

# 16 The surgery of pregnancy

## 16.1 Surgical problems in pregnancy

The staff in your clinics should be able to manage most of the minor complications of pregnancy. In early pregnancy they will need to refer incomplete abortions, especially septic ones (6.6a). McDonald's suture (16.5) will prevent some second-trimester abortions. They will also need to refer acute ectopic pregnancies (16.6), and, if they are well-trained, an occasional chronic one (16.7). Rarely, you may have to treat an abdominal pregnancy (16.9), a missed abortion (16.4), or a hydatidiform mole (32.38). Late in pregnancy, after the 28th week, your main concerns will be antepartum haemorrhage, from *placenta praevia* (16.12) or placental abruption (16.13). Both of these need differentiation from incidental bleeding from lower in the birth canal. Another problem will be the dead baby, whose management before 18 weeks differs from that later on (16.4).

## 16.2 Evacuating an abortion

*Primary Mother Care* tells midwives how to evacuate an incomplete abortion, if they have to, using their fingers and sponge forceps. Here we describe the hospital procedure for doing the same thing. For septic abortions see Section 6.6a.

Many abortions don't need evacuating (see below), but those that do need evacuating soon, so don't let incomplete abortions wait unnecessarily. Evacuating a pregnant uterus differs from curetting a non-pregnant one (20.3) in two important ways: (1) After an abortion the cervix is open, so there is rarely any need to dilate it. (2) The wall of an infected uterus is so soft that you can perforate it much more easily with a curette.

**SOME TERMINOLOGY** An abortion is the expulsion of a pregnancy from the uterus before 28 weeks. An early (first trimester) abortion occurs before 14 weeks, a late one (second trimester) from 14 to 28 weeks. A septic abortion is an incomplete abortion with signs of intra-uterine infection. Postabortal sepsis is pelvic infection after a complete abortion. A missed abortion is an intrauterine death during the first trimester or early in the second, after which the pregnancy is not expelled for at least another month. A carneous mole is a continuation of a missed abortion, in which the dead fetus is surrounded by shells of organized blood clot. Habitual abortion is a sequence of three successive first trimester abortions, or two successive second trimester ones.

An abortion goes through these stages: (1) threatened (bleeding and perhaps cramps, but the cervix is still closed), (2) inevitable (the cervix is open but no products of conception have been expelled), (3) incomplete (part of the products have been expelled), and (4) complete (all the products have been expelled, bleeding has stopped, the cervix is closed, and the uterus is now much too small for the duration of the pregnancy). In the first trimester the distinction between an inevitable and an incomplete abortion is pointless, because you can manage them both in the same way. In the second trimester the distinction is important, because an inevitable abortion is not ready for evacuation, whereas an incomplete one must be evacuated. Before 14–16 weeks it is difficult to tell if an abortion is complete or not; because to make sure it is complete you have to identify the fetus and the whole of the placenta, with the membranes, as fully formed structures. Before 14–16 weeks they are not sufficiently well formed for you to be sure about this.

SITI (27 years) was admitted with a threatened 16-week abortion. It seemed to settle, and she was discharged, but she bled in the bus on the way home and was readmitted. Fetal parts were extracted through a dilated cervix, and traumatized pieces of gut were seen through it. A laparotomy showed a tear in her descending colon, old clots and pus in her peritoneal cavity, and a rupture of her uterus. The tear in her descending colon was sutured and her abdomen closed. Some days later she passed

faeces through her cervix. She was re-explored, and a proximal defunctioning colostomy was done, after which she eventually recovered. **LESSONS** This true story is an extreme case. It shows the magnitude of the disasters that can follow the mismanagement of what might seem to be quite a minor condition. She was fortunate to escape with her life. The many lessons include: (1) An abortionist had tried to abort a 16-week pregnancy, which is dangerously late. (2) If an abortion is incomplete, evacuation is mandatory. She should not have been discharged before her uterus had been emptied. (3) Whenever the large gut has to be repaired, a proximal defunctioning colostomy must be done immediately. Had this been done at her first laparotomy, she would not have required another one.

## BLEEDING BEFORE THE 28TH WEEK

**THE DIFFERENTIAL DIAGNOSIS** includes the various stages of abortion, ectopic pregnancy (16.6), and hydatidiform mole (32.38). In late pregnancy consider also *placenta praevia* (16.12), and abruption (16.13). There are also gynaecological causes of bleeding: trichomoniasis, candidiasis, venereal warts, cervical polypi, cervical erosions, and cervicitis. These can all cause a bloody vaginal discharge. Also, a patient may not be pregnant, and have DUB (dysfunctional uterine bleeding, 20.2). Much bleeding remains unexplained.

**THREATENED ABORTION.** Ask her to rest in bed at home and give her a sedative (although neither are of proven value). Admit her if: (1) She has bled much (regardless of her gestational age). (2) She is more than 14 weeks pregnant. (3) She has a bad obstetric history (admit her for psychological reasons), or she lives far away and cannot get help if bleeding becomes much worse, especially during the night.

**UNCOMPLICATED INEVITABLE ABORTIONS.** Here are the instructions for an uninfected abortion. If a patient is febrile, has a foul discharge, and perhaps signs of peritonitis, her abortion is septic, so see Section 6.6a. Management also depends on the duration of her pregnancy.

**If she is less than 14 weeks,** monitor her pulse, blood pressure, and temperature, her peripheral circulation, and the amount of bleeding. Measure her haemoglobin, and take a specimen for grouping and cross-matching. Give her 0.25 or 0.5 mg of ergometrine intramuscularly on admission. If she has bled much, set up a drip. Starve her, and prepare to evacuate her uterus as soon as possible. If it is the custom of the hospital to shave her labia and perineum, do so.

If you have plenty of theatre time, you will save time and morbidity if you take all abortions less than 14 weeks, other than threatened ones, to the theatre for formal evacuation.

If theatre time is scarce the mandatory indications for evacuation are: (1) Considerable bleeding (evacuation is urgent). (2) Bleeding which continues for more than 24 hours. (3) Patients in whom the retained products of conception are obviously still present on vaginal examination. Together, these cases form about a quarter of the total; treating the others non-operatively will considerably reduce your workload and is less expensive. Some obstetricians think that all abortions less than 14 weeks, except threatened ones, should be evacuated.

**If she is more than 14 weeks,** with an inevitable abortion (her cervix is open at least one finger, but the products of conception, especially the fetus, have not been expelled), assess and monitor her as above. *Don't evacuate her uterus until the fetus has been expelled.* When it has been expelled, and there is even a possibility that evacuation is incomplete, complete it. If however the fetus and placenta are expelled together, and the membranes are complete, there will be nothing left to evacuate.

Opinions differ on the use of a curette after 14 weeks: (1) One contributor considers that an instrument should never be used on an abortion which is more than 14 weeks (except perhaps occasionally ovum forceps). Her cervix will always be open enough for your finger. Fishing around with any instrument in a large flabby uterus for a few fragments of tissue is likely to do more harm than good, especially if you use a standard curette. If she has stopped bleeding, do nothing. If she continues to bleed, put up an oxytocin drip, and give her intravenous ergometrine. This will probably complete her abortion. If these measures fail, and she continues to bleed, explore her uterus as if you were removing her placenta manually (19.11a). (2) Another contributor reminds you that these patients can bleed severely, and cannot always be evacuated with a finger. He advises you to use a large curette carefully!

## EVACUATING AN INCOMPLETE ABORTION

**ERGOMETRINE** may make evacuation unnecessary, so try it first. Give her ergometrine 0.25 mg intravenously or 0.5 mg intramuscularly (0.5 mg intravenously will cause nausea and vomiting, and is unnecessary). The products of conception may be discharged, and she may stop bleeding. If it fails, it will not prevent you dilating her cervix. Alternatively, use ergometrine with oxytocin. Even 0.25 mg will often make her sick, so if there is little bleeding, you can omit it.

**RESUSCITATION** may be necessary. Do it at the same time as the evacuation.

**EQUIPMENT.** A catheter. Three ovum forceps or sponge-holding forceps without ratchets (one for swabbing the vagina and the

## EVACUATING AN INCOMPLETE ABORTION

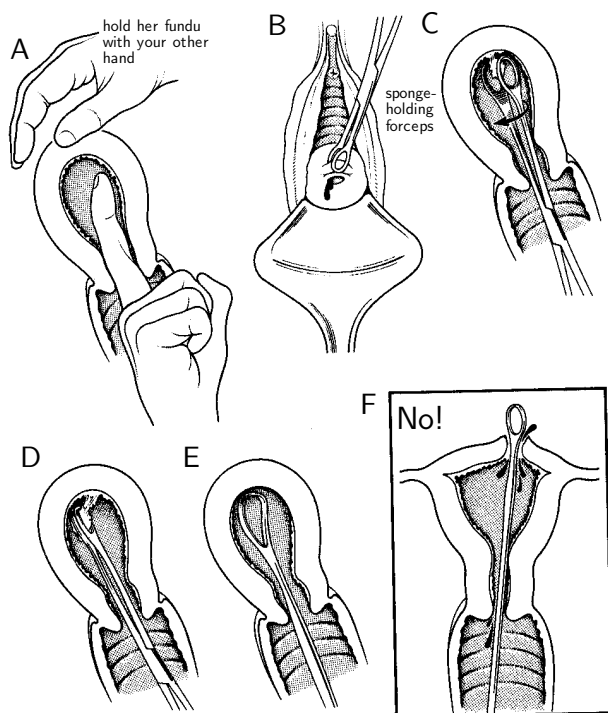


Fig. 16-1: EVACUATING AN INCOMPLETE ABORTION. A, explore the patient's uterus with your finger while your other hand is holding her fundus. You may find it easier to use two fingers or your middle finger. B, grasp her cervix with sponge forceps and use them to pull it down. C, and D, while holding her uterus with your other hand, introduce ring forceps, turn them through 90°, grasp and remove any products of conception, reinsert the forceps and do the same thing again. E, gently curette her uterus. F, this is the disaster you are trying to avoid!

other for removing the contents of the uterus), uterine curettes blunt and sharp, preferably a few sizes of each. A vaginal speculum (Sims' or Auvard's). Don't use a sound, because this can readily perforate her uterus. A set of Hegar's dilators (only occasionally necessary).

**ANAESTHESIA.** (1) Intravenous pethidine with diazepam (A 8.8). (2) Intravenous ketamine (A 8.2). (3) Thiopentone with pethidine (A 8.8), provided she is not shocked and anaemic. Thiopentone alone is adequate, unless you need to dilate her cervix. (4) A saddle block (A 7.7), or a caudal block (A 7.3). (5) Light ether (A 11.3).

**CAUTION!** Don't operate until: (1) She has a drip up, if this is necessary. It is necessary if there is: (a) much bleeding, or (b) hypovolaemia or anaemia. Some contributors consider it is mandatory always. It may be unnecessary if she is in vasovagal shock because the placenta is distending her cervix (see below).

**METHOD.** Put her into the lithotomy position with her buttocks over the end of the table, so that you can insert your instruments comfortably in any direction. Clean her suprapubic area, vulva, and perineum with chlorhexidine, and put a drape under her and on her abdomen. If you cannot drape her, clean her abdomen and thighs. *Take careful aseptic precautions.* Catheterize her bladder. An empty bladder will make it easier for you to check that her uterus is contracting well after evacuation. Use a swab in a sponge-holder to swab out her vagina.

Do a bimanual examination with two fingers in her vagina and your other hand on her abdomen. Check: (1) The state of her cervix and its degree of dilatation. (2) The size of her uterus and the products of conception palpable inside it. (3) Any adnexal masses (don't miss an ectopic pregnancy, but don't use an examination under anaesthesia to diagnose one! 16.6).

**If you can get your finger into her cervix,** use it to empty her uterus (finger curettage). A finger is much safer than a curette, because you can feel where you are, so avoid using a curette if you can. Put half your hand into her vagina and use your right index or middle finger. *At the same time push down the fundus of her uterus with your left hand on her abdomen,* so that your finger can reach right into it. Ideally this requires good muscular relaxation. If you are using a local block, be gentle, talk to her kindly, and persuade her to relax. Loosen all the retained tissue with your finger. If you can empty her uterus with your finger, there is no need to curette it.

**If you cannot get your finger into her cervix,** insert a speculum and grasp her cervix with a sponge-holder, as in B, Fig. 16-1. Give her 0.25 mg of ergometrine intravenously, and wait a minute for it to make her uterus contract, harden it, and reduce the risk of perforation. With your left hand pull her cervix well down with the sponge-holder to straighten her uterine cavity. *Keep pulling during the rest of the procedure.* Introduce the second pair of sponge-forceps into her uterus with your right hand. Slide them in gently until you can lightly feel the top of her fundus. Open them, turn them through 90°, close them, and remove them (C). Do this several times, to remove pieces of placenta hanging from her uterine wall, until her uterus is empty.

**If you cannot insert your finger or a curette,** as occasionally happens in the first trimester when her cervix is not sufficiently dilated but her uterus seems enlarged, dilate it to size 9 Hegar. First insert a small dilator, and then progressively larger ones, until you have reached size 9. You can easily make a cervix incompetent. So don't dilate a cervix beyond Hegar 9.

**CAUTION!** (1) Don't put a sound into a pregnant uterus. If you want to know how long it is, insert a large Hegar dilator or sponge-holder and mark how far it goes in with your finger. (2) Be gentle, or you will perforate her fundus. Your exploring finger will have shown you how deep it is. (3) Don't try to put large ovum forceps into an undilated cervix, and don't explore it with other instruments.

With your left hand on her abdomen, explore her uterus again with your finger to make sure it is empty.

If it is not empty, use a blunt curette to remove the remaining pieces of placenta. While it is still hard under the influence of the ergometrine, *very gently* scrape the inside of her uterus with a

blunt curette (E). Let it almost rest in your hand as you use it. Leaving the retained products of conception behind is serious, but perforating it (F) is more so. You will know that her uterus is empty by: (1) A characteristic grating feeling (difficult to detect on the anterior surface). If part of its wall feels a little rough, this is probably the placental bed. (2) Your failure to remove any more tissue. CAUTION! Don't curette a uterus which has not been hardened by ergometrine. An intravenous dose will keep it contracted for about half an hour, and an intramuscular one for somewhat longer. Finally, do a bimanual compression (19-9) to encourage contraction and expel clots from her uterus. Put two fingers into her anterior vaginal fornix, and your other hand on to her abdominal wall. Compress her uterus between them. Send her back to the ward with a vulval pad. Inspect this from time to time during the first hour or two after the evacuation. If bleeding recurs, give her another dose of ergometrine 0.5 mg intramuscularly.

POSTOPERATIVELY, monitor her for further bleeding and check her vital signs. If she is well send her home the next day, and advise her on contraception, which should be part of the ward routine. If there has been a suspicion of interference or venereal infection, consider giving her the appropriate broad-spectrum antibiotic (for example, tetracycline) for a few days.

## DIFFICULTIES EVACUATING A UTERUS

See also Sections 6.6aD and 20.3 (dilatation and curettage).

**If she is admitted apparently VERY SHOCKED, and is hypotensive and semiconscious,** she may be having a VASOVAGAL ATTACK because the placenta has stuck in her cervix (common). Her external os may be tight, while her internal os and cervical canal dilate to accommodate the pregnancy. This is quite different from a cervical pregnancy (rare, 16.8). Don't wait to put up a drip. Remove the placenta with a gloved finger on the ward without anaesthesia. If this fails (unusual), pass a Sims' or Cusco's speculum. If you see products of conception in her cervix, remove them with sponge forceps. She will recover miraculously.

**If she is ADMITTED WITH HEAVY BLEEDING,** resuscitate her, give her ergometrine, and at the same time evacuate her uterus with a finger on the ward. Even if evacuation is not complete, it will help to stop bleeding.

**If she is or becomes SERIOUSLY ANAEMIC,** are you going to transfuse her? If yours is a high-HIV area, you will hardly transfuse anybody. In a low-HIV area, if her haemoglobin is >100 g/l, transfusion is unnecessary; between 80 and 100 g/l transfuse her only if she is symptomatic; if it is below 80 g/l transfuse her. Always give her iron.

**If you find INJURIES to her vagina, cervix or uterus,** and there is a possibility that an instrument has entered her abdominal cavity, do a laparotomy immediately, and inspect it.

**If SHE DOES NOT IMPROVE after evacuation,** reconsider the diagnosis. She may have an ectopic pregnancy, or be severely anaemic, or have a collection of pus. If you find an abscess in her pouch of Douglas, drain it (6.5).

**If you think you have PERFORATED HER UTERUS,** console yourself with the thought that experts sometimes also do this, perhaps more often than they admit.

**If you perforate her uterus after you have emptied it, and you don't think you have damaged her gut or omentum (they don't appear in her vagina),** send her back to the ward. Starve her, set up a drip, give her antibiotics (2.9), and observe her pulse, temperature, and blood pressure carefully. Her perforation will probably heal. If there are increasing signs of infection or bleeding (unusual), do a laparotomy to sew up the wound in her uterus.

**If you perforate her uterus before you empty it,** you have the difficult task of completing the evacuation in the presence of a perforation. If you can do a laparoscopy (unlikely, 15.4), you can observe her uterus while you curette it. If not, accept that evacuation is incomplete, give her antibiotics, set up a drip, and observe her very carefully.

**If she collapses, and OMENTUM OR GUT APPEAR IN HER VAGINA (very rare),** you have certainly perforated her uterus. If this happens, do an immediate laparotomy, and sew up the tear. If her large gut is

perforated, do a diversionary colostomy (9.5). If there is severe bleeding or an extensive tear, tie her internal iliac arteries (3.5). If this fails a hysterectomy may be necessary. If you have sewn up a tear, warn her that her uterus is in danger of rupturing in later pregnancies. She will need an elective Caesarean section (18.9).

**If you FEEL A FIBROID in her uterus (uncommon),** it may have been the cause of her abortion (unusual). Leave it for 3 months before you treat it. If it is pedunculated and submucous with a narrow neck, *don't be tempted to twist it off vaginally.* This can cause severe bleeding. Leave it for 3 months. See Section 20.6.

**If BLEEDING DOES NOT STOP after the evacuation,** it is probably due to poor contraction of her uterus, or there may still be products of conception in her uterus. Often there is no obvious reason. (1) Make sure her uterus is empty. (2) Give her a second dose of intravenous ergometrine, rub up her uterus to stop it bleeding, and repeat bimanual compression. *Be patient at this stage,* 5 or 10 minutes of bimanual compression may be necessary, but it will usually succeed. (3) If this fails, give her an oxytocin drip (40 units per litre), and run this in fast.

**If the above measures fail to control bleeding (rare),** curette her again if you have not already done so. Don't try packing her uterus, it will not remove the cause of the bleeding.

**If even this fails to control bleeding (very rare),** tie both her internal iliac arteries (for a discussion as to the feasibility of doing this see Section 3.5). If even this fails (very rare indeed), a hysterectomy is necessary. See also cervical ectopic pregnancies (very rare) in Section 16.8.

**If you think you are evacuating an incomplete abortion, and yet there are VERY FEW CURETTINGS,** her abortion is probably complete. There is however a possibility that your diagnosis may be wrong, and that she has a CHRONIC ECTOPIC. Read the story of Theresa in Section 16.7.

**If you feel that she has a UTERINE SEPTUM,** clean out each side of her uterine cavity.

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### BE CAREFUL WITH THE CURETTE!

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## 16.4 Fetal death, missed abortion, and intrauterine death

A baby can die at any time during pregnancy. What you can do about it depends on whether he dies before or after 18 weeks. Before this time his death is termed a missed abortion, after it he is an intrauterine death.

**Before 18 weeks** a dead baby is usually aborted without his mother knowing that he is dead. Occasionally however, the abortion is delayed for several weeks (a missed abortion). When this happens the only sign of fetal death is that her uterus fails to grow. Or, she may have a threatened abortion which stops bleeding, and is followed by a brown discharge and no further periods. Although the loss of a baby may be tragic, a missed abortion has few risks, there is little risk of a clotting defect this early in pregnancy, and provided nobody interferes, she runs no risk of infection.

**After about 18 weeks:** (1) a mother is aware of the death of her baby (intrauterine death) because the fetal movements stop, or do not occur when they should (18 to 22 weeks in a primip, 16 to 20 weeks in a multip). (2) The fetal heart cannot be heard when it should be (28 weeks), but remember that this is an unreliable sign, especially if she is fat, or has polyhydramnios. Listen to it electronically if you can. (3) The height of her fundus, as found by palpation, fails to match that expected from her dates. Instead, it either remains stationary or falls (M 6.4). For this sign to be useful, the height of her fundus above her *symphysis pubis* must be measured accurately with a tape measure. So, when fetal death is suspected, impress this on your midwives. (4) There are radiological signs of fetal death, but they are not easy before 28 weeks. The most reliable ones are overlapping of the bones of the baby's skull (Spalding's sign), hyperflexion of his spine, and

gas in his great vessels. Endocrine tests for pregnancy take 4 or even 8 weeks to become negative, so they are of little value.

If you do nothing, there is a ninety per cent chance that she will deliver her baby in 4 weeks, whatever the duration of her pregnancy. But, as long as he remains inside her, she runs the remote but serious risk of a serious coagulation defect, and catastrophic bleeding. This risk is low initially, but increases with time, particularly after he has been dead 4 to 6 weeks. Rupturing the membranes to induce labour is dangerous, because the dead fetal tissues are easily infected by anaerobes. The following regime attempts to balance these risks. Use oxytocin and/or prostaglandins. The sensitivity of her uterus to prostaglandins remains constant, but its sensitivity to oxytocin increases with each gestational week.

Prostaglandins are expensive. The most commonly used one is PGE<sub>2</sub> or dinoprostone ('Prostin' E<sub>2</sub> Upjohn). You can use: (1) A solution of prostaglandin instilled into the extra-amniotic space through a Foley catheter. (2) Pessaries or tablets in the posterior fornix (19.3).

## THE DEAD BABY

### DEATH BEFORE 18 WEEKS (missed abortion)

If a mother's uterus is small for her gestational age, perhaps with a brownish vaginal discharge, suspect the death of her baby. Monitor the growth of her uterus carefully. If he is dead, it will not grow, and may even become smaller. Pregnancy tests become negative. Methods of detecting the fetal heartbeat vary in their sensitivity: ultrasound scanning detects it at 8 weeks, Doppler ultrasound at 10–16 weeks, and an ordinary stethoscope at 20–28 weeks.

THE DIFFERENTIAL DIAGNOSIS includes a normal pregnancy of shorter duration (wrong dates), a slow-leaking ectopic pregnancy, a false pregnancy, and fibroids.

MANAGEMENT. You can, if you wish do nothing for several weeks. Spontaneous abortion will inevitably follow. Alternatively:

**If her uterus is smaller than 10 weeks (a *small orange*),** you can do a 'D and C', either using the ordinary method (16.2) or a Karman curette. Give her perioperative chloramphenicol and metronidazole (2.9) when you do this (one contributor considers this unnecessary). Dilate her cervix up to at least Hegar 10. If possible, 'prime' her cervix with prostaglandins beforehand. Either, (1) put a 0.5 mg tablet of prostaglandin E<sub>2</sub> in her cervix, and repeat this 6-hourly for 24 hours. Or, (2) place 3 mg prostaglandin E<sub>2</sub> vaginal tablets in her vagina 6 hourly. Or, (3) use a newer preparation, gemeprost ('Cervagem').

**If you are using a Karman curette,** dilate her cervix to 8 Hegar and then use a Number 8 Karman curette with a vacuum of up to 500 mm Hg. Continue until her uterus is empty, and you can feel her uterus tight round the curette.

If her uterus is larger than 10 weeks, don't attempt an ordinary 'D and C'. Instead, either use oxytocin and/or prostaglandins, see below. Or, dilate her uterus to 11 Hegar, and use a No 10 Karman curette, which is safe up to 12 weeks — *but not beyond!*

CAUTION! Attempting to do a 'D and C' on a uterus larger than this can cause disastrous bleeding, and perhaps infection. We have advised a 10-week threshold rather than the more normal 12 weeks, to allow for a margin of error.

### DEATH AFTER 18 WEEKS (intrauterine death)

A mother notices that fetal movements stop, or do not occur when they should (at 18 weeks). Or, a midwife fails to hear the fetal heart after 24 weeks. If possible, confirm the absence of the fetal heartbeat with Doppler ultrasound. During 2 to 4 weeks observe if her uterus fails to grow or gets smaller.

CAUTION! A pregnancy test is no use at this stage. It may be positive when the baby is dead.

THE DIFFERENTIAL DIAGNOSIS includes: (1) A normal preg-

nancy of shorter duration (wrong dates). (2) A hydatidiform mole. (3) Polyhydramnios (her uterus will be large for her dates). (4) Multiple gestation with small fetuses. (5) An abdominal pregnancy. (6) Ascites, an ovarian tumour, fibroids, or a false pregnancy.

MANAGEMENT. Do nothing for a month after the fetal movements have stopped. Explain carefully why you are doing nothing. She may find this difficult to understand and her husband may try to persuade you to act prematurely. Explain that, if you attempt induction by the method below, it may fail and she may need a few days rest before you try again.

**If she is still undelivered a month after fetal movements have stopped,** consider induction. Before you induce her, check her clotting time (16.13).

AN ESCALATING OXYTOCIN DRIP. Use this regime from about 10 (before which it is unnecessary), until about 28 weeks when the method in Section 19.3 is indicated. See also Section 18.4a on oxytocin. Her uterus is less likely to rupture in early pregnancy, so start with 5 units of oxytocin in 500 ml of Ringer's lactate or saline, at 25 drops a minute. You may find that labour does not start until the following day. If this fails, repeat the drip the next day with 25 units in 500 ml. If necessary, wait and repeat it in another week. If this does not work, wait and try a third time. You may have to give her up to 100 units in 500 ml (the absolute maximum). Usually, much less is necessary.

EXTRA SPECIAL CAUTION! is necessary when you use oxytocin at this stage of pregnancy! (1) You may have to use large doses. Oxytocin has an antidiuretic effect, so you can overload her with fluid, so that she develops water intoxication (rare). So: (a) increase the strength of the infusion, rather than the volume you give, (b) give it in Ringer's lactate or saline, rather than 5% dextrose, and (c) give it for a day and then stop. (d) Don't give more than 3 litres of fluid in 24 hours. (e) Keep a fluid-balance chart; if she has a positive fluid-balance of more than 2 litres stop the drip. Because of these dangers some obstetricians wait to let nature take its course between 14 and 28 weeks. (2) Oxytocin can rupture the uterus as early as 18 weeks, so don't give more oxytocin than you need.

**If she becomes drowsy or has convulsions while on an oxytocin drip,** she has probably developed water intoxication. Stop the drip and let her kidneys excrete the water. Give her a slow infusion of 5% sodium chloride (if you have it).

If an escalating oxytocin drip fails, and the products of conception have not been expelled within 2 to 4 weeks of presentation, refer her to an expert. If you cannot refer her, see below.

EXTRA-AMNIOTIC PROSTAGLANDINS. The indications are: (1) The termination of pregnancy after 14 weeks. (2) Missed abortion (intrauterine death) after 14 weeks. (3) The evacuation of a hydatidiform mole.

CAUTION! With both methods follow the manufacturer's instructions carefully.

**Using a Foley catheter (the preferred method).** Using a Cusco's speculum and sponge forceps pass a sterile 12 to 14 Ch Foley catheter with a 30 ml balloon gently through her cervix into her extra-amniotic space. A Foley catheter of this size will always enter a pregnant cervix.

Now inject prostaglandin E<sub>2</sub> in the following regime.

Prepare a solution containing 100 micrograms in 1 ml (add 0.5 ml of a 10 mg/ml solution to 50 ml of diluent). Fill the dead space in the catheter system with the dilute drug solution. Then inject 1 ml of solution through the catheter initially, followed by 1 or 2 ml 2-hourly to maintain regular contractions. Go on until the catheter falls out.

Alternatively, cut the tip off the Foley catheter, pass an infant feeding-tube through it, and push the catheter through her cervix, so that the balloon lies just above her internal os. Through the feeding tube instil PG F<sub>2</sub>alpha (Dinoprost) 5 mg diluted with 4 ml of sterile isotonic saline. Repeat this 2-hourly until she has adequate contractions.

The Foley catheter will always be expelled eventually. Most obstetricians would give her an oxytocin drip at the same time; a few consider this dangerous, and only give oxytocin if prostaglandins

fail to establish contractions in 6 hours. Using dinoprostone (PGE<sub>2</sub>) vaginal tablets. The standard tablets are 3 mg ('Prostin' Upjohn, expensive). To terminate her pregnancy, insert 3 mg vaginal tablets in her posterior fornix 4-hourly up to a total of 6 tablets in 24 hours. This will usually evacuate her uterus within 12 hours. If it has not succeeded in 24 hours, try another method, or wait for 2–3 days and try again. CAUTION! Don't rupture her membranes. It may hasten delivery, but it is not worth the risk. See also 'Stop Press'.

#### THE DEAD BABY at term or during labour

See also Sections 18.4 and 18.7.

A dead baby is usually easy to deliver when he has died as the result of gestational hypertension or abruption, because he is usually small and is often macerated. But if he died because labour was obstructed, delivery is more difficult. Caesarean section might seem to be the obvious answer. Unfortunately, if his head is impacted deep in her pelvis, removing it from her uterus at Caesarean section is difficult. She also runs the serious immediate risk of septic shock and peritonitis, and the later one of a scar in her uterus. Provided his head is well down in her pelvis, an operative vaginal delivery, if necessary a destructive one, will be safer. If it is high, you will have to section her.

DIFFICULTIES with a dead baby before about 30 weeks

If you are NOT SURE IF A BABY IS DEAD OR NOT, wait, and see her again in 2 weeks. If necessary, wait 4 weeks. By this time it should be clear if he is dead or not.

If delivering a dead baby late in pregnancy or at term is complicated by SEVERE BLEEDING, disseminated intravascular coagulation (DIC) is a possibility, so see Section 19.11a. Maintain her blood volume, and try to give her fresh blood. If bleeding is not controlled by two doses of ergometrine with oxytocin ('Syntometrine'), or by ergometrine alone, intravenously or intramuscularly, give her a prostaglandin such as dinoprost ('Prostin F<sub>2</sub>α') 250 to 500 µg directly into the myometrium through her abdominal wall. Try compressing her uterus, pack it for 24 hours, and then remove the pack. This is a useful temporary measure for any bleeding uterus, and may save the need to do a laparotomy. If this fails to control bleeding, tie her internal iliac arteries (3.5). If this too fails, remove her uterus (20.12). Give her fresh blood.

If oxytocin and prostaglandins FAIL TO EXPEL A DEAD BABY (rare), suspect an extrauterine pregnancy (16.6).

If she has FEVER and GASTROINTESTINAL SYMPTOMS while she is having prostaglandins, these are probably side-effects. They are much less likely when lower doses are instilled through a Foley catheter.

## 16.5 Suturing an incompetent cervix for recurrent second-trimester abortions

Mothers with a history of repeated first-trimester abortions are not easy to help. These are often the result of some fetal abnormality for which nothing can be done. The best advice for them is to: "Keep trying". Most of them will eventually achieve a successful pregnancy.

Second-trimester abortions are different. They are not usually caused by recognizable fetal abnormalities. Some are due to maternal illness (syphilis, hypertension, diabetes, etc.), or to a congenital malformation of the uterine cavity. Others are caused by a somewhat mysterious condition called 'cervical incompetence'. As in the first trimester, often no cause can be found. The prognosis of a mother with repeated second-trimester abortions depends on the cause, and is excellent if syphilis can be treated, or cervical incompetence corrected surgically. Hypertension and diabetes are more difficult to treat, and the outcome of the pregnancy is less certain. Mothers in whom no cause can be found have a reasonable prognosis: about 70% of their pregnancies go to term.

Here we are concerned with the management of patients with 'suspected cervical incompetence'. This means that the cervix opens spontaneously during the second trimester, without the uterus contracting. Sometimes this is due to a too-forceful dilatation during a 'D and C', or to a previous traumatic delivery. Usually, there is no obvious cause.

The diagnosis is difficult. It is usually made by the history alone. A typical patient gives a history of two or more spontaneous second-trimester abortions, without uterine contractions (until the membranes have ruptured), or bleeding. Her first symptom is a watery vaginal discharge, often followed by a sudden loss of amniotic fluid. Soon afterwards the fetus is delivered, sometimes still alive. The diagnosis is only certain in the present pregnancy if the uterus is found to be effacing and dilating, without any uterine contractions. When this is happening it is too late to insert a cervical suture — in this pregnancy.

Doctors differ greatly in the frequency with which they diagnose 'cervical incompetence'. True cervical incompetence is probably quite rare. If you make this diagnosis too often, you will suture many patients without cervical incompetence unnecessarily. This is undesirable, because inserting them is time-consuming, and they can cause complications. So only suture those patients with a highly suggestive history. Cervical incompetence never causes first-trimester abortions.

The simplest method is McDonald's, and is a variation of the original Shirodkar suture. If you do it on the right indications, it has a good chance of succeeding. Timing is critical. If you do it too early (<14 weeks), the patient may get a first-trimester abortion due to a fetal abnormality, and the suture is wasted. If you do it too late (>24 weeks), she may abort before you place it. Don't insert a suture between pregnancies. This will cause more trouble than it is worth. As we go to press, Chalmers has reported that this method prevents one delivery before 33 weeks about every 20 times it is used, so its benefit is minimal.

SIFLOSA (20 years) had a McDonald suture inserted at 14 weeks, following three second-trimester abortions. Her pregnancy continued uneventfully until term, when she was admitted for delivery. Unfortunately, the consultant who inserted the suture was on leave, and it was not noticed by the duty team. She complained of severe pain during the second stage, but this was ignored. Labour proceeded normally, and she delivered a live baby without help. Immediately after delivery she complained of urinary incontinence and collapsed. No notice was taken of this, and she was discharged after 2 days. On examination 2 months later in another hospital she was found to have a high juxta-cervical 1 cm vesicovaginal fistula, which was contiguous with her cervix, which was torn and ragged. This was successfully repaired abdominally. LESSON (1) Always explain clearly to the patient that she must have the suture removed at 38 weeks or in labour. (2) Take her complaints seriously. Reported by Timothy Goodacre in 'Tropical Doctor'.

## MCDONALD'S CERVICAL SUTURE

INDICATIONS. Two or more painless abortions between 16 and 28 weeks. The patient may have a scarred patulous cervix. Exclude syphilis, hypertension, and diabetes. If you see her between pregnancies, exclude abnormalities such as uterine septa (for which she needs a hysterosalpingogram) and fibroids, which can also cause second-trimester abortions.

CONTRAINDICATIONS. (1) Drainage of amniotic fluid or rupture of the membranes. (2) Vaginal bleeding. (3) Established premature labour. (4) Local infection. (5) Fetal anomalies if you can detect them. (6) An IUD or a missed abortion.

CAUTION! Don't insert these sutures unless: (1) She has access to hospital. (2) It can guarantee that at all hours of the day and night there will be someone who will see her, who is competent to remove her suture. (3) You have explained to her what you are going to do, and that she must have her suture removed at 38 weeks, or when she goes into labour. (4) If she does go into labour with her suture in, it may cause a severe cervical tear, even

## Mc DONALD'S CERVICAL SUTURE

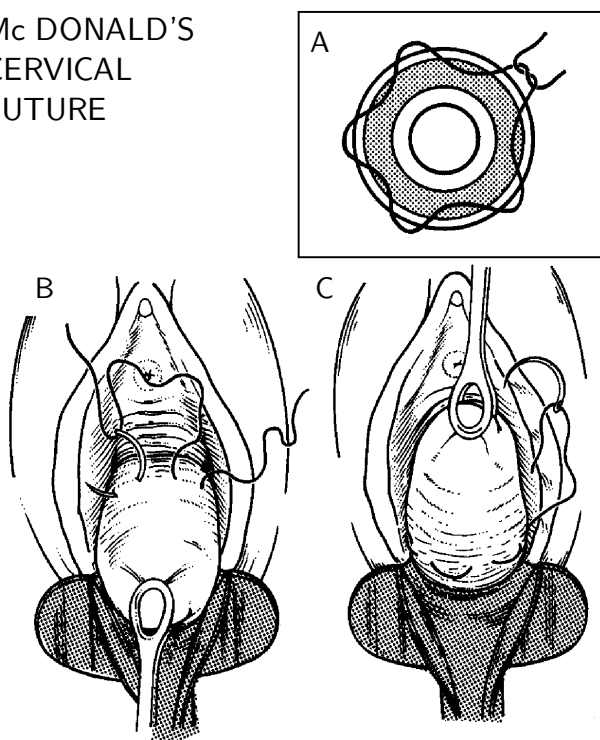


Fig. 16-2: McDONALD'S CERVICAL SUTURE. A, the position of the suture. B, inserting it anteriorly. C, inserting it posteriorly. Partly from Bonney's 'Gynaecological Surgery', Baillière Tindall, with kind permission.

worse cervical incompetence, a vesico-vaginal fistula or rupture of her uterus.

Preferably insert the suture at 14 weeks, when the danger of an early abortion is passed. Experts insert them up to 26 weeks, but never after 28 weeks. Check the fetal heart with Doppler ultrasound if you can. If you have an ultrasound scan, check that the fetus is alive, and confirm the gestational age.

**ANAESTHESIA.** (1) General anaesthesia is preferable. You must be able to retract her cervix and dilate her vagina widely to insert the sutures. (2) Ketamine.

**METHOD.** Insert a speculum. Grasp her cervix with sponge forceps. Insert a suture of No. 2 monofilament superiorly in the outer surface of her cervix, near the level of her internal os. Continue to place sutures in her cervix at regular intervals as shown, so as to encircle it. Then tighten the suture round it, so as to reduce its diameter to a few mm. The canal must be just patent as the suture is tied. If she is pregnant, don't insert a dilator. Admit her for 8 days; most failures occur in the first week.

Write on her notes in large red letters 'For removal of suture' at 36 weeks. See her every 2 weeks, and insert a speculum to check that the suture is still in place. Occasionally a stitch comes out and has to be reinserted.

At 36 weeks, or better, at 38 weeks (to avoid the respiratory distress syndrome in the baby) remove the suture, or remove it in early labour if she does not come in until then.

**CAUTION!** Remove the suture immediately (rare) if: (1) The operation fails, and signs of imminent abortion develop. If you don't, her cervix may tear. (2) Her membranes rupture in the absence of labour. If you leave it in place, the risk of infection to both her and the baby may be increased.

**If she has a tear at the side of her cervix,** don't try to repair it. If she has signs of cervical incompetence, insert a McDonald's suture as above.

## 16.6 'Acute' ectopic pregnancy

In many parts of the world one in every 50 to 200 pregnancies is ectopic. Ninety-nine per cent of them implant somewhere along the Fallopian tube. An occasional one implants in the abdominal cavity (16.9), or in the cervix (even rarer). Trouble occurs either because the tube ruptures, or because the pregnancy aborts through the abdominal end of the tube, into the abdominal cavity. How soon there is trouble depends on where the fetus embeds. It can embed: In the distal two-thirds of the tube, sites (1) and (2) in Fig. 16-3. These are the common places for an ectopic pregnancy. Here, it may cause either: (a) An acute or subacute rupture 6 to 10 weeks after the last period. Or, (b) a tubal abortion at 8 to 14 weeks, in which the fetus aborts into the peritoneal cavity out of the free end of the tube, which is not ruptured. Instead, chronic bleeding continues slowly into the pelvis, to cause a pelvic haematoma (haematocele). (3) In the isthmus (unusual), where it ruptures at 4 to 6 weeks. (4) In the uterine part of the tube (unusual) where it ruptures early. (5) In an angle of the uterus (cornu, unusual) where it may proceed to 20 weeks (see 16.8). (6) In the body of the uterus, which is the normal place. (7) Close to the internal os, leading to placenta praevia. (8) In the cervix (rare). (9) On the ovary (rare). Or, (10) elsewhere in the abdomen (rare), where it may rupture after the end of the first trimester (16.9). If an ectopic pregnancy survives to 20 weeks without causing serious symptoms, it is probably in one of the less common sites, perhaps in an angle.

Patients with an ectopic pregnancy form two groups: (1) Those who have had a massive bleed into the abdominal cavity. These are the acute and subacute cases described below. (2) Those with little abdominal bleeding. A few of these will have a massive bleed later, but many will never lose more than a few hundred millilitres of blood into their abdominal cavities. These are the 'chronic ectopics' in Section 16.7. There are also various intermediate forms.

Symptoms start when an ectopic pregnancy grows so large that it ruptures out of the tube that contains it. The patient's periods are usually a few days to a few months late, and she may rightly think she is pregnant. Or, she may not think she is pregnant because: (1) Her tube may rupture before she has missed a period. (2) Vaginal bleeding due to the ectopic pregnancy may begin at about the time of the expected period. (3) She may have an IUD in, or be on the minipill, and assume she cannot be pregnant. If her period of amenorrhoea is short, before her symptoms start, her pregnancy is likely to be in the isthmus, and the effects of rupture worse.

**An acute rupture** presents as a sudden severe lower abdominal pain, with signs of hypovolaemia. Her pain and internal bleeding may be severe enough to make her vomit and faint. Her pulse rises as she starts to bleed. Her blood pressure falls and she becomes shocked. Some mild dark red or brown vaginal bleeding usually follows 24 hours after the onset of the pain, as the decidua are shed (if she has had a very severe rupture and has not been treated, she may have died from internal bleeding before this happens). A 'four quadrant tap' (66.1) confirms the presence of blood in her abdomen. The blood that remains in her circulation may not have had time to dilute, so she may not yet be anaemic. Surgery is urgent.

**A subacute rupture** typically presents with a history of 3 to 7 days of weakness, anaemia and abdominal swelling, usually with little pain. Her lower abdomen may be tender, with rebound tenderness and guarding, but these signs are often minimal. Blood irritating her diaphragm may cause referred pain at the tip of her shoulder. She should give a history of a small dark vaginal bleed, but you may need to question her carefully to find this. A four quadrant tap confirms the presence of blood. Treatment is fairly urgent, but transfuse her first.

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**REMEMBER TO RECORD 'FOR REMOVAL OF STITCH  
AT 36 WEEKS'!**

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## SITES OF IMPLANTATION

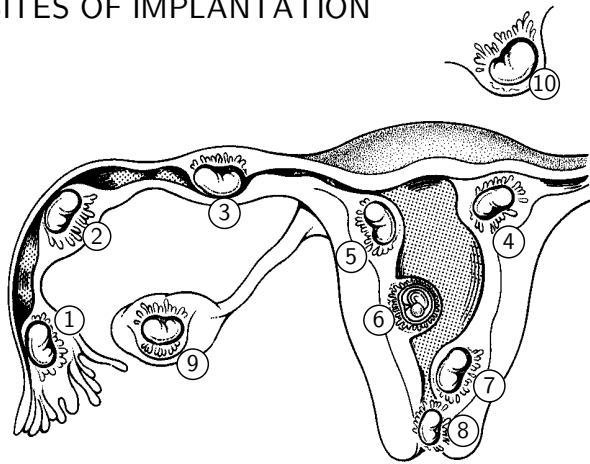


Fig. 16-3: SITES OF IMPLANTATION. 1, the fimbria. 2, the ampulla (with the fimbria, the most common abnormal site). 3, the isthmus. 4, the uterine part of the tube. 5, the angle. 6, the body of the uterus, which is the normal site for implantation. 7, close to the internal os, leading to placenta praevia. 8, the cervix. 9, the ovary. 10, elsewhere in the abdominal cavity.

A **chronic ectopic pregnancy** presents as a vague lower abdominal pain, that is easily confused with PID (pelvic inflammatory disease) and does not require urgent treatment — see Section 16.7.

The diagnosis is easy when she has bled massively into her abdominal cavity, and is either shocked or grossly anaemic. But it can be very difficult, and if there is only a little bleeding, even the expert may be misled. Remember that any woman with a menstrual irregularity (a period or more missed or periods which have been lighter than usual), combined with abdominal pain and adnexal tenderness on one side probably has an ectopic pregnancy. Anaemia, dizziness, shoulder pain, and a tender mass are all extras which encourage the diagnosis, but are not necessary for it.

Ectopic pregnancies can be fatal, so if you are in doubt do a laparotomy soon. Even if your diagnosis is wrong, and she has salpingitis or appendicitis, you have done no harm. Don't let anyone who *might* have an ectopic pregnancy go home — admit her. If you decide to observe her on the ward rather than operate immediately, you must: (1) monitor her carefully, and (2) be able to operate at very short notice. As so often, 'look and see' is better than 'wait and see'.

These are rewarding patients, because they seldom die, if you treat them correctly, even if they have bled severely. So be watchful.

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### DON'T FORGET ECTOPIC PREGNANCY IN A WOMAN OF CHILDBEARING AGE

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## ECTOPIC PREGNANCY — ACUTE AND SUBACUTE

**EXAMINATION.** Look for signs of blood loss (shock and anaemia), and for signs of bleeding into the patient's abdomen. If she has generalized tenderness (which may be mild), distension, a thrill, and shifting dullness, bleeding has been severe. Rebound tenderness and guarding are variable, and may be absent. If she has a large tender mass in her lower abdomen, bleeding has been confined there by adhesions.

*Gently* examine her vaginally. The important signs are pain on moving her cervix, tenderness in her posterior fornix and pouch of Douglas, and perhaps acute adnexal tenderness, which is worse

on one side (highly suggestive).

**CAUTION!** (1) *Don't do a vigorous vaginal or bimanual examination, or an examination under anaesthesia.* You may squash the ectopic and may make bleeding worse. (2) Most patients are afebrile, but some have a low fever.

**HER HAEMOGLOBIN** is normal to begin with, falls as her blood dilutes, and shows no change for at least 24 hours, unless she has been given intravenous fluids which will dilute her blood faster. A few days after a severe bleed it may fall to as little as 30 g/l.

**THE TEST FOR ORTHOSTATIC HYPOTENSION** is sensitive to much milder degrees of hypovolaemia than a change in her blood pressure, which may not fall until she is quite severely hypovolaemic. If her pulse taken when she is sitting up is more than 25 beats faster than when she is lying down, she is hypovolaemic (see 66.1).

**OTHER TESTS.** A raised temperature and white blood count, favour a diagnosis of appendicitis, salpingitis, or torsion of an ovarian cyst, but do not exclude an ectopic pregnancy.

**PERITONEAL ASPIRATION.** Culdocentesis (16-6) is not very reliable. If the diagnosis is in doubt, aspirate her peritoneum. Empty her bladder, and push a syringe attached to a large needle into one of her iliac fossae pointing towards her pelvis. If you aspirate blood which does not clot, she has internal bleeding, probably from an ectopic pregnancy. If necessary, repeat this in the other four quadrants of her abdomen (66.1). You can do this in the ward.

**CAUTION!** A negative test does not exclude an ectopic pregnancy.

**PREGNANCY TESTS.** Routine tests become positive at 2000 iu/l HCG and are only positive in 50% of ectopic pregnancies, so they are not helpful. However, there are more sensitive pregnancy tests which become positive at 75 iu/l, and are positive in 90–95 per cent of cases. A negative test of this kind is very useful.

**THE DIFFERENTIAL DIAGNOSIS** includes many of the causes of an acute abdomen in Section 10.2, especially PID (6.6), appendicitis (12.1), urinary tract infection, and torsion of an ovarian cyst (20.7). The degeneration of a uterine fibroid in early pregnancy can also cause acute abdominal pain, but there are no systemic signs of bleeding. Other causes of anaemia, especially hookworm anaemia.

If shock and anaemia parallel the blood that she has lost vaginally (which they do not in an ectopic pregnancy), suspect an abortion. If she has ascites and anaemia, suspect an ectopic until you have proved otherwise.

### LAPAROTOMY FOR ECTOPIC PREGNANCY

**EQUIPMENT.** A general laparotomy set, equipment for autotransfusion (16-8).

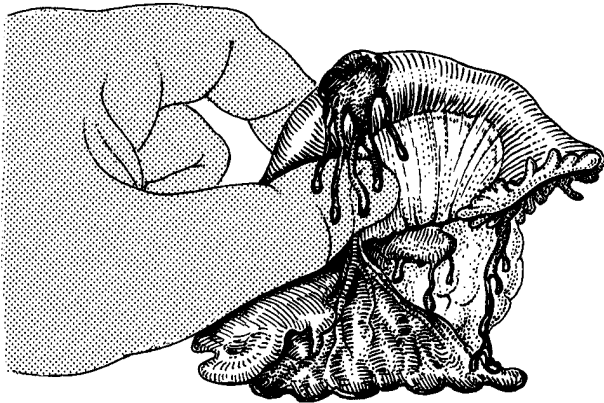
**RESUSCITATION.** Set up a drip immediately with saline or dextran. Take blood for grouping and cross-matching. If possible, try to replace most of the blood she has lost. Contributors differ on the value of the vacuum bottle autotransfusion method (16.10) preoperatively. Some consider it very valuable.

If she is shocked and blood is scarce, restore her blood volume with saline. After you have operated and controlled the bleeding, give her whatever compatible blood you have.

**CAUTION!** Operate as soon as you have started resuscitation, especially if blood and fluids are scarce. If she is bleeding severely, you may never be able to resuscitate her until you tie the bleeding vessel; large volumes of fluids will only wash her last red cells into her abdomen.

**PREPARATION.** Catheterize her and leave the catheter in. One ectopic pregnancy is often followed by another, so, if she has had all the children she wants, ask her permission to tie her normal tube. However, it is common for a patient with an ectopic pregnancy to have few children and want more. One contributor dislikes asking for permission for sterilization in an acute crisis, and would

## PINCH HER BROAD LIGAMENT



*Fig. 16-4: PINCH THE PATIENT'S BROAD LIGAMENT TO STOP HER BLEEDING. As soon as you open her abdomen and have cleared away the blood (for autotransfusion if necessary), find her burst Fallopian tube. If it is still bleeding significantly, grasp its broad ligament between your finger and thumb, so as to compress the vessels and stop bleeding.*

only do it with a 'super-grand multip'.

**ANAESTHESIA.** If she is shocked, or very anaemic, follow the general precautions for anaesthesia in hypovolaemic shock (A 16.7). Give her pethidine 25 mg intravenously as premedication. (1) Ether, tracheal intubation, relaxants, and controlled ventilation. Keep anaesthesia light. Give her the minimum of ether, or use nitrous oxide and a Boyle's machine. (2) Ketamine, preferably with a relaxant (A 8.4). You do not need much muscle relaxation, and most cases can be done under ketamine alone. (3) Infiltration anaesthesia (A 6.9). *Subarachnoid (spinal) anaesthesia is contraindicated!*

**INCISION.** Make a subumbilical midline incision (9.2). There will be blood in her abdominal cavity. Put your hand into her pelvis and feel for her uterus. Find her burst Fallopian tube, and if it is still actively bleeding, grasp its broad ligament between your finger and thumb, so as to compress the vessels in it, as in Fig. 16-4.

If there is much free blood in her peritoneal cavity, ladle it out into a sterile container, and filter it through gauze as you do so. Return it to her circulation by autotransfusion (16.10). It will have the same HIV status as she has, and is therefore safer than donor blood.

Examine both her tubes to make sure that she has not got two ectopic pregnancies (rare). The other tube may contain a little blood, but this is not an indication to remove it. The fetus will probably only be about 1 cm long, so you don't usually find it. Or, you may find quite a large unruptured amniotic sac containing it.

**If she has a subacute ectopic,** her ruptured tube will be covered with blood clot and adherent to the surrounding structures. Free it from them with scissors or a finger.

Apply two haemostats, one from the lateral and one from the medial side, as in Fig. 16-5. Let them meet in the middle with their points in contact, so that no part of her broad ligament is unclamped. Try to preserve her ovary.

Contributors disagree about positions 'X' and 'Y' for the second clamp in Fig. 16-5. Position 'X', is easier for beginners, and preserves the fimbrial end for a possible repair later (difficult, seldom successful, and unlikely to be practical). It has the disadvantage that an ovum may be fertilized by sperm which have swum up the other tube, so that a second ectopic pregnancy may occur in the same tube. Position 'Y' avoids this.

Remove the burst part of the tube by cutting along the free side of the clamps. Put two ligatures of chromic catgut under the joints of each clamp. Tie them with a sliding knot (4.8). Leave the ends of these ligatures long, and hold them in haemostats. Make double ligatures on both sides, to make sure that no arteries are missed.

**CAUTION!** (1) If you don't tie these ligatures carefully, she will bleed postoperatively. (2) If she continues to bleed when you have applied two ligatures, apply more. (3) Don't do anything else which is not essential.

Clean her peritoneal cavity thoroughly. Close her abdomen without drainage. If she has previously consented, tie her other tube.

Examine the specimen. In the middle of an ill-defined placenta and blood clot you will see the amniotic sac. If there is evidence of a hydatidiform mole (rare, 32.38), send it for histology.

**POSTOPERATIVELY,** monitor her urine output until she is out of danger (A 15.5). Treat her anaemia, she may need further transfusions: folic acid by mouth, or iron.

## DIFFICULTIES WITH ACUTE AND SUBACUTE ECTOPIC PREGNANCIES

See also Sections 16.7 (chronic ectopic pregnancy), 16.8 (angular and cervical pregnancy) and 16.9 (abdominal pregnancy).

**If you CANNOT FIND THE TUBE with the ectopic in it,** don't panic. Allow yourself time to scoop out blood and clots. Tip the head of the table down (the Trendelenburg position), so as to make the blood and her gut move away from her pelvis. Feel for her uterus in the midline in the hollow of her sacrum. Pull it into the wound. If it is stuck down by adhesions, tear them with traction, or cut them with scissors. Having found her uterus, feel for the affected tube. If this is stuck down by adhesions to her omentum or gut, separate them (usually not too difficult). If her tube is stuck to her broad ligament on the same side (more difficult), try to get your fingers under it and her ovary, and lift them into the wound, by scraping the tip of your fingers along the back of her broad ligament. If necessary, cut adhesions between her tube and her rectum.

If her ovary is stuck to her tube, or you have torn it as you mobilized it, remove it.

**CAUTION!** Before you remove her ovary (if you have to), make sure you separate adhesions between it and her broad ligament. If you don't do this, you may clamp her broad ligament too low down, and so include her ureter.

**If adhesions obscure everything,** search for: (1) her uterus, or (2) her infundibulopelvic ligament (20-17). On the right this comes away from under her caecum and appendix, and on the left side from under her mesosigmoid.

The blood supply to the tube and ovary comes from: (1) the ovarian vessels in the infundibulopelvic ligament. (2) The ascending branches of the uterine vessels. If you can put a clamp across her infundibulopelvic ligament, and another one across her tube and broad ligament next to her uterus, you will interrupt the blood supply to the ectopic.

**If there is a RAW AREA IN HER PERITONEUM which oozes, after you have removed her ectopic pregnancy,** it will usually stop spontaneously, if there are no obviously bleeding vessels. Try compressing it firmly for 5 minutes with a warm pack. If it continues to ooze, insert a drain for 24 hours, and monitor her carefully.

**If you find that she has INFLAMED TUBES with pus pouring from their fimbriated ends,** she has salpingitis (6.6), not an ectopic pregnancy. Don't excise them; close her abdomen and give her antibiotics.

**If she has a TUBO-OVARIAN abscess (6.6),** drain it.

**If she has a CHRONIC PYOSALPINX,** excising it will be very risky if it has stuck to her gut, but this may be possible if it is not too friable and adherent.

**If you find her APPENDIX STUCK TO HER TUBE,** peel it off. If you damage it, do an appendicectomy (12.1).

**If there is no ectopic, and you find a BLEEDING CORPUS LUTEUM,** control bleeding with sutures. If this is difficult, excise the corpus luteum from her ovary and suture the gap. Or, less satisfactorily, remove her ovary. If she is less than 8 weeks pregnant, she will probably abort. After 8 weeks the placenta makes enough progesterone to keep the pregnancy going.

**If there is a SECOND PREGNANCY in her uterus (very rare),** removing the ectopic pregnancy may not disturb it. If she continues to have amenorrhoea its presence will soon be obvious.

**If she has a LARGE PURPLE HAEMATOMA in her broad ligament (rare),** her ectopic pregnancy has ruptured into it, and not into her peritoneum, and may be quite large (12- to 16-week size or larger).

## ECTOPIC PREGNANCY

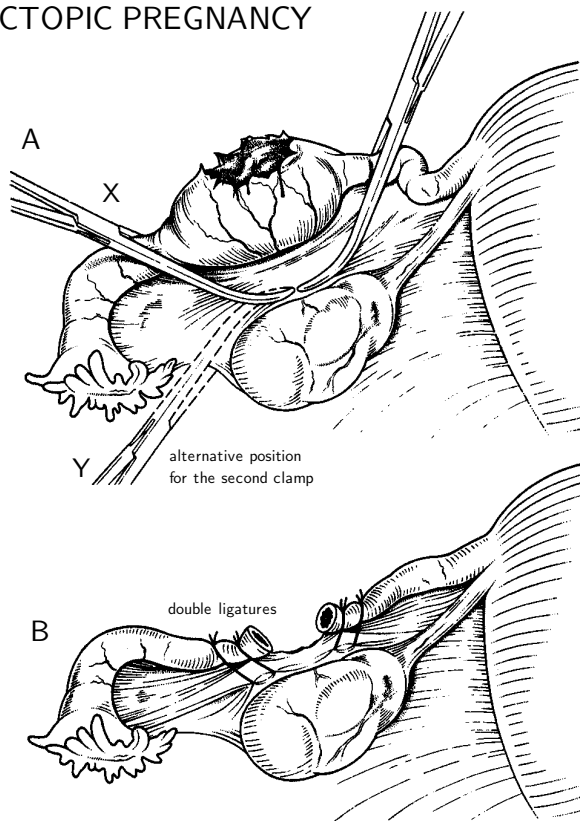


Fig. 16-5: ECTOPIC PREGNANCY. A, put clamps on either side of the patient's ruptured tube. Try to preserve its fimbrial end if you can (position 'X'). If necessary, you can put the second clamp in the position 'Y'. B, cut out the ectopic pregnancy, and put two ligatures round the clamps.

**CAUTION!** (1) Don't burrow into the lower part of her broad ligament. You may damage the large venous plexuses there, or her ureter. (2) Don't try to control bleeding by suturing deeply, unless this is absolutely essential. You may tie her ureter. Here are two ways of treating her:

**First method.** Clamp and divide her round ligament on the same side 2 or 3 cm from her uterus. Clamp her tube and ovarian ligament close to her uterus, but don't divide them yet (if her anatomy is confused, leave this and do it later). Cut the peritoneum from her round ligament in the direction of her infundibulopelvic ligament. This will open the top of her broad ligament. As you approach her infundibulopelvic ligament, find, clamp and divide her ovarian vessels without including her ureter! For the anatomy of her ureter and pelvic ligaments see Figs. 15-6, 20-16, and 20-17. This will have isolated both blood supplies to her ectopic pregnancy. Now you can clamp and divide her tube and ovarian ligament. If the ectopic is not already free, a little blunt dissection should free it from the base of her broad ligament. If oozing from the base of her broad ligament does not stop spontaneously, clamp and tie the bleeding vessels.

**Second method.** Mobilize her uterus by removing blood clot and dividing light adhesions. Apply two large artery forceps to her tube as shown in Fig. 16-5, but don't excise the ectopic pregnancy yet. Cut a half a centimetre opening in the back of her broad ligament, and squeeze out the haematoma by pressing it from below. Watch her; several things can happen after either method.

**If the haematoma does not reform (usual),** you are lucky, the artery forceps have controlled the bleeding. Excise the ectopic pregnancy, complete the operation in the usual way, and then suture the hole in her broad ligament.

**If the haematoma reforms (unusual),** open her broad ligament more widely, look for a bleeding point, and tie it.

**If there is no bleeding point, but only a general ooze,** press a warm pack against the oozing area, and wait 10 minutes by the clock. If this

controls bleeding, complete the operation.

**If a pack fails to control the bleeding,** tie or undersew as many bleeding vessels as you can. Be careful to feel for her ureter to avoid including it in a ligature. Trace it from where it enters her pelvis over her sacroiliac joint (20-16). It has a characteristic firm feeling, and you can roll it between your fingers.

### 16.7 'Chronic' ectopic pregnancy, (ectopic pregnancy without massive abdominal bleeding)

Two kinds of ectopic pregnancy do not cause massive bleeding: (1) An acute ectopic which has, so far, only caused a small bleed, and a massive bleed is to follow later. (2) A 'chronic ectopic' in which repeated small bleeds have caused a haematoma (pelvic haematocoele) containing 100 to 500 ml of blood and clot. Some of these chronic cases resolve without treatment, but don't wait for this to happen. You can never be sure that the patient will not have another larger bleed, and they can cause much trouble.

A patient with a chronic ectopic may present with varying combinations of the following: (1) Lower abdominal pain, perhaps combined with pain on micturition, defaecation, or sex. (2) A small dark vaginal blood-loss (less than a normal period), perhaps preceded by amenorrhoea, and sometimes with the passage of a decidual cast. (3) A mass in her lower abdomen, at the side of her uterus, or in her pouch of Douglas. Occasionally, if her adnexae have a long pedicle, this mass is entirely outside her pelvis. Moving her cervix is painful, but this is not such a reliable sign as in an acute rupture. Her uterus is usually slightly enlarged.

The diagnosis of a chronic ectopic can be difficult, and is often missed. Its symptoms are like those of PID; if she has had several similar attacks without any missed periods, she probably does have PID.

THERESA (24 years) was seen in hospital complaining of heavy prolonged bleeding for 5 days. She had missed two periods and said that she had passed clots. She was anaemic, her uterus was slightly enlarged, and her cervix was closed and still bleeding. A doctor diagnosed her as having an incomplete abortion, and did a 'D and C'. There were few curettings, so he thought "she must have had a complete abortion". He gave her iron tablets and discharged her, but she continued to bleed and have low abdominal pain. So she went to another hospital where the doctor there felt a tender mass on the left side of her uterus. He thought at first that she had an ectopic, but he read the discharge card from the first hospital, which said that she had had an incomplete abortion, and a 'D and C'. So he was misled and diagnosed PID with a tubo-ovarian abscess. He gave her antibiotics, and she went home. Nearly a month later she went to a private clinic run by a medical assistant. He correctly diagnosed an ectopic pregnancy, before even doing a vaginal examination, and referred her. Her haemoglobin was 40 g/l. She had had 5 children, so at laparotomy her tubes were tied. **LESSONS** (1) Don't be misled by other people's clinical opinions. (2) 'Abortions' may be ectopics. (3) PID can produce symptoms which are very like those of a chronic ectopic pregnancy. (4) This patient has some of the features of a subacute ectopic (severe anaemia), and some of those of a typical chronic ectopic pregnancy (a history of chronic pain); this shows that there is no sharp borderline between these two conditions. (5) Before you diagnose PID, stop and think — "Could this be a chronic ectopic?"

**DON'T FORGET THE POSSIBILITY OF AN ECTOPIC PREGNANCY IN A WOMAN OF CHILDBEARING AGE**

## CHRONIC ECTOPIC PREGNANCY

**DIAGNOSIS.** You will only make the diagnosis if you think of a chronic ectopic pregnancy whenever you see a patient with irregular, missed, or prolonged periods. Ask her if she has low abdo-

## CULDOCENTESIS

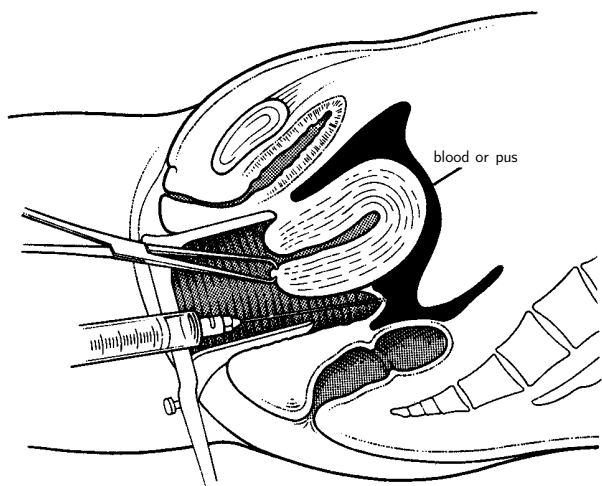


Fig. 16-6: **CULDOCENTESIS** can be used to confirm the presence of blood or pus in the pelvic peritoneum, and to distinguish between PID and a pelvic haematocoele (chronic ectopic pregnancy) as the cause of a pelvic mass.

minal pain, and examine her for tenderness. Examine her vaginally and look for slight vaginal bleeding. Move her cervix and feel for tenderness on either side. If you can feel a mass, or tenderness which is greater on one side than on the other, she may have an ectopic.

The diagnosis may be difficult to confirm. She has no evidence of blood loss (except perhaps one or more episodes of fainting). She may be anaemic. A pregnancy test may or may not be positive.

**CULDOCENTESIS** is the confirmatory test for rupture of a chronic ectopic pregnancy, or a pelvic abscess. *It is only positive if the haematocoele is in her pouch of Douglas*, and not if it is elsewhere (unusual). You can do a culdocentesis in the ward without an anaesthetic. But do it in the theatre after induction if: (1) she has a pelvic mass which could be a chronic ectopic pregnancy for which she will need a laparotomy. Or, (2) she has a pelvic abscess which needs drainage.

Put her into the lithotomy position. Clean her vulva and do a careful bimanual examination, feeling for a mass. Insert a sterile bivalve speculum. Clean her vagina with 1% chlorhexidine. Stab a 1.2 mm needle on a 20 ml syringe through her posterior fornix 1 cm behind her cervix. Withdraw the plunger.

**If you withdraw more than 2 ml of dark or free-flowing fresh blood, often with bits of clot in it**, she has blood in her peritoneal cavity, probably from an ectopic pregnancy.

**If you aspirate a little fresh blood which clots easily**, you have punctured a blood vessel.

**If you aspirate nothing, or only a little fresh blood which clots easily**, there is either no ectopic pregnancy, or her pouch of Douglas is obliterated by adhesions.

**If you aspirate pus**, she has pelvic peritonitis or a pelvic abscess.

**CAUTION!** A negative test makes an ectopic pregnancy unlikely, but does not exclude it. (2) The test is only positive if you aspirate blood which does not clot when you leave it in a tube for 10 minutes. If it clots after removal, it is probably venous.

**DIFFERENTIAL DIAGNOSIS.** The main one is PID, see also Section 6.6. The important features are the volume, appearance, and timing of the blood loss, the history of missed periods (in an ectopic) and of fever (in PID). Culdocentesis should distinguish them.

**Suggesting a chronic ectopic** — one or more missed periods. Anaemia, which may be severe. No fever. Little vaginal bleeding not defined into periods. No obvious relationship between low abdominal pain and 'periods'. Sometimes a history of faintness when the pain started.

**Suggesting PID** — no missed periods. No obvious anaemia. Fever, which may be severe. Low abdominal pain which is often worse

## A LARGE PELVIC HAEMATOCELE



Fig. 16-7: **A LARGE PELVIC HAEMATOCELE** (chronic ectopic pregnancy). You will only make the diagnosis if you think of this whenever you see a patient with irregular, missed, or prolonged periods. From Young, James, 'A Textbook of Gynaecology'; (5th edn. 1939), Fig. 101. A and C Black.

during and after periods, and which usually begins after the bleeding starts. A vaginal discharge, which may only be mild. No history of faintness.

**Other pitfalls:** (1) If she believes she is pregnant, and bleeds vaginally, you may think that she has a threatened abortion, especially if the haematocoele surrounds a normal-sized uterus, and makes it appear to be enlarged to that of a 10- or 12-week pregnancy. (2) If she has passed a decidual cast, you may think she has a complete or incomplete abortion. (3) If you feel what you think is an enlarged uterus (a uterus surrounded by haematocoele) in the presence of abnormal bleeding, you may think she has fibroids. (4) If the mass is difficult to feel you may think she has DUB (dysfunctional uterine bleeding, 20.2).

**LAPAROTOMY.** Proceed as in Section 16.6 where relevant.

You will find blood in her pelvis, mostly in her pouch of Douglas and mostly clotted. Clean it out. Find the tube which has the ectopic and do a salpingectomy, as in Fig. 16-5 and Section 16.6.

### DIFFICULTIES WITH A CHRONIC ECTOPIC PREGNANCY

See also Section 16.6.

**If there are MANY DENSE ADHESIONS between the ectopic pregnancy and her surrounding organs**, scoop out as much blood clot as will easily come out without tearing and pulling. If you try to remove firmly adherent clot, there will be much oozing. Don't try to remove the whole 'wall' of the haematoma cavity, or you may injure her gut.

**If the surfaces of her pelvic organs are congested and OOZE BLOOD**, as may happen when blood has been present in her pelvic cavity for some days, control bleeding with warm abdominal packs.

**If you INJURE HER RECTUM or sigmoid colon (this should be rare)**, suture the injury, and do a transverse colostomy (9.5). Pass a drain down to the site of the repair, and close her abdomen. Close the colostomy at a convenient time later.

**If you INJURE HER SMALL GUT (this should also be rare)**, and the injured area is healthy, anastomose it. If the injured area is inflamed, resect a length of gut and do an end to end, or side to side, anastomosis. If this is not possible, exteriorize (9.5) a loop of gut proximal to the lesion, and make an ileostomy. Later, refer her for expert repair.

## 16.8 Angular and cervical ectopic pregnancies

An ectopic pregnancy occasionally implants itself towards the

medial end of a patient's Fallopian tube. If it implants itself at the point where her tube enters her uterus, it ruptures early, but if it implants in the intramural part of the tube near her uterine cavity (angular or cornual pregnancy), it may not rupture until 20 weeks (see Fig. 16-3). In either case the whole angle of her uterus becomes a bleeding mass. When this happens, you can usually resect part of her uterus (a wedge resection).

If an ectopic pregnancy implants itself in her cervix (a cervical pregnancy, rare) this will be open and contain a thin-walled cavity in which you can feel fragments of chorionic tissue. This cavity bleeds massively, and may resemble an abortion, but whereas there is little bleeding after an abortion has been evacuated, a cervical ectopic pregnancy continues to bleed. You are most likely to be aware of it as an abortion which continues to bleed after evacuation (16.2).

## ANGULAR AND CERVICAL ECTOPIC PREGNANCIES

**ANGULAR PREGNANCY.** At laparotomy for an ectopic pregnancy you find a purple bleeding mass arising from one angle of the patient's uterus. Bleeding can be torrential. If the only way to control it is to clamp her broad ligaments, clamp both of them and do a subtotal hysterectomy (20.12). Usually, a wedge resection is possible. Plan for Caesarean section in her next pregnancy.

**CAUTION!** In some societies a woman who does not menstruate is not acceptable as a wife, and if this is so in your community, don't sacrifice her uterus unless her life is in danger.

**To do a wedge resection,** aim to remove the mass by cutting her uterus from around it, so as to leave a wedge-shaped gap.

If there are not too many dense adhesions between her uterus and her pelvis, tie a rubber tourniquet around the lower part of her uterus. Or ask your assistant to compress the angle as firmly as he can while you insert the sutures. Bring the two sides of the gap together firmly, and suture them with two layers of No. 2 chromic catgut, the inner layer being mattress sutures, and the outer layer simple ones (difficult, because the tissue is friable and vascular). When you have done this, you will probably find that the bleeding has stopped.

**Alternatively,** repair her uterus with a single layer of silk through the full thickness of its wall. Place as many sutures as necessary before you tie any. Then, as your assistant pulls all but one tight, tie the remaining one. This will minimize the risk of them cutting out.

**Alternatively,** remove the tube and ovary on the same side. This has the advantage of avoiding the possibility of a further ectopic pregnancy on that side.

If she already has several children, consider tying her tubes, because the risk of rupture of the scar is considerable.

**CERVICAL PREGNANCY (rare).** She either presents as an abortion which continues to bleed, or you may suspect that she has a cervical pregnancy, when you find a bleeding thin-walled cavity in her cervix. The important differential diagnosis is an ordinary abortion which has stuck in her cervix, because her external os is too tight to let it out (16.2).

Pack the cavity tightly to stop bleeding, and let you resuscitate her. She will bleed severely.

If her ectopic pregnancy is early, packing may be all she needs. Bleeding may have stopped when you remove the pack 24 hours later.

**If a pack does not control bleeding,** there are two more manoeuvres you can do before hysterectomy: (1) Suture the descending cervical branches of her uterine arteries. Pull her cervix firmly down and insert catgut sutures at the 3 o'clock and 9 o'clock positions, as high as you can at the level of her cervico-vaginal junction. Provided you do not go above this level her ureters will be safe. Don't do any dissection. (2) Insert a large (50 ml or more) Foley catheter into the bleeding cavity in her cervix, blow it up, and leave it for 24 hours. Fluid from her uterus will be able to drain through the tube. If this fails, tie her internal iliac arteries (3.5); if this too fails do a hysterectomy (20.12).

## 16.9 Abdominal pregnancies

An ectopic pregnancy occasionally aborts backwards down a tube, or bursts out of it without killing the patient, and embeds itself elsewhere in her abdominal cavity. Sometimes, an ovum is fertilized outside a tube on the surface of an ovary, and then implants itself in the abdominal cavity. Such an ectopic may die at any stage, or proceed to term. An abdominal pregnancy is thus a rare complication of an ordinary ectopic pregnancy, so that in areas where ectopic pregnancies are common, the incidence of abdominal pregnancies is increased also. An abdominal pregnancy causes comparatively few symptoms. None of them are individually diagnostic, so the diagnosis depends on the sum of many clues, none of which is enough by itself.

A patient with an abdominal pregnancy may present with: (1) Persistent abdominal pain from about 26 to 28 weeks onwards of variable severity, which is not well localized. (2) Her 'uterus' (in reality the gestational sac) is ill-defined, and feels 'odd', when you palpate it. The fetal parts may be abnormally easy or abnormally difficult to feel. The lie of the baby is often abnormal, and may be persistently transverse or oblique. (3) The features of (1 and 2) accompanied by the failure of her 'uterus' to enlarge, typically at 32 weeks, and a dead baby. (4) The features of (1 and 2) combined with a 'uterus' that distends more than it should, so that you suspect polyhydramnios. (5) Postmaturity (>40 weeks). (6) A dead baby which she does not expel, either spontaneously or with oxytocin (16.4).

Less commonly, she may present with: (7) An abdominal mass after 26 weeks adjacent to an empty uterus (or a uterus enlarged to the size of a 12- to 16-week pregnancy), which is quite separate from it. (8) A distended abdomen which is like a full term pregnancy, and a mass which is less cystic and rubbery than a normal pregnancy. She says she is pregnant, but is having normal periods. On questioning she admits having missed some periods, possibly nine, in the past. (9) Loss of weight and general ill health.

The diagnosis depends on recognizing (a) that she is pregnant and (b) that her pregnancy is not in her uterus. Her history is seldom helpful, but: (1) She may have had episodes of pain in early pregnancy. (2) She may have a history of a previous ectopic pregnancy. (3) If she is an experienced multip, she may say that her pregnancy 'feels different'.

The fetus can implant itself anywhere, but because the placenta is so large, it is always attached to gut or omentum somewhere. The common sites are: (1) In her pouch of Douglas. (2) In her broad ligament, where it is attached to her uterus, or the wall of her pelvis. (3) On an ovary.

MARY (19 years) was observed to have a transverse lie at 7 months. External version failed, so she was allowed to go to term. At 40 weeks she had abdominal pains, but the lie was still oblique. On pelvic examination her cervix was in a curious position in front of the fetal head. At Caesarean section she did not seem to have a uterus, instead her membranes were close against her abdominal wall. After a live baby girl had been delivered, the placenta was found to be attached to her left Fallopian tube. It was left in place and as many of the membranes as possible removed. She recovered uneventfully. **LESSONS** (1) If something rather unusual happens, think of the possibility of an extrauterine pregnancy. (2) If you cannot easily remove the placenta, leave it.

## ABDOMINAL PREGNANCY

**X-RAYS.** (1) The fetus may be in an abnormal attitude and remain in it over a long period. (2) In a standing lateral film the fetal parts may overlap the shadow of the patient's spine. This is rare in a normal pregnancy. Ultrasound in the hands of an experienced operator is very helpful, so refer her for it if you can.

**MANAGEMENT.** If you make the diagnosis before 24 weeks, a laparotomy is usually indicated. This is difficult, so try to refer her.

If the pregnancy is more than 24 weeks and the baby is still alive, consider leaving him until 34 to 36 weeks, so as to improve his chances of survival. Often, she has few children or none, and is grateful for a live child. If you decide to do this she may bleed before term (uncommon), so keep her in hospital to wait.

If the pregnancy is more than 24 weeks but the baby is dead, postpone the operation for 3 or 4 weeks after the fetal movements have stopped, so that the vascularity of the placental bed is reduced. If he has been dead for more than 4 to 6 weeks, check her clotting time before you operate, because of the possibility of DIC (19.11b).

If he has been dead for more than a month, book her for the next operating list, whatever the duration of pregnancy. There is always a danger that he may become infected. Check her clotting time.

If she has sudden pain at any time, it may indicate rupture of the membranes or haemorrhage, so operate immediately.

## REMOVING AN ABDOMINAL PREGNANCY

This is an expert's task, so refer her if you can. If you have to operate yourself, prepare for much bleeding. You will need at least 2 units of blood and preferably more.

**ANAESTHESIA.** General anaesthesia with tracheal intubation.

**INCISION.** Listen over her abdominal wall for a vascular bruit (sound). This may tell you where the placenta is getting its blood from. If you hear one, place your abdominal incision over some other part of her abdominal wall. If you can feel the baby close under it, this may be a good site to incise. If there is no obvious site to be preferred or avoided, make a paramedian or midline incision, if necessary above the umbilicus. Open her abdomen with care, because her gut may have stuck to her abdominal wall.

## ADVANCED EXTRAUTERINE GESTATION

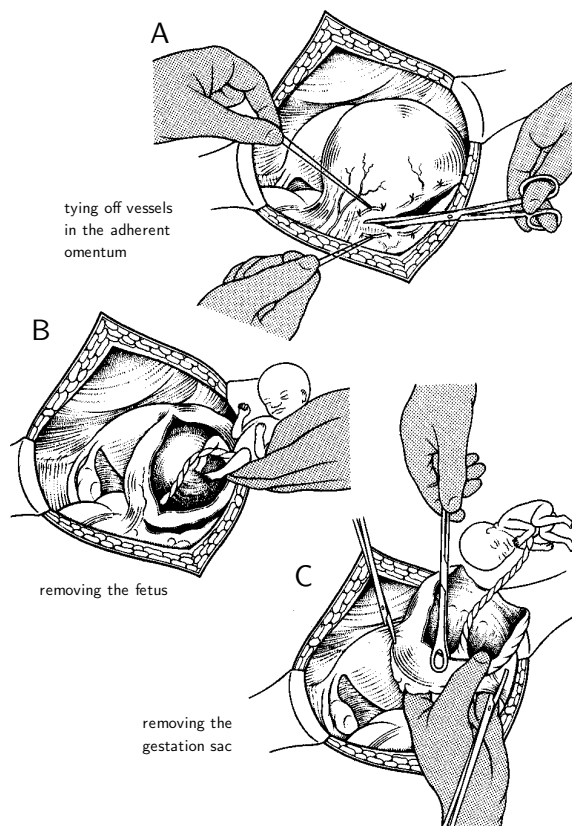


Fig. 16-8: AN ADVANCED EXTRAUTERINE PREGNANCY in the omentum. A, tying off the vessels in the omentum. B, removing the fetus. C, in this patient the entire sac is being removed; if it is not easy to remove, leave it. From Bonney's *Gynaecological Surgery*. Ballière Tindall, with kind permission.

Search for the amniotic sac and placenta. Open the sac through a thin area where there is no placenta. If necessary, remove any gut and omentum from the front of the sac. Dissect away the sac and remove the baby. Clamp and tie his cord firmly.

If he was alive when he was removed, leave the placenta.

If he was dead, and: (1) the placenta is not fixed to her gut, or some other essential structure, and (2) you think you could shell it out quite easily, then remove it. But if it is fixed to the gut or some other vital structure, or to her mesentery or to her parietal peritoneum over a large area, leave it. Disturbing it will cause severe bleeding.

If the pregnancy has arisen in a tube or ovary, and the sac has a vascular pedicle which you can clamp, divide the pedicle and remove the sac completely with the placenta.

**CAUTION!** (1) Don't dissect in the region of the placenta. This may cause catastrophic bleeding, especially if he is still alive. (2) Take care not to injure the mesentery, or its blood supply, or part of her gut will necrose, and she will die from peritonitis. (3) Take special care not to injure her large gut!

If you decide to leave the placenta, cut and tie the cord as short as possible. Then remove as much of the sac as you safely can. Don't insert a drain, the placenta is going to be absorbed anyway, and a drain might only introduce infection. Close her abdomen (9.8).

## DIFFICULTIES WITH ABDOMINAL PREGNANCIES

If you CANNOT CONTROL BLEEDING in any other way (rare), you may have to send her back to the ward with clamps in place protruding from the wound, and then cautiously remove them later (3.1). Or, pack the bleeding area, and then gently withdraw the pack later (3.1).

If she presents with an ABDOMINAL MASS and a SINUS on her abdominal wall (rare), the sinus may be arising in an ectopic pregnancy. Probe it, you may feel fetal bones. Open it with great care not to injure her gut.

## 16.10 Autotransfusion

Blood from the peritoneal cavity can be life-saving, especially when it comes from a ruptured ectopic pregnancy or a ruptured spleen. Also, it carries no risk of hepatitis or HIV, and it will be perfectly cross-matched. Autotransfusion is thus very useful.

### AUTOTRANSFUSION

**INDICATIONS.** (1) Ectopic pregnancy. (2) Rupture of the spleen (66.6).

**CONTRAINDICATIONS.** Don't attempt autotransfusion if: (1) There is an offensive smell when you open the patient's abdomen. (2) Her gut has been injured. (3) The blood is obviously haemolysed. (4) She is more than 14 weeks pregnant with a ruptured amniotic sac. Her blood will be contaminated with amniotic fluid containing large quantities of thromboplastin. If you transfuse this, it could theoretically cause DIC (disseminated intravascular coagulation).

**CAUTION!** The presence of fresh clots is not a contraindication to autotransfusion.

**THE VACUUM BOTTLE METHOD** is the best one and allows you to transfuse her before induction (not usually desirable). Buy vacuum bottles, or prepare them by closing blood-taking bottles containing a citrate solution immediately they have been sterilized, before the steam in them has had time to condense (Primary Anaesthesia, Appendix A). Clamp a taking set, introduce one of its needles into her abdomen, as if you were doing a four quadrant tap (66.1), and then put the other needle into the bottle and remove the clamp. To fill the bottle insert another sterile needle connected to a vacuum pump into the bung. You may be able to collect up to 3 litres of blood this way. If the vacuum is imperfect, and does not fill the bottle, apply suction with a vacuum (water) pump connected to a sterile needle inserted through the bung.

**THE SOUP LADLE METHOD** is less satisfactory, but is useful

## AUTOTRANSFUSION

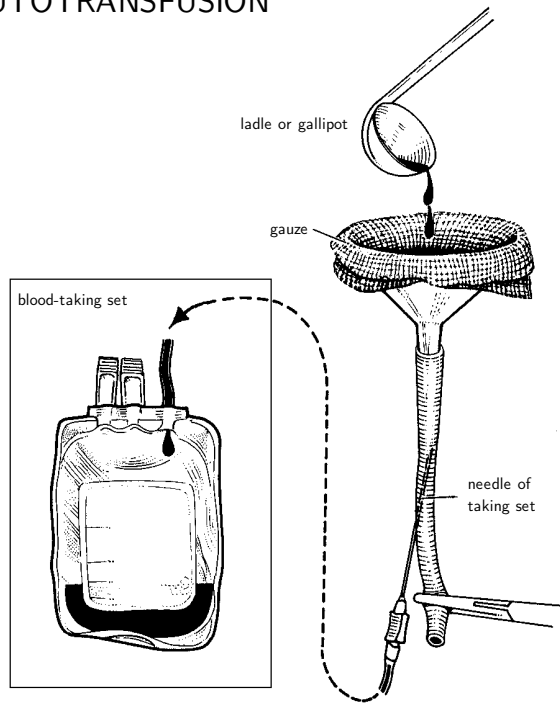


Fig. 16-9: AUTOTRANSFUSION using a funnel and a blood-taking set. This is also useful if the patient has a ruptured spleen (66.6). Use large pieces of gauze, and collect the blood in a taking set. Kindly contributed by Stephen Whitehead of Maua Hospital, Kenya.

when you cannot use a vacuum bottle because there are too many clots. Keep the equipment shown in Fig. 16-8 ready sterilized. Put her into a slight Trendelenburg position, make a small opening in her peritoneal cavity to begin with, and be prepared to catch the blood, as it escapes, with a sterilized stainless steel soup ladle or gillipot. Then complete the incision and ladle out the rest of the blood. Her right hypochondrium may be the easiest place to collect it. Pour it through a filter made of 2 or 3 thicknesses of gauze, and collect it in a blood-taking set. The filter in the drip set will remove smaller clots.

Alternatively, you will find a sump useful. This is a conical vessel with a handle and holes towards its tip. Insert it deep in the abdomen; blood will flow in through the holes and can be sucked out. CAUTION! (1) Either transfuse the blood immediately, or throw it away. (2) Don't give it to someone else.

### 16.11 APH — bleeding after the 28<sup>th</sup> week

In about half the patients who bleed antenatally you never find a cause. When you do find one it may be: (1) Obvious placental abruption (mild, moderate, or severe). (2) *Placenta praevia* (Grades One, Two, Three, or Four). (3) A variety of usually harmless lesions of the lower genital tract. The first two causes are much the most dangerous ones, but fortunately they are both about equally uncommon. An important problem in the antenatal clinic is the patient with a small bleed: "Has she got *placenta praevia*, or is it going to remain unexplained?"

### BLEEDING AFTER THE 28TH WEEK

Admit her, keep her in bed, and observe her carefully. Record all the blood she loses. Measure and record her pulse, blood pressure, and haemoglobin.

Decide how much blood she has lost. She may be: (1) An emer-

gency with severe bleeding (500 ml or more), or in shock, or in labour. (2) A non-emergency with none of these things.

Resuscitation may need to start immediately. Take blood for grouping and cross-matching, and make sure that there are always 2 units of blood cross-matched for her.

Examine her, but *don't do a vaginal examination with your fingers!* Ask yourself three questions: (1) Has her uterus ruptured (18.17) due to obstructed labour? (2) Has she ruptured the scar (18.14) from a previous Caesarean section? Both these are uncommon causes of vaginal bleeding during pregnancy or labour. (2) How likely is she to have placenta praevia? (see below)

Decide the probable duration of her pregnancy (don't use the surfactant test (19.2), because the amniocentesis needle may go through a low-lying placenta). Record the position, presentation, and lie of the baby. Feel for rhythmical contractions. Listen to his heart.

CAUTION! If you find an abnormal lie, don't try to correct it.

Test her urine for protein. This is worth doing even though interpreting the result may be difficult.

DIAGNOSIS. Assess the probabilities like this:

**Suggesting placenta praevia** — (1) Bright red painless bleeding which can be anything from mild to severe, especially after 32 weeks, and tends to stop and start again. (2) A soft non-tender uterus that relaxes between contractions. (3) The fetal heart can be heard. (4) Shock is proportional to the blood she has lost. (5) The presenting part is higher than expected, and an unstable lie or an abnormal one are common. Suspect placenta praevia if you find a high head or a breech, a head or breech overlapping her symphysis by more than two finger widths, or a transverse lie. Placenta praevia is unlikely (but not impossible), if the head or breech are in easy contact with her symphysis, and do not overlap it. You can only be sure that she has not got placenta praevia, if the head or the breech are deeply engaged in her pelvis. If placenta praevia is likely, see Section 16.12.

**Suggesting abruption** — (1) Painful bleeding which is slight to moderate. (2) The presenting part is not higher than you expect, and the lie is usually stable. (3) A tense, tender, woody-hard uterus with poorly defined fetal parts. (4) An absent fetal heart. (5) Shock which is worse than you would expect from the blood she has lost vaginally. (6) Constant lower abdominal pain. (7) Loss of fetal movements. If abruption is likely, see Section 16.13.

CAUTION! Beware of diagnosing abruption in a patient who has had a previous Caesarean section; rupture of her uterus is much more likely, even if she has not been in labour for long.

**Suggesting a heavy show** — (1) There is less than 10 ml of blood. (2) She bleeds with contractions. (3) Blood is usually mixed with mucus. (4) Bleeding stops when her membranes rupture.

**Suggesting rupture of her uterus** — See Section 18.17.

If she does not have an obvious abruption or placenta praevia, and is not in labour, do a speculum examination.

SPECULUM EXAMINATION. Do this to see where the blood is coming from, and to diagnose the incidental causes of bleeding. Do it in the labour ward in the lithotomy position in a good light. It is not easy, and can precipitate bleeding if you do it roughly. Even poking around to find the cervix can cause bleeding if she has placenta praevia. Pass a sterile speculum.

CAUTION! Don't examine her vaginally with your fingers. If she does have a placenta praevia, you may cause massive bleeding. Use gentle speculum examination only.

Look for: (1) Cervical erosions. (2) Cervical polypi. (3) Vaginitis. (4) Carcinoma of her cervix. (5) Varicose veins (rare). (6) Decidua in her upper endocervix.

If she has placenta praevia (hopefully most unlikely, since you are examining her in the labour ward), you may see — a normal cervix, a haemorrhagic mucous plug, a blood clot in her external os, active bleeding from her cervix, or an open cervix with placental tissue peeping out of it. If you mistakenly do a digital examination, there will be a boggy feeling of placenta in front of the baby's head, followed by torrential bleeding as you remove your finger!

If she has abruption, you will see blood coming out of her cervix (if you mistakenly do a digital examination, you don't feel placenta).

If she has trichomoniasis (red vaginal wall and a pale green frothy dis-

charge), treat her and her sexual partner at the same time (M 29.6).

If she has cervical erosions, they will usually heal after delivery and need no specific treatment. Treat any associated trichomoniasis. They seldom cause more than staining of her underwear or spotting, which may be related to sex.

If she has vulval varicosities, local pressure will probably stop it. If necessary, insert a suture. Varicosities sometimes occur at the vulva or introitus of older multipars and occasionally bleed.

If she has a cervical polyp, don't twist it off during pregnancy: it may bleed severely. Leave it alone, and deal with it after delivery (20-5).

If she has carcinoma of her cervix, and is in labour, section her. If the lesion is large, the classical operation is better.

If you find an incidental cause of bleeding, she can get up and go home, if appropriate, depending on the cause. However, finding an incidental cause (such as a small polyp) does not prevent her from also having a placenta praevia, so beware! Does the incidental cause look as if it could have caused the bleeding she describes?

If you are not sure what she has, she will probably only have mild bleeding, but you will be wise to assume that she might have placenta praevia.

## 16.12 Placenta praevia

In the last trimester of pregnancy the isthmus of the uterus unfolds to form the lower segment. Normally, the placenta does not overlie it, so there is no bleeding. If however the placenta does overlie the lower segment, it may shear off over a small area and bleed.

Most patients with placenta praevia bleed before labour starts. They bleed painlessly and pass bright red blood. The first bleed may be slight, and subsequent ones increasingly severe, as the area of placental separation increases. You are unlikely to have ultrasound, or any other test to confirm the position of a patient's placenta, so you will have to find out where it is by examining her in the theatre, when you are fully prepared for an elective or emergency delivery. The correct timing of this is vital. You can do it early, soon after she presents. Or, if she is not bleeding severely, you can postpone it, and manage her non-operatively in hospital until she reaches 36 weeks, by which time her baby's chances of survival are almost as good as they would be at term. Most of your patients with placenta praevia will present before the 36th week, so non-operative treatment will improve your perinatal mortality — but it is only justified if Caesarean section is instantly available 24 hours a day, 7 days a week!

Unfortunately, the worst type of placenta praevia (Type Four) often does not bleed until labour starts. Even so, a high presenting part, or a persistent transverse lie, should lead a smart midwife to suspect it in the antenatal clinic.

There are several ways in which you can deliver a patient with placenta praevia:

(1) Caesarean section is the safest method in 95 per cent of cases. Its various risks and difficulties are described in Sections 18.8 and 18.10.

(2) You can deliver her vaginally. This may be necessary in health centres, if she cannot be referred, so it is described in *Primary Mother Care*. There are two ways of doing this. (a) The baby's head can be brought down on to the placental site, if necessary with Willet's forceps or a vulsellum, and a weight attached to his scalp. (b) A leg can be brought down and his buttocks used to compress the placental site. These methods almost always kill him, so it is desirable that he be already dead, or so small as to be unlikely to survive. They are both ancient methods, and are no longer done when Caesarean section is available, unless he is dead, and her cervix well dilated (>5 cm) and not too thick.

The main risks of vaginal delivery are that, in trying to bring

down the head or a leg, you separate more of the placenta and increase bleeding. If you fail, and the task is not easy, you worsen her prognosis. You may also be tempted to force delivery before adequate dilatation, and so tear her cervix.

Placenta praevia increases the risk of puerperal sepsis, and of postpartum haemorrhage, because the lower segment, to which the placenta was attached, contracts less well after delivery.

MRS X died in hospital during labour. The doctor who treated her certified her death as being due to placenta praevia. The specialist obstetrician said that haemorrhage might not have been fatal, if she had not been anaemic due to parasitic infection and malnutrition. There was also concern because she had only been given 500 ml of blood, and because she died on the table while being sectioned by a trainee. The hospital administrator noted that she had not arrived at the hospital until 4 hours after the onset of severe bleeding, and that she had bled several times during the previous month, for which she did not seek treatment. A sociologist observed that she was 39 years old, with seven previous pregnancies and 5 living children. She had never used contraceptives, and her last pregnancy was unwanted. She was also poor, illiterate, and lived in a rural area. LESSONS Here we are concerned with the technology of treatment, but the critical factors are often the social ones.

## PLACENTA PRAEVIA

This is the patient with a probable placenta praevia diagnosed in the last section.

If she continues to bleed, and the the presentation is cephalic do an EIT (examination in theatre). If it is not cephalic, section her.

If she is no longer bleeding, her baby is alive and she is not in labour, admit her to the labour ward for observation and non-operative treatment. If she has not bled for 6 hours transfer to the antenatal ward and ask her to do a kick count (M 28.3). Keep her in bed in the antenatal ward for 5 days. If she does not bleed during this time, she can get up to go to the toilet. Abandon non-operative treatment at any time if she goes into labour, or she bleeds seriously, or her baby dies. If none of these things happen, allow her to continue to 36 weeks, or if you don't know her dates, until her baby has reached a reasonable size.

CAUTION! This non-operative management is only indicated if: (1) Her baby is alive. (2) She is not in labour. (3) She is in hospital. (4) You have plenty of blood to transfuse her, if necessary. (5) You can section her at any moment.

If her baby is dead, don't section her unless her placenta praevia requires it. Encourage her to go into labour. See Section 16.4 on the 'dead baby'.

### AN EXAMINATION IN THE THEATRE ('EIT') FOR PLACENTA PRAEVIA

The purpose of a vaginal examination at this stage is to find whether she has a placenta praevia or not, and what type it is. If it is Type One or Two, she should be able to deliver vaginally, unless she has other problems. For Types Three or Four she needs Caesarean section.

INDICATIONS. A patient with suspected placenta praevia and a cephalic presentation who has (1) reached 36 weeks, or (2) bled heavily before reaching 36 weeks.

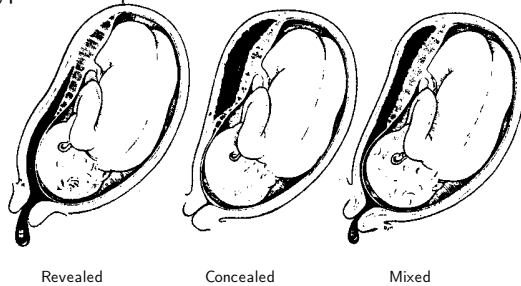
PREPARATION. Take her to the theatre and have everything absolutely ready for a Caesarean section, with the trolley laid, the trolley nurse scrubbed up, and your assistant also scrubbed up ready for a Caesar. Have two units of blood cross-matched for her ready in the theatre.

ANAESTHESIA. If she is very likely to have a placenta praevia, give her a general anaesthetic and intubate her. There may not be time for a local one. If she is unlikely to have placenta praevia, and your anaesthetist is good have everything ready to give her a general anaesthetic, if necessary, but don't actually start to give it. If there is time, starve her.

CAUTION! If your anaesthetist is unskilled, anaesthetize all patients having an EIT. She may bleed suddenly, and an unskilled

## ANTEPARTUM BLEEDING

### Types of abruption



### Types of placenta praevia

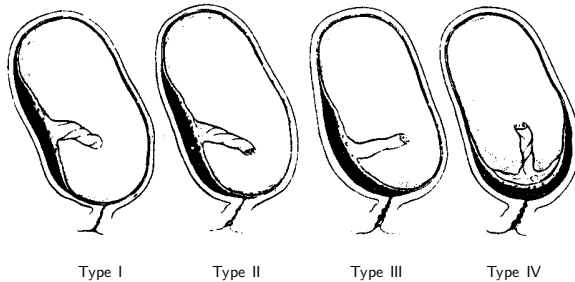


Fig. 16-10: ANTEPARTUM BLEEDING. The three types of abruption, revealed, concealed, and mixed, and the four types of placenta praevia. From Munro Kerr's 'Operative obstetrics' (7th edn. edited by Chassar Moir), Figs. 30,1 and 30,2. Ballière Tindall, with kind permission.

anaesthetist may panic.

Don't pass a stomach tube, because gagging may precipitate bleeding. Set up a drip. Catheterize her bladder.

**VAGINAL EXAMINATION.** Start by doing a vaginal examination with one or two Sims' specula to confirm that blood is actually coming from her cervix. Occasionally, you find that it is coming from a varicosity on her vulva or in her vagina.

Then ask an assistant to press the baby's head into the brim of her pelvis. Explore her vaginal fornices with your finger.

Can you feel any abnormal thickness in her lower uterine segment between your finger and the presenting part? Is the thickening all round her os, or only related to part of it? You should be able to get a fairly good idea of what type of placenta praevia she has: One, Two, Three, or Four (Fig. 16-9). If necessary, put your whole hand into her vagina.

**If you can feel an abnormal thickening**, she probably does have a placenta praevia. The type of placenta she has is all important. Feel very carefully where the thickening is in relation to her os. If there is abnormal thickening all round it (probably Type Four), *don't put your finger through her os*. Section her.

**If: (1) you cannot feel any abnormal thickening, or (2) the thickening you can feel does not suggest a Type Four placenta praevia**, put your index finger *very gently* through her os, and explore all round it. Sweep it in gently widening circles, until you have examined all round as far as you can reach with your finger. *Stop, as soon as you feel any placenta!* Remove your finger from time to time to see if she has started to bleed. If you feel placenta over her os, or if she bleeds, section her.

**If you cannot feel the placenta anywhere, when you put your finger through her os, and she does not bleed much**, she is probably a case of abruption, or Type One placenta praevia. Rupture her membranes. Avoid oxytocin to begin with, because its use in a case of abruption can cause nasty cervical tears, rupture of the uterus, and occasionally amniotic fluid embolus. If, however, she does not go quickly into labour, set up an oxytocin drip (2.5 units in 500 ml of dextrose 5%). If you are giving her oxytocin, watch the fetal heart carefully. If fetal distress develops in the first stage, section her.

**If she bleeds so severely that it cannot be controlled by rupturing her membranes, and pressing his head into her pelvis**, section her.

## PLACENTA PRAEVIA DURING LABOUR

**IF SHE IS IN LABOUR AND IS BLEEDING SEVERELY**, she is usually an emergency admission. Take her to the theatre, give her a general anaesthetic, and do an EIT as above. Section her, unless her cervix is fully dilated or almost so, and her membranes are presenting at the os.

**If you can feel the vertex is presenting through the membranes**, rupture them, so as to bring her baby's head down on to her placenta. This is possible for a Type One and an anteriorly placed Type Two placenta, and usually stops bleeding in a multip when it begins during labour.

If bleeding continues, section her, unless you expect her to deliver soon.

**If the placenta is fully detached or nearly so, and is sitting on top of the baby's head (rare)**, remove it and deliver him.

If any other part is presenting, management depends on where the placenta is.

**If the breech is presenting, the placenta does not cover her internal os, and her cervix is sufficiently dilated**, consider bringing down a leg and delivering her vaginally (M 12.2). This is always satisfactory for a dead fetus; but only consider it for a live one, if her cervix is more than 5 cm dilated and the baby is very small. Improvise a string of gauze swabs, tie this to his leg, tie a weight of 500 g to the other end, and hang this over the end of her bed.

**CAUTION!** Don't pull the baby through an inadequately dilated cervix (it need not necessarily be fully dilated, depending on the size of the baby).

**If the placenta covers her internal os and she bleeds**, section her and transfuse her if necessary.

## OTHER TREATMENT

Finally, don't hurry labour, take careful aseptic precautions, and restore her blood volume. Monitor the fetal heart carefully. If there are signs of fetal distress, consider Caesarean section.

Give her ergometrine with oxytocin at the completion of the second stage. Watch carefully for further bleeding for at least 24 hours.

## 16.13 Placental abruption

Abruptio is not common, and is not easy to treat. The longer you leave a patient undelivered, the worse her prognosis. If she has severe abruption, she has at least a 25% chance of DIC (disseminated intravascular coagulation), if you leave her more than 48 hours. So try to deliver her vaginally well within this time. She will usually go into labour spontaneously within 24 hours. Only section her on the uncommon indications given below. If she has severe abruption, DIC will make it dangerous. Her baby is often dead, and is usually growth-retarded and premature, so CPD (cephalopelvic disproportion) is seldom a problem.

The principles of management are: (1) Correct hypovolaemia. (2) Deliver her quickly, preferably vaginally. (3) Prevent the complications — postpartum haemorrhage, DIC, and renal failure.

If she has DIC, try to: (1) Empty her uterus. (2) Give her fresh blood. You can manage most cases with 2 or 3 units, but you may occasionally need much more. Stored blood is less useful, but is much better than no blood. You are unlikely to have fresh frozen plasma, or cryoprecipitate. If you have fibrinogen give it, she will need 3 g (19.11a).

There is no practical way of diagnosing mild abruption, so the account below refers to severe abruption only.

## SEVERE ABRUPTION

Make the diagnosis, as in Section 16.11. This account applies to revealed and concealed abruption (more common), and combinations of the two. If you are going to rupture a patient's membranes, and you will probably have to, do this EARLY, before you do anything else — see below.

### THE CLOTTING TIME

If you want to know if her blood will clot normally or not, take 5 ml into a dry glass tube. Invert it every 30 seconds, and see when it clots. It should clot in 5 to 8 minutes. If it takes longer than this, she has a clotting defect. If it clots in 2.5 minutes or less, it is hypercoagulable. Then put the tube in your pocket. If the clot lyses in 30 minutes (fibrinolysis), fibrin degradation products are present, and she needs fibrinogen and an antifibrinolytic agent (aprotinin) — if you have it!

**RESUSCITATION.** Start a rapid transfusion of 0.9% saline, or Ringer's lactate, through a wide needle or cannula. Take a sample to determine her blood group. Ask for an emergency (30 minutes) crossmatch of 4 to 6 units of *fresh* blood. Measure her clotting time. Give her pethidine 25 to 50 mg by slow intravenous injection.

As soon as blood is ready, transfuse her rapidly. Give her calcium gluconate (10 ml of 10% solution) with every third unit. If you don't have blood, give her Ringer's lactate or saline. Try to correct her hypovolaemia and anaemia within 2 hours of admission. You want her to deliver soon, and you don't want to let her go into labour while she is shocked.

Insert an indwelling catheter and measure her hourly urine output: it should be more than 60 ml. If possible, and you are experienced, insert a central venous catheter (A 19.2). Keep her CVP between 8 and 12 cm of water. Ideally, her haemoglobin should be not less than 110 g/l, and her haematocrit above 30.

If you cannot measure the CVP, here is a guide as to how much blood she needs.

Transfuse her until her systolic blood pressure is at least 100 mm Hg. If it is below this, she needs at least 1000 ml. If it is below 80 mm she needs 1500 to 2000 ml.

If she is dehydrated, correct her dehydration with 0.9% saline or Ringer's lactate.

If the above measures fail, try correcting her acidosis, with 50 to 100 mmol of sodium bicarbonate (A 15.1).

**CAUTION!** (1) Heparin is contraindicated. (2) Don't give plasma expanders, such as dextran, because these may precipitate DIC, and cause uncontrollable haemorrhage.

**MONITORING.** Start a partogram (M 18.2). All through labour check her pulse, her blood pressure, and her central venous pressure half-hourly. Every 2 hours check her urine output, her clotting time and her haemoglobin, and do a vaginal examination. Note the size of her uterus, and repeatedly check it. An increase in height shows that she is continuing to bleed.

### THE DELIVERY OF A PATIENT WITH ABRUPTION

**If her baby is alive (unusual), and weighs more than 1.5 kg,** consider section, as soon as she is resuscitated. If you are going to section her, you **MUST** do so immediately, before a clotting defect develops. Waiting a few hours and then sectioning her is a recipe for disaster.

**If he is dead and she is not in labour,** rupture her membranes (M 19.3) and give her an oxytocin drip (M 22.2). Labour is usually fast. Try to deliver her in 6 to 8 hours. Once she is in the active phase, labour should progress rapidly. You may decide to rupture her membranes, regardless of his condition, and give her life precedence over his. Besides inducing labour, rupturing her membranes will reduce her intra-amniotic pressure. This will slow the abruptive process, and may also release retroplacental clot. Her tense, tender, woody-hard uterus will make her contractions difficult to monitor, and the dose of oxytocin difficult to adjust. If she is obese and highly parous, with an unfavourable cervix, she is

particularly at risk; so try to feel for uterine contractions as best you can, and assess the progress of her labour by careful vaginal examination.

**If active labour has not started after a further 6 to 8 hours and her clotting time is normal,** consider section. If it is abnormal, Caesarean section will probably kill her.

**LATER STAGES.** The **second stage** is usually rapid. Her dead baby, the placenta, and clot may all be expelled suddenly, and tear her perineum, cervix, or uterus.

The **third stage** causes problems, because of the clotting defect, and because she may have an atonic uterus. She runs a serious risk of postpartum haemorrhage, so be sure to manage this actively. As he is delivered, give her an ampoule of intravenous ergometrine with oxytocin ('Syntometrine'). Add 15 units of oxytocin to 500 ml of Ringer's lactate or saline, and run this in fast to keep her uterus well contracted.

**CAESAREAN SECTION** should rarely be necessary. Either do it immediately, or don't do it at all. Late section (after 24 hours) is dangerous if she has an abnormal clotting time, unless you have plenty of blood and plenty of experience. At section her uterus will look bruised ('Couvellaire' uterus), but will contract normally.

The absolute indications for Caesarean section include: (1) A previously scarred uterus. Avoid a 'trial of a Caesarean scar' (18.14), because you will not know if she is rupturing — vaginal bleeding, — ycardia, and pain can all be caused by abruption, or by a uterus which is rupturing. (2) Failure to progress, despite artificial rupture of her membranes and oxytocin. (3) A patient who is bleeding to death before having a chance to deliver. Caesarean section is a desperate step and may save her life. (4) A live baby at term, with signs of fetal distress. (5) The transverse lie of a baby at term for whom vaginal delivery is impossible.

If you have fibrinogen, give it just before you operate. Have hot packs ready when you operate, and empty her uterus quickly. Bleeding usually stops, but if she bleeds severely, deliver her uterus into the wound, surround it with hot packs, grasp it firmly, and give her ergometrine with oxytocin. If this fails to control bleeding, tie her internal iliac arteries (3.5); if this too fails proceed to hysterectomy (20.12).

### DIFFICULTIES WITH PLACENTAL ABRUPTION

**If her URINE OUTPUT FALLS to below 30 ml an hour in spite of adequate fluid replacement, as observed by her CVP,** give her at least a litre of Ringer's lactate, and then give her frusemide 40 mg intravenously as a bolus injection. If she develops renal failure, see Section 53.3.

**If her UTERUS DOES NOT CONTRACT after vaginal delivery (atonic uterus),** manage her in the usual way by giving her oxytocin, making sure that her bladder is empty and all blood clot expressed from her uterus. Give her an oxytocin drip as above, and a repeat dose of ergometrine with oxytocin, provided this is not contraindicated, either because she is hypertensive, or because you have already given her two 0.5 mg doses. Compress her uterus bimanually (19.3). If her bleeding fails to stop, you may have to open her abdomen and tie her internal iliac arteries, or do a hysterectomy as a last resort. If possible, give her an ampoule of prostaglandin F<sub>2</sub>alpha, either intravenously, or through her abdominal wall directly into her myometrium.

**If she CONTINUES TO BLEED AFTER DELIVERY from multiple small tears,** she may have: (1) DIC. (2) An atonic uterus (see above). (3) Multiple lacerations in her cervix. Correct (1) and (2). Examine her vaginally, and you may see many small lacerations and bleeding points. Carefully pack her genital tract as in section 19.11a. Give her an oxytocin drip to make sure her uterus is well contracted. Remove the pack in 24 to 48 hours.

**If you diagnose ABRUPTION IN A PATIENT WITH A CAESAREAN SCAR,** it is probably a ruptured uterus. Section her immediately.