

Caesarean section: techniques and complications

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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 preoperative 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 over a quarter of births in the UK. Rates across the world vary widely and have been reported as greater than 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%. Although a rate of 10–15% was recommended, the 2015 WHO statement has indicated that due to the enormous variation in healthcare facilities, including clinical management protocols which vary widely, it is unfeasible to

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apply a population based recommended rate at a hospital level. The statement points out that there is no difference in mortality where rates range from 10 to 30% and when rates are >30% there is not enough available data to assess. Overwhelmingly, the message is to ensure every effort is made to provide caesarean sections for those women in need, rather than aiming for a specific rate.

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 experience 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.

A classification relating the degree of urgency to the presence or absence of maternal or fetal compromise

Grade

1	Immediate threat to the life of the woman or fetus
2	Maternal or fetal compromise which is not immediately life-threatening
3	No maternal or fetal compromise but needs early delivery
4	At a time to suit the woman and maternity services

Examples of indications or clinical features consistent with grade 1 are placental abruption, cord prolapse, uterine rupture, actively bleeding placenta praevia, fetal bradycardia, or a fetal blood sampling pH less than 7.20. Grade 2 examples include ante partum haemorrhage or failure to progress in labour with some maternal or fetal compromise.

(Adapted from Classification of urgency of caesarean section – a continuum of risk (Good Practice No. 11) RCOG 2010)

Table 1

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 gained 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 sterilisation should be deferred if they have not previously been discussed. If sterilisation has been previously discussed and is the wish of the woman then an additional specific consent form should be used (RCOG consent 2009). 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. It is advisable to structure the consent in to maternal, fetal and future pregnancy risks. Women who are at a higher risk of complications, for example women who are obese or have pre-existing medical conditions, should be informed that the quoted risks for complications will be increased (RCOG Consent 2009).

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 considerations

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 unnecessary.

The mother is usually given H₂ receptor antagonists or a proton pump inhibitor preoperatively to reduce the gastric acid content in case of the need for a general anaesthetic. This, along with the use of pre-oxygenation, a cuffed endotracheal tube and rapid sequence induction, decreases the significant risk of aspiration of gastric contents, which may occur when anaesthetising 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 anaesthesia.

A previous caesarean section increases the risk of placenta praevia and accreta in subsequent pregnancies. It is essential for the surgeon to be aware of placental localisation prior to caesarean section by reviewing the woman's scans, however it is not necessary to arrange a pre-operative placental localisation scan in women who are otherwise healthy and uncomplicated as doing so does not reduce incidences of caesarean section morbidity (NICE 2009). If the placenta 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 occur 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 and therefore should be offered as the first line. 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 give it very quickly and allow 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.

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