

ABC of labour care

Operative delivery

Geoffrey Chamberlain, Philip Steer

In Britain all operative deliveries are now performed in a hospital. Caesarean sections must take place in hospital, but the National Birthday Trust's 1994 survey of home births reported that all ventouse and low forceps deliveries also took place in hospital (Chamberlain, 1997). However, not only obstetricians have to know about these deliveries—general practitioners and midwives need to know too, so that they can brief women and prepare to deal with any complications that may arise.

An operative delivery is performed if a spontaneous birth is judged to pose a greater risk to mother or child than an assisted one. Operations are divided into abdominal methods (caesarean section) and vaginal assisted deliveries (forceps delivery and vacuum extraction).

Preparations for operative delivery

- Discuss operative delivery with the woman and her partner (if time is short, at least outline what will happen)
- Follow the woman's wishes—no operative delivery can proceed without her consent even if the doctors think that the baby will die if it is not done
- Get written consent for elective procedures
- A paediatrician should attend any delivery where problems are anticipated; local guidelines should be drawn up and followed for all operative deliveries

Caesarean section

Use

The frequency of this operation in Britain has increased from about 5% in 1930 to about 16% now. In a survey of 327 obstetricians by Savage et al in Great Britain in the early 1990s, the main reason reported for this rise (cited by 48% of respondents) was litigation (defensive medicine).

In the United States, where the rate for caesarean sections is even higher, close scrutiny by peers and consumer groups has been associated with a reduction; the same may happen in Britain. Even in Britain, the rates vary widely between units.

Indications

The only absolute indications for caesarean section are cephalopelvic disproportion and major degrees of placenta praevia. The rest demand a judgment by the obstetrician that the risk of vaginal delivery exceeds the risk of the operation or that the mother's perception is that it does.

Caesarean sections are often carried out for debatable indications—for example, breech presentation after 34 weeks. The safety of vaginal birth in these situations often depends on the skill of the birth attendants. Recent evidence shows that perinatal mortality is increased at night and at weekends, when senior staff are less readily available, and is even higher in August and in February, when new resident staff arrive (*Maternity Statistics*, 1997). With shorter training hours and less exposure to difficult vaginal deliveries, deskilling of obstetricians has occurred, so that an elective caesarean section during office hours may well be seen to be safer than a difficult vaginal birth performed out of hours by a junior doctor.

The use of repeat caesarean section depends on the indication for the first caesarean section. If the indication was

NHS hospital deliveries England, 1980-94 (from *NHS Maternity Statistics England*, 1997)

Type of delivery	% of all deliveries
Spontaneous	
Vertex	71.5
Breech	0.9
Other	1.3
Total	73.7
Assisted vaginal	
Forceps:	
Low	3.3
Other	2.4
Vacuum	4.8
Total	10.6
Caesarean section	
Elective	6.5
Emergency	9.0
Total	15.5
Other	0.2

Home deliveries made up 2% of all deliveries, and all were spontaneous

Indications for caesarean section

Cephalopelvic disproportion—When it is obvious either antenatally or in the early stages of labour that the fetus, presenting by the head, is not going to pass through the pelvis

Relative cephalopelvic disproportion—The fetus descends initially during labour but is then arrested, possibly due to a malposition such as occipito-posterior

Placenta praevia—Particularly if it is overlapping the internal os

Fetal distress—In the first stage of labour

Prolapsed cord

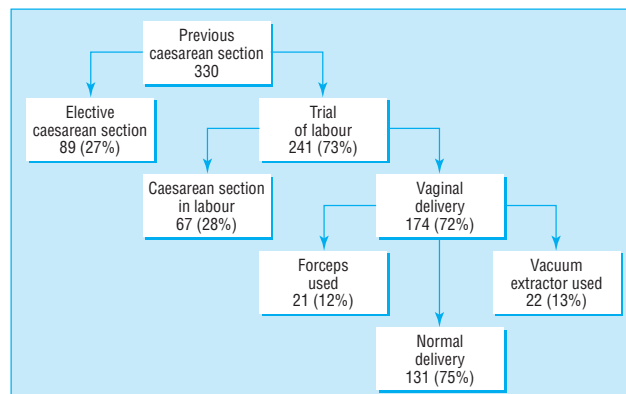
To avoid fetal hypoxia—When there is poor perfusion of the placental bed (for example, pre-eclampsia)

Malpositions—For example, brow

Malpresentations—For example, transverse lie, breech

Bad obstetric history

Maternal request



Delivery in one hospital (with low primary caesarean section rate) among 330 women who had previously had caesarean section, 1995

recurrent—such as a small pelvis—this demands a repeat caesarean section. If however, the indication was not necessarily recurrent—such as fetal distress—vaginal delivery can be tried. In Britain about two thirds of women who have had a caesarean section try a vaginal delivery in their next pregnancy, and in about two thirds of these a vaginal delivery is successful.

Procedure

How to perform a caesarean section is best learned in the operating theatre with a mentor. It must be learned through practice, with skilled teachers assisting. What follows here is a brief account of the operation—to show what happens, not how to do it. The usual approach is through a transverse lower abdominal incision (Pfannenstiel's incision). Having opened the abdomen carefully, the obstetrician exposes the lower segment of the uterus. The visceral peritoneum is incised and the bladder pushed down, having previously been drained with an indwelling catheter. The uterus is opened slowly with a transverse incision, and when the bulge of membranes appears, this is pricked and the amniotic sac is opened fully with a finger from each side.

The baby is delivered; if presentation is by the head, sometimes a pair of short obstetric forceps is helpful. With a breech presentation, the legs are brought down and a modified breech extraction is performed. If the lie is transverse, the obstetrician aims to bring down the legs to move the baby into a breech position. Care has to be taken not to bring down an arm.

Syntometrine is given, and the placenta is delivered by controlled cord traction. Manual removal increases the blood loss and should be performed only if the placenta is adherent. The uterus is closed in layers, as is the abdominal wall.

A vertical uterine incision used to be used but is now done only in exceptional circumstances: if the lower segment is unapproachable because of fibroids; if there is a transverse fetal lie with the back inferior; or if the lower segment is not formed (for example, before 28 weeks' gestation). Such an incision means that future births will probably be by caesarean as rupture of the vertical scar in the next labour is many times more common than rupture of a transverse scar, and a rupture in the upper segment bleeds much more than one in the lower segment.

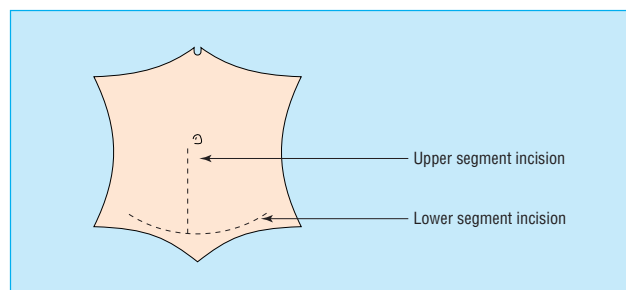
Most caesarean sections are now performed under a regional block—spinal (fastest and densest block) or an epidural (allows postoperative top ups for continuing pain relief). General anaesthesia is best avoided as the incidence of complications postoperatively is substantially higher (aspiration of stomach contents, chest infections, and thrombosis). The main indications for general anaesthesia are maternal anxiety, an operation that is likely to be complicated, or, in an emergency, when there is insufficient time to establish an epidural or spinal block.

Complications

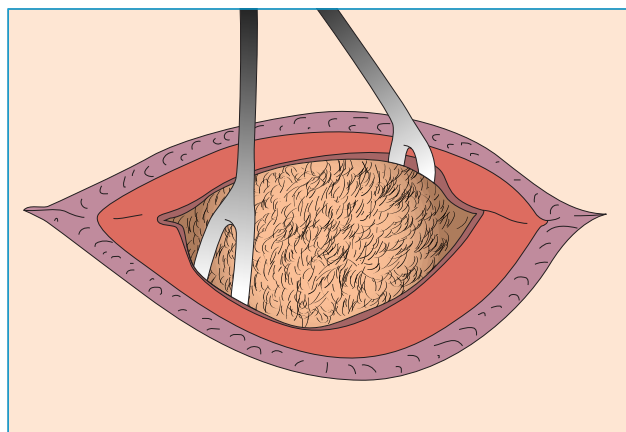
Currently, most women receive antibiotic prophylaxis as many studies have shown this to be cost effective, and subcutaneous heparin is increasingly given to prevent venous thrombosis and embolism. The latter is mandatory if there are additional risk factors, such as pre-eclampsia, prolonged inactivity, or obesity.

Postoperative care

The woman usually rises from her bed in the first 24 hours to exercise her legs and to go to the lavatory. The wound is commonly closed with clips or subcuticular prolene; the former can be removed on the fourth day, and this is now the peak time for discharge from hospital. Pain, lack of sleep, and



Skin incisions used for caesarean section: for lower segment operation, a gently curved Pfannenstiel's incision following the Langer's lines in the skin, about 3 cm above the pubis in the centre; for classic upper segment operation, a vertical right paramedian incision from level of umbilicus to 3 cm above symphysis pubis



Extracting the fetal head through a lower segment caesarean section with Wrigley's forceps

Complications of caesarean section

Haemorrhage

- Worst from the angles of the uterine incision or with placenta previa

Infection

- Prophylactic antibiotics usually given for caesarean sections, particularly if done after the membranes have ruptured

Thrombosis

- Eight times the risk than after vaginal deliveries
- Commonly occurs in the leg or pelvic veins
- Risk that the thrombus may embolise to a pulmonary vessel
- Prophylactic anticoagulation is given, particularly for those at highest risk (age over 35, anaemia, history of thrombosis, obese)

Ileus

- Mild ileus may last for a day after operation
- Treat conservatively with intravenous fluids and no oral fluids until the mother has passed flatus

difficulty with establishing breast feeding must all be watched for and dealt with appropriately. A discussion on the next day with the parents explaining why the caesarean was necessary is useful as many women have poor recollection of emergency events. Women should be assessed for any resulting psychological morbidity and appropriate help offered.

Forceps

A pair of curved blades can secure a purchase on the rounded head and so apply traction to alter the speed of progress. Usually this is to hasten delivery, but occasionally it is to slow it down, as when delivering the after-coming head in a breech delivery.

Use

Forceps deliveries are performed in 5-10% of deliveries depending on the indication, the availability of trained obstetricians, and the population served. In Britain, use of vacuum extraction is now greater than use of forceps because of reduced maternal trauma; both forms of vaginal delivery, however, are giving way to caesarean section.

Indications

All indications are relative and depend on the facilities for diagnosis and the attitudes of the professional staff.

Types of instruments

There are two types of forceps—those with a pelvic curve, and those without. Kielland's forceps are for rotation and extraction; Simpson's forceps are for mid-cavity assisted delivery without the need for rotation when the maximum diameter of the fetal head is about 5-8 cm above the vulva. Short forceps (Wrigley's) are for low extraction when the maximum diameter is about 2.5 cm above the vulva. These were designed for use by general practitioner obstetricians, with the safety feature that they could not reach high into the pelvis.

Procedure

How to use forceps is again best learned by watching and doing the procedure under skilled tutelage. The woman should receive an explanation of what will happen.

The bladder is catheterised, and regional anaesthesia is given. Each blade is slipped beside the fetal head, the vagina being guarded by the operator's hand. When correctly sited, the handles should lock, and gentle traction in the correct line of pull will help delivery. An episiotomy is usually required to achieve a line of pull sufficiently posterior. Once the head is crowned, the blades can be removed and the rest of the baby delivered normally.

Criteria to be fulfilled before forceps delivery

Cervix must be fully dilated—attempts to apply forceps blades with an undilated cervix will lead to much trauma and bleeding without successful delivery

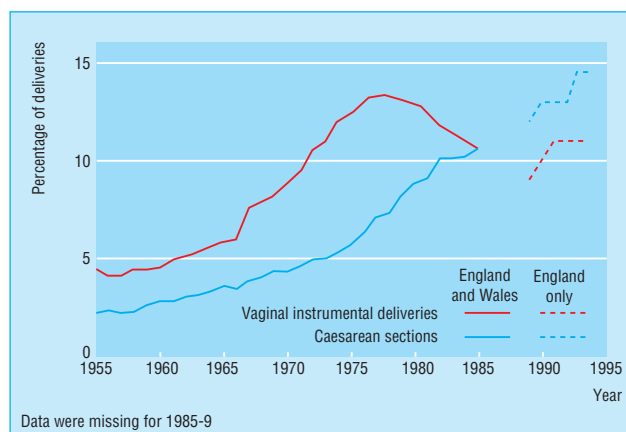
Bladder must be empty—if necessary emptied with a catheter. This prevents trauma and subsequent lack of bladder sensation

Membranes should be ruptured

No obvious bar exists to delivery, such as disproportion

Episiotomy should usually be performed to allow space for the posterior pull

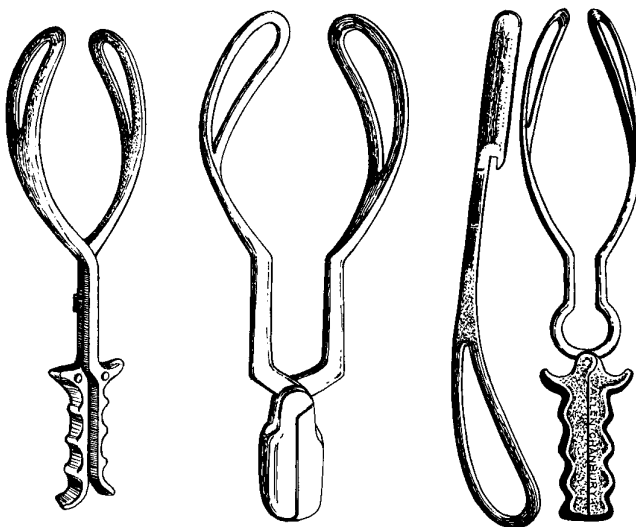
Analgesia—some form should be used: lignocaine pudendal block with infiltration to the vulva is sometimes enough for a mid-cavity forceps; more anaesthesia (epidural or spinal) is usually needed for rotation forceps



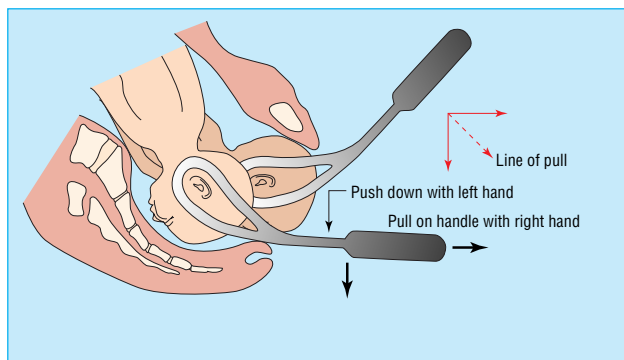
Operative delivery rates in England and Wales, 1955-95

Indications for using obstetric forceps

- Fetal distress in second stage of labour
- Maternal distress in second stage of labour
- Lack of advance in second stage of labour
- Prophylactic shortening of second stage—for example, in heart disease
- Control of after-coming head in a breech delivery



Types of forceps used in Britain: straight Kielland's forceps for rotation (left); curved Wrigley's forceps for lower cavity traction (centre); curved Simpson's forceps for mid-cavity traction (right)



Correct line for pull of forceps. The line of pull is the resultant of two lines of forces in mid-cavity. As the head descends, the line of pull needs to become more anterior to negotiate the pelvic curve

Complications

A perineal tear may extend from the episiotomy, leading to:

- Damage to the vagina or rectum;
- Bleeding;
- Reflex retention of urine.

Fetal scalp haematoma may occur. If the blades are applied improperly, intracranial haemorrhage can follow. Temporary facial palsy may be due to pressure on the facial nerve in front of the fetal ear where the nerve is unprotected. Permanent facial palsy is rare and probably due to a developmental abnormality.

Vacuum extractor

Vacuum extraction is fast becoming the method of choice for vaginal assisted delivery. A negative pressure raises an overhang of soft tissues in the rim of the metal cap, so that the pull is on the overhang of the fetal scalp at this edge. Silastic caps give more surface area applied to the scalp.

Use

Vacuum extraction is widely used in Europe, increasingly in Britain, and least in the United States. Depending on the skills of the obstetrician, about 5% of deliveries can be assisted by a vacuum extractor.

Indications

The vacuum extractor can be used in the first stage of labour before dilatation of the cervix, although this is now rarely done and is potentially dangerous for less experienced staff. Vacuum extractors have a safety factor—they will come off if too much traction is applied, so they are not useful with even mild disproportion. They require less maternal analgesia and cause less maternal trauma than forceps, but the incidence of scalp trauma in the baby is increased; they should not be used before 34 weeks' gestational age because of the softer fetal head.

Types of instruments

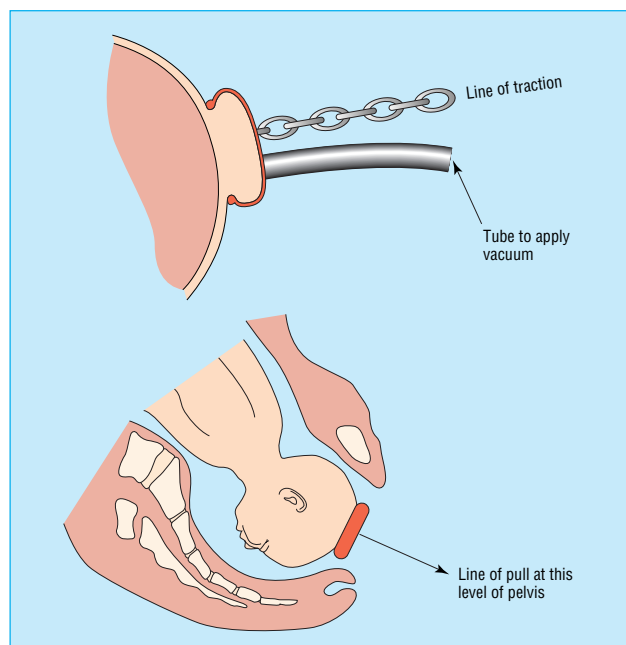
The conventional vacuum extractor has a metal cap of 60 mm, 50 mm, or 40 mm diameter. The negative pressure is usually applied by a foot controlled vacuum pump. There are also Silastic caps, which cause fewer abrasions but exert less traction. They have irregularities of their inner surface for a better grip of the scalp, which is particularly useful for helping rotation through the birth canal.

Procedure

Vacuum extraction is best learned by watching and helping a more senior operator. In essence, the largest cap possible should be used. It should lie flat against the fetal head. The pressure is reduced so that it is below 0.8 kg/cm² atmospheric pressure. A check should be made that no part of the vaginal wall (or, if not fully dilated, the cervix) has been sucked in. The cap is held on to the head with the left hand as traction is applied with the right hand. The correct line of pull is very important to prevent the cap coming off and the head not flexing correctly. An early episiotomy is often required to allow the pull to be sufficiently posterior.

Complications

Damage can occur to the cervix if not fully dilated and to the vaginal wall. Such damage can be prevented by checking that no redundant wall is sucked into the cap while the negative pressure is being raised. Haematoma of the baby's scalp sometimes occurs but usually disappears in a week; scalp abrasions may also occur but usually heal readily.



Vacuum extraction. Top: Chignon of loose skin raised by vacuum; note that pull is on the overhang. Bottom: Line of traction in the mid-cavity is more posterior than would be expected, so early episiotomy is indicated

Indications for use of vacuum extractor (ventouse)

First stage of labour (rarely)

- Fetal distress after cervix is 8 cm dilated in a multiparous woman
- Lack of advance after 8 cm dilation in a multiparous woman

Second stage of labour (commonly)

- Lack of advance—often with occipito-posterior or occipito-transverse position
- After an epidural has relaxed the pelvic floor
- If the mother is tired
- If the head of a second twin is high



Types of vacuum extractor: metal cap (left) and Silastic cap (right)

Genital tract trauma

The perineal skin does not stretch as well as the vagina, probably owing to the increased fibrous content of the skin compared with vaginal epithelium. Perineal tears are classically divided into three grades according to severity.

If the perineum seems to be splitting, an episiotomy is often performed to limit the damage. Episiotomies are not done routinely now but for specific indications; in Britain the rate varies from 15% to 40% of women, depending on the hospital.

An episiotomy should always be done under anaesthesia (at least 1% lignocaine infiltration). In Britain an episiotomy is usually mediolateral so that if the incision extends, it does not run into the anus. Episiotomies are usually repaired by trained midwives, preferably the one who performed the episiotomy.

Occasionally the episiotomy will extend at its upper end in the vaginal tissues into one of the fornices. This must be checked for carefully when repairing. It is important for haemostasis to put in at least one stitch above the highest point of the cut or tear to occlude vessels coming in from above.

Operative deliveries are performed by trained obstetricians, but the events leading up to and following such deliveries are in the care of many other health workers, all of whom should be knowledgeable about the subject

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Philip Steer is professor of obstetrics and consultant obstetrician at the Imperial College School of Medicine, Chelsea and Westminster Hospital, London.

The ABC of Labour Care is edited by Geoffrey Chamberlain, emeritus professor of obstetrics and gynaecology at the Singleton Hospital, Swansea. It will be published as a book in the summer.

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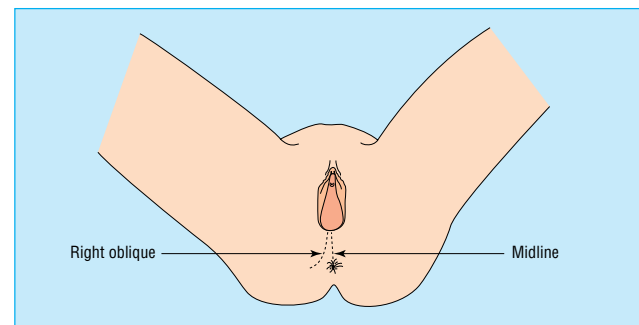
Staging of degrees of perineal tear in order of severity

- Stage 1: Skin of fourchette or vagina only
- Stage 2: Skin and superficial perineal muscles
- Stage 3: Anal muscles and sphincter involved*

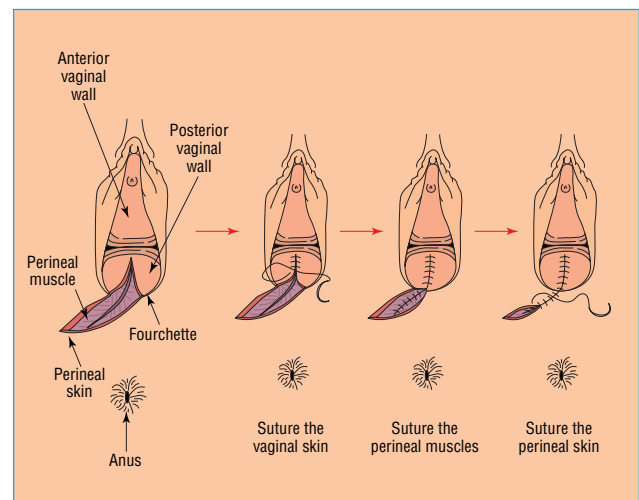
*In the United States, stage 3 is confined to tears to the anal margin, and involvement of the sphincter and rectal mucosa becomes stage 4

Indications for episiotomy

- To speed the later part of the second stage of labour in the presence of fetal distress
- To open up posterior areas to allow the correct line of traction at forceps or vacuum extraction
- To overcome a perineum that is rigid and delaying the last part of delivery
- If there is likely to be a major perineal tear, an episiotomy may prevent it and may be easier to repair



Sites for episiotomy: midline heals well; right oblique curves away from anus



Repair of episiotomy. A recent trial has shown that suturing of the skin is not necessary provided that the muscle layer is well closed

The data in the figure showing delivery in women who had previously had a caesarean section were provided by the National Maternity Hospital, Dublin. The graph on operative delivery rates in England and Wales is adapted from one prepared by Alison Macfarlane based on data from the maternity hospital inpatient inquiry and hospital episodes statistics.