birth. The oral treatment is only effective if all of the doses are given.

1 Usually, a healthy child is born blue but becomes pink within 30 s of the onset of breathing. In dark-skinned infants, check palms of the hands, soles of the feet and mucous membranes.

2 The HR is measured by palpating the umbilical cord stump or by auscultation at the cardiac apex by stethoscope. Count the number of beats in 6 seconds and multiply by 10. If it is difficult to evaluate count, consider it as normal if the newborn breathes well, is pink and has good tone.

Always use the IM route:
- in premature or low birth weight infants;
- if the mother is being treated with a liver enzyme inducer (rifampicin, phenobarbital, phenytoin, carbamazepine);
- in all newborns, if compliance to oral treatment cannot be guaranteed.

• Put the infant to the breast as soon as possible within the first hour (if the mother is HIV-infected, see page 68).

– *Prior to discharge:*
Commence vaccination (OPV 0, BCG, hepatitis B).

2. The infant is not doing well

He has respiratory distress (difficulty breathing, gasping or apnoeic); is hypotonic or floppy, cyanosed or pale[3], or the heart rate is less than 100 bpm[4].

Keep the infant warm

Rapidly dry him then wrap him in a clean, dry cloth (hypothermia compromises resuscitation).

Position the infant

Place him on his back with the head in a neutral position (Figure 91); avoid flexion or hyperextension of the neck as it can cause airway obstruction.

Clear the airway

Clear the airway by wiping mouth and nose gently; gently suction his mouth and nose if necessary.
Meconium-stained amniotic fluid requires systematic aspiration in the event the child has poor respiratory effort and is hypotonic.
Do not suction too deeply nor too long (risk of bradycardia and/or apnoea): for the nose, to a maximum depth of 1 cm by each nostril; for the mouth, to a maximum depth of 5 cm; for a maximum duration of 5 seconds.
In case of meconium-stained amniotic fluid, suction down to the trachea. Use a laryngoscope, only if experienced in its usage. Otherwise, it is better to suction without a laryngoscope.

Stimulate

Gently flick the bottoms of the feet and rub the back (do not shake, slap or hang the infant by the feet). Tactile stimulation may initiate spontaneous respirations.

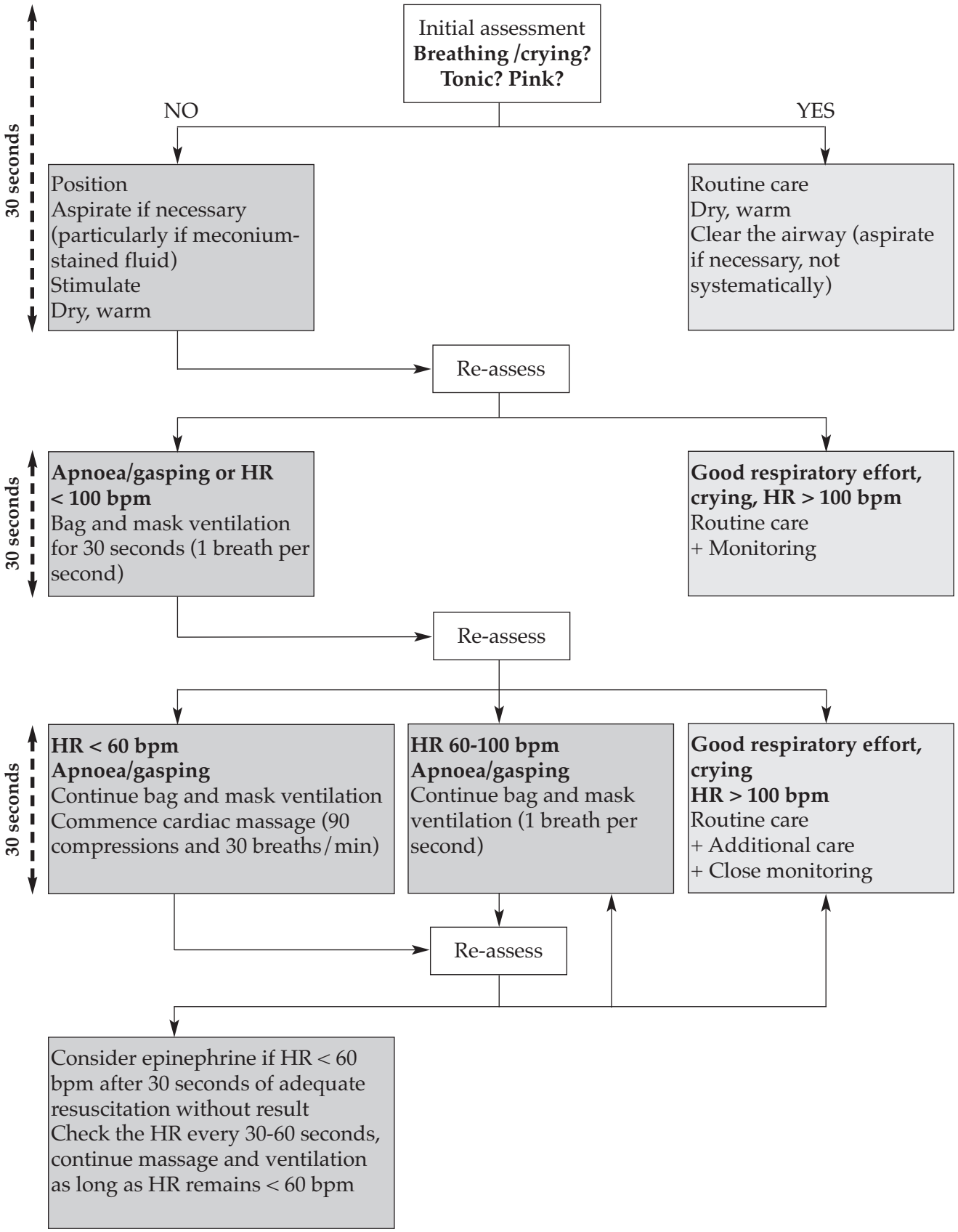
If good respiratory effort has commenced and the infant is recovering within 30 seconds: provide routine care (see page 177).

If good respiratory effort has not commenced within 30 seconds: stop stimulation, the infant needs assisted ventilation, see *Resuscitation of the newborn* page 180.

3 In dark-skinned infants, check palms of the hands, soles of the feet and mucous membranes.

4 The HR is measured by palpating the umbilical cord stump or by auscultation at the cardiac apex by stethoscope.

Immediate care at birth



Resuscitation of the newborn

Ventilation should be the priority in resuscitation of the newborn. It must be commenced if the infant remains apnoeic or gasping after stimulation or if heart rate (HR) remains < 100 bpm.

Management

Record all procedures on the monitoring sheet.

Bag-mask ventilation[1] (the airways have already been cleared)

– Adjust head position (Figure 91).

– Apply the mask to the nose and the mouth, which has been opened beforehand to prevent obstruction by the tongue. Adjust the mask to prevent air leaks (Figure 92).

– Squeeze the bag with 2 fingers only, at a rate of 60 compressions per minute for 30 seconds. Caution: the newborn's alveoli are very fragile, excessive ventilation pressure can cause a pneumothorax.
Ventilation is effective if the chest rises. If the chest does not rise: reposition the infant (if the infant is in the incorrect position, the air might be going into his stomach, rendering ventilation ineffective) and clear the airway again.

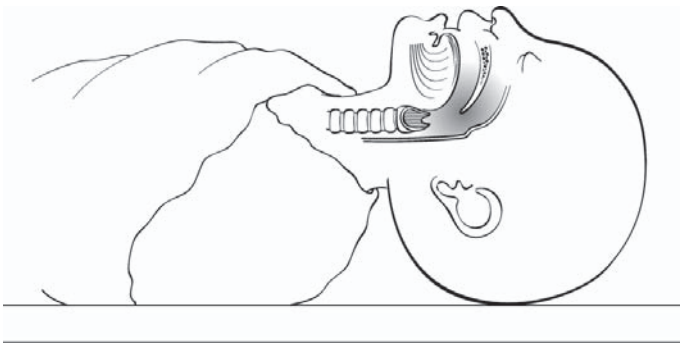


Figure 91
Head position for ventilation

[1] If there is no ventilation equipment, use mouth-to-mouth and nose ventilation. Use a neonatal mask or, failing that, a compress between your mouth and the infant's mouth and nose. Place mouth so that it covers the infant's mouth and nose. Give 30 gentle breaths per minute, in such a way that the chest rises slightly.

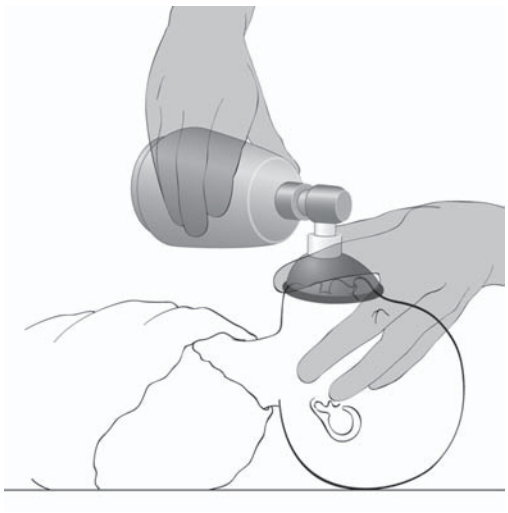


Figure 92
Position of the mask

– Re-assess after 30 seconds:
  • If breathing is normal, the infant cries and the HR is > 100 bpm: stop assisted ventilation but re-assess after 30 seconds then every minute for 5 minutes.
  • If spontaneous respiratory effort remains poor or absent but the HR is > 60 bpm: continue assisted ventilation and re-assess every 30 seconds, until spontaneous breathing occurs.
  • If spontaneous respiratory effort remains poor or absent and the HR remains < 60 bpm: continue assisted ventilation and commence cardiac massage. Re-assess every 30-60 seconds.

Cardiac massage

Chest compressions should only be initiated when effective ventilation has been established (compressions may compromise the effectiveness of the ventilation).
Chest compressions are indicated when the HR remains < 60 bpm despite adequate assisted ventilation for 30 seconds.

– Apply both thumbs superimposed to the sternum with fingers surrounding the thorax (Figure 93). Compress to approximately one third of the anterior-posterior diameter of the infant's chest.

Figure 93
Cardiac massage

Compressions and ventilations should be coordinated to avoid simultaneous delivery. The rate is 3 compressions for 1 ventilation (i.e. 90 compressions and 30 breaths per minute).

– Re-assess after 30 seconds:
  - If HR is > 60 bpm: stop compressions and continue ventilation until spontaneous breathing occurs.
    When spontaneous breathing is present, stop ventilation and re-assess the infant after 30 seconds then every minute for 5 minutes, then closely monitor the infant.
  - If HR remains < 60 bpm: continue ventilation and chest compressions and administer **epinephrine** (**adrenaline**) IV or intraosseous:
    0.01 to 0.03 mg/kg (= 10 to 30 microgrammes/kg) i.e. 0.1 to 0.3 ml/kg of a 1:10 000 solution of epinephrine, to be repeated every 3 to 5 minutes, if needed.

> Caution on dosing errors with epinephrine:
>
> If the ampoules available are *1 ml* ampoule containing *1 mg per ml*, these correspond to a 1:1000 solution of epinephrine. This solution must be diluted to obtain a 1:10 000 solution. To prepare a 1:10 000 (= 0.1 mg/ml) solution: dilute one ampoule of epinephrine in 9 ml of 0.9% sodium chloride.
>
> If the ampoules available are *10 ml* ampoules containing *0.1 mg per ml*, these correspond to a 1:10 000 solution of epinephrine. This solution must not be diluted, it is ready to use.

For the injection: draw up the 1:10 000 solution in a 1-ml syringe. For example, for a child weighing 3 kg, the dose per injection is 0.3 to 0.9 ml of 1:10 000 solution of epinephrine.

Re-assess every 60 seconds. In the event of cardio-respiratory arrest that has not responded to 10-15 minutes of continuous resuscitation, consider that the infant is dead.

After resuscitation

– If possible place the infant in a unit where it can receive ongoing care surveillance.

– Check blood glucose level as soon as possible. In the event of hypoglycaemia (blood glucose < 2,6 mmol/litre), administer 10% glucose (2 ml/kg slow IV) and check blood glucose level after 30 minutes.

– Severe foetal distress is often infection-related. In the event of suspected infection, give antibiotic therapy for 7 to 10 days:
ampicillin IV: 100 mg/kg/day divided in 3 injections, for a minimum of 3 days, then, if the infant state permits, change to **amoxicillin** PO: 50 to 75 mg/kg/day in 3 divided doses to complete 7 to 10 days of treatment
+ **gentamicin** IM: 3 to 4 mg/kg/day in one or two injections for 3 days

Care of the low birth weight infant (< 2500 g)

Low birth weight may be due to either preterm birth or intrauterine growth retardation. In either case, the infant is at high risk for hypothermia, hypoglycaemia, and infection.

Management

– Ask the mother to keep the infant in constant skin-to-skin contact, against her chest (kangaroo method, Figure 94). If necessary, wrap the mother and infant in warm clothing (cover the infant's head with a cap).

Figure 94
Kangaroo method

– Early, frequent breastfeeding; monitor weight

– If sucking is ineffective but the swallowing reflex is present: manual expression of breast milk every 2 or 3 hours. Collect the milk in a clean cup, and feed the infant by spoon or cup, after having him nurse for 2 or 3 minutes.

– If this doesn't work, as an exception, use tube feeding:
  • Verify that the tube is correctly positioned in the stomach: with a stethoscope placed over the infant's stomach, inject a few ml of air through the tube and listen for bubbling or whooshing sounds. Attach the tube securely; watch out for aspiration.

- Amounts to administer, as a general guide:
  1st day .....60 ml/kg, divided into 8 to 12 meals (every 2 to 3 hours)
  2nd day .....90 ml/kg, divided into 8 to 12 meals (every 2 to 3 hours)
  3rd day.....120 ml/kg, divided into 8 meals (every 3 hours)
  4th to 7th day .....150 ml/kg, divided into 8 meals (every 3 hours)
  8th day and thereafter.....180 ml/kg, divided into 8 meals (every 3 hours)
- Before each meal, aspirate the stomach contents and check the position of the tube:
  If the fluid is clear or there is less than 5 ml of milk, give the next meal.
  If there is more than 5 ml of residual milk, reduce the volume of the meal (for example, if the anticipated amount for the meal is 45 ml and the residual is 15 ml, give 30 ml for that meal).
- Each meal should be administered very slowly.
- Hold the infant in a slightly head-up position.

– In all cases, try putting the infant to the breast periodically to see whether or not he can breastfeed effectively.

CHAPTER 10

Postpartum care

Normal postpartum events

Uterine involution

– After the delivery of placenta, the uterus contracts and becomes hard. It is palpable below the umbilicus.
– Around the 5th or 6th day, it is halfway between the navel and the symphysis pubis.
– Around the 10th day, it is at the symphysis pubis.
– After 6 weeks, it returns to its normal size.

Cervix

The internal os closes between the 8th and 12th day.

Lochia

A bloody, then blood-tinged, discharge for the first three days; normally odourless, it stops after 15 to 21 days.
The first menstrual period occurs between the 6th and 8th week in women who are not breastfeeding.

Breasts

Secretion of yellowish colostrum for the first 2 days.
Around the 3rd day, breast tenderness, sometimes accompanied by a short-lived fever of 38-38.5°C.
Then the actual milk comes in, whiter and more abundant.

Postnatal visits

A postnatal visit should be organised:
– within 8 days of delivery, especially for women who delivered at home;
AND
– within four to six weeks of delivery for all patients.

Content of postnatal visits

For the mother

– Take temperature and blood pressure.
– Look for anaemia: examine the conjunctivae; if available, measure haemoglobin.
– Examine the vulva and perineum: look for tears, assess the healing of episiotomy or sutured wound, and review any vaginal discharge.
– Assess uterine involution.
– Check for breast lesions (if breastfeeding).
– Do a dipstick urinalysis if there are any symptoms of urinary tract infection and/or fever.
– Assess the mother-infant interaction, looking for mood disorders (postpartum depression).
– Provide information on contraception (time until fertility returns; available contraceptive methods; efficacy, benefits, constraints, and adverse effects of each method) and prescribe contraceptive if desired (see page 192).
– If there are no clinical signs of anaemia or if haemoglobin concentration is over 11 g/dl, give iron supplementation for at least one month postpartum (see page 18). If there are clinical signs of anaemia or haemoglobin concentration is below 11 g/dl, treat for anaemia (see page 47).
– In endemic areas of vitamin A deficiency, vitamin A supplement (**retinol** PO: 200,000 IU as a single dose)

For the infant

– General clinical examination, weight, condition of cord
– Feeding
– Immunization
– If not done at birth, apply ophthalmic tetracycline and administer vitamin K within the 1st week.

Example of pregnancy monitoring card (postnatal visit)

DELIVERY

Date: 25 September 2006
Location: home
Type of delivery: vaginal, cephalic

MOTHER

Perineum: intact
Third stage of labour: normal, rapid
Treatment received: none

CHILD

Sex: female
Birth weight: ?
Name: XXXXXXX
Treatment received at birth: none

POSTNATAL VISIT

Date: 27 September 2006

EXAM - MOTHER

TA 120/60, T° 37,5°C
perineum, breasts, conjunctivae = OK
lochia normal

Treatment:
iron/folic acid 1 tab/day x 1 month
vitamin A 200,000 IU single dose
Does not want contraception

EXAM - CHILD

weight 3200 g, exam normal
breast-fed

Treatment:
cord care, vitamin K1, ophthalmic tetracycline

Vaccination:
BCG, polio (0), hepatitis B (1)

PREGNANCY MONITORING CARD

Name: XXXXXXXXX
Address: camp 2

Age: 28 yrs Height: > 1.50 m

Live births: 3
Living: 2 Dead: 1 (meningitis at 6 months)
Stillbirths: 1
Abortions or miscarriages: 2
Gestation*: 7 Parity**: 4

Last menstrual period:
1st week of January 2006?
Due date: mid-october 2006

Medical / surgical history:
tuberculosis in 2000 (treated, cured)

Obstetric history:
postpartum haemorrhage (cause?) for 2nd delivery (stillbirth)

Tetanus vaccination:
TT1 november 2003
TT2 january 2004
TT3 8 april 2006

Others:
hasn't heard from her husband since March 2006

Postpartum complications

Excessive uterine bleeding

Normally, the amount of lochia does not exceed that of a normal menstrual period. If the discharge is heavier, consider the possibility of retained products or endometritis.

If suspicion of retained placenta: digital curettage or manual vacuum aspiration or extremely cautious instrumental curettage, with antibiotic coverage. For antibiotic therapy (treatment of 5 days):
amoxicillin-clavulanic acid PO: 3 g/day in 3 divided doses
or
amoxicillin PO: 3 g/day in 3 divided doses + **metronidazole** PO: 1.5 g/day in 3 divided doses

Infectious complications

Fever higher than 38°C for more than 48 consecutive hours

Check systematically for malaria

Treat all bouts of malaria (after laboratory diagnosis, if possible), taking into account local resistance to antimalarials.

Postpartum endometritis and salpingitis

- Pelvic pain, foul-smelling lochia
- Physical exam: uterus enlarged, soft, painful when mobilized; open cervix; swelling in the posterior fornix
- Look for residual retained products of conception
- Antibiotic therapy:
  amoxicillin-clavulanic acid (**co-amoxiclav**) IV: 6 g amoxicillin/day (2 g every 8 hours)
  + **gentamicin** IM: 5 mg/kg once daily
  Continue this treatment for 48 hours (until fever disappears), then change to oral treatment with **co-amoxiclav** PO: 3 g/day in 3 divided doses, to complete 5 days of treatment.
  or
  ampicillin IV: 6 g/day (2 g every 8 hours)
  + **metronidazole** IV: 1.5 g/day (500 mg every 8 hours)
  + **gentamicin** IM: 5 mg/kg once daily
  Continue this treatment for 48 hours (until fever disappears), then change to oral treatment with **amoxicillin** PO: 3 g/day in 3 divided doses + **metronidazole** PO: 1.5 g/day in 3 divided doses, to complete 5 days of treatment.

Pelvic abscess or peritonitis

A complication of untreated puerperal endometritis/salpingitis

– Abdominal guarding or spasm, ileus, pelvic mass
– Surgical treatment: laparotomy or, when abscess is confined to the Pouch of Douglas, colpotomy to drain the abscess
– Same antibiotic regimen as for postpartum endometritis and salpingitis

Other infectious causes of postpartum fever

– Abscess after caesarean section
– Lymphangitis and breast abscess (see below)
– Upper urinary tract infection: pyelonephritis, see page 62

Breast-related complications

Cracked nipples

– Intense nipple pain when starting to nurse; nipple erosion. No fever (except when associated with lymphangitis).
– Clean with soap and clean water before and after each feeding, dry carefully.

Breast engorgement

– Bilateral pain 2 to 3 days after childbirth; hard, painful breasts.
– Warm compresses (before nursing); gentle manual expression (before nursing, if the infant cannot latch onto the overly distended breast, or after nursing to finish emptying the breast); more frequent nursing.
– Engorgement is a benign problem that subsides in 24 to 48 hours.

Lymphangitis (inflammation of a milk duct)

– Unilateral pain, 5 to 10 days after childbirth. Red, hot, painful, well-defined, non fluctuant plaque; high fever; axillary lymphadenopathy possible. Milk collected on a compress is clean, without pus.
– Empty the breast by nursing the infant frequently on the involved side. If the mother finds nursing too painful, temporarily stop nursing on the painful side (but empty the breast manually) and continue breastfeeding with the other breast.
– Routine analgesia (**paracetamol** PO: 3 g/day in 3 divided doses).

Mastitis (breast infection)

– Unilateral infection, with satellite lymph node; breast swollen, hot, red, painful; purulent discharge from the nipple; fever, sometimes
– Stop breastfeeding on the affected side, carefully empty the infected breast manually, and administer an antibiotic with anti-staphylococcal activity:
cloxacillin PO: 2 g/day in 2 divided doses for at least 7 days
– Routine analgesia (**paracetamol** PO: 3 g/day in 3 divided doses)
– Antibiotic treatment helps prevent progression to the suppurative stage (breast abscess) that requires surgical drainage. Surgical drainage of a "ripe" abscess is urgent, because an abscess can quickly spread.

Contraception

Contraceptive method should be chosen based on medical indications or contraindications AND the preferences of the patient, who is in the best position to know which method fits her lifestyle.

No laboratory testing is required for prescribing contraceptives. It is only necessary to measure blood pressure. If an intrauterine device is being considered, a pelvic exam (speculum and digital vaginal exam) is also required.

For women who are not breastfeeding

Ovulation occurs in the 4th week postpartum, at the earliest. For women who want it, contraception should be offered beginning at the end of the 1st month postpartum, if sexual relations are resumed:

– *From Day 21: hormonal contraception* (see corresponding entries in the appendix).
  - Combined oestrogen-progestogen oral contraceptives:
    for example, ethinylestradiol + levonorgestrel (Microgynon®, Minidril®, etc.)

  or

  - Progestogen-only contraceptives:
    low dose oral progestogen: levonorgestrel (Microlut®, Microval®, Norgeston®, etc.)
    or
    progestogen injectables: medroxyprogesterone (Depo-Provera®, etc.), norethisterone (Noristerat®, etc.)
    or
    progestogen implants: etonogestrel (Implanon®), levonorgestrel (Jadelle®), etc.

  If a woman cannot be seen again after 21 days (e.g., nomadic populations), progestogen implants or injectables may be used as soon as the opportunity presents itself, including immediately after delivery.

– *From the 4th week postpartum: intrauterine device (IUD)*
  Placement of an IUD less than 4 weeks postpartum is not advisable, due to the higher risk of uterine perforation.
  IUD placement is contraindicated in the event of active pelvic infection.

For women who are breastfeeding

– Breastfeeding is a temporary (for 6 months following childbirth) and effective (> 98%) contraceptive method, but only when all of the following conditions are met:
  - the infant is exclusively breastfed
  - the time between feedings is under 6 hours
  - menstrual periods have not resumed
  - the infant is under 6 months old

If all of these conditions are not met, suggest a different contraceptive method:

– Combined oestrogen-progestogen oral contraceptives should be avoided during the first 6 months postpartum. If, however, they are the only available or acceptable contraceptive method, they can be introduced sooner, but only after 6 weeks postpartum.
– Oral progestogens should be initiated at 6 weeks postpartum. If, however, they are the only available or acceptable contraceptive method, they may be started 21 days postpartum.
– Progestogen injections and implants can be used from the 6th week postpartum. However, if a woman cannot be seen again after 6 weeks (e.g. nomadic populations), or if they are the only available or acceptable contraceptive method, injections or implants may be used as soon as the opportunity presents itself, including immediately after delivery.
– Intrauterine device (IUD) can be used starting at 4 weeks postpartum. Placement of an IUD less than 4 weeks postpartum is not advisable, due to the higher risk of uterine perforation. IUD placement is contraindicated in the event of active pelvic infection.

Notes:

– Contraception may be started immediately after abortion, with either a combined contraceptive or a progestogen-only contraceptive. An IUD can be inserted immediately, provided there is no associated pelvic infection.
– Always give condoms for use with the above methods, for protection against HIV and other sexually transmitted diseases.
– Every woman should be informed about—and, if needed, have access to—emergency contraception: **levonorgestrel** PO (1.5 mg as a single dose), as soon as possible after unprotected sexual intercourse (preferably within 72 hours, and up to 120 hours or 5 days after). There are no contraindications to emergency contraceptive; it can be used whether a woman is breastfeeding or not.

Appendices

ATENOLOL
(Tenormin®…)

Prescription under medical supervision

Therapeutic action
– Cardioselective beta-blocker

Indications
– Hypertension (including hypertension in pregnancy)
– Prophylaxis of angina pectoris
– Arrhythmia

Presentation
– 50 mg and 100 mg tablets

Dosage
– *Hypertension*
  Adult: 50 to 100 mg once daily, preferably in the morning
– *Prophylaxis of angina pectoris*
  Adult: 100 mg once daily
– *Arrhythmia*
  Adult: 50 to 100 mg once daily

Duration
– According to clinical response. Do not stop treatment abruptly, decrease doses gradually.

Contra-indications, adverse effects, precautions
– Do not administer to patients with asthma, chronic obstructive bronchopneumonia, bradycardia < 50/minute, atrio-ventricular heart blocks, Raynaud's syndrome, severe hypotension, severe depression.
– May cause: bradycardia, hypotension, heart failure, asthma attack, gastrointestinal disturbances, hypoglycaemia, dizziness.
– In the event of anaphylactic shock: risk of resistance to epinephrine.
– Reduce dosage in patients with renal impairment.
– Administer with caution to patients with diabetes (induces hypoglycaemia, masks the symptoms of hypoglycaemia) or to patients treated with digitalis glycosides (risk of bradycardia).
– Do not administer simultaneously with antacids such as aluminium hydroxide, etc. (decreased intestinal absorption), administer 2 hours apart.
– Monitor combination with epinephrine (hypertension); tricyclic antidepressants, other antihypertensive drugs, nitrates,acetazolamide, ketamine (hypotension); mefloquine, digoxin, amiodarone, verapamil, diltiazem (bradycardia).
– *Pregnancy: no contra-indication. After delivery monitor the newborn for at least 72 hours (risk of hypoglycaemia, bradycardia, respiratory distress).*
– *Breast-feeding: avoid*

Remarks
– Atenolol is also used for the secondary prophylaxis of myocardial infarction (50 mg once daily).
– *Storage: below 25°C* –

DEXAMETHASONE

Prescription under medical supervision

Therapeutic action

– Corticosteroid

Indications

– Inflammatory syndrome in severe infections: severe typhoid fever, acute subglottic laryngitis, etc.
– Foetal lung maturation, in the event of threatened premature delivery before 34 weeks of gestation

Presentation and route of administration

– 4 mg dexamethasone phosphate in 1 ml ampoule (4 mg/ml) for IM or IV injection or infusion

Dosage and duration

– *Inflammatory syndrome in severe infections*
Dosage and duration vary according to severity and clinical response:
Child: 0.2 to 0.4 mg/kg/day
Adult: initial dose of 0.5 to 24 mg/day

– *Foetal lung maturation*
Administer to the mother: 6 mg by IM injection every 12 hours for 2 days (total dose: 24 mg)

Contra-indications, adverse effects, precautions

– For systemic infections, only administer if patient is under antibiotic treatment.
– In the event of treatment longer than 10 days, decrease doses gradually to avoid adrenal gland failure.
– *Pregnancy: no contra-indication*
– *Breast-feeding: no contra-indication*

Remarks

– Foetal lung maturation:
  • after 34 weeks of gestation, corticosteroid treatment is not indicated;
  • dexamethasone may be replaced by betamethasone (Betnesol®): 2 doses of 12 mg by IM injection at 24-hour interval (total dose: 24 mg).
– For allergic reactions (Quinke's oedema, anaphylactic shock) and status asthmaticus, use hydrocortisone.
– Dexamethasone acetate (Dectancyl®), insoluble in water, is a suspension used only for local treatment: intra-articular or peri-articular injection, epidural injection (sciatica).
– *Storage: below 25°C –* 
The solution precipitates at 0°C, it must not be exposed to cold temperatures.

ETHINYLESTRADIOL + LEVONORGESTREL (Microgynon 30®, Minidril®…)

Prescription under medical supervision

Therapeutic action
– Combined hormonal contraceptive, estrogen-progestogen

Indications
– Oral contraception

Presentation
– 21-tablet pack: 21 active tablets of 30 µg ethinylestradiol + 150 µg levonorgestrel
– 28-tablet pack: 21 active tablets of 30 µg ethinylestradiol + 150 µg levonorgestrel **and** 7 inactive tablets

Dosage
– Start the first day of menstruation or immediately after abortion or as of the 21st day after childbirth (if the women does not breastfeed).
– 21-tablet pack: 1 tablet each day at the same time, for 21 days, followed by a tablet-free interval of 7 days
– 28-tablet pack: 1 tablet each day at the same time, with no interruption, even during menstruation

Duration: if there are no adverse effects, as long as contraception is desired.

Contra-indications, adverse effects, precautions
– Do not administer to patients with breast cancer, uncontrolled hypertension, non equilibrated or complicated diabetes, history of thromboembolic disorders, coronary insufficiency, valvular disease, stroke, severe or recent liver disease, undiagnosed abnormal vaginal bleeding, migraine with neurological signs, renal impairment, hyperlipidaemia; to women smokers, especially over age 35.
– May frequently cause: nausea, weight gain, breast tenderness, mood changes, acne, oligo-amenorrhoea, headache, vaginal candidiasis. Other rare and severe adverse effects require the discontinuation of treatment: hypertension, cardiovascular and thromboembolic disorders, jaundice, hepatic adenoma, migraine, visual disturbances.
– Hepatic enzyme inducers (carbamazepine, griseofulvin, phenobarbital, phenytoin, rifabutin, rifampicin, nevirapine, nelfinavir, ritonavir) reduce the contraceptive efficacy of estroprogestogens. Possible alternatives include injectable medroxyprogesterone, copper IUD or condoms, depending on situation.
– Clinical examinations must be carried out before (blood pressure, breasts) and during treatment (blood pressure).
– *Pregnancy*: **CONTRA-INDICATED**
– *Breast-feeding*: **CONTRA-INDICATED** *before 6 weeks; not recommended between 6 weeks and 6 months (except if it is the only available or acceptable contraceptive method); no contra-indication after 6 months.*

Remarks
– In a woman misses an active tablet, she should take it as soon as possible and continue treatment as normal. If she misses by over 12 hours, contraceptive protection will be lessened, it is therefore recommended to use an additional contraceptive method: condoms for 7 days and, if she has had sexual intercourse within 5 days before forgetting the tablet, emergency contraception.
– 28-tablet packs can simplify use as there is no interruption between two packs. Explain to the woman which are active and inactive tablets. She must be careful not to start with inactive tablets.
– *Storage: below 30°C*

ETONOGESTREL subdermal implant (Implanon®…)

Prescription under medical supervision

Therapeutic action

– Hormonal contraceptive, progestogen

Presentation and route of administration

– Flexible rod containing 68 mg of etonogestrel, in a sterile disposable applicator, to be inserted subdermally into the inner side of the non-dominant arm, 6 to 8 cm above the elbow crease, under local anaesthesia and aseptic conditions.

Indications

Long-term contraception:

– *If no current contraception, the implant is inserted:*
during the first 5 days of menstruation
or immediately after abortion
or after childbirth:
  • if the woman breastfeeds: as of the sixth week postpartum
  • if the woman does not breastfeed: as of the 21st day postpartum

However, if there is a risk that the woman may be lost to follow-up, the implant may be inserted whenever, even after childbirth, whether she breastfeeds or not.

– *When switching from another contraceptive method, the implant is inserted:*
for an oral estroprogestogen: the day after taking the last active tablet in the pack
for an oral progestogen: at any stage of the cycle
for an injectable progestogen: the day the next injection is due
for an intrauterine device: the day of its removal

Duration

– The implant slowly releases a low dose of etonogestrel. It is left inserted, as long as contraception is desired and it is well tolerated, for a maximum of 3 years (2 years in obese women) after which it no longer provides contraception and must be changed.

Contra-indications, adverse effects, precautions

– Do not use in patients with breast cancer, severe or recent liver disease, undiagnosed abnormal vaginal bleeding, current thromboembolic disorders.
– May cause: headache, acne, menstrual irregularities, amenorrhoea, menometrorrhagia, breast tenderness, weight gain, mood changes, abdominal pain, gastrointestinal disturbances, itching, allergic reaction.
– Hepatic enzyme inducers (carbamazepine, griseofulvin, phenobarbital, phenytoin, rifabutin, rifampicin, nevirapine, nelfinavir, ritonavir) may reduce the contraceptive efficacy of etonogestrel. Possible alternatives include injectable medroxyprogesterone, copper IUD or condoms, depending on situation.
– Do not insert the implant deeply as the removal can be difficult later on. It should be palpable under the skin. Read carefully manufacturer's instructions.
– Remove the implant under local anaesthesia and aseptic conditions, using a forceps, after incision with scalpel.
– *Pregnancy*: **CONTRA-INDICATED**

Remarks

– Implants provide long term contraception, their efficacy is not conditioned by observance. Fertility returns rapidly after removal of the implant.
– *Storage: below 30°C* –

HYDRALAZINE
(Apresoline®…)

Prescription under medical supervision

Therapeutic action
– Antihypertensive vasodilatator

Indications
– Severe hypertension in pregnancy, when oral treatment is not possible

Presentation and route of administration
– Powder for injection, 20 mg vial, to be dissolved in 2 ml of water for injection, for slow IV injection or IV infusion

Dosage
Dosage must be adapted according to BP: treatment is administered if the diastolic BP is ≥ 110 mmHg. Hypertension is controlled when diastolic BP remains between 90 and 100 mmHg. During administration diastolic BP must never fall below 90 mmHg. Monitor maternal BP and pulse, as well as fœtal heart rate.

– *By IV infusion*
  • Dilute 100 mg (5 ampoules) in 500 ml of sodium chloride 0.9% or Ringer lactate to obtain a solution containing 200 micrograms/ml.
  • Initial dose: 200 to 300 micrograms/minute; maintenance dose: 50 to 150 micrograms/minute.
  • Administer by increasing the rate up to 20 drops/minute (maximum 30 drops/minute), check BP every 5 minutes.
  • As soon as hypertension is controlled, decrease progressively the rate (15 drops/minute, then 10, then 5) until stopping infusion. An abrupt discontinuation may provoke a hypertensive crisis.

– *By slow IV injection*
  Administer 5 mg by slow IV injection (over 2 minutes) and check BP for 20 minutes. If diastolic BP remains ≥ 110 mmHg, repeat injection. Continue repeating if necessary, waiting 20 minutes between each injection, without exceeding a total dose of 20 mg.

Duration
– Change over to an oral antihypertensive as soon possible.

Contra-indications, adverse effects, precautions
– Administer with caution to patients with heart failure, coronary insufficiency, recent myocardial infarction, severe tachycardia, history of stroke.
– Reduce doses in patients with renal or hepatic impairment.
– May cause: tachycardia, headache, nausea, hypotension.
– Respect dosage and administration rate. An overdose or too rapid administration may provoke an abrupt and excessive fall in maternal blood pressure with placental hypo-perfusion and fœtal death.
– In the event of hypotension, administer Ringer lactate to maintain diastolic BP ≥ 90 mmHg.
– *Pregnancy: avoid during the 1st trimester*
– *Breast-feeding: no contra-indication*

Remarks
– For administration, only use sodium chloride 0.9 % or Ringer lactate (incompatibility with glucose and other solutions).
– Do not mix with other drugs in the same syringe or infusion bottle.
– *Storage: below 30°C –*

LEVONORGESTREL
(Microlut®, Microval®, Norgeston®…)

Prescription under medical supervision

Therapeutic action
- Hormonal contraceptive, (low-dose)progestogen

Indications
- Oral contraception

Presentation
- 30 µg (0.03 mg) tablet, 28-tablet pack or 35-tablet pack

Dosage
- 1 tablet each day at the same time, continuously, including during menstruation
- Start:
  the first day of menstruation
  or immediately after abortion
  or after childbirth, as of the 21st day (if the woman does not breastfeed)

Duration: if there are no adverse effects, as long as contraception is desired.

Contra-indications, adverse effects, precautions
- Do not administer to patients with breast cancer, severe or recent liver disease, undiagnosed abnormal vaginal bleeding, current thromboembolic disorders.
- May cause: oligo-amenorrhoea, menstrual irregularities, nausea, weight gain, breast tenderness, mood changes, acne, headache.
- Hepatic enzyme inducers (carbamazepine, griseofulvin, phenobarbital, phenytoin, rifabutin, rifampicin, nevirapine, nelfinavir, ritonavir) reduce the contraceptive efficacy. Possible alternatives include injectable medroxyprogesterone, copper IUD or condoms, depending on situation.
- *Pregnancy*: ***CONTRA-INDICATED***
- *Breast-feeding*: *it is recommended to wait 6 weeks after childbirth before starting levonorgestrel if the woman breastfeeds. However, if it is the only contraceptive method available or acceptable, it can be started 3 weeks after childbirth.*

Remarks
- Levonorgestrel is a possible alternative if estroprogestogens are contra-indicated or poorly tolerated. However, it has a lesser contraceptive effect than estroprogestogens and requires taking tablets at a precise time (no more than 3 hours late).
- In a woman misses a tablet, she should take it as soon as possible and continue treatment as normal. If she misses by over 3 hours, contraceptive protection will be lessened, it is therefore recommended to use an additional contraceptive method: condoms for 7 days and, if she has had sexual intercourse within 5 days before forgetting the tablet, emergency contraception.
- Progestogens also exist as subdermal implants and in injectable forms.
- *Storage*: *below 30°C*

LEVONORGESTREL for emergency contraception (Norlevo®, Plan B®, Vikela®…)

Therapeutic action

– Hormonal contraceptive, progestogen

Indications

– Prevention of pregnancy in the event of a lapse or absence of contraception

Presentation

– 750 µg and 1500 µg tablets

Dosage and duration

– One 1500 µg tablet or two 750 µg tablets as a single dose, whatever the day of the cycle, as soon as possible after sexual intercourse and preferably within the first 72 hours as effectiveness decreases with time. It is however recommended to administer the treatment up to 120 hours (5 days) after sexual intercourse.

Contra-indications, adverse effects, precautions

– No contra-indication.
– May cause: vaginal bleeding within 7 days following administration, nausea.
– Re-administer treatment if vomiting occurs within 3 hours of taking treatment.
– *Pregnancy: in the event of treatment failure (i.e. pregnancy develops) or if used during an undiagnosed pregnancy, there is no known harm for the foetus.*
– *Breast-feeding: no contra-indication*

Remarks

– Emergency contraception is intended to prevent pregnancy; it cannot terminate an ongoing pregnancy.
– There is a risk of treatment failure. Carry out a pregnancy test if there is no menstruation:
  • within 5 to 7 days after the expected date, if the date is known,
  • or within 21 days following treatment.
– *Storage: below 30°C*

LEVONORGESTREL subdermal implant (Jadelle®…)

Prescription under medical supervision

Therapeutic action

– Hormonal contraceptive, progestogen

Presentation and route of administration

– Set of two flexible rods containing 75 mg of levonorgestrel, with a sterile applicator (reusable after sterilisation or for single use only, depending on the presentation), to be inserted subdermally into the inner side of the non-dominant arm, 6 to 8 cm above the elbow crease, under local anaesthesia and aseptic conditions.

Indications

Long-term contraception:

– *If no current contraception, the implant is inserted:*
during the first 7 days of menstruation
or immediately after abortion
or after childbirth:
  • if the woman breastfeeds: as of the sixth week postpartum
  • if the woman does not breastfeed: as of the 21st day postpartum

However, if there is a risk that the woman may be lost to follow-up, the implant may be inserted whenever, even after childbirth, whether she breastfeeds or not.

– *When switching from another contraceptive method, the implant is inserted:*
for an oral estroprogestogen: the day after taking the last active tablet in the pack
for an oral progestogen: at any stage of the cycle
for an injectable progestogen: the day the next injection is due
for an intrauterine device: the day of its removal

Duration

– The implant slowly releases a low dose of levonorgestrel. It is left inserted, as long as contraception is desired and it is well tolerated, for a maximum of 5 years (4 years in women over 60 kg) after which it no longer provides contraception and must be changed.

Contra-indications, adverse effects, precautions

– Do not use in patients with breast cancer, severe or recent liver disease, undiagnosed abnormal vaginal bleeding, current thromboembolic disorders.
– May cause: headache, acne, menstrual irregularities, amenorrhoea, menometrorrhagia, breast tenderness, weight gain, mood changes, abdominal pain, gastrointestinal disturbances, itching, allergic reaction.
– Hepatic enzyme inducers (carbamazepine, griseofulvin, phenobarbital, phenytoin, rifabutin, rifampicin, nevirapine, nelfinavir, ritonavir) may reduce the contraceptive efficacy. Possible alternatives include injectable medroxyprogesterone, copper IUD or condoms, depending on situation.
– Do not insert the 2 rods deeply as the removal can be difficult later on. They should be palpable under the skin. Read carefully manufacturer's instructions.
– Remove them under local anaesthesia and aseptic conditions, using a forceps, after incision with scalpel.
– *Pregnancy*: **CONTRA-INDICATED**

Remarks

– Implants provide long term contraception, their efficacy is not conditioned by observance. Fertility returns rapidly after removal of the implant.
– The duration of action of the levonorgestrel implant (5 years) is longer than that of the etonogestrel implant (3 years). However, the etonogestrel implant (one rod) is easier to insert/remove than the levonorgestrel implant (2 rods).
– *Storage: below 30°C* –

MAGNESIUM SULFATE

Prescription under medical supervision

Therapeutic action

– Anticonvulsant

Indications

– Eclampsia: treatment of eclamptic seizures and prevention of recurrence
– Severe pre-eclampsia: prevention of eclamptic seizures

Presentation and route of administration

– 1 g ampoule (500 mg/ml, 2 ml) and 5 g ampoule (500 mg/ml, 10 ml) for IM injection or IV infusion

Warning, also comes in different concentrations: ampoule containing 1.5 g (150 mg/ml, 10 ml), 2 g (100 mg/ml, 20 ml), 3 g (150 mg/ml, 20 ml) and 4 g (200 mg/ml, 20 ml). Check concentration before use, there is a risk of potentially fatal overdosage.

Dosage and duration

– *IV protocol:*
  Start with a loading dose of 4 g, to be administered by IV infusion in 0.9% sodium chloride over 15 to 20 minutes.
  Then administer a maintenance dose of 1 g per hour by continuous IV infusion. Continue this treatment for 24 hours after the delivery or the last seizure.
– *IV/IM protocol:*
  Start with a loading dose of 4 g, to be administered by IV infusion in 0.9% sodium chloride over 15 to 20 minutes.
  Then administer by IM route: 10 g (5 g in each buttock) followed by 5 g every 4 hours (changing buttock for each injection). Continue this treatment for 24 hours after the delivery or the last seizure.

Regardless of the protocol chosen, in the event that seizures persist or recur: administer a further 2 g (patients < 70 kg) to 4 g by IV infusion, without exceeding 8 g total dose during the first hour.

Contra-indications, adverse effects, precautions

– Do not administer to patients with severe renal failure.
– Check:
  • urine output every hour,
  • patellar reflex, blood pressure, pulse and respiratory rate every 15 minutes during the first hour of treatment. If no signs of overdosage are observed, continue this surveillance every hour.
– May cause:
  • pain at the injection site, warm flushes,
  • in the event of overdosage: diminished then absent patellar reflex (early sign of hypermagnesaemia), hypotension, drowsiness, difficulty in speaking, confusion, arrhythmias, respiratory depression (respiratory rate < 12/minute).

– In the event of decreased urine output (< 30 ml/hour or 100 ml/4 hour):
  • pre-eclampsia: stop magnesium sulfate and perform delivery as soon as possible,
  • eclampsia: stop magnesium sulfate and perform delivery immediately. If delivery cannot be performed *immediately*, stop magnesium sulfate for one hour then resume magnesium sulfate perfusion until delivery.
– In the event of overdosage: stop magnesium sulfate and give 1 g calcium gluconate by IV route as an antidote (in this event, the anticonvulsant effect is reversed and seizures may recur).
– Reduce dose in patients with renal impairment.
– Do not combine with nifedipine and quinidine.
– *Pregnancy: no contra-indication*

Remarks

– Regardless of the protocol chosen, delivery must be performed:
  • within 12 hours after the first seizure in the event of eclampsia,
  • within 24 hours after the appearance of symptoms in the event of severe pre-eclampsia.
– 1 g magnesium sulfate contains approximately 4 mmol (or 8 mEq) of magnesium.
– Do not mix with other drugs in the same syringe or infusion fluid.
– *Storage: below 30°C* –

MEDROXYPROGESTERONE
(Depo-Provera®…)

Prescription under medical supervision

Therapeutic action
– Hormonal contraceptive, long-acting progestogen (3 months)

Indications
– Long-term contraception

Presentation and route of administration
– 150 mg in 1 ml vial (150 mg/ml) for IM injection
– Medroxyprogesterone acetate is a suspension: shake vial before use.

Also comes in 3 ml vial containing 150 mg (50 mg/ml).

Dosage
– 150 mg per injection, one injection every 12 weeks
– The first injection is given:
  during the first 5 days of menstruation
  or
  immediately after abortion
  or
  after childbirth:
  - if the woman breastfeeds: as of the sixth week. However, if there is a risk that the woman may be lost to follow-up or if this is the only available or acceptable contraceptive, the injection may be given before 6 weeks, even after childbirth.
  - if the woman does not breastfeed: between the 1st and the 21st day postpartum

Duration: if there are no adverse effects, as long as contraception is desired.

Contra-indications, adverse effects, precautions
– Do not administer to patients with breast cancer, uncontrolled hypertension, history of thromboembolic disorders, coronary insufficiency, stroke, non equilibrated or complicated diabetes, severe or recent liver disease, undiagnosed abnormal vaginal bleeding.
– May cause: menstrual irregularities, amenorrhoea, menometrorrhagia, nausea, vomiting, allergic reactions, weight gain.
– In post-partum period, it is better to wait until the fifth day if possible, as the risk of bleeding is increased if the injection is administered before.
– Clinical examinations must be carried out before (blood pressure, breasts) and, if needed, during treatment.
– *Pregnancy*: ***CONTRA-INDICATED***

Remarks
– An injection may be administered within the 2 weeks before the scheduled date. It may also be administered up to 2 weeks after, without the need for additional contraception.
– Return of fertility may be delayed long after the discontinuation of treatment (3 to 12 months).
– There is a combined contraceptive injection containing medroxyprogesterone 25 mg + estradiol 5 mg (Cyclofem®, Lunelle®) administered once monthly.
– There also exist subdermal progestogen implants. This method is less constraining and provides longer-term contraception (several years).
– Do not mix with other drugs in the same syringe.
– *Storage: below 30°C*

METHYLDOPA
(Aldomet®…)

Prescription under medical supervision

Therapeutic action
– Centrally acting antihypertensive

Indications
– Hypertension in pregnancy

Presentation
– 250 mg tablet

Dosage
– Initially 500 to 750 mg/day in 2 to 3 divided doses for 2 days, then increase gradually if necessary by 250 mg every 2 to 3 days, until the optimal dose is reached, usually 1,5 g/day. Do not exceed 3 g/day.

Duration
– According to clinical response. Do not stop treatment abruptly; reduce doses gradually.

Contra-indications, adverse effects, precautions
– Do not administer to patients with active liver disease, history of drug-related liver disease, severe depression.
– Administer with caution to patients with hepatic impairment, and reduce doses in patients with renal impairment.
– May cause:
  • orthostatic hypotension, drowsiness, headache, gastrointestinal disturbances, dry mouth,
  • rarely: haematological, hepatic, psychical disorders; allergic reactions.
– Stop treatment if haemolytic anaemia or jaundice appear during treatment.
– In the event of unexplained fever during treatment, check blood count and transaminases for possible hepatitis due to methyldopa.
– Monitor combination with lithium (risk of lithium overdose), antidepressants (enhanced hypotensive effect), CNS depressants (increased sedation).
– *Pregnancy: no contra-indication*
– *Breast-feeding: no contra-indication*

Remarks
– *Storage: below 30°C*

METHYLERGOMETRINE (Methergin®…) and ERGOMETRINE (Ergotrate®…)

Prescription under medical supervision

Therapeutic action

– Uterine stimulant

Indications

– Postpartum or postabortal haemorrhage caused by uterine atony (preferably use oxytocin for this indication)

Presentation and route of administration

– Methylergometrine maleate: 200 µg in 1 ml ampoule (200 µg/ml), for IM injection
– Ergometrine maleate: 500 µg in 1 ml ampoule (500 µg/ml), for IM injection

Dosage

– Methylergometrine maleate: 200 µg/injection
– Ergometrine maleate: 250 µg to 500 µg/injection

To be repeated every 2 to 4 hours if necessary, without exceeding a total of 5 injections.

Contra-indications, adverse effects, precautions

– Do not administer during delivery; do not use to induce or facilitate labour.
– Do not administer to patients with hypersensitivity to ergot derivatives (cabergoline, bromocriptine, ergotamine, etc.), severe hypertension, pre-eclampsia, eclampsia, septicaemia.
– Before administration always check:
  • that expulsion of the placenta is complete,
  • that there is no multiple pregnancy. Do not use before the birth of the last child.
– May cause: gastrointestinal disturbances, headache, paraesthesia, confusion, dizziness, tinnitus, hypertension, peripheral vasoconstriction, chest pain.
– Do not combine with another ergot derivative.
– Monitor combination with: metronidazole, azole antifungals, macrolides, protease inhibitors, efavirenz, fluoxetine (risk of ergotism).
– Exceptionally, for extensive uterine bleeding and if oxytocin is not available, ergometrine and methylergometrine may be used by IV route, slowly over a period of no less than one minute, with careful monitoring of blood pressure (risk of sudden hypertensive accidents).
– *Pregnancy*: **CONTRA-INDICATED**
– *Breast-feeding*: *avoid, except if clearly needed*

Remarks

– Do not confuse with dihydroergotamine, a related drug used for totally different indications.
– Ergometrine is also called ergonovine or ergobasine.
– *Storage: to be kept refrigerated (2°C to 8°C). Do not freeze* –
  • *Expiry date indicated on the label is only valid if stored under refrigeration and protected from light.*
  • *If refrigeration is not available, vials can be kept for one month on condition that they are protected from light and the temperature remains under 30°C.*
  • *Exposure to heat and especially light causes the deterioration of the active ingredients and thus loss of efficacy. Methylergometrine is as sensitive as ergometrine.*
  • *The solution must be colourless. Discolouration indicated a deterioration of the active ingredients. Never use a coloured solution.*

MIFEPRISTONE = RU486
(Mifegyne®…)

Prescription under medical supervision

Therapeutic action

– Antiprogestogen

Indications

– Termination of pregnancy, in combination with misoprostol (or another prostaglandin)
– Cervical dilatation before aspiration or curettage (preferably use misoprostol for this indication)
– Cervical dilatation and labour induction in the event of intrauterine foetal death, when prostaglandins or oxytocin cannot be used

Presentation

– 200 mg tablet

Dosage and duration

– *Termination of pregnancy*
  200 mg as a single dose, followed by a dose of misoprostol 36 to 48 hours later
– *Cervical dilatation before aspiration or curettage*
  200 mg as a single dose, 36 to 48 hours before aspiration or curettage
– *Labour induction in the event of intrauterine foetal death*
  600 mg once daily for 2 days

Contra-indications, adverse effects, precautions

– Do not administer in women with ectopic pregnancy, chronic suprarenal failure, non controlled severe asthma.
– May cause: gastrointestinal disturbances, metrorragia, uterine hypertonicity, headache, dizziness.
– Do not combine with NSAIDs (reduces the efficacy of mifepristone).
– Monitor combination with corticosteroids (reduces their efficacy).
– *Breast-feeding: avoid*

Remarks

– In the event if pregnancy termination, check after treatment if uterus is empty.
– *Storage: below 25°C* –  –

MISOPROSTOL
(Cytotec®, GyMiso®…)

Prescription under medical supervision

Therapeutic action

– Cervical ripening agent, oxytocic drug (prostaglandin)

Indications

– Cervical dilatation and labour induction in the event of:
  • intrauterine foetal death
  • severe pre-eclampsia and eclampsia, when the cervix is not favourable and a caesarean section cannot be performed
– Cervical dilatation before aspiration or curettage
– Treatment of post-partum haemorrhage due to uterine atony, when injectable oxytocics are unavailable or ineffective
– Termination of pregnancy, in combination with mifepristone

Presentation

– 200 µg tablet

Also comes in 25 µg and 100 µg tablets.

Dosage and duration

– *Cervical dilatation and labour induction*
  • intrauterine foetal death: 200 µg vaginally every 6 hours until labour occurs (2 to 3 doses are usually sufficient)
  • severe pre-eclampsia and eclampsia: 25 µg vaginally every 6 hours until labour occurs (up to a maximum of 6 doses or 150 µg)
– *Cervical dilatation before aspiration or curettage*
  400 µg vaginally as a single dose, 3 hours before procedure
– *Post-partum haemorrhage*
  1000 µg rectally as a single dose
– *Termination of pregnancy*
  36 to 48 hours after the administration of oral mifepristone, administer misoprostol:
  • up to 12 completed weeks since last menstrual period: 400 µg orally or vaginally. Repeat the dose of misoprostol after 3 hours if expulsion has not occurred.
  • after 12 completed weeks since last menstrual period: 400 µg orally, to be repeated every 3 hours, up to a maximum of 5 doses

Contra-indications, adverse effects, precautions

– During the 2nd and the 3rd trimester: do not administer in the event of malpresentation, cephalo-pelvic disproportion, complete placenta praevia, fragile uterus (history of caesarean section, grand multiparity).
– Before delivery, do not administer simultaneously with oxytocin. Only administer oxytocin 8 hours after the last administration of misoprostol.
– May cause: gastrointestinal disorders, headache, dizziness, fever, shivering, uterine hypertonia, uterine rupture, fœtal distress.
– If the patient vomits within 30 minutes after administration, administer the same dose vaginally.
– *Breast-feeding: no contra-indication*

Remarks

– In the event if pregnancy termination check after treatment if uterus is empty.
– *Storage: below 30° C*

NIFEDIPINE
(Adalat®, Adalat®LA…)

Prescription under medical supervision

Therapeutic action
- Uterine relaxant
- Antihypertensive drug (calcium channel blocker)

Indications
- Threatened premature labour
- Hypertension

Presentation
- 10 mg short-acting (liquid-filled) capsule
- 10 mg prolonged-release tablet
  Also comes in 20 mg, 30 mg, 60 mg and 90 mg prolonged-release tablets to be administered once daily or to be administered twice daily. Follow manufacturer's instructions.

Dosage
- *Threatened premature labour* (short-acting capsule)
  10 mg by oral route, to be repeated every 15 minutes if uterine contractions persist (maximum 4 doses or 40 mg), then 20 mg by oral route every 6 hours
- *Hypertension* (prolonged-release tablets)
  20 to 100 mg/day in 2 divided doses or 20 to 90 mg once daily depending on the preparation used

Duration
- *Threatened premature labour*: 48 hours
- *Hypertension*: lifetime treatment

Contra-indications, adverse effects, precautions
- Do not administer to patients with severe cardiac disease (recent myocardial infarction, unstable angina).
- Do not administer if systolic blood pressure is below 90 mmHg.
- May cause:
  - headache, flushing, peripheral oedema (common adverse effects at the start of treatment);
  - dizziness, hypotension, tachycardia, nausea, gingival hyperplasia, rash.
- Stop nifedipine if ischaemic chest pain occurs or existing pain increases shortly after starting treatment.
- Do not combine with magnesium sulphate, salbutamol IV, and calcium channel blockers.
- Monitor combination with cimetidine (additive hypotension), phenytoin (risk of phenytoin toxicity), rifampicin (efficacy of nifedipine diminished), itraconazole (increased risk of oedema), beta-blockers (enhanced antihypertensive effects).
- *Pregnancy: **CONTRA-INDICATED** during the 1st trimester. Never administer sublingually (risk of foetal death from placental hypoperfusion).*
- *Breast-feeding: avoid*

Remarks
- Methyldopa and beta-blockers are the drugs of choice for treating hypertension in pregnancy.
- Short-acting formulations of nifedipine should not be used in hypertension since their use may cause excessive fall in blood pressure and cerebral or myocardial ischaemia.
- Prolonged-release tablets must be swallowed whole.
- *Storage: below 30°C –*

NORETHISTERONE
(Noristerat®…)

Prescription under medical supervision

Therapeutic action
– Hormonal contraceptive, long-acting progestogen (2 months)

Indications
– Long-term contraception

Presentation and route of administration
– 200 mg in 1 ml ampoule (200 mg/ml), oily solution for IM injection

Dosage
– 200 mg per injection, one injection every 8 weeks
– The first injection is given:
  during the first 5 days of menstruation
  or
  immediately after abortion
  or
  after childbirth:
  • if the woman breastfeeds: as of the sixth week. However, if there is a risk that the woman may be lost to follow-up or if this is the only available or acceptable contraceptive, the injection may be given before 6 weeks, even after childbirth.
  • if the woman does not breastfeed: between the 1st and the 21st day postpartum

Duration: if there are no adverse effects, as long as contraception is desired.

Contra-indications, adverse effects, precautions
– Do not administer to patients with breast cancer, uncontrolled hypertension, history of thromboembolic disorders, coronary insufficiency, stroke, non equilibrated or complicated diabetes, severe or recent liver disease, undiagnosed abnormal vaginal bleeding, hyperlipidaemia.
– May cause: menstrual irregularities, amenorrhoea, menometrorrhagia, nausea, vomiting, breast tenderness, weight gain.
– Clinical examinations must be carried out before (blood pressure, breasts) and if needed, during treatment.
– *Pregnancy*: ***CONTRA-INDICATED***

Remarks
– An injection may be administered within the 2 weeks before the scheduled date. It may also be administered up to 2 weeks after, without the need for additional contraception.
– Return of fertility may be delayed long after the discontinuation of treatment.
– There is also a combined contraceptive injection containing norethisterone 50 mg + estradiol 5 mg (Mesigyna®) administered once monthly.
– There also exist subdermal progestogen implants. This method is less constraining and provides longer-term contraception (several years).
– Do not mix with other drugs in the same syringe.
– *Storage: below 30°C*

OXYTOCIN
(Syntocinon®…)

Prescription under medical supervision

Therapeutic action
– Synthetic oxytocic

Indications
– Induction and augmentation of labour
– Treatment of postpartum haemorrhage caused by uterine atony
– Prevention of postpartum haemorrhage
– Prevention of uterine atony after caesarean section

Presentation and route of administration
– 10 IU/ampoule (10 IU/ml, 1 ml) for IM or slow IV injection or infusion in Ringer lactate or 0.9% sodium chloride or 5% glucose

Also comes in 5 IU/ampoule (5 IU/ml, 1 ml).

Dosage
– *Induction and augmentation of labour*
  • Dilute 5 IU in 500 ml of solution for infusion.
  • Initially 5 drops/minute, then increase the rate by 5 drops/minute every 30 minutes until efficient contractions are obtained (i.e. over 10 minutes, 3 contractions lasting 40 seconds). Do not exceed 60 drops/minute.
– *Treatment of postpartum haemorrhage*
  Immediately start an infusion of 10 IU, in 500 ml of Ringer lactate or 0.9% sodium chloride, at the rate of 80 drops/minute. Simultaneously, administer 5 to 10 IU by slow direct IV injection, to be repeated if necessary until retraction of the uterus; do not exceed a total dose of 60 IU.
– *Prevention of postpartum haemorrhage*
  5 to 10 IU by IM or IV injection *after* delivery of the placenta
  Only competent medical staff with experience in obstetrics can administer oxytocin *before* delivery of the placenta (risk of placental retention).
– *Caesarean section*: systematic administration immediately after the foetus is delivered
  5 to 10 IU by slow IV injection

Duration: according to clinical response

Contra-indications, adverse effects, precautions
– Do not administer when vaginal delivery is contra-indicated (malpresentation, cephalopelvic disproportion, complete placenta praevia).
– Do not administer to patients with fragile uterus (history of caesarean section, grand multiparity), uterine hypertonia, foetal distress.
– May cause, especially when injected too rapidly by IV route or when excessive doses are used: uterine hypertonia and/or uterine rupture, foetal distress.
– Respect the dosage and rate of administration, monitor uterine contractility and foetal heart rate.
– Administer with caution to women with pregnancy-induced hypertension.
– Do not administer simultaneously with prostaglandins (misoprostol, etc.). Only administer oxytocin 8 hours after the last administration of misoprostol.

Remarks
– *Storage: to be kept refrigerated (2°C to 8°C). Do not freeze.*
  • *Expiry date indicated on the label is only valid if stored under refrigeration and protected from light. Exposure to light and heat causes the deterioration of the active ingredients and thus loss of efficacy.*
  • *If refrigeration is not available, vials kept below 30°C and protected from light may be stored for a maximum of one month.*

PHYTOMENADIONE = VITAMIN K1

Prescription under medical supervision

Therapeutic action

– Vitamin, anti-haemorrhagic

Indications

– Prophylaxis and treatment of haemorrhagic disease of the newborn

Presentation and route of administration

– 1 mg ampoule (1 mg/ml, 1 ml), only for IM or slow IV injection
– 2 mg ampoule (10 mg/ml, 0.2 ml), for oral administration, IM or slow IV injection
– 10 mg ampoule (10 mg/ml, 1 ml), for oral administration, IM or slow IV injection

Dosage

– *Systematic prophylaxis of haemorrhagic disease of the newborn*

	IM route	Oral route
Breastfed infants	*Single dose:* 1 mg the day of birth	*3 doses:* 2 mg the day of birth 2 mg 4 to 7 days after birth 2 mg 4 weeks after birth
Formula fed infants	*Single dose:* 1 mg the day of birth	*2 doses:* 2 mg the day of birth 2 mg 4 to 7 days after birth

Prophylaxis by oral route is effective only if all the doses are administered. Therefore, use IM route systematically in all newborn infants if treatment compliance cannot be guaranteed.
In *newborns at high risk* (preterm neonates, jaundice, neonatal diseases; newborns whose mother is treated with enzyme-inducing drugs), always use IM route.

– *Treatment of haemorrhagic disease of the newborn*
1 mg by IM injection, to be repeated every 8 hours if necessary

Duration: according to clinical response and results of coagulation tests

Contra-indications, adverse effects, precautions

– May cause: allergic reactions, especially by IV route, haematoma at IM injection site.
– *Pregnancy: no contra-indication*
– *Breast-feeding: no contra-indication*

Remarks

– To pregnant women taking enzyme-inducing drugs (rifampicin, phenobarbital, phenitoin, carbamazepine), administer 10 mg/day orally for the 15 days prior to the expected date of delivery. This maternal prevention does not change the need for IM prophylactic treatment in newborns at high risk.
– Phytomenadione is also used for the treatment of haemorrhage due to antivitamin K agents: 5 mg by slow IV route in the event of severe haemorrhage; 0.5 mg by slow IV route or 5 mg orally in the event of minor haemorrhage or risk of haemorrhage.
– Vitamin K has no direct or immediate haemostatic action, it is not indicated for traumatic haemorrhage.
– Do not mix with other drugs in the same syringe.
– *Storage: below 25°C* – 

SALBUTAMOL = ALBUTEROL
(Salbumol®…)

Prescription under medical supervision

Therapeutic action
– Uterine relaxant

Indications
– Threatened premature labour

Presentation and route of administration
– 0.25 mg in 5 ml ampoule (0.05 mg/ml) for SC, IM, slow IV injection or infusion

Also comes in 1 ml ampoule containing 0.5 mg (0.5 mg/ml) and 5 ml ampoule containing 5 mg (1 mg/ml).

Dosage
– Dilute 5 mg (10 ampoules of 0.5 mg) in 500 ml of 5% glucose or 0.9% sodium chloride to obtain a solution of 10 micrograms/ml.
Start infusion at the rate of 15 to 20 micrograms/minute (30 to 40 drops/minute).
If contractions persist, increase the rate by 10 to 20 drops/minute every 30 minutes until uterine contractions cease. Do not exceed 45 micrograms/minute (90 drops/minute).
Continue for one hour after contractions have ceased, then reduce the rate by half every 6 hours.
Monitor maternal pulse regularly, decrease the infusion rate in the event of maternal tachycardia > 120/minute.

Duration
– 48 hours maximum

Contra-indications, adverse effects, precautions
– Do not administer to patients with pre-eclampsia, eclampsia, uterine haemorrhage, intra-uterine infection, intra-uterine foetal death, placenta praevia, placental abruption, rupture of membranes, multiple pregnancy; severe cardiopathy, uncontrolled hypertension.
– Do not combine with nifedipine.
– May cause: foetal and maternal tachycardia, tremor, headache, dizziness, hypokalaemia, hyperglycaemia, gastrointestinal disturbances.
– Administer with caution to patients with diabetes, hyperthyroidism.
– *Pregnancy: no contra-indication*
– *Breast-feeding: avoid*

Remarks
– Do not mix with other drugs in the same syringe or the same infusion fluid.
– *Storage: below 25°C* –

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