

Clinical update: obstetric anaesthesia

In the developed world, around two-thirds of women use some form of anaesthesia during childbirth.^{1,2} Changes in maternal physiology during pregnancy, and the care of both mother and fetus, present unique challenges to obstetric anaesthetists. Also, diverse maternal expectations of the birth experience, demands for neuraxial block, advancing maternal age, obesity, coexisting medical morbidities, and caesarean section rates have all escalated.¹ Serious adverse events associated with obstetric anaesthesia are rare, but are of particular concern because pregnancy and childbirth generally has an expectation of little or no risk.

Severe obstetric morbidity occurs in around 1% of deliveries. Risk factors include maternal age above 34 years, hypertension, previous postpartum haemorrhage, induction of labour, and previous caesarean section.³ Anaesthetists need to minimise adverse consequences, especially those relating to obstetric haemorrhage and severe pre-eclampsia.⁴ The American Society of Anesthesiologists (ASA) Task Force on Obstetric Anesthesia recently updated their guidelines (panel).⁵ Many of the recommendations are based on consensus opinion, indicating a paucity of good evidence. Cochrane systematic reviews⁶ also have limited implications for guiding obstetric anaesthesia practice, reflecting the small number of women studied and the very low incidence of anaesthesia-related complications in this population. Maternal mortality reports provide valuable insight into these rare events and can influence obstetric anaesthesia practice.⁷

Improved safety in obstetric anaesthesia is shown by the substantial reduction in the incidence of pulmonary aspiration of gastric contents and its consequences, and in other risks associated with the use of general anaesthesia for caesarean section. This reduction is attributed to the more active role played by senior experienced staff, the increased use of regional techniques, fasting regimens, and the use of non-particulate antacids and H₂-receptor antagonists.⁸ Left-lateral tilt to avoid aortocaval compression and care in drug administrations to avoid fetal adverse effects remain standard.

Pregnant women want information about analgesia, anaesthesia, and the risks associated with central neuraxial block.^{9,10} The consent process should include

a description of the procedure, alternatives, and risks and benefits. When possible, such information should be given antenatally, because the opportunity for discussion is necessarily shortened during labour and might be less than optimum.¹¹ Women can be reassured that long-term postpartum back pain and caesarean section rates are not increased after the placement of intrapartum neuraxial block.¹²

Many techniques are available for analgesia during labour and can be used alone or in combination. Many women choose non-drug pain relief in labour. Interventions such as continuous intrapartum support and hypnosis or acupuncture could reduce the need for pharmacological analgesia and other interventions during labour and childbirth.¹² Self-administered nitrous oxide is simple, safe, inexpensive, and effective in some women.¹² Parenteral analgesia, as intramuscular pethidine or morphine, is used by almost a quarter of women in labour.¹ Intravenous fentanyl can be administered by patient-controlled analgesia during labour when regional anaesthesia is contraindicated, unavailable, or impossible. Intravenous fentanyl can also provide short-term analgesia during neuraxial block placement in a distressed mother or in the second stage of labour when regional block is unlikely to have time to be effective before delivery. Concern about the risk of neonatal respiratory depression at birth limits the dose, frequency, and timing of opioid administrations during labour.

Epidural analgesia provides more effective pain relief during labour than non-epidural methods.¹² However, traditional epidurals (bupivacaine 0.25% or greater) can lengthen the second stage of labour, and increase the incidence of labour augmentation, maternal hypotension, motor blockade, and need for instrumental vaginal birth. Epidural analgesia with low concentrations of local anaesthetic (eg, ropivacaine 0.2% or bupivacaine 0.1%) can increase the incidence of spontaneous vaginal birth compared with a traditional technique.¹² Single-shot spinal analgesia can be useful before placement of an epidural catheter in a distressed woman or as the sole analgesic when spontaneous vaginal birth is imminent.

Combined spinal epidural analgesia is a popular alternative to epidural alone in some centres. It involves

the administration of intrathecal opioid (eg, fentanyl) or local anaesthetic, or a combination of the two, before or immediately after epidural catheter placement. This technique has the advantages of spinal analgesia (eg, fast onset) with the ability to provide additional analgesia or anaesthesia as required via the epidural catheter. Although increased mobility and other advantages are claimed, comparisons of combined spinal epidural analgesia with low-dose epidural techniques show that both provide effective analgesia in labour and a high maternal satisfaction, with only a slightly faster onset with the combined technique and less pruritus with epidurals.¹³

Epidural analgesia during labour is extended to provide surgical anaesthesia should caesarean section be necessary. Spinal anaesthesia has the advantage of simplicity, rapid onset, low failure rate, minimum drug dose, and excellent muscle relaxation, which makes it the technique of choice for both elective and emergency caesarean section when a functioning epidural catheter is not in place. Regional anaesthesia has well-recognised advantages compared with general anaesthesia, including intact protective airway reflexes, the mother being awake at the baby's birth, and reduced need for systemic opioids postoperatively. However, general anaesthesia is preferred for operative delivery when a regional technique is contraindicated, such as in major haemorrhage or coagulopathy. Compared with epidural anaesthesia, spinal anaesthesia for caesarean section is associated with a shorter time to starting the operation, but an increased incidence of sympathetically mediated maternal hypotension that requires treatment.¹⁴ Techniques that reduce the incidence of hypotension associated with spinal anaesthesia at the time of caesarean section include administration of intravenous fluids and vasopressors (eg, phenylephrine or ephedrine), and lower-limb compression with stockings or inflatable boots.¹⁵

Pre-eclampsia can lead to an exacerbated hypertensive response at laryngoscopy and airway difficulties, should general anaesthesia be needed. A single-shot spinal anaesthetic is the preferred method of providing anaesthesia for women presenting for caesarean section without an epidural catheter in situ, provided there is no hypovolaemia or clinical evidence of coagulopathy. Although the lower limit varies with the clinical situation, a platelet count above $80\,000 \times 10^9/L$ is usually adequate

Panel: Selected recommendations adapted from ASA guidelines for obstetric anaesthesia⁵

- Spinals or epidurals are preferred over general anaesthesia for most caesarean sections
- Early insertion of spinal or epidural catheter for obstetric (eg, twin gestation or pre-eclampsia) or anaesthetic indications (eg, anticipated difficult airway or obesity) should be considered to reduce need for general anaesthesia if an emergent procedure becomes necessary
- If functioning epidural catheter is in place and patient is haemodynamically stable, epidural anaesthesia is preferred technique for removal of retained placenta
- In major maternal haemorrhage, general anaesthesia is preferred over neuraxial anaesthesia. Suggested resources for obstetric haemorrhagic emergencies include: large-bore intravenous catheters, fluid warmer, forced-air body-warmer, blood bank, uterotonic agents, surgery. Consider off-label use of recombinant activated factor VII in massive postpartum haemorrhage refractory to conventional treatments
- Sublingual (ie, metered dose spray) or intravenous nitroglycerin can be used as an alternative to general anaesthesia with halogenated agents for uterine relaxation
- Intravenous ephedrine and phenylephrine are both suitable for treating hypotension during neuraxial anaesthesia. In absence of maternal bradycardia, phenylephrine might be preferable because of improved fetal acid-base status in uncomplicated pregnancies
- For postoperative analgesia after neuraxial anaesthesia for caesarean birth, neuraxial opioids are preferred over intermittent injections of parenteral opioids
- Anaesthetists should have preformulated strategy for intubation of difficult airway. If tracheal intubation fails, ventilate with mask and cricoid pressure, or with a laryngeal mask airway or supraglottic airway device. Suggested resources for difficult intubation include: rigid laryngoscope blades of alternative design and size from those routinely used; laryngeal mask airway; endotracheal tubes of assorted size; endotracheal tube guides (eg, semirigid stylets), light wands, and forceps designed to manipulate distal portion of endotracheal tube; retrograde intubation equipment; at least one device suitable for emergency non-surgical airway ventilation (eg, intubating laryngeal mask airway); fiberoptic intubation equipment; equipment suitable for emergency cricothyrotomy
- If cardiac arrest occurs during labour and birth, standard resuscitative measures should be started. Uterine displacement (usually left displacement) should also be maintained. If maternal circulation is not restored within 4 min of cardiac arrest, caesarean section should be done by obstetric team

for administration of neuraxial block, as long as there are no other risk factors¹⁶ and the count is not falling. Regional block should be avoided for at least 12 h after standard doses of prophylactic low-molecular-weight heparin. Epidural catheters should not be removed for at least 12 h after the last dose of such treatment, and any subsequent dose should not be given until at least 2 h after catheter removal.¹²

Although neuraxial techniques are largely safe and effective, potential complications, such as postdural puncture headache, can be problematic and fairly common (around 1%).¹⁷ Preventive measures involve the use of small diameter 25G or 27G pencil-point spinal needles.⁵ Rare complications, such as meningitis, spinal abscess, or epidural haematoma, can be severe.

Other settings suggest that full aseptic precautions, including mask, gown, and gloves, should be used,¹⁸ with meticulous attention to detail when doing regional techniques in obstetrics.

Anticipation and preparation for managing the difficult airway is essential at all times in obstetric anaesthesia and analgesia, but is especially relevant before induction of general anaesthesia. Oxygenation without aspiration is the main initial goal. A poor view of the glottis at laryngoscopy can often be rectified by simple manoeuvres, such as adjustment of the assistant's cricoid-pressure hand while maintaining direct laryngoscopy. The laryngeal mask airway and bougie are life-saving in the event of difficult intubation.⁵

Obstetric units are advised to practice emergency drills to improve team responses to critical situations, such as major obstetric haemorrhage.⁴ Recognised risk factors for haemorrhage include the presence of placenta praevia, low-lying anterior placenta (especially when overlying a previous caesarean section scar), grand multiparity, and history of postpartum haemorrhage.

Obese women have an increased risk of pregnancy complications, such as gestational diabetes and hypertensive conditions (including pre-eclampsia) and labour and birth complications (including obstetric interventions and caesarean section). Despite technical difficulties in administering epidural analgesia for this group of women, early provision of regional techniques might decrease perinatal and anaesthetic-related complications should emergent delivery be needed.¹⁹

Maternal deaths related to anaesthetic complications have reached a low nadir.⁸ The CEMACH Report⁴ and the ASA Task Force⁵ both emphasise the importance of communication and teamwork in providing safe obstetric care. The multidisciplinary team is often challenged by the urgency of operative birth, especially when the mother might have an underlying medical condition or complication of pregnancy.²⁰ Maintaining hard-won improvements in the safety of obstetric anaesthesia requires a constant guard against apathy and complacency.

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