IUFD
&
Anaesthesia for non-obstetric surgery in pregnancy

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ST7
Intrauterine Foetal Death
Past SAQ (2012)

SEPTEMBER 2012

a) What are the implications of managing a patient with an intrauterine foetal death (IUFD) at 36-weeks gestation? (55%)
b) How does the presence of an IUFD influence the choice in the method of pain relief in labour? (20%)c) Which abnormal haematological results would contraindicate epidural analgesia? (25%)

Question 3: Obstetrics/Intrauterine foetal death/analgnesia for labour. 49.9% pass rate.
The question was written because the anaesthetist is often involved with the provision of analgesia for labour in these circumstances. Many candidates unnecessarily wrote about the physiological changes of a 36-week pregnancy. Section a) was specifically asking about the implications of intrauterine foetal death (IUFD). The implications of IUFD focused on:
- Psychological distress
- Method of delivery
- Mandatory level 1 care (MEOWS) and possible transfer to level 2 care
- Exclude possible causes
- Provide effective analgesia
- Consider sedation

Section a) was answered poorly but fared better in sections b) choice of pain relief and b) haematological results that might contraindicate epidural analgesia.
Past SAQ (2017)

**Question 9 (Orange Book)**
A woman, who has had an intrauterine fetal death (IUFD) at 36 weeks gestation in her first pregnancy, is admitted to your delivery suite for induction of labour.

a) Describe the important non-clinical aspects of her management. (4 marks)
b) What are the considerations when providing pain relief for this woman? (13 marks)
c) If this patient requires a caesarean section what are the advantages of using regional anaesthesia, other than the avoidance of the effects of general anaesthesia? (3 marks)

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**Question 9: Intrauterine fetal death**

*Pass rate NA*

This question was removed from the exam after marking but no candidates were disadvantaged by its removal. The reason for not including it in the final scores was that there was confusion amongst candidates about whether the intrauterine fetal death had occurred in the current, or a previous pregnancy. On reflection, the examiners agreed that the wording of the question did allow either interpretation. As has been outlined above, all the SAQs undergo rigorous scrutiny and are checked and rechecked for clarity and accuracy. Unfortunately, the alternative interpretation was not spotted in this case. The question will be reworded before being reused.

Having said all of the above, the pass rate for this question was poor, with most marks being lost in section b where candidates were asked to discuss considerations for analgesia. Even those who had correctly interpreted the question tended to simply list methods of analgesia rather than outlining the advantages and disadvantages of each.
IUFD CRQ

- List non-clinical considerations
- List clinical considerations
- Pain relief – general considerations
- Pain relief options – advantages and disadvantages
- List haematological results that would contraindicate epidural
- List advantages of regional for CS
IUFD - management

- List non-clinical aspects of management
- List clinical aspects of management

- Psychological
  - Non-Clinical

- Obstetric
- Anaesthetic
- Midwifery
IUFD – Non-clinical management

Psychological - psychological distress

- Quiet isolated room
- Away from normal labour ward activity (including other babies)
- Family members should have free access to patient
- Bed for partner
- Counselling, support groups

- Risk of post traumatic stress disorder
IUFD – Clinical management

Obstetric:

• **Mode of delivery**
  - vaginally vs caesarean section
  - all potential complications may occur: slow progress of labour, difficulty with delivery, PPH
  - Oxytocics drugs not limited by concerns of fetal welfare – risk of overstimulating uterine contractions -> uterine rupture

• **Timing of delivery**
  - delayed delivery increases chance of coagulopathy/DIC
IUFD – Clinical management

**Obstetrics (continued):**

- **Exclude possible causes**
  - **antepartum:**
    - congenital malformation
    - congenital infection
    - antepartum haemorrhage
    - preeclampsia
    - maternal diabetes
  - **intrapartum:**
    - placental abruption
    - severe maternal or foetal infection
    - cord prolapse
    - uterine rupture
    - idiopathic hypoxia-acidosis
IUFD – Clinical management

Midwifery

- mandatory level 1 care and possible transfer to level 2 care
- one-to-one midwife care
- experienced midwife
- MOEWS monitoring
IUFD – Clinical management

Anaesthetic

• review by obstetric anesthetist
• provide effective analgesia
• consider sedation
  – anxiety
6.6 Are there any special recommendations for pain relief in labour?

Diamorphine should be used in preference to pethidine.

Regional anaesthesia should be available for women with an IUFD.

Assessment for DIC and sepsis should be undertaken before administering regional anaesthesia.

Women should be offered an opportunity to meet with an obstetric anaesthetist.
IUFD – Analgesia considerations

• Choice of analgesia depends on presence of:
  – Coagulopathy
  – Sepsis

• Can offer
  – Simple analgesia
  – Opioid analgesia
  – Morphine/remifentanil/fentanyl PCA
  – Entonox
  – Epidural/CSE if no contra-indications
  – Consider sedation
**Pain relief in labour: How do the options compare?**

<table>
<thead>
<tr>
<th>Methods with medication</th>
<th>Entonox (Gas and air)</th>
<th>Pethidine or diamorphine injection</th>
<th>Patient - controlled intravenous analgesia (PCIA)</th>
<th>Epidural or combined spinal epidural (CSE)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What is it?</strong></td>
<td>A gas mixture of nitrous oxide and oxygen.</td>
<td>Pethidine or diamorphine is injected into the muscle in your arm or leg.</td>
<td>Small dose of fentanyl or remifentanil given from a pump into a drip in your hand.</td>
<td>Local anaesthetic and a painkiller given through a fine tube in your back to numb your nerves. May not be recommended very early or late in labour.</td>
</tr>
<tr>
<td><strong>What do you do?</strong></td>
<td>Breathe it through a mask or mouthpiece with a valve.</td>
<td>Have an injection in your arm or leg.</td>
<td>Press the button to give yourself a dose every time you feel a contraction starting.</td>
<td>Sit still in a curled-up position for five to 10 minutes while the tube is put in.</td>
</tr>
<tr>
<td><strong>How much pain relief?</strong></td>
<td>Moderate help.</td>
<td>Often mild. May reduce anxiety.</td>
<td>The amount of pain relief varies. Women often need to use Entonox as well.</td>
<td>Usually very good. One in 10 times, it may not work well and may need replacing.</td>
</tr>
<tr>
<td></td>
<td>Advantages</td>
<td>Disadvantages</td>
<td></td>
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<td>----------------------</td>
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<td>----------------------------------------------------</td>
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</tr>
<tr>
<td><strong>Entonox</strong></td>
<td>Easily accessible on labour ward</td>
<td>Moderate pain relief</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Immediate effect</td>
<td>Nausea</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>No extra procedures required</td>
<td>Feeling “spaced out”</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No effect on labour and delivery</td>
<td>Dry mouth</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pethidine/Diamorphine</strong></td>
<td>May reduce anxiety</td>
<td>Mild pain relief</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Effective within 30min</td>
<td>Drowsiness</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Lasts for few hours</td>
<td>N+V</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>No extra procedures required</td>
<td>Delayed gastric emptying</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>No effect on labour and delivery</td>
<td>Respiratory depression</td>
<td></td>
<td></td>
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<tr>
<td><strong>PCA</strong></td>
<td>Effective within minutes</td>
<td>Variable pain relief</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fentanyl/Remifentanil/Morphine</strong></td>
<td>Effective within minutes</td>
<td>IV access required</td>
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<td>Sats monitoring</td>
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<td></td>
<td></td>
<td>Supplemental O₂ maybe required</td>
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<tr>
<td></td>
<td></td>
<td>Drowsiness</td>
<td></td>
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<td>N+V</td>
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<td>Delayed gastric emptying</td>
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<tr>
<td></td>
<td></td>
<td>Respiratory depression</td>
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<tr>
<td></td>
<td></td>
<td>May increase risks of forceps</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Epidural/ CSE</strong></td>
<td>Most effective pain relief</td>
<td>1 in 10 may not work</td>
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<td></td>
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<td></td>
<td></td>
<td>Requires around 20min to set up +20 min to work</td>
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<td>IV access, urinary catheter required</td>
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<td></td>
<td></td>
<td>Hypotension</td>
<td></td>
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<td></td>
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<td>PDPH, Nerve damage</td>
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<td></td>
<td></td>
<td>Pyrexia</td>
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<td></td>
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<td>Difficulty in pushing</td>
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</tbody>
</table>
After intra-uterine death, there is an increased risk of coagulopathy and sepsis, especially in the second week after fetal demise.
Contraindications to regional:

- **Coagulopathy:**
  - Platelets <75-100
  - INR >=1.5
  - APTT >45 secs
  - Presence of DIC: prolonged PT, prolonged APTT, low fibrinogen, low platelets
  - Abnormal TEG

- **Sepsis:**
  - Raised WBC
  - Raised inflammatory markers (e.g. CRP)
IUFD – benefits of regional

• Avoidance of GA risks

• CVS
  – Reduction of SNS activity leading to decrease incidence of tachycardia, arrhythmias
  – Reduced incidence of myocardial ischemia

• RS
  – Improved pulmonary mechanics with effective pain relief
  – Avoidance of high dose systemic opioids reduces respiratory depression and other effects of opioid

• GI
  – Reducing systemic opioid use and improving intestinal motility by blocking nociceptive and sympathetic reflexes, reduces the duration of postop ileus

• Haematological/thromboembolic
  – Reduced intraop blood loss
  – Attenuates the hypercoagulable response to surgery
  – Reduces incidence of DVT and PE
Anaesthesia for non-obstetric surgery in pregnancy
Past SAQ (2014)

A 28 year-old woman presents for acute appendicectomy - she is 22 weeks pregnant.

a) List the risks to the fetus during anaesthesia for the mother. (5 marks)
b) How can the risks to the fetus be minimised? (10 marks)
c) What additional pre and intraoperative steps would you take to ensure foetal safety if she was 27 weeks pregnant? (5 marks)

**Question 3** Pass Rate 33%

The poor pass rate for this important subject is of concern as similar clinical scenarios are commonly encountered. Many candidates wrote principally on the preparation of a pregnant woman for general anaesthesia or on the conduct of a rapid intubation sequence, ignoring the emphasis on the fetus in the question. Teratogenesis by anaesthetic agents was frequently listed as an important consideration although the patient was in the second trimester of pregnancy. Many candidates failed to consider that a fetus of twenty two weeks gestation is highly unlikely to be viable and concentrated on preparation for an unplanned delivery. A clue to this consideration was given in section (c) where the focus was changed to a scenario in which the fetus is potentially viable, but weak candidates ignored this prompt.
Non-obstetric surgery - CRQ

- List perioperative considerations if <24 weeks
  - Pre-operative
  - Intra-operative
  - Post-operative

- List perioperative considerations if >24 weeks
  - Pre-operative
  - Intra-operative
  - Post-operative

- List risks to fetus

- Minimising risks to fetus
Non-obstetric surgery <24 weeks

PREOP
• Postpone surgery until second trimester or postpartum if possible
• Request preoperative assessment by obstetrician
• Counsel the patient preoperatively
• Antacid for aspiration prophylaxis

INTRAOP
• Use regional anaesthesia when appropriate
• Monitor and maintain oxygenation, normocarbia, normotension, euglycemia
• Avoid N2O in high concentrations (controversial)

POSTOP
• Use regional analgesia for postop pain management when appropriate
• Document fetal heart tones before and after procedure
• DVT prophylaxis
Non-obstetric surgery <24 weeks

PREOP

- Postpone surgery until postpartum if possible
- Counsel the patient preoperatively
- MDT with obstetrician, surgeon, neonatologist, midwife
- Informed consent to emergency cesarean delivery
- Steroids for fetal lungs
- Magnesium for fetal neuroprotection
- Surgery should be conducted where facilities for obstetric and neonatal care are available
- Aspiration prophylaxis
- Maintain left uterine displacement perioperatively
Non-obstetric surgery <24 weeks

INTRAOP:

• Consider regional anesthesia
• Maintain left uterine displacement
• Monitor and maintain
  – oxygenation,
  – normocarbia,
  – normotension,
  – euglycemia
  – normothermia
• Consider perioperative tocolytic agents
• Consider use of fetal monitoring intraoperatively (when feasible) to optimize intrauterine environment
Non-obstetric surgery <24 weeks

POSTOP:

• Maintain left uterine displacement
• Monitor for uterine contractions and fetal heart tones postoperatively
• Regional techniques for postoperative pain management when possible
• DVT prophylaxis
Fetal considerations

Anaesthesia may impact on fetus in two ways:

1. Interruption of pregnancy:
   - Pregnancy loss
   - Premature delivery

2. Impact on fetal development
   - Teratogenic pharmacological effect
   - Physiological derangements
Fetal considerations

TERATOGENICITY

- Fetal risk:
  - 0-15d - usually embryotoxic
  - 15-60d (organogenesis) - great risk to fetus
  - Then functional deficits

- Nearly all drugs have been demonstrated to be teratogenic in some species at some dose.
Minimising risks to fetus

O₂
Oxygen

CO₂

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Minimising risks to fetus

**OXYGENATION**

- **Moderate, transient maternal hypoxemia** – tolerated well – HBF high affinity to O2
- **Acidotic fetus** – rightward shift of O2 curve, reduced affinity to maternal O2
- **Severe maternal hypoxia** – compensatory response – uterine vasoconstriction blood diverted from placenta to vital organs
Minimising risks to fetus

NORMOCARBIA

- **Hypercarbia**
  - Direct effect – diffusion into fetal circulation – respiratory acidosis, impaired myocardial contractility
  - Indirect effect – uterine vasodilation and increased uteroplacental flow however severe hypercarbia – vasoconstriction and reduced uteroplacental flow

- **Hypocarbia**
  - Uterine vasoconstriction – reduction in uteroplacental flow
Minimising risks to fetus

NORMOTENSION - Uteroplacental blood flow

• **HYPOtension** may be caused by
  - Anesthetics (GA or RA)
  - Volatiles can reduce uterine perfusion by decreasing BP, however these effects are partially compensated by uterine vasodilation and relaxation which tend to increase uterine blood flow
  - AO/VC compression
  - Hyperventilation – decreased venous return
  - Phenylephrine preserves fetal acid–base status – suggested to treat maternal hypotension

• **HYPERtension**
  - Uterine vasoconstriction - reduced uterine blood flow
  - Vasoconstriction may be caused by endogenous or exogenous sympathetic activity, including injection of ketamine (> 2mg/kg)
  - Analgesia to avoid catecholamine surges
Minimising risks to fetus

**NORMOTHERMIA**

- Hyperthermia acts as a teratogen in some animals where it can induce resorption of the fetus and fetal death. Fever during pregnancy, especially in the period of embryogenesis, is also suspected as being a risk factor for fetal death in human beings.

- Hypothermia – fetal bradycardia

**EUGLYCEMIA**

- Hyperglycemia – Stillbirth, birth defect, macrosomia
## Table 3  Factors important in maternal laparoscopy

- Use an open technique to enter the abdomen
- Monitor maternal end-tidal $P_{CO_2}$ (4 – 4.6 kPa range) with or without arterial blood gas to avoid fetal hypercarbia and acidosis
- Maintain low pneumoperitoneum pressure (1.1 – 1.6 kPa) or use gasless technique
- Limit the extent of Trendelenburg or reverse Trendelenburg positions and initiate any position slowly
- Monitor fetal heart rate and uterine tone when feasible
Reference:

*British Journal of Anaesthesia* **107** (S1): i72–i78 (2011)
doi:10.1093/bja/aer343

**OBSTETRICS**

**Anaesthetic considerations for non-obstetric surgery during pregnancy**

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**Anaesthesia for non-obstetric procedures during pregnancy**

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