

# Perioperative care of the pregnant patient undergoing non-obstetric surgery

There are a number of challenges associated with the pregnant patient undergoing non-obstetric surgery. Careful assessment and planning, taking into account the physiological and anatomical changes, will allow for optimal perioperative management.

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## Introduction

Surgery during pregnancy poses clinical and ethical challenges. Although the patient is the priority, fetal wellbeing needs to be considered, while physiological, anatomical and pharmacological changes within the parturient must be accounted for. With surgery risking spontaneous abortion or early labour (Walton and Melachuri, 2006), senior clinicians must establish the need for surgery, and be involved in perioperative care. Elective surgery should be delayed, and urgent surgery deferred to the second or third trimester, when the risk of miscarriage decreases (Cohen-Kerem et al, 2005). Obstetric input can identify whether fetal monitoring is required and whether preparations should be made for early labour.

Once it has been decided that an operative procedure is needed, involvement of a senior anaesthetist is vital. A thorough anaesthetic pre-assessment is required. Areas of particular interest include an examination of the patient's airway, cardiovascular and respiratory disease, and a summary of any issues with the pregnancy itself. An understanding of the surgical procedure is also essential, as this may allow the use of regional anaesthesia alone, avoiding delivery of systemic drugs and the risks of a general anaesthetic.

## Anaesthetic considerations

Airway management can be problematic, with a greater incidence of a difficult airway in this population. Increased progesterone production causes relaxation of the lower oesophageal sphincter, and a concomitant risk of reflux. Anatomical changes during pregnancy make the airway more difficult to secure; the pregnant patient is also prone to desaturation because of the decreased functional residual capacity and increased oxygen demand of the fetal–maternal unit (LoMauro and Aliverti, 2015). If surgery can be done under regional anaesthesia alone, the risk of desaturation can be minimised. However, if general anaesthesia is required, premedication with an antacid, a rapid sequence induction, the use of a video laryngoscope and having an airway escalation plan can help negate such issues.

Physiological changes also affect the circulatory system of the parturient. The most significant issue is the gravid uterus causing aorto-caval compression in the supine position, which can result in catastrophic hypotension, particularly post-induction or after a spinal has been sited. Further, placental perfusion is not auto-regulated, and is pressure dependent; maternal hypotension can therefore result in fetal hypoxia (Bedson and Riccoboni, 2014). Placing the patient in the left-lateral position and the judicious use of fluids and vasopressors can address these issues. If hypotension is a particular concern, such as in systemic sepsis, invasive arterial monitoring can help with earlier identification and treatment.

The risk of teratogenicity as a result of drugs is highest in the first trimester; however, if a general anaesthetic is indicated, most commonly used anaesthetic drugs are safe for use in pregnancy (Reitman and Flood, 2011). Regional anaesthesia has the benefit of not exposing the fetus to high concentrations of anaesthetic agents. However, the physiological changes have an impact upon drug handling by the body. Increased blood volume raises volumes of distribution, and a decrease in plasma albumin concentrations alters drug–protein

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binding (Rosen, 1999). Further, the minimum alveolar concentration of volatile agents is reduced in pregnancy. Cautious titration of anaesthetic drugs to achieve desired end-points will help overcome these concerns.

Pregnancy is a hypercoagulable state with an increased risk of venous thromboembolism that is higher in individuals undergoing non-obstetric surgery because of the increased likelihood of postoperative immobility, dehydration and the surgical stress response (Royal College of Obstetricians and Gynaecologists, 2015). The perioperative use of pressure stockings and intermittent pneumatic compression devices, as well as considering giving a weight-adjusted dose of a low molecular weight heparin, will help reduce this risk. Adequate hydration, nutrition and analgesia, enabling early mobility, will also contribute.

In some patients, there may be added concerns, such as pre-eclampsia, cholestasis, placenta praevia, placenta accreta and gestational diabetes. The physiological and anatomical effects of these disease processes need to be appreciated, and their impact addressed to deliver safe anaesthesia.

## Conclusions

Pregnancy alters maternal anatomy and physiology to support fetal growth, but does not preclude the mother from developing pathology that may need operative correction. The decision to operate should be delayed if possible, to avoid risk to the mother and fetus. If the risk of surgical delay is greater, delivery of anaesthesia should account for altered maternal anatomy and physiology to allow the optimum outcome for both mother and baby.

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## References

- Bedson R, Riccoboni A. Physiology of pregnancy: clinical anaesthetic implications. *Cont Educ Anaesth Crit Care Pain*. 2014;14(2):69–72. <https://doi.org/10.1093/bjaceaccp/mkt036>
- Cohen-Kerem R, Railton C, Oren D et al. Pregnancy outcome following non-obstetric surgical intervention. *Am J Surg*. 2005;190(3):467–473. <https://doi.org/10.1016/j.amjsurg.2005.03.033>
- LoMauro A, Aliverti A. Respiratory physiology of pregnancy: physiology masterclass. *Breathe*. 2015;11(4):297–301. <https://doi.org/10.1183/20734735.008615>
- Reitman E, Flood P. Anaesthetic considerations for non-obstetric surgery during pregnancy. *Br J Anaesth*. 2011;107:i72–78. <https://doi.org/10.1093/bja/aer343>
- Rosen MA. Management of anesthesia for the pregnant surgical patient. *Anesthesiology*. 1999;91(4):1159–1163. <https://doi.org/10.1097/00000542-199910000-00033>
- Royal College of Obstetricians and Gynaecologists. Reducing the risk of venous thromboembolism during pregnancy and the puerperium. Green Top Guideline. 2015. [www.rcog.org.uk/globalassets/documents/guidelines/gtg-37a.pdf](http://www.rcog.org.uk/globalassets/documents/guidelines/gtg-37a.pdf) (accessed 5 October 2020)
- Walton N, Melachuri V. Anaesthesia for non-obstetric surgery during pregnancy. *Cont Educ Anaesth Crit Care Pain*. 2006;6(2):83–85. <https://doi.org/10.1093/bjaceaccp/mkl008>