General anaesthesia for caesarean section: is the end in sight for thiopental?

In 1959, Hamer Hodges first described the use of thiopental for obstetric anaesthesia which has historically been the induction agent of choice in this setting. Propofol entered clinical practice in the late 1980s; early studies comparing thiopental with propofol had conflicting findings, so thiopental continued to be the preferred induction agent for caesarean section. However, there has been a shift away from using thiopental outside the UK as a result of problems with drug supply, and many have started to question whether the end is in sight for thiopental.

Case for thiopental

Thiopental, administered as part of a classic rapid sequence induction, is well known to generations of anaesthetists. Substantial evidence supports its efficacy and safety for caesarean section and, unlike propofol, thiopental is licenced for use in pregnancy (Rucklidge, 2013). For propofol to become the first-line drug, its safety and superiority over thiopental should be established.

Some pharmacological characteristics of thiopental could make it more suitable for rapid sequence induction. It has a faster onset of action and, importantly in the context of an increased risk of awareness during caesarean section, the induction dose lasts longer than propofol. However, previous studies have not found any difference in the incidence of awareness between propofol and thiopental. Compared to propofol, thiopental is more cardiostable and causes less maternal bradycardia and hypotension, which could otherwise adversely affect placental blood flow (Duggal and Russell, 2003). Pain remains a problem with injection of propofol and could be distressing for parturients. Thiopental is not associated with deleterious neonatal outcomes other than subtle neurobehavioural effects observed on the first day of life.

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Case for propofol

Propofol, unlike thiopental, does not need to be reconstituted and can be drawn up rapidly when needed in an emergency. Because of this need for reconstitution, obstetric units routinely pre-prepare thiopental and then discard any unused drug, but this incurs extra clinician workload, cost and waste. Concerns have been raised about diminished drug potency, as the manufacturer's recommendation that it should be used within 7 hours is not consistently followed (Rucklidge, 2013).

Failure to reconstitute can lead to administration of water instead of thiopental, and inadvertent administration of antibiotic instead of thiopental or vice versa has also been reported. Such errors could be related to distraction, fatigue, haste and inattention, all common factors in obstetric emergencies. Drug errors are less likely with propofol owing to its distinctive appearance. Although thiopental is licensed for use in pregnancy, the dose should not exceed 250 mg which is commonly and justifiably exceeded in clinical practice (Duggal and Russell, 2003). Propofol is cheaper than thiopental and not short in supply. Compared to thiopental, propofol obtunds the increase in maternal blood pressure at laryngoscopy and intubation which could be advantageous in the hypertensive parturient.

Owing to its widespread use, propofol is a more familiar induction agent than thiopental, especially for more junior anaesthetists. In the 5th National Audit Project, the use of thiopental, in inappropriately low doses in some cases, was a risk factor for accidental awareness under anaesthesia (Plaat et al, 2014). Moreover, in 2014, the MBRRACE-UK report found evidence of overdosage of thiopental in its analysis of two maternal deaths attributed to anaesthesia (Lucas and Yentis, 2015). Even though some studies have suggested that propofol could be associated with poorer Apgar scores, hypotonus and inferior neurobehavioural measures, others have shown no differences in neonatal outcomes between propofol and thiopental (Rucklidge, 2013). More research is needed to evaluate the effect of propofol and thiopental in the compromised mother and fetus.

Conclusions

In the UK, most anaesthetists use thiopental as their induction agent of choice for caesarean section but over half of those surveyed would support a change to propofol (Murdoch et al, 2013). Thiopental is no longer available in the USA, making propofol the induction agent of choice. Reassuringly, there is little evidence of any harm from this change. It is unlikely that the minor, if any, benefits of thiopental over propofol in obstetric anaesthesia will withstand the external forces of higher costs and lack of availability. Is it now time to consider thiopental a historic drug and change to propofol for induction of caesarean section anaesthesia? **BJHM**

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