

Anaesthetic management of the pregnant patient for non-obstetric surgery

Introduction

Each year the incidence of non-obstetric surgery in the pregnant patient is approximately 1-2%. Operations performed may be directly related to the pregnancy, e.g. interventions for cervical incompetence, indirectly related to the pregnancy, e.g. ovarian cystectomy, or unrelated to the pregnancy, e.g. appendicectomy, cholecystectomy and trauma operations. The main risks for any procedure are fetal loss, premature labour and delivery, secondary to the underlying disease process or the operation itself. Good anaesthetic practice aims to provide safe anaesthesia for the mother while minimising risk to the unborn fetus.

Overriding aims

The overall aims for the anaesthetist are to:

- Preserve the mother's life
- Maintain normal maternal physiology
- Maintain uteroplacental blood flow and oxygen delivery
- Avoid teratogenic effects of drugs
- Avoid stimulating the myometrium

Pre-operative considerations

Timing of Surgery

- Elective surgery should be postponed until after delivery
- Semi-elective surgery which cannot be deferred should be delayed until the 2nd trimester where possible
- Urgent, necessary surgery should not be delayed, regardless of trimester, as any delay may have a detrimental effect on both the pregnant women and fetus

Communication

- With the team: A consultant anaesthetist should be informed and close liaison is required between the anaesthetist, obstetrician and surgeon
- With the patient: patient should be counselled on risks
 - Risks to the pregnancy are thought to be related to either the operation or the patients underlying condition e.g. sepsis, rather than the anaesthetic itself. Intrabdominal surgery carries the highest risk
 - Large outcome studies³ show non obstetric surgery is associated with one extra:
 - Caesarean section for every 25 operations
 - Preterm delivery for every 31 operations
 - Low birth weight baby for every 39 operations
 - Prolonged inpatient stay for every 50 operations
 - Stillbirth for every 287 operations

Fetal monitoring

- Up to the limit of viability e.g. 22 weeks gestation, the fetal heartbeat (FH) should be detected using Doppler before and after the procedure, where maternal condition allows
- Between 22-23 weeks gestation discussion is necessary, including the pregnant woman, consultant obstetrician and consultant neonatologist
- If the fetus is at a viable gestational age e.g. 23 weeks and above, CTG monitoring should be used before and after the procedure, where maternal condition allows
- Intraoperative CTG monitoring may be appropriate when certain criteria are met:
 - Monitoring is physically possible during surgery
 - Viable gestational age
 - Informed maternal consent

- Neonatal services available
- Presence of an obstetric team both to monitor the CTG and perform an EMLUSCS should fetal distress occur

Patient location and positioning

- **Planned** surgery from 24 weeks should **ideally** be undertaken at the Wishaw site where immediate access to obstetric and neonatal facilities is available.
- **Emergency** surgery should be undertaken at the site most suitable to preserve the mother's life at any gestation of pregnancy. Secondary consideration should be given to the fetus once fetal viability is reached from 24 weeks and transfer to Wishaw considered pre-operatively only if safe to do so. Communication with the on call consultant obstetrician is vital in this regard.
- If the patient is on the Wishaw site, they may be kept in a surgical or obstetric ward pre-operatively depending on initial presentation and location most appropriate for maternal management. FH/CTG monitoring can be performed by midwives in both locations.
- If the patient is unwell and bed-bound, an upright position or a left lateral tilt should be adopted from 20 weeks onwards.

Premedication

- Patients should be fully fasted if possible
- Omeprazole 40mg (or Ranitidine 150mg) and 30mls 0.3M Sodium Citrate should be given to all patients from 14 weeks unless contraindicated.
- Consideration should be given to the administration of corticosteroids 24-48hrs prior to surgery for patients with fetuses at viable and premature gestational ages. This should be discussed with the consultant obstetrician.

Thromboprophylaxis

- RCOG guidelines puts patients undergoing surgery in an intermediate risk category for VTE, meaning that patients should be prescribed LMWH if it is not contraindicated
- Unless contraindicated all patients should have TEDS applied
- Care should be taken around the timing of doses of LMWH if regional anaesthesia is to be performed

Intra-operative considerations

Due to alteration in the maternal anatomy and physiology secondary to pregnancy, some alterations to standard anaesthetic practice is indicated

Positioning

- From 20 weeks all patients should be placed on a 15 degrees left lateral tilt to avoid aorto-caval compression

Regional anaesthesia

- This is preferred as it avoids the hazards of general anaesthesia associated with the pregnant patient (hypoxia, acid reflux, difficult intubation, foetal drug exposure)
- The main risks are related to hypotension and decreased placental blood flow – this may be counteracted with IV fluids and phenylephrine (20-50mcg boluses), with ephedrine (3-6mg boluses) as a second-line vasopressor
- Dose of local anaesthetic for spinal/epidural may need to be reduced due to the mechanical effects of an enlarging uterus
- Supplementary oxygen may be required due to the increased risk of hypoxaemia secondary to a decreased FRC and an increased oxygen demand

General anaesthesia

- RSI with careful pre-oxygenation (at least 3 minutes recommended), cricoid pressure and rapidly acting muscle relaxant should be performed in all patients from 16 weeks
- A head up tilt may be beneficial to increase FRC and reduce the risk of gastro-oesophageal reflux
- Increased airway oedema and vascularisation may make intubation more difficult, a smaller ETT may be required e.g size 7.0 ETT
- Maintain normal respiratory alkalosis of pregnancy (3.7 – 4.3 kPa) when mechanically ventilating
- Avoid hypoxia and hypotension

Thromboprophylaxis

- Intermittent calf compression devices should be used for all patients intra-operatively

Drug considerations

The most vulnerable period is between the 15th and 56th day of gestation, when structural abnormalities can occur, thereafter functional changes are more common. The principle of drug choice in these patients is to choose agents with a good track record of use in pregnancy. However it is reassuring that no anaesthetic agents at usual clinical doses have been shown to be teratogenic. There is no proof of efficacy for prophylactic tocolytics.

Drugs to avoid

- Ketamine – due to increasing uterine tone and therefore risk of miscarriage
- N₂O – especially in first trimester due to its inhibition of methionine synthetase and therefore potential impairment of DNA production
- Benzodiazepines – single doses are considered safe, however regular use in the first trimester has been associated with cleft palates
- NSAIDS – associated with premature ductus arteriosus closure and persistent pulmonary hypertension from 30 weeks gestation and may be associated with miscarriage when used in early pregnancy. May be considered for short term use for 2-3 days in 2nd trimester. Some patients may already be on low dose aspirin which should be continued. Paracetamol and opiates are considered safe.

Drug dose alterations required

- MAC of volatile agents is reduced from 8-12 weeks. Volatile agents increase uterine blood flow and decrease uterine tone in pregnancy.
- Reduced doses of LA are required for similar dermatomal spread for central neuraxial blocks. Reduced protein binding increases the risk of LA toxicity
- Reduction in plasma cholinesterase activity can prolong the effects of suxamethonium

Safety of laparoscopy

Laparoscopy confers similar benefits in pregnant as is non-pregnant patients and is considered safe, provided that:

- Uterine size should be determined by palpation or ultrasound. The port insertion site should be adjusted according to fundal height. The procedure should be performed by an experienced laparoscopist.
- Pneumoperitenum should be gradual and current evidence supports operating intraabdominal pressures of 12mmHg
- Capnography is used for intra-operative CO₂ monitoring
- Uterine blood flow should be maintained by avoiding maternal hypotension and hypo/hypercapnia (maternal end tidal CO₂ of 3.7-4.3kPa)

Post-operative considerations

- Patients should be managed in recovery until usual discharge criteria are met
- Patients should be returned to an appropriate surgical ward for post-operative care
- Fetal monitoring should be performed as appropriate for gestational age
- If there are concerns regarding foetal well-being or threatened premature labour/miscarriage, these should be discussed with the on-call Obstetric Registrar (page 138) or Consultant (page 137), and the Maternity Co-ordinator (Dect phone 7890)
- All patients should continue to wear TEDS until fully ambulant and LMWH should be prescribed where indicated

References

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