Caesarean section: techniques and complications

Kathryn A Diamond
Elizabeth A Bonney
Jenny E Myers

Abstract
An increasing number of deliveries in the UK are performed by caesarean section. The technique has changed very little over the years but safety rates have improved greatly, mainly due to improved pre-operative planning. There is widespread debate regarding the benefits of caesarean section compared with vaginal delivery. Guidance from the UK National Institute for Health and Clinical Excellence has aided clinicians in the counselling of patients about the risks and benefits of the procedure. It is essential to maintain good surgical training as the number of difficult procedures is increasing due to the rise in the rate of repeat caesarean sections. Surgical techniques are discussed along with complications associated with this common procedure.

Keywords caesarean section; complications; haemorrhage

Introduction
Caesarean section was widely introduced into obstetrics in the latter part of the 19th century and now accounts for almost a quarter of births in the UK. Rates across the world vary widely and have been reported as over 50% in China. There is global concern about the rising trend in caesarean section rates prompting the World Health Organisation (WHO) to issue a consensus statement in 1985. This concluded that there were no additional health benefits associated with a caesarean section rate above 10–15%. This figure was based on an examination of estimates of national caesarean section rates and maternal and perinatal mortality rates from various countries.

The majority of caesarean sections are performed for maternal medical or fetal reasons, however, there are an increasing number of women requesting a caesarean section without a medical indication. It is also thought that the increasingly litigious environment of the developed world and the decreased amount of training time, and therefore inexperience of junior doctors in the management of labour and difficult instrumental deliveries, may also be contributing to the increase. Although, the safety of this procedure has greatly improved, there is widespread debate regarding the benefits of caesarean section compared with vaginal delivery.

In general, the risks and complications are greater for emergency than for elective procedures. The improvement in safety is largely related to the availability of antibiotics, blood transfusion, advances in anaesthesia, and also improvements in technique. The main complications are haemorrhage and infection, and these in turn, are related to the complexity of each case. Prolonged labour, prolonged rupture of membranes and increased frequency of vaginal examinations all predispose to infection whereas previous caesarean section, placenta praevia and placenta accreta increase the risk of haemorrhage.

Indication
There are many reasons for performing a caesarean section. The indications for the overwhelming majority include failure to progress in labour, suspected fetal distress, breech presentation and repeat caesarean section. There are relatively few absolute contraindications to vaginal delivery, and there will be some circumstances when a caesarean will be suitable for one woman but not another. No list of indications is exhaustive and the overall justification is often that the perceived risk of a vaginal delivery is higher than an operative delivery.

Classifying caesarean sections into ‘emergency’ and ‘elective’ is no longer common practice, as it does not adequately convey the degree of urgency, which may be associated with the procedure. The ‘emergency’ category is too broad as this term encompasses situations where there is an immediate threat to the mother or fetus and situations where, whilst the procedure may not have been planned, there is no evidence of imminent maternal or fetal compromise. It is also of limited value for auditing obstetric, anaesthetic and neonatal outcomes. In 2000, a new classification (Table 1) was proposed and has now been almost universally adopted in UK maternity units. This standardization aids clear communication between healthcare professionals about the urgency of a CS.

The generally accepted standard in cases of serious maternal or fetal compromise is that a decision-to-delivery (DDI) interval time by caesarean section should be within 30 minutes. However, there is no conclusive evidence to show that 30 minutes improves fetal outcome. Delivery should be accomplished as fast as possible but without endangering the condition of the mother. The RCOG Sentinel Caesarean Section Audit in 2001 suggested that in some cases such as a cord prolapse, a DDI of 15 minutes was possible. Decision-to-delivery intervals for grade 2 CS should be within 75 minutes.

Consent
Ordinarily, full informed written consent must be obtained from the mother prior to any caesarean section, ensuring that she understands the nature of the procedure and the likelihood of any complications. This may be difficult when the patient is in...
pain or under the influence of opioid analgesia. It is advisable for women to be informed during the antenatal period of common problems that occur in labour. Additional procedures such as sterilization should be deferred if they have not previously been discussed. Written consent may not always be possible, for example in some grade 1 emergency caesarean sections. In such circumstances, verbal consent should be obtained and the obstetrician should record the decision and the reasons for proceeding to emergency caesarean section without written consent.

Care should be taken to explain frequent complications such as wound discomfort, infection and fetal laceration, balanced against the more serious but rarer complications such as thromboembolism and bladder injury, with some attention to the effect on future pregnancies.

If a competent woman refuses delivery by caesarean section, even after full explanation of the risks to her and the fetus, her wishes must be respected.

Pre-operative

It is good practice that the operator should have full knowledge of the patient’s history, especially in relation to any previous surgery. Anticipation and adequate planning are important steps to avoid complications.

A haemoglobin assessment should be performed on all women before caesarean section to identify those who have anaemia. Although blood loss of more than 1000 ml is infrequent it is a potentially serious complication. In women who are healthy and who have otherwise had uncomplicated pregnancies, NICE suggest that grouping and saving of serum, cross-matching of blood or performing a clotting screen is not necessary.

The mother is usually given H₂ receptor antagonists or a proton pump inhibitor pre-operatively to reduce the gastric acid content in case of the need for a general anaesthetic. This, along with the use of a cuffed endotracheal tube, decreases the significant risk of aspiration of gastric contents, which may occur when anaesthetizing a pregnant woman.

A urethral catheter should be inserted to ensure the bladder is empty, reducing the risk of injury when opening the abdomen and preventing over-distension of the bladder. It also allows close monitoring of urine output and drainage of the bladder whilst the mother is immobile due to regional anaesthetic.

A previous caesarean section increases the risk of placenta praevia and accreta in subsequent pregnancies. It is essential to identify the location of the placenta prior to any caesarean section. If it is known to be low lying, then a Senior Obstetrician and Senior Anaesthetist should be present in theatre. Imaging in the form of colour flow Doppler and magnetic resonance imaging (MRI) will aid diagnosis of a morbidly adherent placenta. A full discussion with the patient should be done pre-operatively about the possible complications and possible need for further surgical procedures, including hysterectomy. There should be blood cross-matched and available in theatre before commencing the operation.

Anaesthesia

There is little doubt that the risks of general anaesthesia are far greater than those of regional techniques. General anaesthesia is therefore usually reserved for a small number of category 1 caesarean sections or where there is significant contraindication to regional anaesthesia. The induction of a safe general anaesthetic agent in a pregnant woman at term, especially after prolonged labour, can be a major test of skill for even the most experienced anaesthetists. Advantages of general anaesthesia include the ability to administer very quickly and potentially easier control of blood pressure and breathing. Indications for a general anaesthetic may include bleeding or clotting abnormalities, or acute sepsis, where it is preferable that infection is not spread to the spinal area. The major risks to the mother of general anaesthesia are difficulty in intubation and/or aspiration of gastric contents during placement of the tube, which can cause a serious pneumonia (Mendelson’s syndrome), a life-threatening consequence.

Regional anaesthesia includes both spinal and epidural anaesthesia and offers an effective means of anaesthesia while allowing the mother to be awake and see her baby soon after birth. Generally, a spinal is faster and easier to place, and will provide good analgesia for 4–6 hours. An epidural takes slightly longer to place and longer to start working but allows medication to be given repeatedly or continuously. The regional techniques also offer some advantages for the control of pain after the operation, whereas women requiring general anaesthetic may require PCA analgesia post-operatively.

In theatre

When a heavily pregnant woman lies in the supine position, she is likely to get decreased venous return to the heart, because of the uterus compressing the inferior vena cava. This results in hypotension causing decreased perfusion of the placenta and therefore, decreased fetal oxygenation. For that reason, in theatre, the mother is usually positioned supine with a 15° lateral tilt, to reduce the effects of aortocaval compression. It has also been demonstrated that when a tilt is used, there were fewer low Apgar scores and better cord pH measurements.
Infection rates are lowest when shaving is done immediately prior to the surgery. Skin agents which are non-toxic, fast-acting and have broad-spectrum antibacterial activity should be used. Iodophores, such as iodine plus polyvinyl pyrrolidone (povidone—iodine) and chlorhexidine gluconate (0.5% in 70% isopropyl alcohol) are usually recommended.

Prophylactic antibiotics have been shown to substantially reduce the incidence of maternal fever, endometritis, wound infection and serious infection morbidity in women who undergo caesarean section. Recent guidance suggests that antibiotics should be given prior to skin incision to optimize this reduction in risk of maternal infection. Advice from NICE suggests avoiding use of co-amoxiclav, due to the evidence of an increased risk of necrotizing enterocolitis in infants of mothers treated with co-amoxiclav in the ORACLE study. However, many units have continued to use co-amoxiclav as the likely exposure to the fetus is minimal and the ORACLE study looked at a specific group of women with preterm infants.

**Technique**

**Skin**

Both transverse and vertical skin incisions have been used for caesarean section. The Pfannenstiel incision was introduced in 1900 and is widely used. It has excellent cosmetic results, a low incidence of wound breakdown and allows for early ambulation. The initial cut is made cleanly through the skin, just within the pubic hairline and slightly convex towards the pubis. The fat is incised down to the rectus sheath and the aponeurosis of the external oblique muscle. Short incisions are made on the rectus sheath on either side of the midline and then extended for the full length using scissors. The upper and lower edges of the incision are then grasped in turn, and the underlying muscle is separated from the muscle by both blunt and sharp dissection. Caution must be taken to avoid injury to the ilioinguinal and iliohypogastric nerves when extending into the external and internal oblique muscles.

The Joel Cohen incision is a straight transverse incision, positioned slightly higher than the Pfannenstiel. The subcutaneous tissue is not sharply divided. The anterior rectus sheath is incised in the midline for 3 cm, but the muscles are not separated from the sheath. The peritoneum is bluntly opened in a transverse direction. Both Pfannenstiel and Joel Cohen techniques were compared and less fever, pain, blood loss, analgesic requirements and shorter operating time and post-operative morbidity were demonstrated in the Cohen’s incision group.

A vertical incision may be useful when performing caesarean sections along with other procedures; it is simple and quick to perform, allows a less vascular entry and gives good exposure to both abdomen and pelvis. It does, however, have a greater incidence of wound dehiscence, and as it is not frequently used, many trainees will not be comfortable with this type of incision.

Wound healing is affected if the edges are not approximated properly and so in the presence of a previous scar it may be better to remove the old scar to aid healing and give improved cosmetic results.

**Lower segment uterine incision**

The lower segment uterine incision has become accepted as the standard approach because it has certain distinct advantages over the classical operation:

- The lower segment is less vascular than the upper part of the uterus
- The risk of rupture of the uterine scar in subsequent pregnancies is greatly reduced
- Post-operative complications such as ileus and peritonitis are much reduced
- The risk of adhesions and post-operative obstructions is greatly reduced
- As the incision is made in a relatively inactive part of the uterus, haemostasis is easily achieved and healing occurs readily
- In those cases where there is already infection present, the lower segment operation markedly reduces the risk of contamination for the remainder of the peritoneal cavity.

Before an incision is made, rotation of the uterus should be noted and, if possible, corrected, so that the incision will not be asymmetrical, risking extension on the opposite side. A Doyen’s retractor can be used for good exposure of the lower segment. The peritoneum should be incised and the bladder pushed down gently, mainly in the centre, in order to avoid disturbing the vascular plexus. In cases of obstructed labour with formation of Bandi’s ring, or caesarean sections where the cervix is fully dilated, this fold of peritoneum is located higher and the peritoneum should be opened higher up, to avoid bladder injury.

Following reflection of the peritoneum, the lower segment is incised by making a central incision about 2–3 cm long. The amniotic sac frequently balloons through if the membranes are still intact, or the head of the fetus become visible as the lower segment thins. The index fingers of each hand are then used to extend the incision laterally and upwards along the path of least resistance so that the presenting part can be delivered. When difficulties in delivering the presenting part arise, an extension of the transverse incision in the shape of a ‘J’ is better than an inverted ‘T’ as it will heal better, although both extensions will determine that the patient will require delivery by CS in the future.

**Classical caesarean section**

In recent years, the rate of classical caesarean sections has increased, due partly to increased preterm deliveries, especially those before 26 weeks gestation. The few indications for a classical caesarean section include:

- Preterm delivery with poorly formed lower segment
- Premature rupture of membranes with poor lower segment and transverse lie
- Transverse lie with fetal back presenting over the pelvis
- Where there has been a previous classical section and the scar is dangerously thinned and would be best treated by resection of the scar and resuture
- Where a cervical fibroid obstructs access to the lower segment
- As a preliminary to hysterectomy for treating carcinoma of the cervix.

The uterus is carefully checked that it is not rotated and a large gauze pack should be inserted on either side. An incision approximately 10 cm long is now made in the anterior surface of the uterus, which may extend into the lower segment. The incision should be made quickly as considerable haemorrhage may occur from the uterine muscle. However care should be exercised as the risk of cutting the fetus is greater in this procedure.
Delivery of the fetus
When the uterine incision is complete and the head is presenting, the surgeon will insert a hand below the head, to disimpact it from the pelvis. Ideally, the fetal head should be delivered in the occipito-anterior position. The assistant applies fundal pressure when the head is brought into the incision and the fetal head delivered. Occasionally, if the fetal head is high, making delivery difficult, Wrigley’s forceps can be applied to ease delivery.

Delivery of the head in the second stage of labour can cause problems as the head may be impacted deep into the pelvis. It may be beneficial for an assistant to push the head up from below or a tocolytic (e.g. terbutaline) may help to relax the uterus, particularly when the membranes have ruptured. In rare circumstances the fetus may need to be delivered by the breech first to enable disimpaction of the head.

If the presentation is breech, the lower limbs or the breech are grasped and the breech is delivered in the same way as a vaginal breech delivery. The shoulders may need to be delivered by gentle rotation i.e. Lovset’s manoeuvre and the head then follows with the assistant maintaining fundal pressure. The Mauriceau—Smellie—Veit (MSV) technique can be used to help flex the fetal head and aid delivery.

In caesarean sections for transverse presentation, external or internal podalic version can be used to allow delivery as a breech. It is beneficial to leave the membranes intact whilst manipulating the fetus.

Delivery of the placenta
At delivery of the fetus, it is usual practice for the anaesthetist to administer 5 i.u. of oxytocin intra-venously to the mother. This causes the uterus to contract, encouraging separation of the placenta and reduction in blood loss. The method used for delivering the placenta should not be that different from the controlled cord traction used at vaginal delivery. Manual removal of the placenta does not allow time for the retraction of the myometrial fibres, and therefore, leads to unaltered perfusion and increased blood loss and increases the risk of endometritis. The uterine cavity should be inspected to ensure complete removal of the placenta and membranes.

Closure of the uterus
The uterus may be repaired in situ or following exteriorization. Although it is not routinely recommended, exteriorization can allow better access to the lower segment and therefore may allow better surgical repair, however, it may cause an increase in maternal pain. It is often useful when there have been lateral extensions to the incision.

The extreme corners of the uterine wound are identified and the lower segment is sutured in two layers using a continuous absorbable suture. It is important to insert the first stitch a short distance lateral to the corner of the incision to ensure haemostasis is achieved at the angles. The second layer of sutures is used to oversew the first line to encourage haemostasis by ensuring complete apposition of the incision. Occasionally, a small amount of ooze will continue which may simply need pressure for a few minutes. However, if it does not resolve, further haemostatic sutures should be applied, usually placed in a ‘figure of 8’ style.

Single-layer closure of the lower segment uterine incision has been described and theoretically, should cause less tissue damage, include less foreign material and take less operative time. However, there are concerns about the integrity of the scar during subsequent trial of labour. A multicentre randomized controlled trial called The CAESAR Study has recently been undertaken to evaluate alternative approaches to caesarean section. Single versus two-layer closure of the uterus was one of the aspects assessed. Interestingly, single layer closure had no effect on the primary outcome, that is maternal infectious morbidity, nor did it affect any of the secondary outcomes which included further operative procedures on the wound, pain, blood transfusion and breast feeding rates at discharge and 6 weeks. This study, however, only considered short term measures, and the effect on future pregnancies and long term scar integrity is still unknown.

Because of its thickness and vascularity, the classical incision needs to be closed in three layers. Traditionally, about six ‘all layer’ sutures are inserted but not tied. Following this a ‘herring-bone’ suture is used for the deep and middle layers, thereafter the ‘all-layer’ interrupted sutures are tied.

Peritoneum
Current advice on closure or non-closure of the peritoneum is controversial. Current advice from NICE is that non-closure is preferable as it reduces operating time, is associated with lower post-operative analgesia requirement and therefore improves maternal satisfaction. However, the recent CAESAR study found no significant difference in outcome between groups assigned to closure versus non-closure of the peritoneum. There are currently no adequately powered trials which have assessed the frequency of potential long-term outcomes, including adhesion formation and bowel obstruction.

Rectus sheath
This is usually closed with a continuous absorbable suture. Healing is best if the sutures are inserted 10 mm from the edge and 10 mm apart. This is because collagenolysis occurs over an area of 10 mm from the wound edge. Any wound closures within this area will therefore be weaker.

Fat stitch
In slim patients it is unnecessary to suture the fat. However, if the fat layer is more than 2 cm fat stitches should be used and can be done as interrupted or continuous stitches. The aim is to close any potential dead space that may allow formation of seromas or haematomas, which can lead to infection and therefore delayed healing.

Drain
Unless there has been exceptional oozing there is no necessity for drains. The liberal versus restricted use of a sub-sheath drain was the third arm of The CAESAR Study, and again, no significant difference was found between the two groups, suggesting that a drain should only be used when clinically indicated.

Skin
There are many techniques of skin closure such as staples, interrupted stitch or by subcuticular sutures immediately below the skin. The choice is usually based on the surgeon’s preference, speed and cosmetic advantage.
Post-operative considerations

Women should be transferred to a recovery area and as a minimum immediate post-operative observations (non-invasive blood pressure, heart rate and rhythm, respiratory rate and continuous pulse oximetry) should be performed every 5 minutes for the first 30 minutes. Following this, assessment of respiratory rate, heart rate, blood pressure, pain and sedation scores should be continued every half hour for 2 hours and then hourly thereafter, provided the observations are stable and satisfactory.

Umbilical artery pH should be performed after all caesarean sections for suspected fetal compromise to allow for a review of fetal well-being and guide ongoing care for the baby.

Women who are recovering well after surgery and who do not have complications can eat and drink when they feel hungry and thirsty. The urinary catheter is commonly removed after 12–24 hours or when the patient is mobile.

Increasingly, women who have undergone a routine elective caesarean section will be eligible for an enhanced recovery protocol. This aims to promote a patient-centred approach to surgery, with improved pre-operative preparation, specific intra-operative procedures and post-operative targets that aim to aid the patient in a quick recovery and early discharge home.

Antenatally, haemoglobin levels should be optimized, and there should be psychological preparation regarding early discharge and education regarding breast feeding. Pre-operatively, starvation times are reduced and patients are loaded with carbohydrate to optimize nutritional status. Intra-operatively, techniques to minimize blood loss are used, including use of cell salvage, and techniques such as the Joel Cohen approach are suggested to reduce post-operative pain. This is followed by provision of regular analgesia and early removal of the urinary catheter to encourage mobilization, and support from the community midwife when back at home. Currently there are no studies looking at enhanced recovery programmes in obstetrics, but parallels can be drawn from other specialties, including gynaecology.

Caesarean section is a major risk factor for thromboembolic disease; women undergoing emergency caesarean section are four times more likely to develop venous thromboembolism (VTE) than women having vaginal deliveries. The RCOG recommends that all women who have had an emergency (grade 1, 2 and 3) CS receive seven days of low molecular weight heparin (LMWH) and those undergoing elective CS should receive LMWH if they have one or more additional risk factors. Identification of risk factors for VTE is paramount and a risk assessment should be carried out in early pregnancy and repeated at delivery or in the event of a significant change in clinical condition such as the development of a septic illness or pre-eclampsia. Women should also be offered thromboembolic deterrent (TED) stockings, and advised on adequate hydration and early mobilization.

Women who have had a caesarean section should be offered the opportunity to discuss the reasons for their surgery and implications for future pregnancies.

Intra-operative complications

There can be operative difficulties at every stage of a caesarean section. These can include problems entering the abdominal cavity due to dense adhesions from previous surgery, or difficulties due to malposition of the fetus. Each case needs to be managed on an individual basis.

Complications are increased in the presence of obesity, which, in modern day society, has become a major problem. Obese patients have a poor exercise tolerance and tolerate the stress of surgery badly. The problems generated include difficulties in access, difficulties with anaesthetics, stasis of fluid in the limbs and secretions in the lungs and problems with movement and mobilization in the pre- and post-operative period. Thromboembolic prophylaxis is essential. In very obese women, the thinnest part of the abdomen is often a transverse line running roughly across the line of the pubic hair in the equivalent position to a high Pfannenstiel incision. Women with a booking BMI >40 may benefit from assessment of manual handling requirements in the third trimester and ideally additional/specialist theatre equipment and personnel should be arranged. Obesity has been identified as a significant risk factor for anaesthesia-related mortality and women with a BMI >40 should have an antenatal consultation with an experienced obstetric anaesthetist. This provides an opportunity to discuss potential difficulties with venous access, regional or general anaesthesia and allows a plan to be documented in the medical records.

Common complications are discussed below:

Haemorrhage

Blood loss is usually underestimated, particularly when it is large. The average blood loss at caesarean section is 0.7–1 litres. Box 1 shows risk factors associated with haemorrhage at caesarean section.

The commonest cause of haemorrhage is uterine atony. Treatment should be administered in a stepwise manner using local postpartum haemorrhage guidelines. Drugs administered include oxytocin infusions, ergometrine, misoprostol and injection of prostaglandin F2α.

If atony has been excluded or remains resistant to treatment, the next step is to check for extensions of the uterine incision or trauma to the uterine vessels. Following on from this, more advanced surgical techniques may be required such as a B-Lynch suture, ligation of the uterine or iliac arteries or even a caesarean hysterectomy.

<table>
<thead>
<tr>
<th>Risk factors for haemorrhage at caesarean section</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Uterine atony</td>
</tr>
<tr>
<td>- Prolonged labour</td>
</tr>
<tr>
<td>- Second stage caesarean section</td>
</tr>
<tr>
<td>- Placenta praevia</td>
</tr>
<tr>
<td>- Chorioamnionitis</td>
</tr>
<tr>
<td>- Ante partum haemorrhage</td>
</tr>
<tr>
<td>- Previous postpartum haemorrhage</td>
</tr>
<tr>
<td>- Preterm caesarean section</td>
</tr>
<tr>
<td>- Classical incision</td>
</tr>
<tr>
<td>- General anaesthesia</td>
</tr>
<tr>
<td>- Obesity</td>
</tr>
</tbody>
</table>

Box 1
Injury to intra-abdominal organs
The bladder is the main organ at risk in caesarean sections especially in those with multiple adhesions. If necessary, the peritoneum should be opened higher up to allow for the reflection of the bladder flap. If the bladder is inadvertently opened, the damage should be assessed by noting the location and size of the defect and its relation to the ureteric orifices. A urologist should be contacted in the case of extensive damage.

Damage to the ureters is very rare, but when occurs should be repaired immediately by a urologist. The injuries are associated with less morbidity when repaired immediately. Some, however, are only suspected post-natally and in such cases, an urgent renal ultrasound should be arranged.

Bowel injuries are also more common when previous surgery has occurred. Bowel is usually injured at the time of entering the peritoneal cavity. When injury is suspected or recognized before delivery of the fetus, the area should be marked with a stitch and covered with a moist pack. It should be repaired in conjunction with a general surgeon, after the uterine incision is closed. Small bowel damage is repaired using a two layer procedure and large bowel in the same way, but sometimes requiring a temporary defunctioning colostomy. Post-operative broad-spectrum antibiotics are essential.

Post-operative complications

Infection
The most important source of micro-organisms responsible for post-caesarean infection is the genital tract, particularly if the membranes are ruptured pre-operatively. Box 2 demonstrates risk factors associated with post-operative infection.

Venous thromboembolism
Pulmonary embolism remains one of the leading direct causes of maternal death. The incidence of such complications can be reduced by the identification of high risk women and appropriate administration of thromboprophylactic measures.

Future pregnancy
The factors to be taken into account when deciding the mode of delivery depend on the balance between the desires of the mother, the risks of a repeat operation, the risks to her child of labour and the risk of labour on the strength of her old scar. A trial of vaginal delivery in subsequent pregnancies is appropriate if the first operation was carried out for a non-recurrent cause, providing there are no other relevant obstetric complications close to delivery.

A desire of the woman to have a large family may play a crucial role in deciding the mode of delivery in future pregnancies. It has been shown that excessive blood loss, difficulty in delivering the neonate and dense adhesions are more common after multiple caesarean sections. Placenta accreta/increta/praevia are associated with life-threatening haemorrhage, uterine rupture, peripartum hysterectomy and maternal death. The increasing frequency of multiple caesarean sections is thought to play a major role in the increase of these complications.

Summary
Caesarean section has become commonplace on the labour ward. With the safety of caesarean sections improving, more women are choosing to have an operative delivery for maternal choice only. However, with expanding numbers of procedures, complications in future pregnancies, such as placenta praevia and accreta and their associated morbidities are being encountered much more frequently. Obstetricians must therefore be certain that the decision to perform a caesarean section is the right choice for the mother now and in her future pregnancies.

FURTHER READING
Royal College of Obstetricians and Gynaecologists. Reducing the risk of thrombosis and embolism during pregnancy and the puerperium. RCOG Greentop guideline no 37a 2009.

Risk factors for post-operative infection
- Preterm labour
- Ruptured membranes
- Prolonged labour
- Delivery by inexperienced surgeon
- Increased number of vaginal examinations
- Internal fetal monitoring
- Urinary catheter
- Blood loss
- Diabetes
- Obesity
- General anaesthesia
- Low socio-economic status

Box 2

Practice points
- Caesarean section rates are increasing
- Use of the classification of caesarean section improves communication on the labour ward
- Good pre-operative planning can reduce complications
- Identify location of placenta prior to any caesarean section
- Lower segment uterine incision is the standard approach
- Women should have the opportunity to discuss future pregnancies after caesarean section