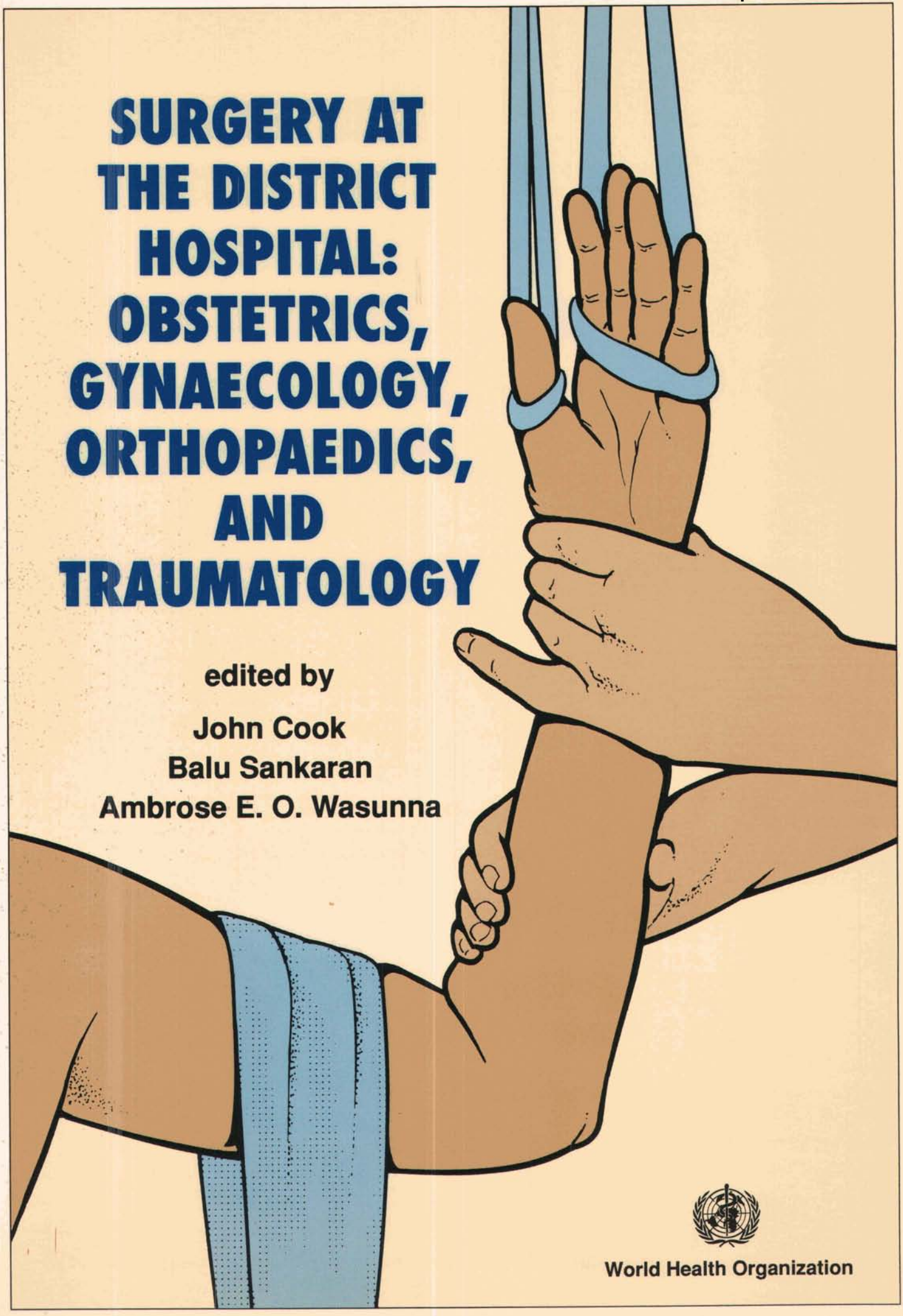
Please see the Table of Contents for access to the entire publication.

SURGERY AT THE DISTRICT HOSPITAL: OBSTETRICS, GYNAECOLOGY, ORTHOPAEDICS, AND TRAUMATOLOGY



edited by

John Cook
Balu Sankaran
Ambrose E. O. Wasunna

World Health Organization

The World Health Organization is a specialized agency of the United Nations with primary responsibility for international health matters and public health. Through this organization, which was created in 1948, the health professions of more than 165 countries exchange their knowledge and experience with the aim of making possible the attainment by all citizens of the world by the year 2000 of a level of health that will permit them to lead a socially and economically productive life.

By means of direct technical cooperation with its Member States, and by stimulating such cooperation among them, WHO promotes the development of comprehensive health services, the prevention and control of diseases, the improvement of environmental conditions, the development of health manpower, the coordination and development of biomedical and health services research, and the planning and implementation of health programmes.

These broad fields of endeavour encompass a wide variety of activities, such as developing systems of primary health care that reach the whole population of Member countries; promoting the health of mothers and children; combating malnutrition; controlling malaria and other communicable diseases, including tuberculosis and leprosy; having achieved the eradication of smallpox, promoting mass immunization campaigns against a number of other preventable diseases; improving mental health; providing safe water supplies; and training health personnel of all categories.

Progress towards better health throughout the world also demands international cooperation in such matters as establishing international standards for biological substances, pesticides, and pharmaceuticals; formulating environmental health criteria; recommending international nonproprietary names for drugs; administering the International Health Regulations; revising the International Classification of Diseases, Injuries, and Causes of Death; and collecting and disseminating health statistical information.

Further information on many aspects of WHO's work is presented in the Organization's publications.

SURGERY AT THE DISTRICT HOSPITAL: OBSTETRICS, GYNAECOLOGY, ORTHOPAEDICS, AND TRAUMATOLOGY

Surgery at the district hospital: obstetrics, gynaecology, orthopaedics, and traumatology

edited by

John Cook
Formerly Consultant Surgeon
Department of Surgery
Eastern General Hospital
Edinburgh, Scotland

Balu Sankaran
Formerly Director
Division of Diagnostic, Therapeutic and
Rehabilitative Technology
World Health Organization
Geneva, Switzerland

Ambrose E. O. Wasunna
Medical Officer
Clinical Technology
World Health Organization
Geneva, Switzerland
and
Professor of Surgery
University of Nairobi
Nairobi, Kenya

illustrated by
Derek Atherton
Elisabetta Sacco
and Patrick Virolle

World Health Organization
Geneva
1991

WHO Library Cataloguing in Publication Data

Surgery at the district hospital : obstetrics, gynaecology, orthopaedics and traumatology / edited by John Cook, Balu Sankaran, Ambrose E. O. Wasunna.

1. Surgery — methods 2. Genitalia, Female — surgery 3. Hospitals, District 4. Labor complications — surgery 5. Orthopedics 6. Pregnancy complications — surgery 7. Surgical equipment 8. Wounds and injuries — surgery I. Cook, John II. Sankaran, Balu III. Wasunna, Ambrose, E. O.

ISBN 92 4 154413 9 (NLM Classification: WO 100)

© World Health Organization 1991

Publications of the World Health Organization enjoy copyright protection in accordance with the provisions of Protocol 2 of the Universal Copyright Convention. For rights of reproduction or translation of WHO publications, in part or *in toto,* application should be made to the Office of Publications, World Health Organization, Geneva, Switzerland. The World Health Organization welcomes such applications.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

The contributors alone are responsible for the views expressed in this publication.

Printed in Switzerland
89/8331 — Atar — 7500

Please click inside the blue boxes below to access the chapters within.

CONTENTS

Gynaecology

Orthopaedics and traumatology

Basic techniques

Fractures, dislocations, and other injuries

Bone and joint infections and other lesions

Preface

This handbook is one of three[1] published by the World Health Organization for the guidance of doctors providing surgical and anaesthetic services in small district hospitals (hospitals of first referral) with limited access to specialist services. The advice offered has been deliberately restricted to procedures that may need to be carried out by a young doctor with limited experience in anaesthesia, surgery, or obstetrics, using the facilities that can reasonably be expected in such hospitals. Wherever possible, the drugs, equipment, and radiodiagnostic and laboratory procedures described conform with WHO and UNICEF recommendations.

Although the handbooks contain detailed descriptions and illustrations, the advice they offer is no substitute for practical experience. The reader is expected to have been exposed to all the relevant techniques during undergraduate or early postgraduate education. When necessary the text indicates which patients should be referred for specialized care at a higher level, as it is important to developing health services that young doctors and their superiors understand the limitations of practice at the district hospital.

It has, of course, been necessary to be selective in deciding what to include in the handbooks, but it is hoped that any important omissions will be revealed during field testing. WHO would also be pleased to receive comments and suggestions regarding the handbooks and experience with their use. Such comments would be of considerable value in the preparation of any future editions of the books. Finally, it is hoped that the handbooks will fulfil their purpose—to help doctors working at the front line of surgery throughout the world.

The three handbooks have been prepared in collaboration with the following organizations:

Christian Medical Commission
International College of Surgeons
International Council of Nurses
International Federation of Gynaecology and Obstetrics
International Federation of Surgical Colleges
International Society of Burn Injuries
International Society of Orthopaedic Surgery and Traumatology
League of Red Cross and Red Crescent Societies
World Federation of Societies of Anaesthesiologists
World Orthopaedic Concern.

[1] Also available: *Anaesthesia at the district hospital* and *General surgery at the district hospital.*

Acknowledgements

The traumatology and orthopaedics section of this handbook has been prepared in collaboration with the International Society for Orthopaedic Surgery and Traumatology (SICOT), which reviewed and endorsed the draft manuscript and illustrations. The International Society for Burn Injuries reviewed and endorsed the draft manuscript and illustrations for the chapter on burns.

The editors would like to acknowledge the valuable suggestions received from: Professor J.A. Boswick, Professor of Surgery and Chief, Hand Surgery Service, University of Colorado School of Medicine, Denver, CO, USA; Dr J.C. Cobey, Chairman, Health Volunteers Overseas, Washington, DC, USA; Dr A. Trias, Orthopaedic Surgeon, Barcelona, Spain; and Mr J.N. Wilson, formerly President, World Orthopaedic Concern, and Consultant Orthopaedic Surgeon, Royal National Orthopaedic Hospital, London, England.

Acknowledgements are also due to Churchill Livingstone, Edinburgh, for permission to adapt drawings from Rintoul, R.F., ed. *Farquharson's textbook of operative surgery* (6th edition, 1978) for Figures 21.3H and 23.3K; from Powell, M. *Orthopaedic nursing and rehabilitation* (9th edition, 1986) for Figures 19.2C and 24.1E; and from Wilson, J.N., ed. *Watson-Jones fractures and joint injuries* (6th edition, 1982) for Figures 15.2D and 19.1A, B.

Contributors

Professor R. Baveja, Professor and Head, Department of Obstetrics and Gynaecology, Motilal Nehru Medical College, Allahabad, India

Mr J. Cook, formerly Consultant Surgeon, Department of Surgery, Eastern General Hospital, Edinburgh, Scotland

Professor K.G. Gürsu-Hazarli, Director, Department of Plastic and Reconstructive Surgery, Hecettepe University Medical School, Ankara, Turkey

Dr B. Sankaran, formerly Director, Division of Diagnostic, Therapeutic and Rehabilitative Technology, World Health Organization, Geneva, Switzerland

Professor S.M. Tuli, Professor of Orthopaedics and Director, Institute of Medical Sciences, Banaras Hindu University, Varanasi, India

Dr A.E.O. Wasunna, Medical Officer, Clinical Technology, World Health Organization, Geneva, Switzerland, and Professor of Surgery, University of Nairobi, Nairobi, Kenya

Introductory notes

This handbook describes a limited number of surgical procedures. They have been chosen as appropriate for the doctor who does not have a formal surgical training, but who nevertheless has experience, gained under supervision, of all the relevant techniques. With the exception of tubal ligation and the insertion of intrauterine devices (IUDs), which may be an important part of national family planning programmes, the procedures included are considered essential for saving life, alleviating pain, preventing the development of serious complications, or stabilizing a patient's condition pending referral. Operations that require specialist skills or that could add unnecessarily to the doctor's workload have been avoided, and simple but standard surgical techniques have been selected whenever possible. Nevertheless, certain procedures that may appear technically difficult (for example subtotal hysterectomy and burr-hole craniotomy) are included because they may offer the best chance of saving a patient's life.

The handbook is split into two main sections—obstetrics and gynaecology, and orthopaedics and traumatology—and covers the more specialized topics not included in Cook, J. et al., ed. *General surgery at the district hospital* (Geneva, WHO, 1988). The reader is referred to the book on general surgery for a discussion of basic surgical principles and techniques, fluid and electrolyte therapy, blood transfusion, and the management of shock and to the list inside the back cover of the present book for details of other WHO publications of related interest. Details of anaesthetic techniques suitable for use at the district hospital are given in Dobson, M.B. *Anaesthesia at the district hospital* (Geneva, WHO, 1988).

Obstetrics and gynaecology

The obstetric procedures described here are those that are essential at the district hospital for treating the major complications of pregnancy and childbirth and for preventing maternal death. Although most normal deliveries are conducted by midwives or traditional birth attendants rather than by medical officers, a description of normal labour and delivery has been included as a basis for recognizing complications. The gynaecology section of the book provides details not only of general gynaecological procedures but also of female sterilization and IUD insertion, and includes a chapter on

biopsies, which may be useful when the provision of a pathology report can be assured and when the suspected disease can be treated at the district hospital.

Orthopaedics and traumatology

Details are provided here both of basic orthopaedic techniques and of the management of specific fractures, dislocations, and other injuries, as appropriate at first referral level. Closed treatment of fractures has been recommended because internal fixation (open or closed) may be technically beyond the competence of the general duty doctor and can have disastrous results in the hands of the inexperienced working with limited resources. Although recovery is slow, closed treatment has over the years proved to be effective and safe for most common fractures.

A final section of the text briefly describes the treatment of various bone and joint infections and other lesions, since timely intervention can often prevent the development of serious complications. Chronic infections, other bone diseases, and congenital deformities are mentioned only to draw attention to the need for referral.

OBSTETRICS

1

Complications of pregnancy

The two main complications of pregnancy that will require treatment at the district hospital are antepartum haemorrhage, due to placenta praevia or abruptio placentae, and eclampsia.

Antepartum haemorrhage

Haemorrhage in the last trimester of pregnancy should be taken particularly seriously. Painless and unexplained haemorrhage in a multigravida is usually due to placenta praevia. Abdominal pain and bleeding with pre-eclamptic toxaemia in a primigravida suggest accidental haemorrhage caused by abruptio placentae.

Diagnosis

In cases of placenta praevia, haemorrhage occurs from an abnormally situated placenta. The placenta praevia is classified according to the relation between its edge and the internal os. A posteriorly situated placenta is more dangerous than an anterior placenta praevia. Bleeding is always revealed, with the blood bright red, though it may cease spontaneously. The degree of the patient's pallor corresponds to the amount of blood lost. There is no tenderness in the abdomen, the uterus is soft and relaxed, the presenting part may be high or abnormal, the fetal parts are easily palpable, and fetal heart sounds are usually present. The patient may show signs of hypovolaemic shock. Vaginal examination can cause severe bleeding, making the need for delivery urgent, so in general it should be avoided. If it is absolutely necessary, it should be done under sterile conditions in the operating room and then only if preparations have been made for immediate blood transfusion and vaginal delivery or caesarean section.

Abruptio placentae—premature separation of the normally situated placenta with resultant retroplacental bleeding—can be of the revealed, concealed, or mixed type. The causes include toxaemia, trauma, sudden uterine decompression, or a short umbilical cord. In the revealed type, the amount of external blood loss is consistent with the condition of the patient. In the concealed type, there is usually no visible vaginal bleeding, yet the patient is pale and the uterus tender, markedly hypertonic, and "woody" hard. In severe cases of abruptio placentae, fetal heart sounds are absent, and there is the risk of a coagulation defect if treatment is delayed.

Abruptio placentae is classified from grade 0 to grade 3 according to its severity. Grade 0 is diagnosed after delivery, when the retroplacental clot is noticed. There are usually no symptoms associated with this grade. Grades 1–3 are classified according to the amount of bleeding, maternal hypovolaemia, and the presence or absence of fetal heart sounds. In Grade 2 the patient is in hypovolaemic shock, but fetal heart sounds are present. In Grade 3 there is death of the fetus.

Differential diagnosis

Differential diagnosis should include ruptured uterus, cervical polyp, carcinoma of the cervix, varicose veins of the vulva or vagina, disseminated intravascular coagulation, and bleeding haemorrhoids.

Investigations

Measure the patient's haemoglobin level and test the urine for sugar and protein. Send a sample of blood for grouping (including Rh factor) and carry out a serological test for syphilis. Determine the bleeding and clotting times, clot-retraction time, platelet count, and prothrombin time.

Equipment

See trays for *Caesarean section* and *Episiotomy,* Annex 1, pages 187 and 188.

Management

Immediately administer 15 mg of morphine by intramuscular injection, if this was not already done before the patient was brought to hospital. Examine the patient to determine the cause of the haemorrhage, but do not carry out vaginal examination. Ascertain the amount of bleeding, the gestational age, and the fetal condition, and then decide upon the line of treatment.

Placenta praevia

If the bleeding is diminishing or shows signs of stopping, if the duration of pregnancy is less than 36 weeks, if fetal weight is less than 2500 g, and if labour is not yet established, the patient can be put on expectant treatment. Vaginal examination is not necessary. Prepare for possible blood transfusion.

If bleeding persists, if the gestational age is 36 weeks or more, and if the fetal weight is more than 2500 g, pelvic examination is permissible provided that trays for both episiotomy and caesarean section are to hand. Check for any local lesions by speculum examination, but if bleeding is excessive and a major degree of placenta praevia is suspected, avoid speculum examination in favour of immediate caesarean section. If a minor degree of placenta praevia is detected and if the patient is in labour and the presentation is favourable for vaginal delivery, rupture the membranes. Check for lacerations after delivery.

A lower-segment caesarean section is the treatment of choice for a major degree of placenta praevia. If the placenta obstructs delivery, either incise it or deliver the baby around the placental edge. Prompt delivery will reduce maternal and fetal haemorrhage.

Accidental haemorrhage (abruptio placentae)

In cases of accidental haemorrhage of the revealed type, if bleeding stops on admission to the hospital or if it is minimal, consider expectant treatment, especially if there is a need to prolong the pregnancy. If bleeding continues, however, examine the patient in the operating theatre, with trays to hand for both episiotomy and caesarean section, to decide upon a further course of action.

If bleeding is moderate to severe, start blood transfusion as soon as possible. If the cervix is favourable, rupture the membranes to expedite delivery. Start the patient on an oxytocin drip of 2 IU in 500 ml of 5% (50 g/litre) glucose at the rate of 15 drops/min. Gauge the response to treatment by the patient's pulse and blood pressure, by the nature of uterine contractions and the progress of labour, and by the fetal condition. Lower-segment caesarean section is indicated if there is poor progress of labour, failure of the uterus to relax between contractions, fetal distress, or increased bleeding.

In cases of accidental haemorrhage of the concealed type, signs of hypovolaemic shock are usually evident. You can roughly estimate the amount of blood that is trapped by the feel and size of the uterus. The volume of blood required for transfusion will be approximately four times the estimated increase in the volume of the uterus. This amount may be life-saving and is unlikely to lead to

overloading, but keep a careful watch for such signs. If the clot-retraction test has indicated that there is a coagulation defect, give fresh blood or, if available, fresh frozen plasma. If the clot formed in the test dissolved after 30 min at body temperature, suspect fibrinolytic activity, which may be an indication for referral for hysterectomy.

General management consists of oxygen administration and the recording of pulse, blood pressure, and hourly urine output. Note the height of the uterine fundus. When the patient's blood pressure has improved, rupture the membranes and start her on an oxytocin drip. If delivery is not complete within 4–6 hours, caesarean section is indicated. Watch for postpartum haemorrhage.

Complications

Possible complications include postpartum haemorrhage, disseminated intravascular coagulation, renal failure, and, rarely, acute pituitary necrosis.

Eclampsia

Eclampsia is a convulsive state that usually develops from severe pre-eclampsia, although it can appear without the preceding pre-eclamptic toxaemia. About half of all cases of eclampsia present before parturition, but the disease can develop at any time during pregnancy or before, during, or after labour.

Diagnosis

Impending eclampsia is characterized by generalized or localized headache, visual disturbances, restlessness, epigastric pain, nausea and vomiting, and oliguria. Examination may reveal hypertension, albuminuria, and retinal changes. An eclamptic seizure follows a characteristic sequence. The premonitory stage, which lasts for about 30 s, is characterized by twitching of the hand and facial muscles and rolling of the eyes. This stage is followed by a phase of tonic convulsion, again lasting about 30 s. The patient has a slow respiratory rate, opisthotonos, and marked cyanosis. The third stage lasts about 1 min, during which there are clonic convulsions with alternate contraction and relaxation of the limb muscles. Cyanosis gradually passes off. Other features of the third stage are frothing at the mouth, biting of the tongue, and urinary and faecal incontinence. Finally, the patient lapses into a deep coma.

Differential diagnosis

Differential diagnosis should include epilepsy, meningitis, cerebrovascular accident, strychnine poisoning, and hysteria.

Investigations

As for normal delivery, measure the patient's haemoglobin level and test the urine for sugar and protein. Send a sample of blood for grouping (including Rh factor). Test for bleeding and clotting times and carry out a serological test for syphilis. In addition, if possible, check blood levels of urea and uric acid.

Management

Eclampsia should be treated immediately in hospital, the main consideration being for the mother's life. The aim is to prevent asphyxia, control the fits, prevent and treat complications, and effect a safe and speedy delivery.

If you first see an eclamptic patient at home, provide deep sedation by a slow intravenous injection of 10–20 mg of diazepam (or 15 mg of morphine sulfate), insert a mouth gag, and place the patient in the semiprone position. Once the fits are controlled and sedation takes effect, transport the patient to hospital, with a note detailing the treatment already given.

Inquire of the patient's relatives about the onset, duration, and number of fits and about the patient's parity, antenatal care, and health during pregnancy. Carry out a quick but thorough clinical examination. Record the duration of pregnancy; the patient's pulse rate, blood pressure, and temperature; the amount of oedema; the condition of the lungs; and the fetal heart rate. Catheterize the patient's bladder and record urinary output.

Prevention of asphyxia

Once the patient has been transported to hospital, nurse her in the semiprone position in a quiet, dark room. She may become markedly cyanosed during convulsions. Aspirate secretions from the throat and administer oxygen intermittently through the nose.

Control of fits

Administer diazepam intravenously, starting with a slow injection of 20–40 mg followed by an infusion of 80 mg/litre in 5% (50 g/litre) glucose at the rate of 30 drops/min.

As an alternative, give 50 mg of chlorpromazine and 25 mg of promethazine intramuscularly soon after admission, followed by 100 mg of pethidine and 50 mg of chlorpromazine in 20 ml of 5% glucose intravenously. Then start an intravenous infusion of 1 litre of 10% glucose containing 100 mg of pethidine, and adjust the drip rate according to the patient's response. Further doses of pethidine may be given as required, but the maximum dose that should be given in 24 hours is 300 mg. After 4 hours, repeat the intramuscular injection of promethazine. After another 4 hours, follow this with 50 mg of chlorpromazine given intravenously, and continue this alternating regimen for 24 to 48 hours.

Control hypertension, for example with 20 mg of hydralazine by infusion. Regulate the dose according to the blood-pressure response. If there is tachycardia, venous congestion in the neck, or persistent cyanosis despite the administration of oxygen, give a slow intravenous injection of 0.1 mg of digoxin, followed by 20–40 mg of furosemide.

Obstetric management

Once the patient is fully sedated, verify fetal heart sounds and carry out abdominal and vaginal examinations. In many cases, spontaneous labour will have started, in which case rupture the membranes artificially. During the second stage of labour, perform a low forceps delivery with episiotomy to reduce the maternal efforts. If labour has not begun, but the fetal lie and presentation and the pelvis are favourable, rupture the membranes and put the patient on a drip of 2 IU of oxytocin in 500 ml of 5% glucose at the rate of 15 drops/min. Monitor the progress of labour, the uterine contractions, and the patient's pulse and blood pressure. Surgical induction is contraindicated if the fetus is dead. Caesarean section is indicated in cases of cephalopelvic disproportion, fetal distress, or oblique lie, or if the fits are not controlled within 4–6 hours of starting treatment.

General treatment

General care of the patient includes turning, to avoid pressure sores, emptying of the bladder, and attention to bowel activity. Total daily fluid intake should be limited to 1000 ml plus the volume of urine output for the previous 24 hours. Aspirate secretions from the upper respiratory passages every 2 hours.

After delivery, continue to administer sedatives and also, if necessary, antihypertensive drugs for at least 24 hours.

Complications

Possible complications include inhalation pneumonia, accidental haemorrhage, vasomotor collapse, bilateral renal cortical necrosis, and cardiac failure.

2

Delivery

Normal delivery

Labour is the physiological process by which the uterus expels the products of conception. The classical signs of the onset of labour are painful, regular uterine contractions, "show", and cervical effacement with dilatation. True labour is differentiated from false labour in that false labour is associated with abdominal pain and irregular uterine contractions that do not lead to cervical shortening and dilatation.

Assessment

Take the mother's history, and review the prenatal records. Carry out a physical examination to detect any systemic disorder and to determine the fundal height, the fetal lie and presentation, the fetal heart rate, the degree of cervical dilatation and effacement, the station of the fetal head, and the fetal position and attitude. Assess the size of the pelvis.

Investigations

Measure the mother's haemoglobin level and test the urine for sugar and protein. Send a sample of blood for grouping (including Rh factor) and carry out a serological test for syphilis.

Equipment

See tray for *Episiotomy,* Annex 1, page 188.

Management

Because the onset of labour delays gastric emptying, the mother should avoid taking food or fluids by mouth; she should be put on an intravenous drip of glucose/saline or be given plain water and antacids orally. In early labour, she may move about or sit on a chair, provided that the fetal head is not free-floating and that the membranes are intact. After rupture of the membranes and during active labour, however, the mother should remain in bed. Monitor and record her pulse rate and blood pressure hourly. Auscultate the fetal heart rate every 15 min during the first stage of labour, and after every contraction during the second stage. Begin auscultation towards the end of a uterine contraction and continue for 30 s after the contraction has stopped.

During labour, cervical dilatation proceeds with a characteristic pattern, which can be plotted against time (for example on a "partograph"). The process is divided into two well-defined phases: the latent phase (from 0 to 4 cm of dilatation) and the active phase (from 4 to 10 cm of dilatation). The mean duration of the entire dilatation phase is 8 hours in primigravidae and 5 hours in multigravidae.

For delivery, the mother should be allowed to choose the most comfortable position. Prepare the vulva, proximal thighs, perineum, and anal area with an antiseptic solution. Drape the abdomen and legs, and place a drape under the

buttocks. The objective during delivery is to allow a slow, controlled delivery of the head to prevent fetal or maternal soft-tissue injury. Perform an episiotomy, if necessary, at the time that the head distends the vulva and perineum (see p. 32). After the occiput has disengaged from the symphysis pubis, place the flat of your hand over the vertex and exert slight pressure to prevent rapid extension of the head. After the delivery of the head, gently aspirate fluid from the baby's nose, mouth, and oropharynx via a soft catheter. Palpate the neck for the presence of coils of umbilical cord. If the cord is found, slip it over the baby's head or cut it between clamps. Support the head as the baby's body rotates. Then grasp it in both hands over the parietal bones and exert gentle downward traction until the anterior shoulder is delivered beneath the symphysis.

With the birth of the anterior shoulder, check whether there is a multiple pregnancy; provided that there is not, administer 0.25 mg of ergometrine or, if this is unavailable, 2 IU of oxytocin. Apply gentle upward traction to deliver the posterior shoulder over the perineum. The remainder of the body should deliver spontaneously, and the baby can then be handed over to an assistant. Normally, the expulsion of the placenta should not take more than 5 min. Once the uterus is contracted, this process can be facilitated by controlled cord traction. After expulsion of the placenta, inspect the cervix; any tears or lacerations should be stitched. If an episiotomy has been made, carry out repair (see page 32). During the first few hours after delivery, keep the patient under observation for postpartum haemorrhage.

Premature labour

Premature labour is defined as labour occurring between day 141 and day 249 of pregnancy (between the 20th and the 37th week) when the fetal weight is 500–2500 g. The predisposing factors include habitual abortion, previous induced abortion, incompetence of the cervix, uterine anomalies, recurrent infection of the urinary tract, asymptomatic bacteriuria, physically demanding work during pregnancy, low socioeconomic status, hypertension, pre-eclampsia, multiple pregnancy, antepartum haemorrhage, abdominal surgery during pregnancy, febrile illness, and gross fetal anomaly.

Prevention

Prevention of pre-term labour is important. All pregnant women, but especially those who are predisposed to premature labour, should be given general advice on the importance of good nutrition, the hazards of smoking, and the need for rest. In patients with an incompetent cervical os, cervical cerclage (suture) applied at 12 weeks of gestation can be effective.

Diagnosis

The diagnosis is confirmed by a history of regular uterine contractions, by abdominal palpation, and, on vaginal examination, by evidence of progressive cervical effacement and dilatation.

Investigations

Measure the patient's haemoglobin level and test the urine for sugar and protein. Send a sample of blood for grouping (including Rh factor) and carry out a serological test for syphilis. In addition, when possible, test the urine for microorganisms.

Management

Management depends upon how early the patient reports for medical help. Patients reporting early with the cervix partially effaced, but with dilatation of less than 2 cm, should be treated conservatively with a view to prolonging the pregnancy to give fetal organ systems time to mature. Certain patients treated conservatively fail to respond and go into progressive premature labour. Patients

presenting late with the cervix fully effaced and with dilatation of more than 2 cm are in progressive premature labour, which requires active management.

Conservative management

Conservative treatment consists of bed rest, preferably in hospital; sedation; and, if available, the administration of drugs to relax the uterine muscles, for example isoxsuprine, terbutaline, ritodrine (all given intravenously or orally), or ethanol (given intravenously). Contraindications to the use of these drugs include premature rupture of the membranes, chorio-amnionitis, fever of unknown origin, heart disease, cardiac dysrhythmias, thyrotoxicosis, severe antepartum haemorrhage, cervical dilatation of more than 2 cm, fetal distress, or intrauterine death.

First calm the patient by giving 10 mg of diazepam intramuscularly every 8 hours. Administer other drugs as appropriate. For example, if you are using isoxsuprine, start an intravenous infusion of 100 mg in 500 ml of 5% (50 g/litre) glucose at the rate of 1.0–1.5 ml/min. Gradually increase the drip rate to 2.5 ml/min or until the uterus becomes calm. Check the mother's blood pressure and both the mother's and the fetal heart rate regularly. Discontinue the drip once the uterus has remained tranquil for 6 hours, and give the patient 10 mg of isoxsuprine intramuscularly every 3 hours for 24 hours and then every 6 hours for the next 48 hours. If she goes into progressive premature labour, proceed with active management as described below.

Active management

The aim of management of progressive premature labour is to minimize birth asphyxia and to prevent the development of respiratory distress syndrome. Rupture the membranes and start the administration of antibiotics. Monitor labour in the usual manner with special consideration for maternal nutrition and hydration and fetal condition.

Caesarean section is sometimes indicated, for example in cases of fetal distress, breech presentation, or placenta praevia, but vaginal delivery is usually preferable. When the head presents at the vulva, perform a wide episiotomy to prevent intracranial injury. To give the baby the advantage of a few extra millilitres of blood, wait until pulsations cease before clamping the cord.

If there is doubt about the maturity of the fetal lungs, and provided there is time before delivery, give the mother 4 mg of betamethasone intravenously every 8 hours for a total of six doses, to prevent respiratory distress syndrome in the newborn baby. Contraindications to this treatment are maternal infection, maternal heart disease, or rupture of the membranes.

After delivery, keep the premature baby warm and provide adequate nutrition.

Low forceps delivery

Although forceps delivery has largely been replaced by vacuum extraction, it is a procedure still undertaken in many developing countries where vacuum extraction is not yet in wide use.

Limit the use of obstetric forceps in delivery to the gentle lifting out of the fetal head at the pelvic outlet.

Indications for low forceps delivery are maternal distress and conditions associated with a threat of maternal distress, such as cardiac disease, pulmonary tuberculosis, thyroid disease, eclampsia, and severe anaemia.

Fetal indications include:

- fetal distress, as indicated by a fetal heart rate of more than 160/min, or less than 120/min, and the passage of meconium;
- conditions that may give rise to fetal asphyxia, for example cord prolapse at full cervical dilatation, eclamptic seizures in the mother, and an after-coming head in breech presentation; and
- a prolonged second stage of labour, especially if the fetal head has not advanced for 20 min, or in a primigravida if active bearing down has continued for about 40 min.

Assessment

Carry out a general assessment and follow the progress of labour as for normal delivery (see page 19). In addition, examine the patient for signs of maternal distress: a dry tongue, a rising pulse rate, pyrexia, and dehydration.

Provided that the fetal head is in low midcavity, obstetric forceps can be applied for delivery in case of: occipito-anterior position (with complete rotation of the fetal head), persistent occipitoposterior position or face-to-pubis presentation, and after-coming head in breech presentation. However, if the sinciput is palpable, forceps should not be used.

Investigations

Measure the mother's haemoglobin level and test the urine for sugar and protein. Send a sample of blood for grouping (including Rh factor) and carry out a serological test for syphilis.

Equipment

See tray for *Episiotomy,* Annex 1, page 188, and add a pair of low obstetric forceps.

Technique

Once the second stage of labour has started, the patient should be given a regional anaesthetic by pudendal block or a general anaesthetic. Place her in the lithotomy position, clean and drape the area, and catheterize the bladder. Then check for the following before proceeding: full dilatation of the cervix, the absence of membranes, complete rotation of the fetal head, and the station of the head below the ischial spines. Check the forceps blades to ensure that they will lock correctly. Apply the left blade first, guiding it into the uterine cavity along your right palm (Fig. 2.1A–D). Similarly apply the right blade along the inserted left hand (Fig. 2.1E, F). Lock the forceps and apply traction during uterine contractions, first downwards and backwards (Fig. 2.1G, H), gradually levelling out, and finally upwards and forwards in the case of the occipito-anterior position (Fig. 2.1I–L). Perform an episiotomy with the crowning of the head. Once the head reaches the pelvic outlet, lift it out using the forceps.

After delivery, inspect the cervix and repair any tears. Stitch the episiotomy in layers and apply a sterile pad.

Complications

Possible complications include fetal asphyxia and intracranial haemorrhage; maternal hypovolaemic shock; injuries such as cervical and vaginal laceration or uterine rupture; and postpartum haemorrhage or sepsis.

Vacuum extraction

Vacuum extraction is an alternative to forceps delivery. It is indicated mainly in cases of delayed labour with an incompletely dilated cervix and a low fetal vertex.

Vacuum extraction is contraindicated in acute fetal distress or prematurity.

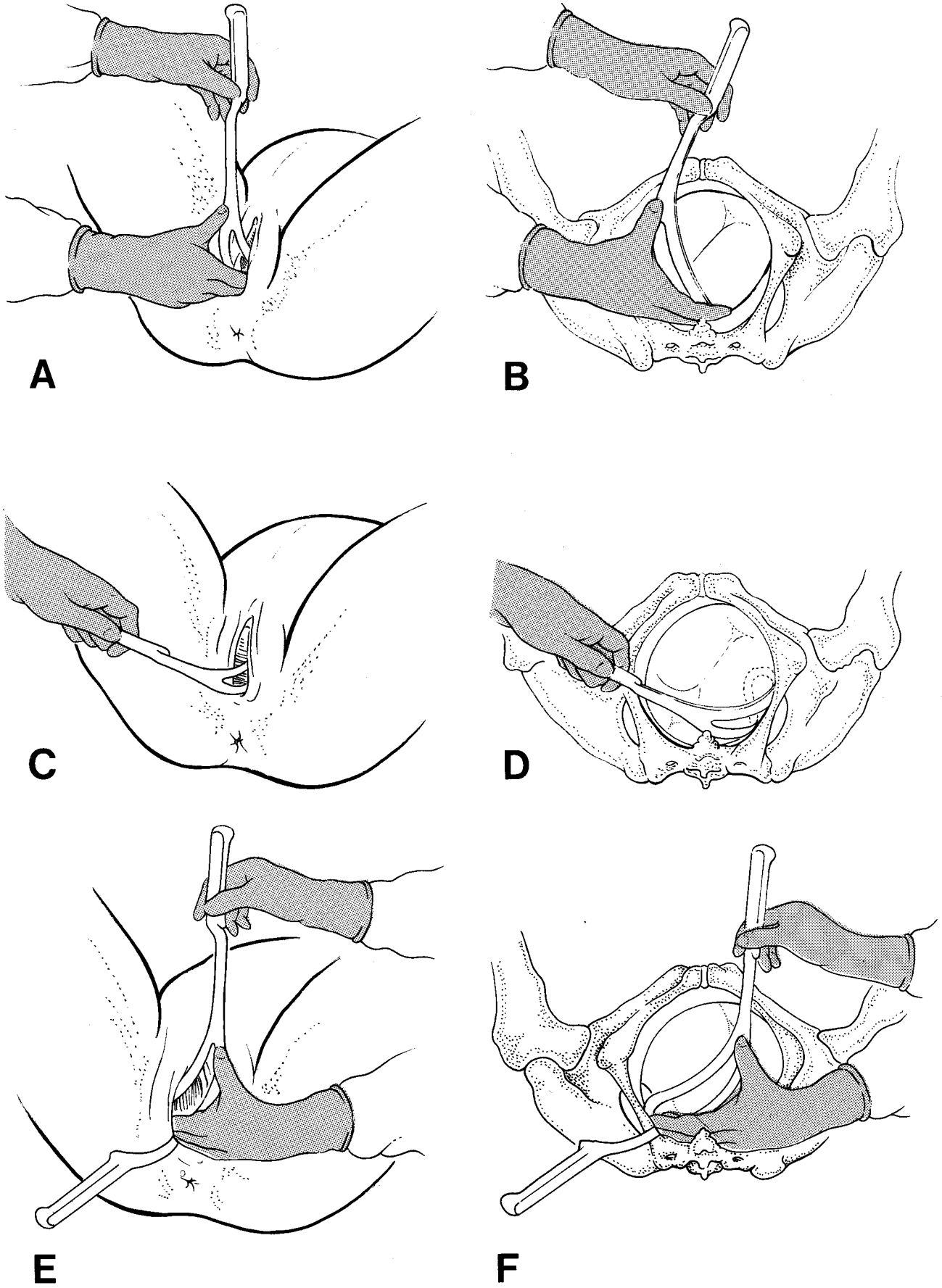


Fig. 2.1. Low forceps delivery. Applying the left blade of delivery forceps (A–D); applying the right blade (E, F). Right-hand illustrations show position of forceps in relation to fetal head and mother's pelvic bones.

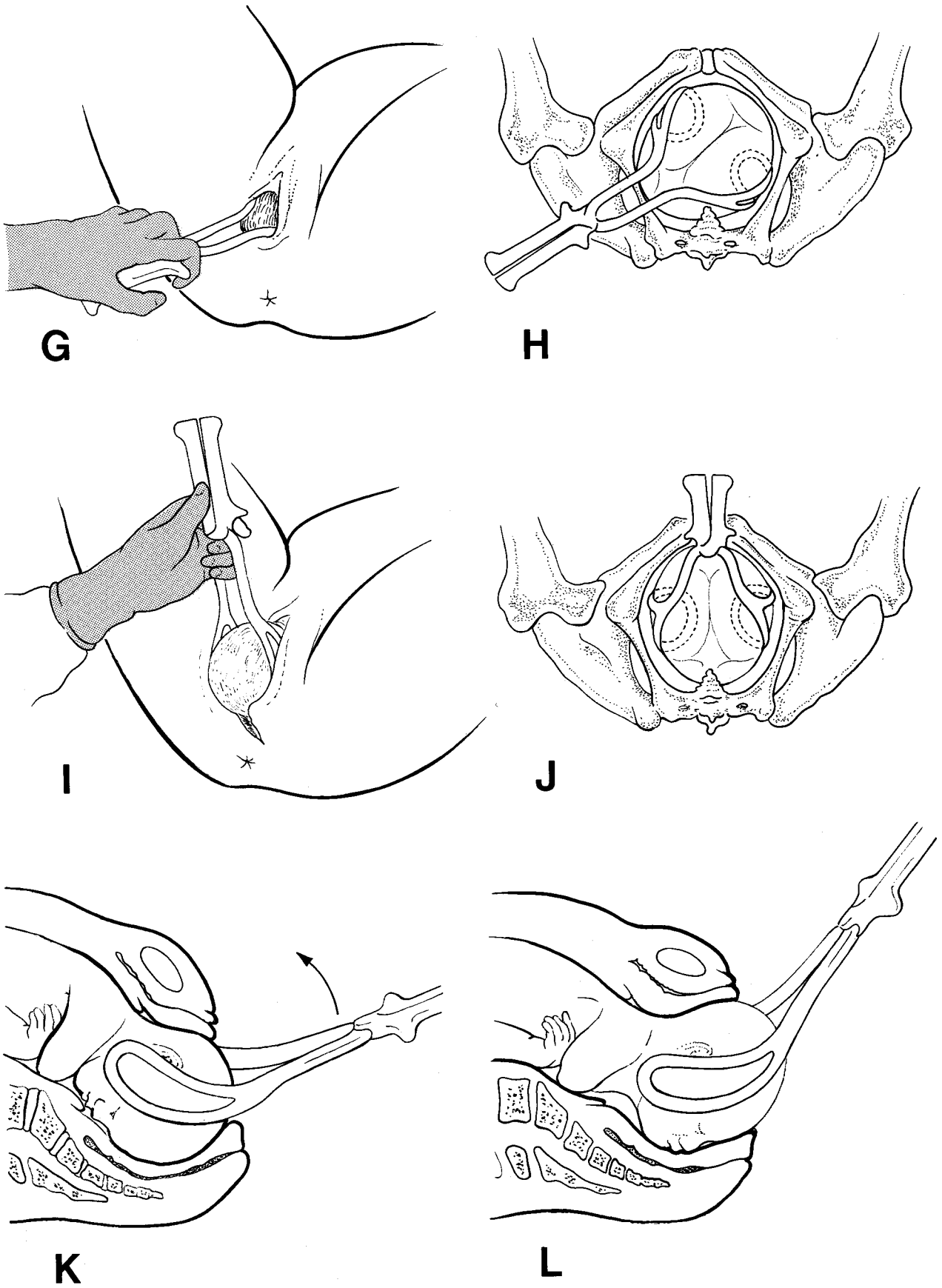


Fig. 2.1. Low forceps delivery *(continued)*. Locking the forceps and applying traction downwards and backwards (G, H); applying traction gradually upwards (I–L). Illustrations H and J show position of forceps in relation to fetal head and mother's pelvic bones.

Assessment

Assess the patient as for forceps delivery (see pages 21–22).

Investigations

Measure the mother's haemoglobin level and test the urine for sugar and protein. Send a sample of blood for grouping (including Rh factor) and carry out a serological test for syphilis.

Equipment

See tray for *Episiotomy,* Annex 1, page 188, and add an apparatus for obstetric vacuum extraction (Fig. 2.2A).

Technique

Employ the largest possible vacuum extraction cup (Fig. 2.2B). Take all aseptic and antiseptic precautions. Perineal infiltration with local anaesthetic is usually sufficient and will also be suitable for episiotomy. Otherwise, use a pudendal block. With the patient in the lithotomy position, retract the perineum with two fingers of one hand and insert the cup with its open end pointing towards the occiput. Press the cup against the baby's scalp, as near to the lambda as possible. Check that no vaginal or cervical tissue has been caught within the rim of the cup.

Instruct an assistant to activate the pump to raise the suction pressure by 0.2 kg/cm^2 every 2 min to a maximum of 0.8 kg/cm^2. As soon as the vacuum has reached the required value, begin traction synchronously with uterine contractions. Release the vacuum as soon as the head crowns, and continue as for a normal delivery. Never apply traction continuously for more than 15 min.

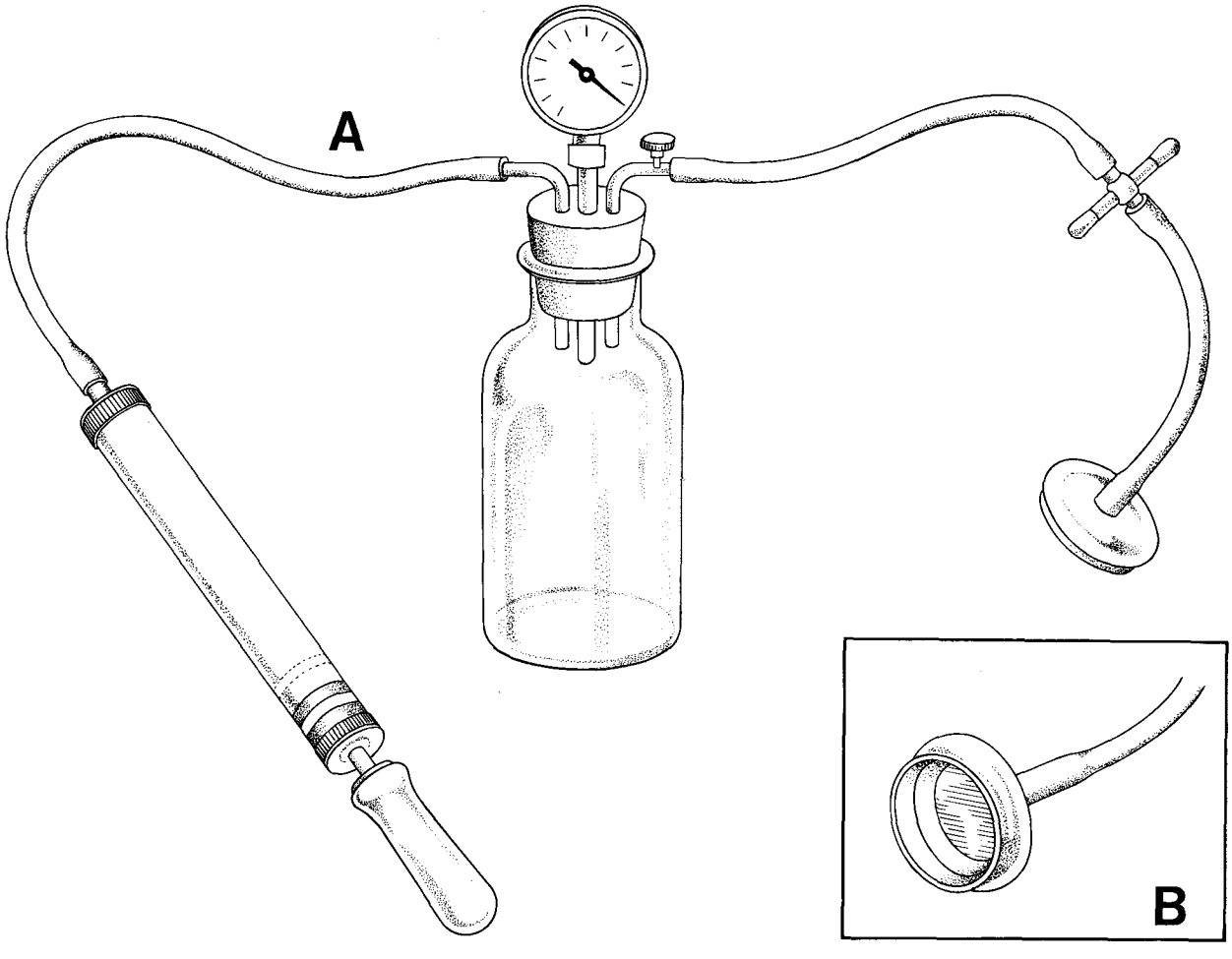


Fig. 2.2. Vacuum extraction apparatus. Assembled apparatus (A); suction cap (B).

Complications Possible complications include cephalhaematoma, intracranial haemorrhage, and sloughing of the scalp.

Lower-segment caesarean section

Indications for caesarean section include fetal distress, cephalopelvic disproportion, failure of labour to progress, previous caesarean section (check what the indications were for this), placenta praevia, malpresentation and malposition, and prolapse of the cord. Caesarean section may also be indicated in cases of soft-tissue obstruction or scarring, diabetes, poor obstetric history, toxaemia, abruptio placentae, placental insufficiency, Rh incompatibility, and failed induction, and in older primigravidae.

Assessment Examine the patient for pallor, oedema, abnormal blood pressure, and heart and lung disease and take appropriate action. Determine the fetal lie and presentation, and check for the presence of fetal heart sounds. For elective caesarean section, a vaginal examination is generally omitted; in emergencies the need will vary.

Investigations Measure the patient's haemoglobin level and test the urine for sugar and protein. Send a sample of blood for grouping (including Rh factor) and cross-matching. Test for bleeding and clotting times and for syphilis. If diabetes is suspected, include a test for fasting postprandial blood sugar.

Preoperative management Perform the elective operation about a week before the expected date of delivery. Admit the patient the day before the operation and give a soap and water enema on the morning of the operation. Patients in labour should be given an antacid every 2 hours to neutralize gastric acid and so minimize the effects of any accidental aspiration of gastric fluid. An intravenous drip should be set up.

Equipment See tray for *Caesarean section,* Annex 1, page 187.

Technique The recommended procedure is transperitoneal, lower-segment caesarean section with a transverse incision into the uterus.

Empty the patient's bladder by catheterization and then tilt her to her left by placing a pillow under her lower back on the right. A general or regional anaesthetic should be given. Prepare and drape the abdomen. Make a midline subumbilical incision (Fig. 2.3A). Incise the loose peritoneum covering the anterior surface of the lower uterine segment and push it downwards with the bladder (Fig. 2.3B). Make a small, transverse incision in the lower segment of the uterus crossing the midline 2 cm below the site of peritoneal incision. Widen the incision bluntly on either side (Fig. 2.3C). Rupture the membranes if they are still intact.

The aim is to deliver the baby as quickly as possible. For head-presentation delivery, carefully insinuate your fingers between the lower uterine flap and the head and hook them round the head (Fig. 2.3D). If the head is deeply engaged and difficult to extract, ask an assistant to dislodge it from the vagina (with gloved hands). A single forceps blade may be required to deliver it. In breech presentation, deliver the arms and the head carefully so as not to enlarge the uterine wound unduly. In cases of transverse lie, deliver the breech first after internal podalic version. An undiagnosed constriction ring may prevent delivery of the head; in such cases the ring must be cut vertically in the course of

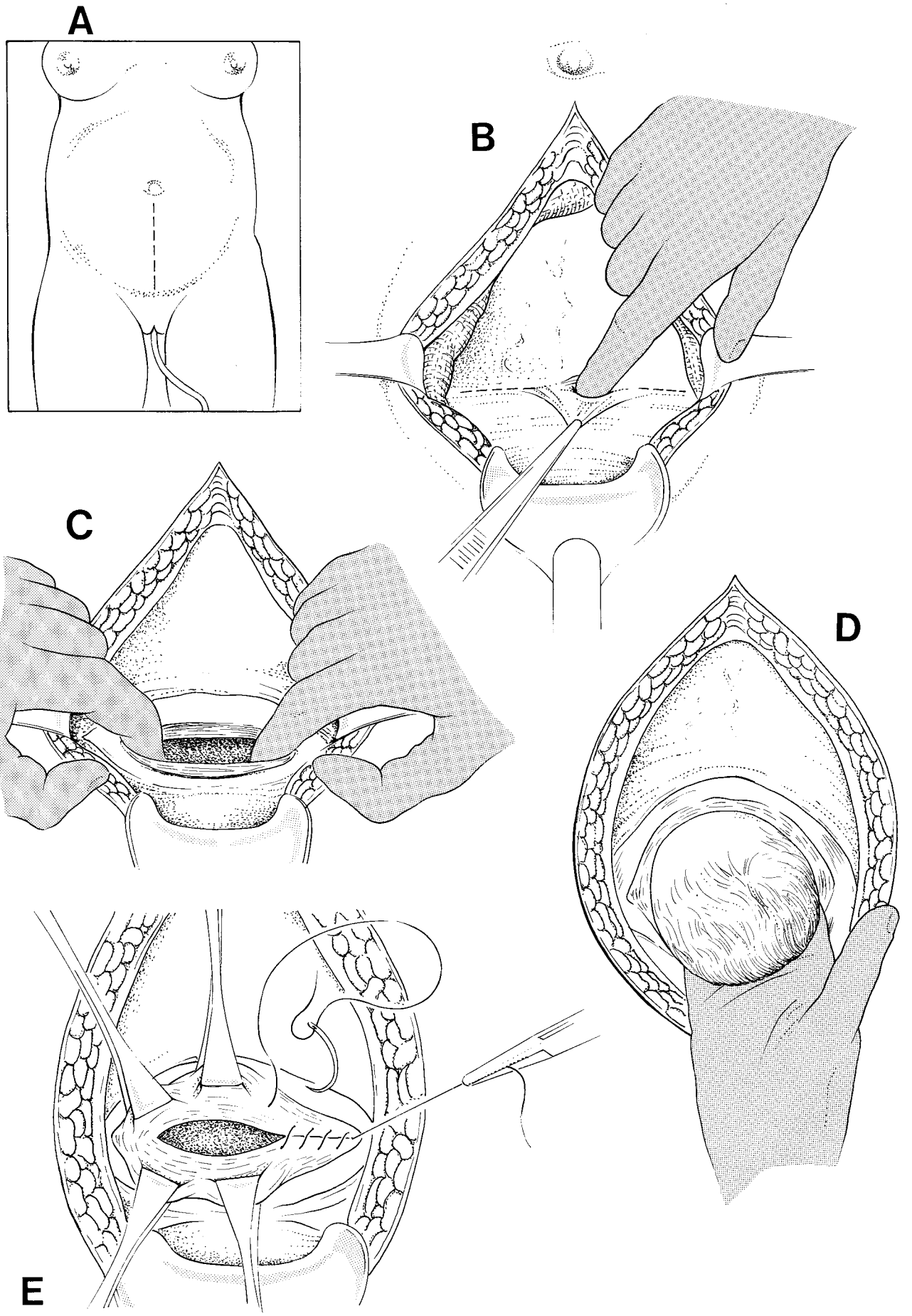


Fig. 2.3. Lower-segment caesarean section. Site of midline subumbilical incision (A); incising and pushing down the loose peritoneal covering of the anterior surface of the uterus (B); widening the incision into the uterus (C); hooking the baby's head with the fingers (D); inserting the first layer of suture (muscle layer) (E).

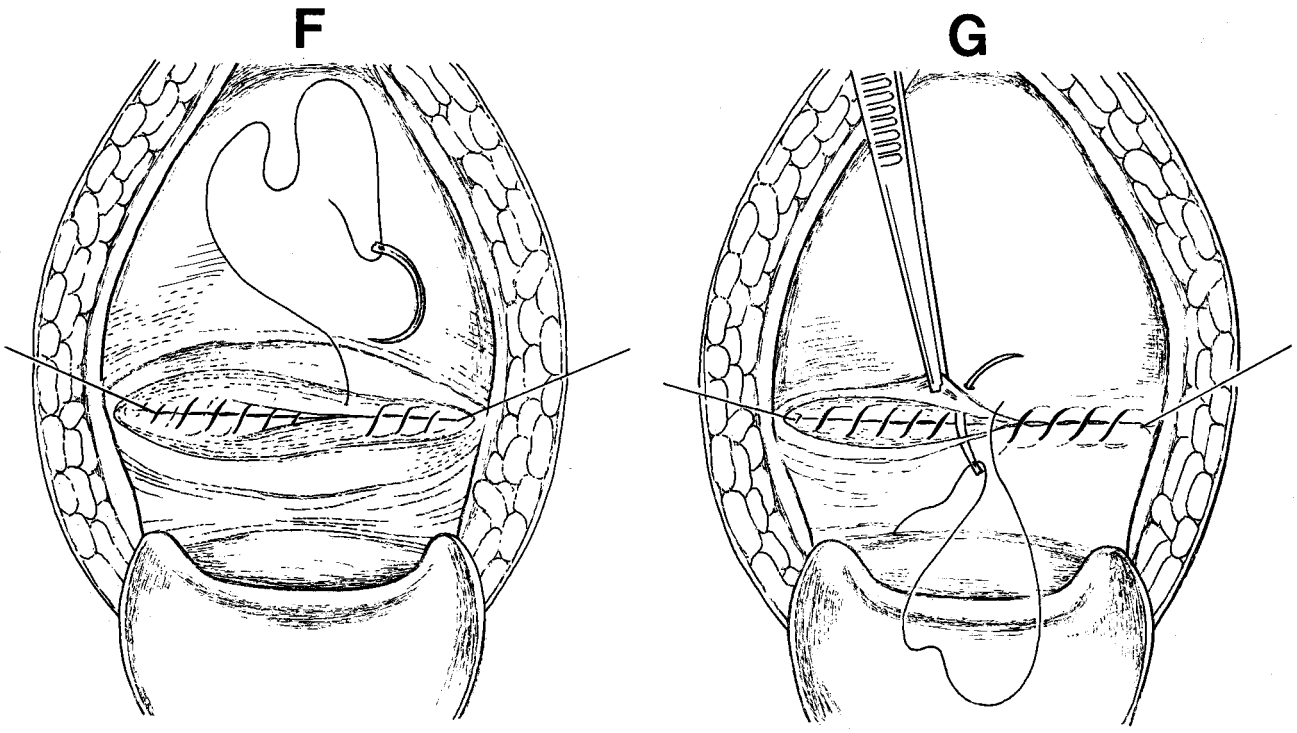


Fig. 2.3. Lower-segment caesarean section *(continued)*. Inserting the second layer of suture, taking the muscles and burying the first layer (F); inserting the peritoneal layer of suture (G).

caesarean section, although this can result in a weak scar (ideally, this condition will have been suspected beforehand).

Extract the fetus. Clean and aspirate fluids from the nose and mouth. Divide the cord between clamps and ligate it. Give the mother 0.25 mg of ergometrine intravenously, and then remove the placenta and membranes. Rub the uterus if it is flabby, and, if necessary, start the patient on a drip of 4 or 8 IU of oxytocin (the amount to be determined according to the patient's response) in 500 ml of 5% (50 g/litre) glucose at a rate of 15 drops/min.

Grasp the edges of the uterine incision with haemostatic (Green-Armytage) forceps. Stitch the incision in three layers. First insert a continuous, muscle-layer stitch of No. 1 chromic catgut on a half-circle, round-bodied needle; avoid the decidua and take the angles carefully (Fig. 2.3E). Then take up any unstitched muscle tissue and bury the inner layer of suture (Fig. 2.3F). Finally, close the visceral peritoneum with 0 chromic catgut (Fig. 2.3G). Complete abdominal toilet and close the abdominal wall in layers. Apply a sterile dressing.

Complications

Possible complications include primary haemorrhage that can lead to hypovolaemic shock, sepsis with peritonitis, secondary haemorrhage, retrovesical haematoma formation, and pulmonary embolism.

Breech delivery

Breech presentation occurs when vertex presentation is affected by conditions such as hydrocephalus, hydramnios, placenta praevia, pelvic contraction, and prematurity.

Diagnosis

Palpate the breech in the suprapubic region. It is softer than the head and less defined in outline, and usually lies above the level of the brim of the pelvis. The head can be felt at the fundus; it is hard, round, mobile, slightly tender, and ballotable. The fetal heart sounds are heard at the level of, or a little above, the umbilicus. Vaginal examination in early labour reveals the presenting part as lying high, with the cervix dilating slowly and the bag of waters unusually elongated and sausage-shaped. A foot may be palpable or, late in labour, a buttock. Meconium may be seen on the examining finger. In incomplete breech presentation, the knee or foot may be palpable.

Differential diagnosis

Breech presentation should be distinguished from vertex presentation. The vertex can be confused with an extended breech, or a face or shoulder.

Assessment

Vaginal breech delivery is considered favourable if the following conditions are met: the gestational age is between 36 and 38 weeks, the fetal weight is estimated as 2500–3800 g, the presenting part is at or below station −1 at the onset of labour,[1] the cervix is soft and effaced with dilatation of more than 3 cm, the pelvis is adequately roomy, and the patient has a history of previous breech delivery of a baby of more than 3800 g or a previous vertex delivery of a baby of more than 4000 g.

Vaginal delivery is considered unfavourable if one or more of the following conditions are met: the gestational age is more than 38 weeks, the fetal weight is estimated as more than 3800 g, the presenting part is at or above station −2 and the cervix is still firm and incompletely effaced with dilatation of less than 3 cm, there has been no prior vaginal delivery (or prior vaginal delivery was difficult), the pelvis is android or flat, or there is a footling or full breech presentation.

Caesarean section is indicated in the presence of toxaemia in the older primigravida or if a radiograph shows hyperextension of the fetal head. If vaginal delivery is decided upon, then the progress of labour should be carefully observed and managed as follows.

Investigations

Measure the patient's haemoglobin level and test the urine for sugar and protein. Send a sample of blood for grouping (including Rh factor) and carry out a serological test for syphilis.

Equipment

See tray for *Episiotomy,* Annex 1, page 188, and add a pair of midcavity obstetric forceps.

Technique

If there are no abnormalities of mechanism or maternal or fetal complications, leave things strictly to nature and intervene only to assist the delivery when clearly necessary. Upon rupture of the membranes, carry out a vaginal examination to exclude cord prolapse. As soon as the buttocks appear, place the patient in the lithotomy position. Anaesthesia should be provided by infiltration of local anaesthetic, pudendal block, or another type of regional anaesthetic.

"Iron out" (gently stretch) the vagina and perineum, and carry out episiotomy. Deliver the legs one at a time. Press on the popliteal fossa, flex the knee, displacing it to the side of the trunk, move your fingers along the leg towards the ankle, and finally hold the ankle and deliver the foot and leg. Repeat the procedure to deliver the other leg. With the delivery of the buttocks (Fig. 2.4A), draw down a loop of the cord. Feel for the arms across the front of the chest and, if they can be

[1] Station (in cm) in relation to the level of the ischial spines.

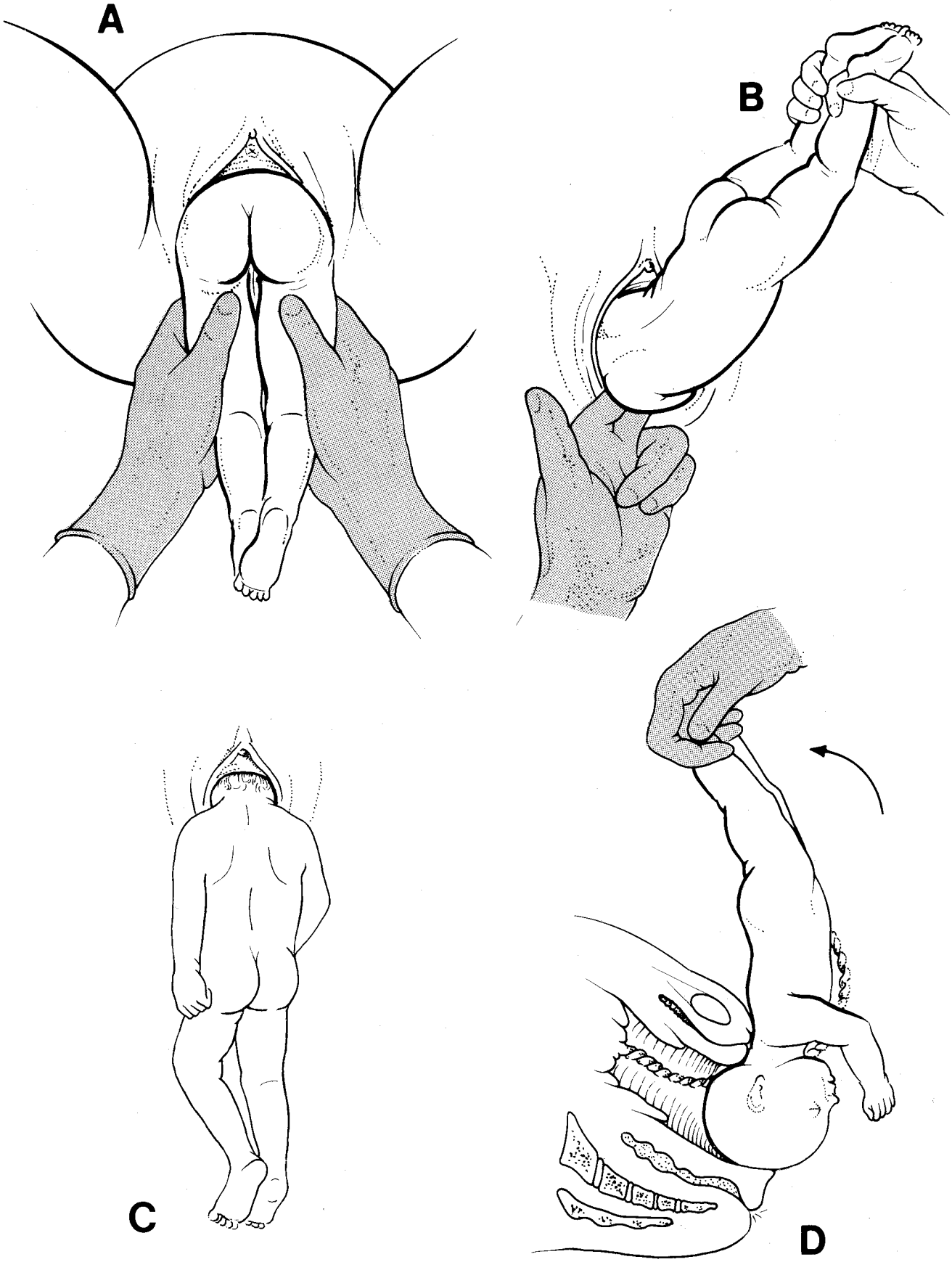


Fig. 2.4. Breech delivery. Delivering the buttocks (A); feeling for the arms for delivery one at a time (B); the hairline over the nape of the neck is visible (C); lifting the legs slowly over the mother's abdomen (D).

found, deliver them one at a time (Fig. 2.4B). If the shoulders and arms are extended and cannot be delivered in this way, gently rotate the fetus to bring first the chest and then the posterior shoulder to the front. Lift out the arm that is now lying in the anterior position; the other arm can then be delivered easily.

For the delivery of the head, bring the patient to the edge of the table and allow the fetus to hang downwards over the perineum for 1–2 min. This will cause the fetal head to come into the cavity, at which point the suboccipital region or hairline over the nape of the neck will become visible beneath the pubic arch (Fig. 2.4C). Once the hairline is visible, accomplish delivery by grasping the ankles of the fetus with one hand, aligning the legs, trunk, and neck in a straight line by a gentle pull, and then exerting a mild, steady abduction force while slowly lifting the legs and trunk over the mother's abdomen (Fig. 2.4D). At the same time, control the escape of the head from the vulva and maintain flexion of the head and neck with the other hand.

The application of forceps is ideal for the delivery of the after-coming head. As an assistant lifts the body of the child, apply the forceps from the ventral aspect to either side of the head and deliver it by slow intermittent traction. The forceps blades act as a protective cage for the head and also allow aspiration of fluids from the respiratory tract.

The method of jaw flexion and shoulder traction may be helpful for delivery of the head when it is high in the pelvis. General anaesthesia is preferred for this procedure. After delivery of the shoulders, place the baby on your supinated left forearm with its limbs hanging on either side; put the middle and index fingers of your left hand over the malar bones on either side to maintain flexion. Put the fourth and the little finger of your pronated right hand on the baby's right shoulder, the index finger over the left shoulder, and the middle finger on the suboccipital region. Now apply traction in a backward and downward direction until the nape of the neck is visible under the pubic arch. Ask an assistant to apply suprapubic pressure during this manoeuvre, to maintain flexion of the head and neck. Carry the baby upwards and forwards towards the mother's abdomen, releasing the face and brow. Finally, depress the trunk to release the vertex and occiput.

Ligate and divide the cord. Administer 0.25 mg of ergometrine or, if this is not available, 2 IU of oxytocin. Then proceed with the third stage of labour and with episiotomy repair as for normal delivery.

Complications

Breech delivery is associated with a higher incidence of perinatal mortality, intracranial haemorrhage, and fetal asphyxia from compression of the cord than is normal delivery. Possible trauma to the fetus includes dislocation of the cervical spine, rupture of the liver, and fracture or separation of the epiphyses of the humerus, femur, or the clavicle. Injury to the fifth and sixth cervical nerves can result in palsy.

3

General obstetric procedures

Episiotomy

Episiotomy may be indicated in any primigravida, and in many cases in multigravidae. It is required in all cases of prematurity, breech delivery, face-to-pubis delivery (persistent occipitoposterior presentation), or forceps delivery; in cases of previous colpoperineorrhaphy; when the head fails to advance because of perineal rigidity; and in cases of narrow subpubic arch when the head has difficulty emerging because of posterior displacement.

Equipment

See tray for *Episiotomy,* Annex 1, page 188.

Technique

Place the patient in the lithotomy position and clean and drape the area. Infiltrate local anaesthetic into the intended site of episiotomy. During the crowning of the fetal head, insert two fingers into the vagina, as a guard against cutting into the baby, and make a posterior mediolateral incision with curved scissors. Divide the whole depth of tissue (Fig. 3.1A–C). After delivery of the baby, repair the episiotomy in three layers with 0 chromic catgut suture: the vaginal layer with continuous suture, the musculature with interrupted sutures, and the skin with interrupted mattress stitches (Fig. 3.1D–F). Apply a sterile pad.

Complications

Possible complications include vulval haematoma, infection, breakdown of the wound, and dyspareunia.

Artificial rupture of membranes

Artificial rupture of the membranes is one of the oldest methods of inducing labour; it can also speed up labour if the first stage is prolonged. No anaesthesia is required, but in the nervous primigravida, sedation is recommended. Because of the small risk of cord prolapse, bleeding, and acute fetal distress, the procedure should be carried out under aseptic conditions, in case a caesarean section is

Assessment

Carry out abdominal and vaginal examinations to confirm the lie, presentation, and condition of the fetus, and to assess the pelvic capacity. Make a complete assessment of the progress of labour, noting the degree of cervical dilatation and effacement, the consistency and position of the cervix, and the station of the fetal head. The findings from this assessment can be presented as a score (Bishop's score), which is a useful guide to the degree of ripeness of the cervix (Table 1). The cervix is favourable (induction of labour is indicated) if the score is 9–13.

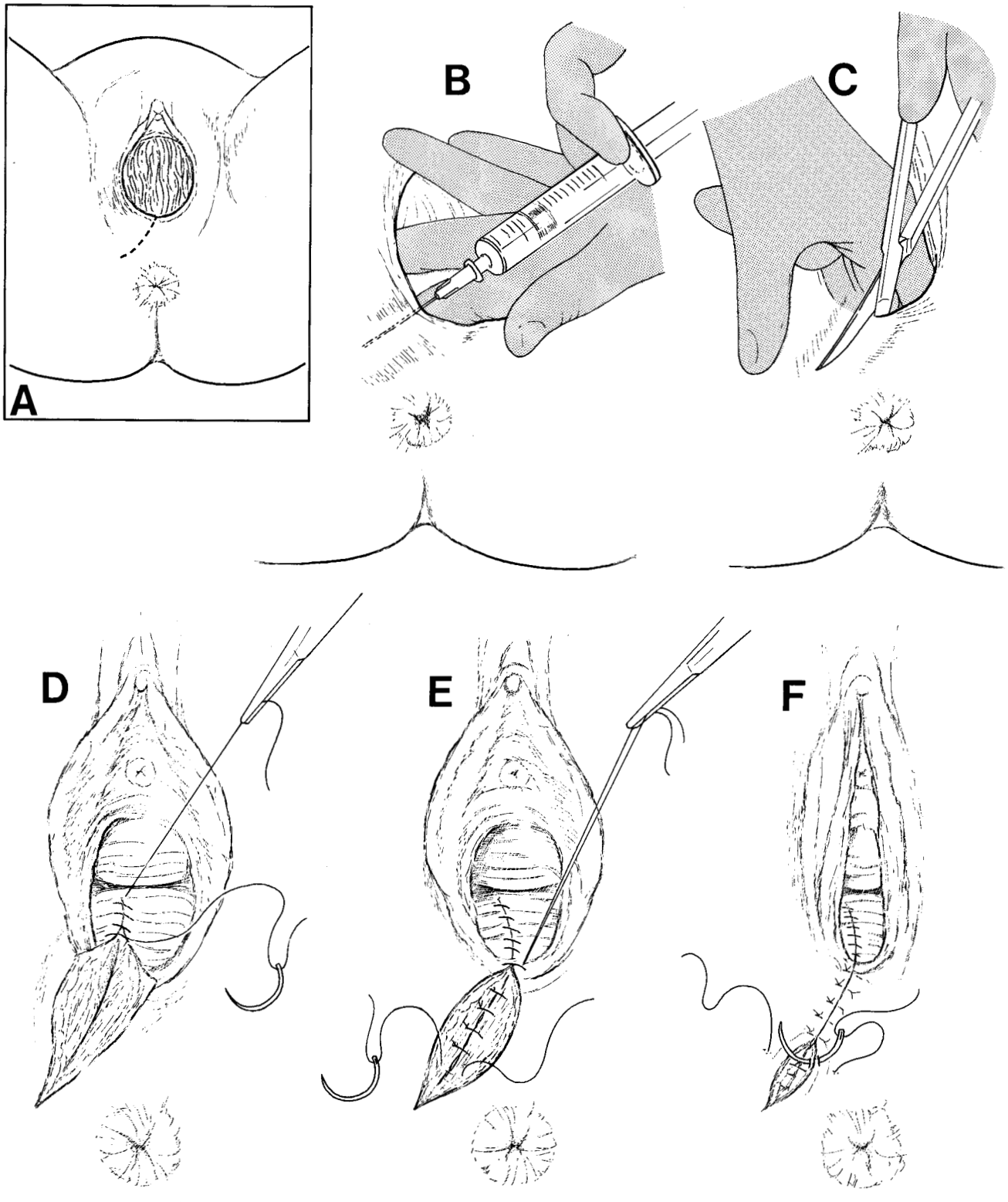


Fig. 3.1. Episiotomy. Line of incision (A); infiltrating tissues with local anaesthetic (B); making the incision, while inserting two fingers to protect the baby's head (C); repairing the wound in three layers by first suturing the vaginal mucosa and submucosa in one layer (D), then suturing the muscle layer (E), and finally suturing the skin (F).

Table 1. Pre-induction score for assessing cervical ripeness

Factors	Score			
	0	1	2	3
Cervix				
Degree of dilatation	closed	1–2 cm	3–4 cm	⩾5 cm
Degree of effacement (length)	0–30% (3 cm)	40–50% (2 cm)	60–70% (1 cm)	⩾80% (fully effaced)
Consistency	firm	medium	soft	–
Position	posterior	midline	anterior	–
Fetal head				
Station in relation to level of the ischial spines	–3 cm	–2 cm	–1 cm	+1, +2 cm
Maximum score 13	Favourable score 9–13		Unfavourable score 0–8	

Equipment

See tray for *Artificial rupture of membranes,* Annex 1, page 187.

Technique

Artificial rupture of the membranes requires rigid adherence to aseptic technique. Place the patient in the lithotomy position and empty the bladder by catheterization. To release the forewaters, pass a finger through the cervix and separate the membranes from the region of the internal os uteri. Pass a pair of long-toothed dissecting forceps (or an amniohook) alongside the finger that is inserted in the cervix and tweak the membranes. Ensure the free escape of the amniotic fluid. Auscultate the fetal heart to confirm that all is well. The onset of labour is usually rapid, but if after 1 hour contractions have not yet started, administer oxytocin as a drip of 2 IU in 500 ml of 5% glucose at a rate of 15 drops/min. Increase the drip rate as indicated by the patient's response. Clinical monitoring of maternal and fetal condition and of the progress of labour is essential. If labour fails to progress or if there is fetal distress, perform caesarean section immediately.

Oxytocin is contraindicated in grand multiparae, in patients who have had a previous caesarean section or hysterotomy or who have cardiac disease, and in cases of malpresentation.

Complications

Possible complications include haemorrhage, sepsis, cord prolapse, and laceration of the cervix.

Cord prolapse

Anticipate possible cord prolapse during labour in multiparae and in cases of hydramnios, twins, prematurity, cephalopelvic disproportion, and malpresentation.

Diagnosis

The diagnosis of cord presentation or prolapse can be made on routine vaginal examination at the beginning of labour, or after amniotomy or spontaneous rupture of the membranes. In cases of cord presentation, cord pulsations can be felt through the intact membranes. Avoid handling the cord, as it can cause spasm of the cord vessels and subsequent fetal death.

Differential diagnosis

If the fetus is dead and pulsation has ceased, the presenting cord can be mistaken for a hand or foot.

Equipment

See tray for *Caesarean section,* Annex 1, page 187.

Management

The aim of management is to relieve pressure on the cord, to determine whether the fetus is alive or dead, and to carry out delivery as appropriate. If the fetus is alive, carry out immediate caesarean section. While preparations are being made, tilt the patient head-down to reduce pressure on the cord. If the fetus is dead, but the pelvis and presentation are favourable, and there is no obstruction, await spontaneous delivery. However, if there is malpresentation, if the pelvis is contracted, or if there is no progress of labour, caesarean section is advisable.

In the case of twins, if after delivery of the first baby, cord prolapse occurs for the second twin, carry out internal version and breech extraction.

Complications

Complications include those of caesarean section (see page 28) and also fetal asphyxia.

Symphysiotomy

Symphysiotomy facilitates the delivery of the fetal head from the pelvic cavity by division of the symphysis pubis to widen the pelvic outlet. Symphysiotomy is an alternative emergency procedure that may be undertaken when facilities for safe caesarean section are not available.

Carry out symphysiotomy during the second stage of labour, when the outlet of the pelvis is contracted and the fetal head is deeply engaged in the pelvic cavity. Symphysiotomy is contraindicated if the fetus is dead.

Equipment

See tray for *Episiotomy,* Annex 1, page 188, and add a vacuum extraction apparatus and a scalpel blade and handle.

Technique

General anaesthesia is preferred. Place the patient in the lithotomy position, with the thighs held in not more than 90° of abduction by an assistant. Clean and drape the area. Insert an indwelling catheter into the bladder. Avoid injury to the urethra by pushing it to one side with the index finger of one hand placed in the vagina (Fig. 3.2A). Make a midline skin incision over the pubis, and then divide the symphysis pubis with a knife (Fig. 3.2B), taking care not to cut the posterior ligament. Deliver the fetal head by vacuum extraction after episiotomy. Bring the pubic bones together, repair the skin wound, and support the pelvis with circumferential strapping. The patient should remain in bed for at least 7 days after operation.

Complications

Complications include injury to the urethra and bladder base, para-urethral haematoma, urinary tract infection, stress incontinence, painful joint, periosteitis and osteomyelitis, and subsequent problems with walking and gait.

Internal podalic version

Version is not a common procedure because of the danger of uterine rupture. It may, however, be indicated in multiparous women, with recently ruptured

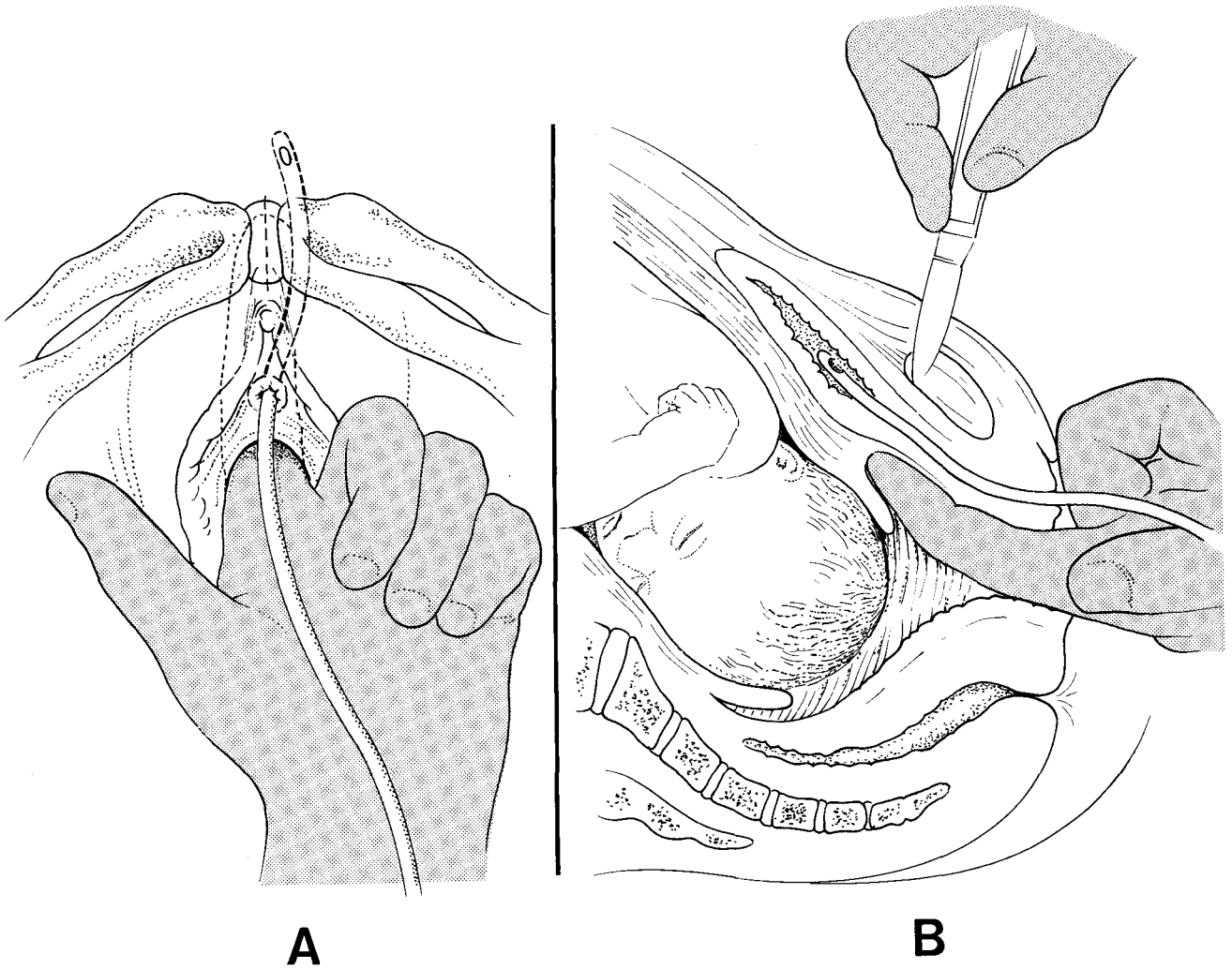


Fig. 3.2. Symphysiotomy. Pushing the urethra to one side with the index finger after inserting a catheter through the urethra into the bladder (A); dividing the symphysis pubis (B).

membranes, in cases of twin delivery when the second twin has a transverse lie, and in cases of shoulder presentation or transverse lie when the fetus is small or dead. Rarely, it is indicated in cases of prolapse of the cord when immediate caesarean section is impossible.

Version is contraindicated in the presence of tonic uterine contraction, when the membranes have ruptured and the liquor has drained out, and in cases of contracted pelvis. It should not be attempted late in labour or if there is an impacted shoulder presentation.

Assessment

Assess the general condition of the patient. Examine the abdomen to establish the lie and presentation of the fetus. Carry out a vaginal examination to determine the degree of dilatation of the cervix, confirm the presentation, and assess the pelvic capacity. For internal version, the cervix should be at least half-maximally dilated.

Investigations

Measure the mother's haemoglobin level and test the urine for sugar and protein. Send a sample of blood for grouping (including Rh factor) and carry out a serological test for syphilis.

Technique

The patient should be given a general anaesthetic. Empty her bladder by catheterization and place her in the lithotomy position.

Observe aseptic precautions. When the uterus is relaxed, pass your hand into the vagina up to the breech with fingers and thumb bent into the shape of a cone. Then partially withdraw the hand along the thigh of the fetus and grasp one or both feet. The heel is the landmark to feel for, and the limb should not be brought down until you have recognized it. With your hands working in conjunction, one placed internally and the other externally, fully or almost fully dilate the os uteri so that the fetus can be extracted, as in cases of breech delivery.

Complications

Possible complications include rupture of the uterus and sepsis.

Craniotomy

Craniotomy consists of perforation and extraction of the fetal head and is indicated in cases of hydrocephalus and dystocia due to cephalopelvic disproportion when the fetus is dead. With adequate obstetric care, this operation is rarely necessary. It is contraindicated if there is a threat of uterine rupture.

The patient usually presents in obstructed labour, but if major cephalopelvic disproportion is discovered at full term, caesarean section is safer than craniotomy and vaginal delivery.

Assessment

The patient's general condition is usually poor as the result of prolonged labour.

Carry out an abdominal examination to estimate the approximate size of the fetus, to establish the presentation and lie, and to verify the absence of fetal heart sounds. Vaginal examination will confirm the presentation of the fetus and permit assessment of the condition of the cervix and the pelvic capacity. In cases of hydrocephalus, the head is enlarged and floating, and there may also be spina bifida. The diagnosis is suggested by the presence of wide cranial sutures. Hydrocephalus can also present as an obstructed after-coming head with breech presentation. Radiographs should be taken to confirm the diagnosis if necessary.

Investigations

Measure the patient's haemoglobin level and test the urine for sugar and protein. Send a sample of blood for grouping (including Rh factor).

Equipment

See tray for *Episiotomy,* Annex 1, page 188, and add a cranial perforator (Fig. 3.3A, B) and a pair of craniotomy forceps or a pair of large, sturdy scissors and a pair of large artery forceps.

Technique

Carry out the procedure with the patient under general anaesthesia. As she may be exhausted and the birth canal already infected, start intravenous infusion of an appropriate fluid and administer antibiotics immediately. Blood transfusion may also be necessary. Empty the bladder by catheterization.

In cases of fore-coming head, it is the parietal bone that is perforated; in after-coming head with breech presentation, the occipital bone; and in face presentation, the orbit.

The closed blades of the perforator come to a sharp point at the tip and have a keen, outer cutting edge. The handles are separated by metal bars to keep the blades in apposition while piercing the skull. During the second stage of labour,

Obstetrics

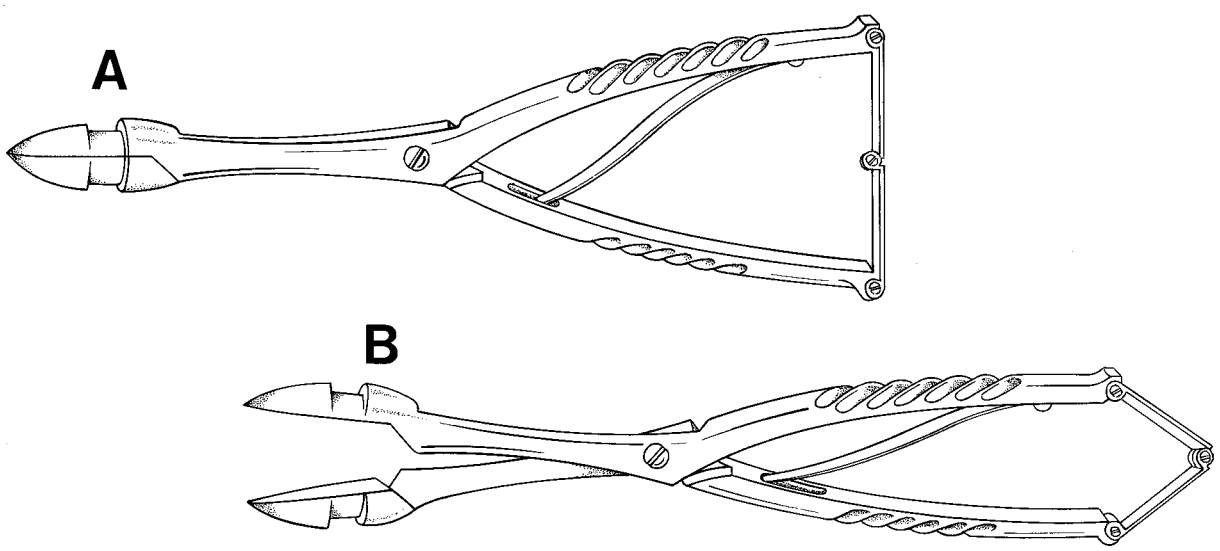


Fig. 3.3. Cranial perforators with jaws closed (A) and with jaws open (B).

as an assistant immobilizes the fetal head by exerting suprapubic pressure, introduce the perforator along the palm of one hand, taking care to protect the vaginal walls from the cutting edge. Press the point of the perforator firmly against the head and penetrate the bone with a rotatory movement until the shoulder of the instrument strikes the skull. Release the crossbars to break the bone. Close the instrument, rotate it through a right angle, and cut the bone again in the opposite direction. Slip the closed head of the perforator into the cranial cavity, thoroughly break up the cranial contents, and express them by suprapubic pressure. As an alternative, the point of a pair of large scissors can be pushed into the skull through a fontanelle or skull suture. A hydrocephalic head can also be collapsed by inserting a lumbar puncture needle into the foramen magnum.

Extraction of the fetus can then be by natural delivery or by extraction with craniotomy forceps or large artery forceps applied to grasp the vault bones. In all cases, the uterine cavity must be checked after delivery of the placenta to exclude rupture. Administer antibiotics and leave the bladder catheter in place for 2–3 days.

Complications

Possible complications include cervical, vaginal, and perineal lacerations; rupture of the uterus; hypovolaemic shock and subsequent collapse; and bladder injury.

4

Postpartum procedures

Repair of perineal, cervical, and vaginal tears

Perineal tears are normally prevented by adequate episiotomy, but can nevertheless occur in certain circumstances such as delivery of a big baby, occipito-posterior position, face presentation, forceps or precipitate delivery, and narrow pelvic outlet or subpubic angle.

Tears predispose to postpartum haemorrhage. Cervical and vaginal lacerations bleed profusely. In postpartum haemorrhage, bleeding is unlikely to come from a contracted uterus, so the patient should instead be examined for tears. Inspection of the cervix for tears is routine after any type of vaginal delivery.

Diagnosis

If blood loss has been profuse, the patient may be hypovolaemic. Perineal tears are visible on local examination: a speculum and swabs held with sponge forceps can be helpful in examining lacerations. Perineal tears are classified according to the degree of damage. In a first-degree tear, the fourchette is torn, together with only a small part of the vaginal and perineal skin. In a second-degree laceration, the perineal body is torn, together with the posterior vaginal wall, to a variable degree. In a third-degree tear, the damage extends beyond the anal sphincter into the anal canal. Tears due to direct trauma have ragged edges with surrounding abrasions and contusions.

Equipment

See tray for *Episiotomy,* Annex 1, page 188, and add a vaginal speculum, No. 1 and 2/0 chromic catgut sutures, and 2/0 plain catgut sutures.

Technique

All tears should be sutured immediately unless they are already infected. Infected tears should be cleaned and dressed, but should not be sutured until the infection has cleared; appropriate antibiotics should be administered.

Perineal tears

For the repair of first-degree and second-degree tears, place the patient in the lithotomy position and infiltrate a local anaesthetic in the region of the tear. Expose the tear (Fig. 4.1A). Suture the vagina first with continuous 0 chromic catgut; then the perineal body with three or four interrupted stitches of No. 1 chromic catgut; and finally the perineal skin with interrupted stitches of 2/0 plain catgut (Fig. 4.1B–D). Apply a sterile pad.

Repair a third-degree perineal tear with the patient under general anaesthesia. First close the muscle wall of the rectum and the anal canal with interrupted or continuous 0 chromic catgut, placing the sutures so as to avoid the bowel mucosa (Fig. 4.1E). Identify the torn ends of the anal sphincter and approximate them with two or three mattress sutures of 2/0 chromic catgut (Fig. 4.1F). The repair of the vagina, perineal body, and the skin can then be carried out as described above. Apply a sterile pad.

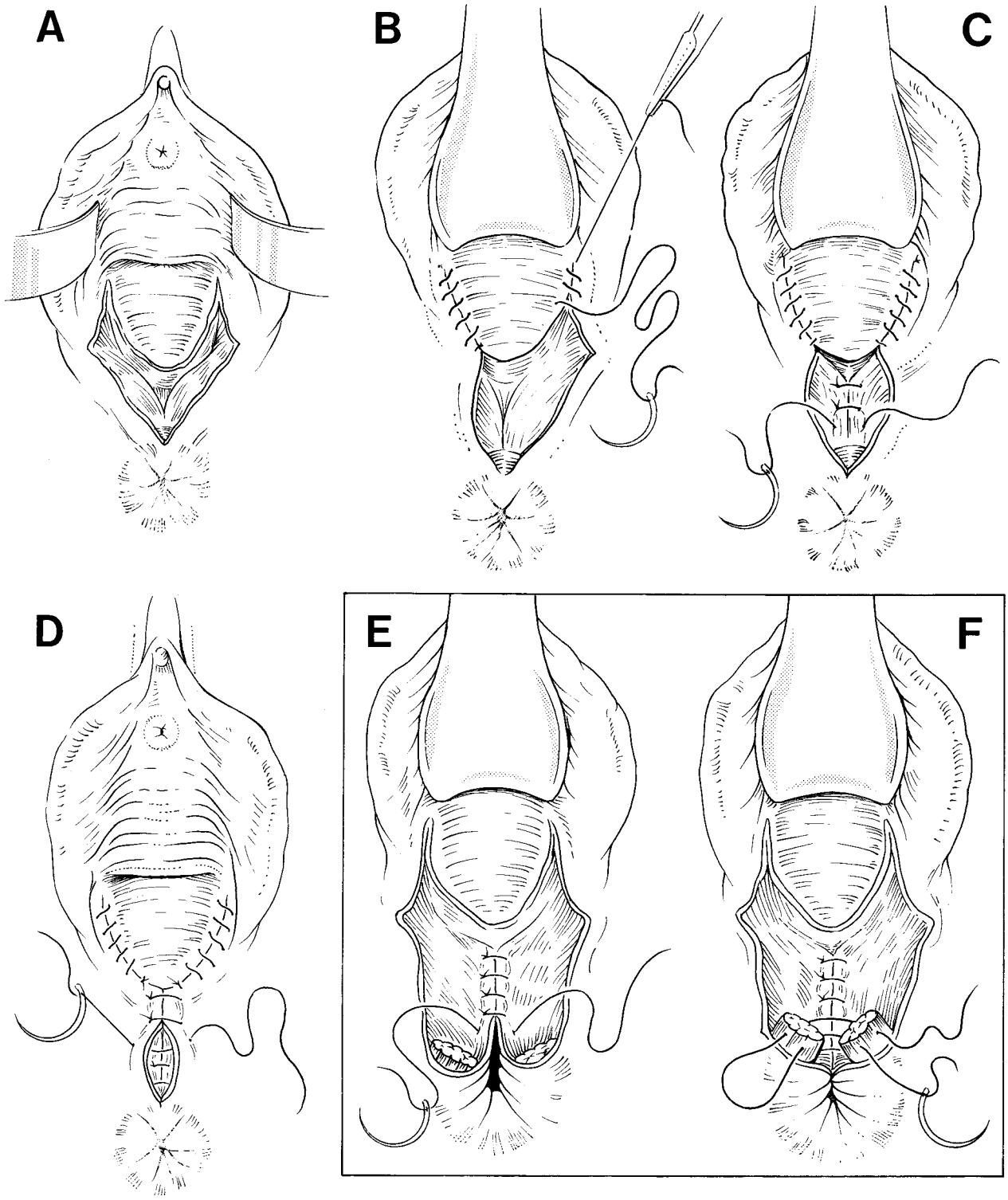


Fig. 4.1. Repair of perineal tears. Exposing a perineal tear (A); suturing a tear of the vagina (B); suturing the perineal body (C); suturing the skin (D). Third-degree tear: closing the muscle wall of the rectum (E) and suturing the anal sphincter (F).

Cervical tears

Infiltrate a local anaesthetic in the region of the tear. Expose the tear and catch both its edges with sponge forceps. Stitch the edges together with mattress sutures of 0 chromic catgut. Take the highest stitch about 1 cm above the apex to include any retracted vessels, after inserting a preliminary stay suture lower down. Apply a sterile pad.

Vaginal tears

After infiltrating a local anaesthetic, stitch a vaginal tear as described above for a perineal tear and apply a sterile pad. Tears of the anterior vaginal wall involve the tissues close to the urethral meatus; the torn edges lie in apposition, and suturing is necessary only when there is free bleeding. Bladder catheterization is necessary if there is retention of urine as a result of muscle spasm and swelling.

After-care

Clean and dress the wound daily and after each passage of stool.

Complications

Possible complications such as haematoma in the parametrium, residual recto-vaginal fistula, and dyspareunia can be prevented by proper surgical techniques.

Drainage of vulval haematoma

Vulval haematoma usually arises from injury during childbirth or as a result of violence. It is also a possible complication of perineal operations.

Diagnosis

The patient complains of severe pain and swelling in the vulva. Local examination confirms the presence of haematoma and possibly some signs of the cause.

Differential diagnosis

Differentiate vulval haematoma from Bartholinian abscess, sessile fibroma of the vulva, and vulval oedema.

Investigations

Measure the patient's haemoglobin level and test the urine for sugar and protein.

Equipment

See tray for *Episiotomy,* Annex 1, page 188, and add a scalpel with blade.

Technique

General anaesthesia is preferred. If the haematoma is the complication of an operation, remove the sutures and evacuate the clot. If any bleeding is visible, ligate the vessel(s) and resuture the wound.

If the haematoma is the result of direct injury at the mucocutaneous junction, incise it, remove the clots, and ligate the bleeding points. Pack the wound with gauze for 12 hours, and then apply a dressing and cold compresses twice daily.

Complications

Possible complications include haemorrhage and sepsis.

Manual removal of the placenta

A common third-stage complication of delivery is delay in the expulsion of the placenta, often accompanied by excessive blood loss due to the retained or adherent placenta. Early, active management is necessary if the patient is bleeding or anaemic.

Diagnosis

The patient may present with a retained placenta after delivery elsewhere. Such patients have usually lost a lot of blood from the vagina. Examination may reveal a relaxed uterus, possibly above the level of the umbilicus. The cord may be hanging down from the vulva or avulsed from its site of attachment to the placenta.

Differential diagnosis

Differentiate retention of the placenta from adherent placenta accreta and other causes of postpartum haemorrhage, such as imperfect retraction as a result of uterine atony, lacerations of the cervix or vagina, uterine inversion, and clotting defects.

Investigations

If appropriate tests have not already been done, for example in cases of home delivery, measure the patient's haemoglobin level and test the urine for sugar and protein. Send a sample of blood for grouping (including Rh) and cross-matching.

Preoperative management

Assess the extent of blood loss. Hypovolaemic shock may be profound. Treat hypovolaemia while preparing to remove the placenta manually. While blood is being grouped and cross-matched, start the patient on a glucose/saline drip and give oxygen.

Equipment

See tray for *Episiotomy,* Annex 1, page 188.

Technique

The patient should be given a general anaesthetic or intravenous diazepam and pethidine. Prepare and drape the area. Empty the bladder by catheterization and cut the cord short at the vulva. Insinuate one hand in the shape of a cone into the vagina and follow the cord until you find the placenta (Fig. 4.2A). With the other hand steady the fundus of the uterus to prevent it from being pushed up towards the costal margin (Fig. 4.2B). Detach the placenta completely by sweeping movements of the fingers (kept close together). Once the whole placental mass is free within the uterine cavity, deliver it by traction on the cord while retaining the hand inside the uterus for a final exploration of its cavity. Administer ergometrine intravenously and apply a sterile pad.

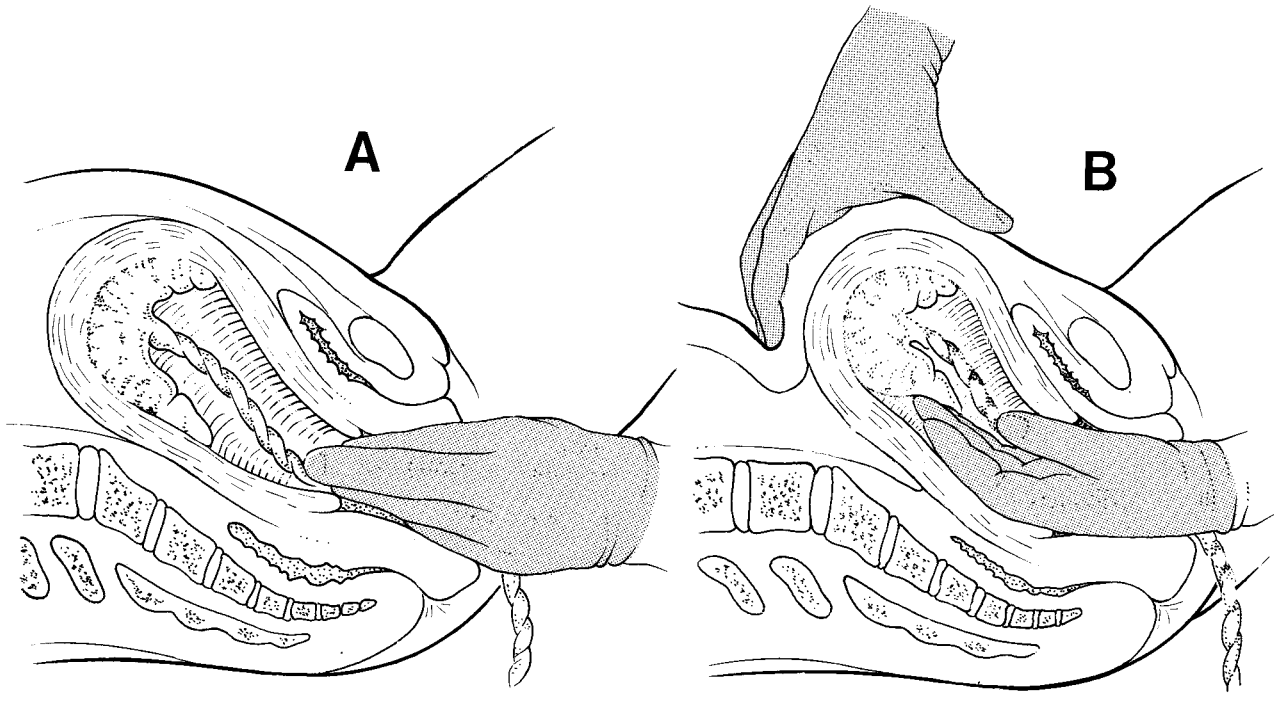


Fig. 4.2. Manual removal of the placenta. Insinuating one hand into the vagina along the cord (A); steadying the fundus of the uterus with the other hand, while detaching the placenta by sweeping movements of the fingers (B).

Complications Possible complications include rupture of the uterus, sepsis, and failure to remove the placenta as a result of placenta accreta, which is an indication for hysterectomy.

Postpartum haemorrhage

Postpartum haemorrhage is defined as bleeding from or into the genital tract during the third stage of labour that amounts to more than 500 ml. Haemorrhage can result from uterine atony, lacerations of the genital tract, or retained products of conception. Predisposing factors include prolonged, stimulated, or precipitate labour; overdistension of the uterus; uterine anomalies; myomas; subinvolution; general anaesthetic agents; uterine inversion; amniotic fluid embolism; lacerations of the vulva, vagina, or cervix; uterine rupture; placenta praevia; antepartum haemorrhage; retained placenta; anticoagulation therapy or clotting defects; thrombocytopenic purpura; and leukaemia.

Postpartum haemorrhage can be prevented by early detection of risk factors, administration of ergometrine with the birth of the baby's anterior shoulder, and routine inspection of the cervix and vagina for lacerations after delivery.

Investigations Appropriate investigations will probably have been carried out before delivery. However, tests to determine bleeding and clotting times and prothrombin time should be repeated.

Equipment See tray for *Episiotomy,* Annex 1, page 188, and add a vaginal speculum and a Foley catheter, and tray for *Laparotomy,* Annex 1, page 189.

Management As soon as postpartum haemorrhage is recognized, begin recording the patient's pulse and blood pressure. Catheterize the bladder and begin a rapid intravenous infusion of physiological saline or Ringer's lactate solution, to be replaced with blood as soon as it is available for transfusion. The next priority is to stop the bleeding. Palpate the uterus and carry out speculum and bimanual examinations with the patient under sedation or, preferably, general anaesthesia. Any lacerations must be stitched and a retained placenta evacuated immediately. Correct any inversion of the uterus. In cases of uterine atony, compress and massage the uterus bimanually (Fig. 4.3) and administer an oxytocic, for example ergometrine 0.25 mg intravenously and 0.5 mg intramuscularly; this is usually sufficient to cause contraction of a large, boggy uterus.

If the bleeding continues, undertake a laparotomy, with a hysterectomy as the last resort (see page 46).

Complication A possible complication is hypovolaemic shock.

Inverted uterus

Inversion of the uterus can be acute or chronic. Acute inversion, which often causes bleeding and shock, usually occurs during labour, the predisposing factors being fundal insertion of the placenta, atony of the uterus, and fibroids. The precipitating causes are pulling on the cord when the uterus is relaxed, pressure of the fundus of the soft uterus, a short cord or a cord wound several times round the baby's neck, precipitate delivery especially in the erect position, and expression of the placenta.

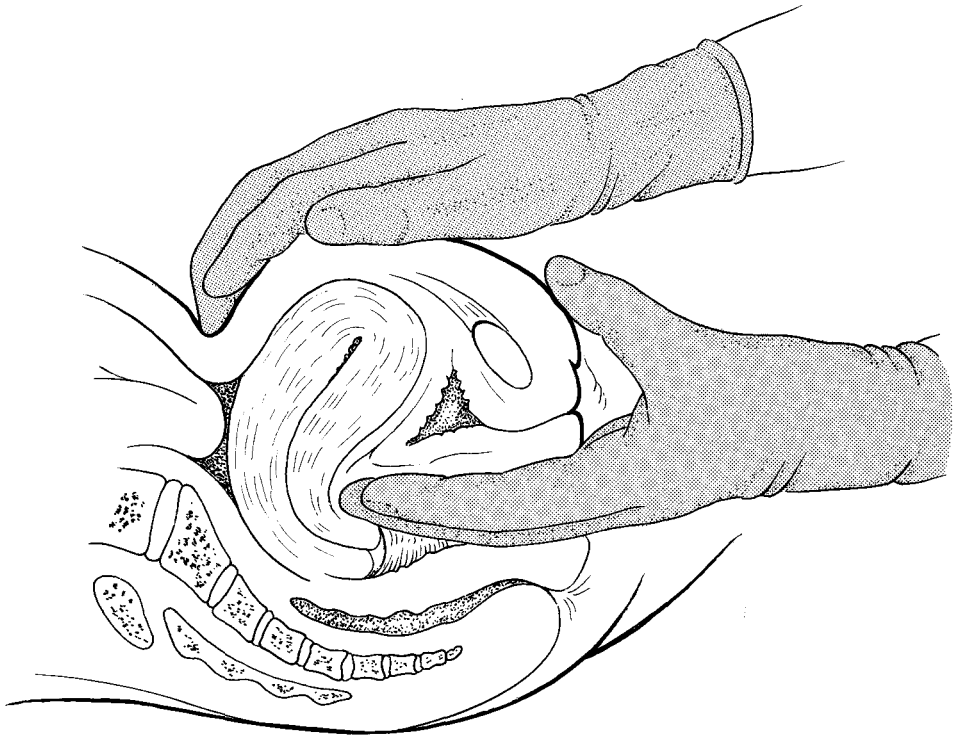


Fig. 4.3. Management of postpartum haemorrhage due to uterine atony; compressing and massaging the uterus bimanually.

Diagnosis

There may be vaginal bleeding and severe lower abdominal pain with a strong, dragging sensation; the patient is usually too weak as a result of hypovolaemia to provide a history.

The uterus of a recently delivered patient with complete inversion is not palpable on abdominal examination. When inversion is minimal (incomplete) there will be cupping, dimpling, or irregularity of the upper surface of the uterine fundus. Vaginal examination confirms the diagnosis (Fig. 4.4A). In severe cases, the body of the uterus lies outside the vagina. The cervix is drawn up and its vaginal portion is palpable as a ring round the inverted part. Keep in mind that the diagnosis of acute inversion is often missed, the bleeding and shock being ascribed to severe postpartum haemorrhage.

Management

The treatment of acute inversion of the uterus is immediate repositioning without attempting to remove the placenta. General resuscitative measures are carried out simultaneously. Patients with chronic uterine inversion should be treated for sepsis, as necessary, and then referred.

Investigations

No special investigations are needed before the repositioning of an inverted uterus. Those specified for normal delivery will usually already have been carried out.

Equipment

Sterile drapes and gloves and a gauze pad are required.

Technique

The patient should be given a general anaesthetic. Place her in the lithotomy position and clean and drape the area. Using manual and digital pressure, replace the inverted part of the uterus, starting with the section nearest the cervix (Fig. 4.4B,C), and then give the patient an intravenous injection of ergometrine. If the placenta is still attached, remove it manually after repositioning the uterus. Apply a sterile pad.

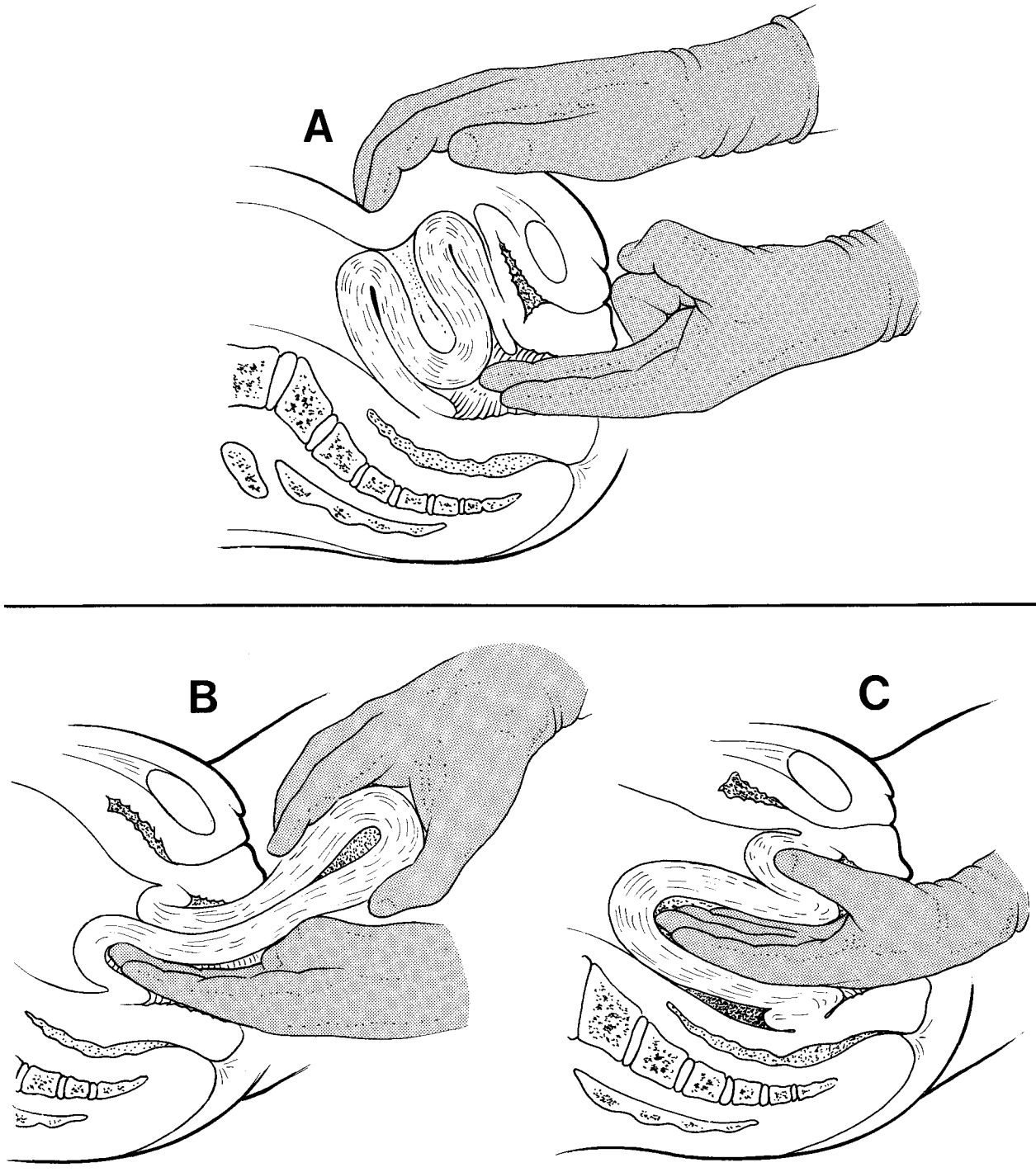


Fig. 4.4. Repositioning an inverted uterus. Confirming inversion of the uterus by bimanual examination (A); replacing the inverted part of the uterus (in this case lying outside the vagina), starting with the section nearest the cervix (B, C).

Complications

Complications can include haemorrhage, hypovolaemic shock, and sepsis. Rarely, repositioning is difficult. Failure to replace the uterus may necessitate hysterectomy, which should be done at the next referral level.

Rupture of the uterus

Rupture of the uterus can occur in obstructed labour, at the site of a classical caesarean-section scar, after injudicious use of oxytoxic drugs, especially in grand

multiparae, during any instrumental delivery, especially if the cervix is not fully dilated, during manual removal of the placenta or internal podalic version, and in cases of rudimentary uterine horn or angular pregnancy.

Prophylaxis and recognition of threatened rupture are important. The warning signs during labour are pain and tenderness, even between contractions, in the region of a previous scar. In obstructed labour there will also be a retraction ring, detectable by abdominal palpation of the uterus. In these cases, caesarean section should be carried out immediately. If actual rupture occurs, immediate surgical intervention and blood transfusion are indicated.

Diagnosis

Typically uterine rupture occurs during labour. The patient experiences a severe bursting pain, vaginal bleeding, and fainting. Less dramatic rupture is sometimes encountered during pregnancy, at the site of a lower-segment scar. After rupture, labour comes to an abrupt end, contractions cease, and hypovolaemic shock ensues. The presenting part cannot be felt in the pelvis, the fetal parts are easily palpable through the abdominal wall, and the fetal heart sound is absent. The empty and retracted uterus forms a firm swelling to one side of the fetus.

Investigations

Measure the patient's haemoglobin level and test the urine for sugar and protein. Send a sample of blood for grouping (including Rh factor) and cross-matching.

Management

When rupture occurs, undertake laparotomy as soon as blood transfusion has been started (a massive blood transfusion of 2 litres or more is usually required). Preferably then proceed to subtotal hysterectomy, but in hypovolaemic patients or when there is a previous caesarean-section scar, repair of the tear is simpler and safer.

Equipment

See tray for *Caesarean section,* Annex 1, page 187.

Technique

The patient should be given a general anaesthetic. Clean and drape the abdominal area and insert an indwelling catheter into the bladder. Open the abdomen through a subumbilical midline incision. Extract the fetus together with the placenta and evacuate blood clots from the abdominal cavity. Clamp the sites of bleeding. Proceed with subtotal hysterectomy or repair of the tear as indicated.

Subtotal hysterectomy

Clamp, cut, transfix, and ligate the round ligaments (Fig. 4.5A–D). In the same way, deal with the ovarian ligaments and the uterine tubes together, on both sides. Turn down the anterior peritoneal flap together with the bladder (Fig. 4.5E). Clamp, ligate, and cut the uterine vessels. Transfix the pedicle with 2/0 thread and ligate it again. Amputate the uterus at the level of the internal os and stitch together the cut edges of the stump with 0 chromic catgut (Fig. 4.5F). Carefully inspect the bladder for injury. Repair any tear in the bladder wall with two layers of continuous 0 chromic catgut. Then, using continuous or interrupted stitches of 0 chromic catgut, close the peritoneum over the pelvis to cover the pedicles and uterine stump (Fig. 4.5G).

Close the abdominal wall in layers and apply a sterile dressing. Start antibiotic therapy, preferably with an initial dose given intravenously.

Repair of the tear

Separate the bladder from the lower segment of the uterus by blunt dissection before the repair, to avoid inadvertently passing stitches through the wall of the bladder. Trim the ragged margins of the laceration and carry out repair as descri-

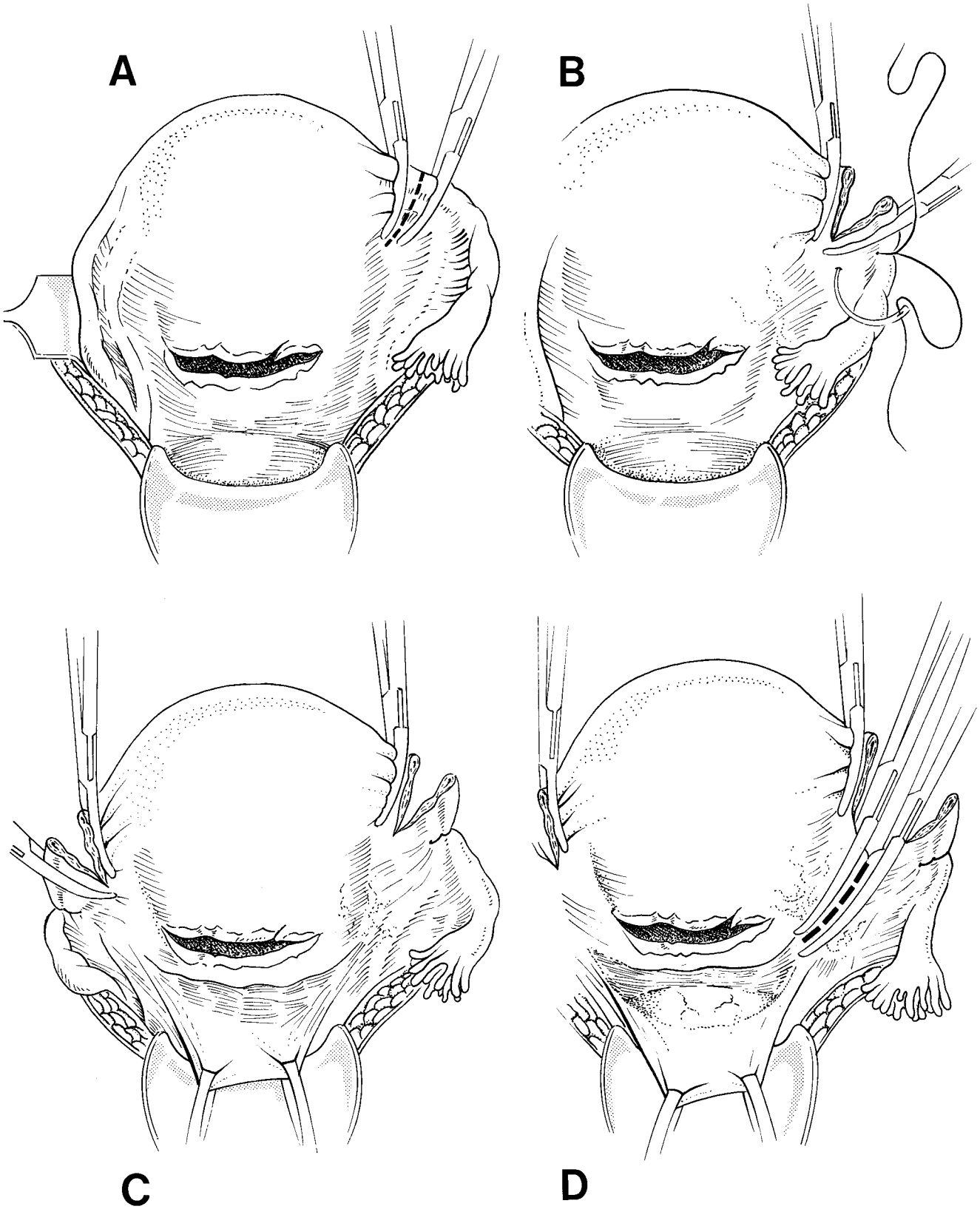


Fig. 4.5. Subtotal hysterectomy for rupture of the uterus. Clamping, dividing, and transfixing the round ligaments, ovarian ligaments, and uterine tubes (A–D). Dotted lines show sites of division.

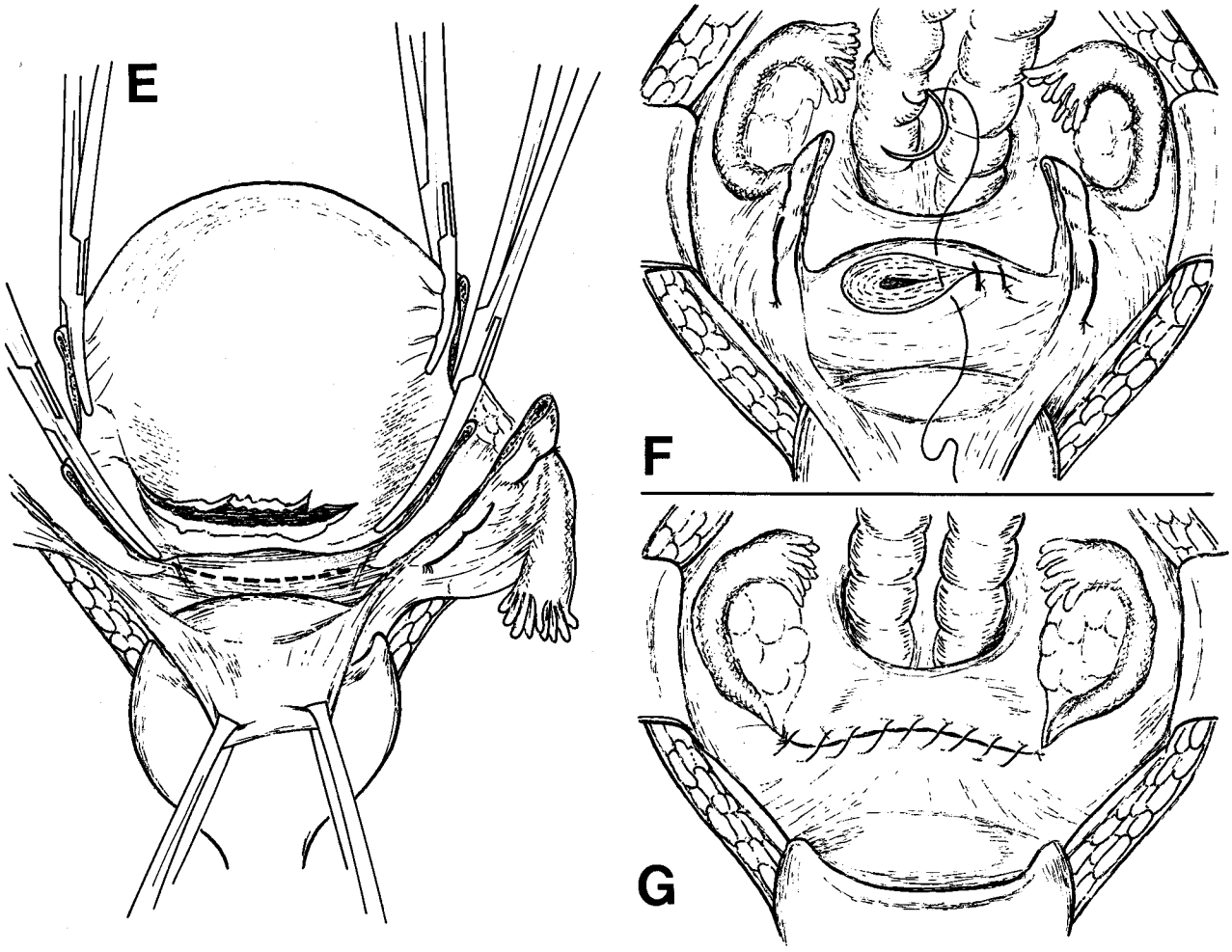


Fig. 4.5. Subtotal hysterectomy for rupture of the uterus *(continued)*. Line of division of the uterus after the anterior peritoneal flap, together with the bladder, has been turned down (E); closing the cut edge of the uterine stump (F); closure of the peritoneum over the pelvis to cover the pedicles and uterine stump (G).

bed for caesarean section (page 28). Keep in mind the possibility of concomitant rupture of the bladder, as well as the danger of damaging the ureter. In view of the risks of a subsequent pregnancy, any repair should be accompanied by sterilization (see page 69).

Close the abdominal wall in layers and apply a sterile dressing. Start antibiotic therapy, preferably with an initial dose given intravenously.

Complications

Possible complications include haemorrhage and sepsis. Injury to the ureters or bladder can complicate subtotal hysterectomy.

5

Aborted pregnancy

Evacuation of the uterine cavity

At the district hospital, evacuation of the uterine cavity is indicated in cases of spontaneous abortion and vesicular (hydatidiform) mole.

Diagnosis

In cases of spontaneous abortion, the patient presents with amenorrhoea, vaginal bleeding, and pain in the abdomen. Her general condition depends on the amount of blood lost and her previous state of health. She may be in hypovolaemic shock.

A general examination should be followed by pelvic and vaginal examinations, which will probably reveal bleeding through the cervical os and possibly products of conception at the os or in the vagina. The internal os is usually open. The uterus is soft and enlarged, the degree of enlargement often corresponding to the period of amenorrhoea.

In cases of vesicular mole, the abortion usually presents at about the 12th week of gestation; some vesicles may have been passed with blood. The degree of uterine enlargement is greater than expected from the period of amenorrhoea.

Differential diagnosis

Differential diagnosis should include threatened, incomplete, or missed abortion, and ectopic pregnancy.

Investigations

Measure the patient's haemoglobin level and test the urine for sugar and protein. Send a sample of blood for grouping (including Rh factor) and cross-matching. Test for bleeding and clotting times and for syphilis.

Equipment

See tray for *Dilatation and curettage,* Annex 1, page 188, and add a suction apparatus and a suction cannula.

Technique

In cases of spontaneous abortion, give blood early if the patient shows signs of hypovolaemia. Evacuation may be carried out with the patient under sedation alone, but general anaesthesia is preferable. Place the patient in the lithotomy position, and clean and drape the area. Empty the vagina of blood clots. Take hold of the anterior lip of the cervix with vulsellum forceps. If the cervix is not sufficiently dilated, perform dilatation with reference to the size of the uterus. Insert a pair of sponge forceps in the uterine cavity and gently remove the products of conception. Carry out curettage to ensure that the cavity is empty. Give an intravenous injection of ergometrine.

In cases of vesicular mole, evacuation by suction is the method of choice. Dilate the cervix, if necessary. Before evacuation, start the patient on an infusion of 4 IU of oxytocin in 1 litre of 5% (50 g/litre) glucose at 30 drops/min. Aspirate the contents of the uterine cavity using a plastic suction cannula (10 mm internal diameter). The combined effect of the oxytocin and the removal of vesicles by suction will cause the uterus to contract and retract. Blood transfusion should be considered with caution, since trophoblastic embolization during evacuation, pulmonary hypertension, and high-output heart failure can prove fatal. One week after evacuation, repeat dilatation and curettage to ensure that the uterus is empty. Hysterectomy, for which referral is necessary, is the treatment of choice in older women who do not desire more children.

Complications

Possible complications include perforation of the uterus, injury to the bladder or bowel, haemorrhage, and sepsis.

Termination of early pregnancy

Termination of pregnancy should be carried out in line with national or local laws and regulations on abortion, and then only under exceptional circumstances and only after obtaining the written consent of the patient and her husband, or as legally stipulated. In general, women requiring termination of pregnancy should be referred to a higher-level hospital.

The patient presents with amenorrhoea and other features of the first trimester of pregnancy, and perhaps with symptoms of a condition for which termination is indicated. The procedure described here is not suitable for use after the 12th week of pregnancy.

Differential diagnosis

Differential diagnosis should include metropathia haemorrhagica (essential uterine haemorrhage, for which referral is necessary), vesicular mole, and extrauterine pregnancy.

Investigations

Measure the patient's haemoglobin level and test the urine for sugar and protein. Send a sample of blood for grouping (including Rh factor) and cross-matching. Test for bleeding and clotting times and for syphilis. Confirm the diagnosis with a urine pregnancy test.

Equipment

See tray for *Dilatation and curettage,* Annex 1, page 188, and add a suction cannula and a suction apparatus.

Technique

Evacuation by suction is the technique of choice for medical termination of pregnancy, although dilatation and curettage (with the patient under general anaesthesia) are acceptable as an alternative.

The patient should be given a sedative or a general anaesthetic. Place her in the lithotomy position and clean and drape the area. Retract the vaginal walls and take hold of the anterior lip of the cervix with vulsellum forceps. Slowly and progressively dilate the cervix, using dilators up to No. 8 for an 8-week pregnancy, up to No. 9 for a 9-week pregnancy, and so on. Remove the products of conception with the suction cannula or by curettage (as in dilatation and curettage, page 62). Perform a "check" curettage after evacuation by suction. At the end of procedure, give 0.25 mg of ergometrine intravenously.

Complications Possible complications include haemorrhage, perforation of the uterus, bowel or bladder injury, sepsis, and cervical laceration.

Ruptured ectopic pregnancy

Diagnosis A typical history of ruptured ectopic pregnancy is of a missed period followed by severe abdominal pain and vaginal bleeding. Amenorrhoea may not be a feature, however, and some patients show little disturbance in pulse or blood pressure. Pain is most severe in cases of tubal rupture, whereas in cases of tubal mole and tubal abortion it is colicky. There is usually nausea and vomiting associated with fainting. Vaginal bleeding is dark and continuous.

If intraperitoneal haemorrhage has occurred, the patient shows signs of blood loss and hypovolaemic shock. There are clinical signs of an "acute abdomen", maximal in the hypogastrium or in one or the other iliac fossa. On bimanual examination the cervix is extremely tender to touch and movement, and an adnexal mass may be palpable; there is a tender resistance in the recto-uterine pouch (of Douglas). If bleeding is localized, there is an irregular boggy swelling in the adnexa. A tubal mole or haematosalpinx can be distinguished as a retort-shaped swelling in one of the fornices. Culdocentesis may be useful in confirming the diagnosis, but it should be carried out in the operating theatre.

Differential diagnosis Ectopic gestation can be confused with pyosalpinx, haematosalpinx, retroverted gravid uterus, an early stage of uterine abortion, or acute appendicitis.

Investigations Measure the patient's haemoglobin level and test the urine for sugar and protein. Test for pregnancy. Send a sample of blood for grouping (including Rh) and cross-matching.

Management Treatment for ruptured ectopic pregnancy is surgical. Diagnosis must be made without delay and laparotomy carried out immediately. Resuscitative measures should accompany preparations for operation.

Equipment See tray for *Laparotomy,* Annex 1, page 189, and have equipment for autotransfusion at hand.

Technique The patient should be given a general anaesthetic.[1] Prepare the skin and drape the area. Open the abdomen through a midline, subumbilical incision and insert a self-retaining retractor. Identify the affected tube and inspect the other tube and ovary before proceeding, to ensure that they are normal (if they are not, a special effort should be made to spare ovarian tissue on the affected side). Draw out the affected tube and excise it beyond clamps placed across its cornual end and the free edge of the mesosalpinx (Fig. 5.1A,B). Tie the pedicle with No. 1 chromic catgut (Fig. 5.1C), and close the peritoneum over it. Collect blood for autotransfusion, if feasible, and evacuate clots from the peritoneal cavity. Close the wound in layers.

Complications Complications are rare, but may include postoperative sepsis and burst abdomen.

[1] A suitable anaesthetic technique for use in cases of ruptured ectopic pregnancy is given in Dobson, M.B., *Anaesthesia at the district hospital* (Geneva, World Health Organization, 1988).

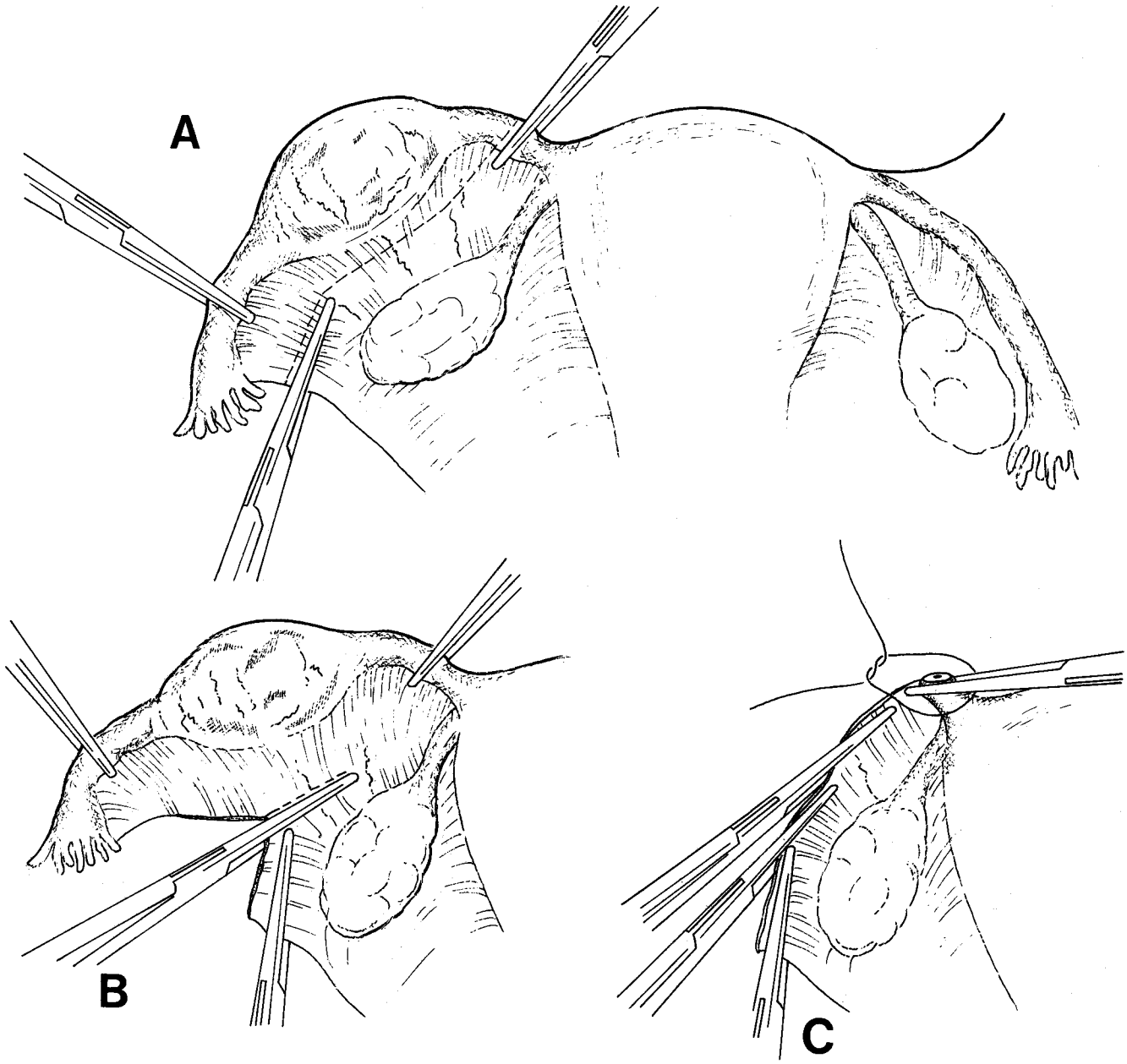


Fig. 5.1. Laparotomy for ruptured ectopic pregnancy. Drawing out the affected tube and clamping the free edge of the mesosalpinx (line of resection indicated by dotted line) (A, B); tying the pedicle of the tube (C).