York Final FRCA course – Obstetric Anaesthesia

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York
Obstetrics

- Syllabus
- Past papers and BJA education
- Practice questions
FRCA syllabus

- Physiological changes of pregnancy
- Anaesthesia in early pregnancy
- Antenatal assessment of the pregnant woman
- Medical diseases complicating pregnancy
- Pain relief in labour, dermatomes
- Anaesthesia for operative obstetrics
- Failed intubation drill
- Emergencies in obstetrics, Massive obstetric haemorrhage, Amniotic fluid embolus, Pre-eclampsia, PPH
- Tocolytics, uterotonics
- Maternal morbidity and mortality, Most recent Confidential Enquiry findings, deaths related to anaesthesia
- Neonatal resuscitation
Prior questions

Sept 2019 SAQ (Question 10) - Amniotic fluid embolus

a) What are the two commonest causes of direct maternal death (occurring within 42 days of the end of pregnancy) in the latest Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK (MBRRACE-UK) report 2018? (2 marks)

b) What is the leading cause of indirect death in the latest MBRRACE-UK report 2018? (1 mark)

c) Amniotic fluid embolism (AFE) is a direct cause of maternal mortality. How does AFE present clinically? (8 marks)

d) What are the possible obstetric (3 marks) and non-obstetric (4 marks) differential diagnoses of AFE?

e) State the two possible theories about the pathophysiology of AFE. (2 marks)
Sept 2018 (Question 11) - obesity

A primiparous patient with a BMI of 55 kg/m² presents in the high risk anaesthetic antenatal assessment clinic at 34 weeks gestation. She is hoping to have a normal delivery.

a) Which specific points do you need to elicit from the anaesthetic history and examination? (5 marks)

b) What are the specific obstetric risks associated with a raised BMI in pregnancy? (5 marks)

c) What do you need to communicate to the patient? (10 marks)
Prior questions

March 2018 (Question 10) – Pre-eclampsia

A 25-year-old pregnant women at 35 weeks gestation is admitted to labour ward with a blood pressure of 180/110 mmHg. She is known to have pre-eclampsia and there is a plan to deliver her baby within the next 24 hours.

a) What is the definition of pre-eclampsia? (1 mark)

b) What symptoms may this woman complain of due to her pre-eclampsia? (4 marks)

c) What are the important priorities in her management when she arrives on the labour ward? (10 marks)

d) A decision has been made to proceed to Caesarean section (CS) and the patient insists on having a general anaesthetic (GA). Explain potential changes to your normal GA technique for CS due to her pre-eclampsia. (5 marks)
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)
March 2017 (Question 6)

The obstetric team tell you about a patient who is 2 days post-partum with what they suspect is a post-dural puncture headache (PDPH).

a)  What is the differential diagnosis of post-partum headache? (8 marks)

b)  What features, in this patient, would lead you to consider a serious underlying cause? (7 marks)

c)  You diagnose a PDPH and arrange treatment by epidural blood patch (EBP). What are the described risks of EBP? (5 marks)
BJA Education

July 2020 - Management of intrathecal catheters in the obstetric patient

June 2020 – General anaesthesia in obstetrics

March 2020
- Antepartum and intrapartum risk factors and the impact of PTSD on mother and child
- Neuraxial analgesia for labour

January 2020
- The peripartum management of diabetes
- Conversion of labour epidural analgesia to surgical anaesthesia for emergency intrapartum Caesarean section

November 2019 - Non-regional analgesia for labour: remifentanil in obstetrics
Q1

a) What are the two commonest causes of direct maternal death (occurring within 42 days of the end of pregnancy) in the latest Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK (MBRRACE-UK) report 2018?

b) What is the leading cause of indirect death in the latest MBRRACE-UK report 2018?
Figure 2.3: Maternal mortality by cause 2015-17

Solid bars indicate indirect causes of death, hatched bars indicate direct causes of death.

Hatched bars show direct causes of death, solid bars indicate indirect causes of death;
*Rate for direct sepsis (genital tract sepsis and other pregnancy related infections) is shown in hatched and rate for indirect sepsis (influenza, pneumonia, others) in solid bar
**Rate for suicides (direct) is shown in hatched and rate for indirect psychiatric causes (drugs/alcohol) in solid bar
†Rate for direct malignancies (choriocarcinoma) shown in hatched and rate for indirect malignancies (breast/ovary/cervix) in solid bar
Source: MBRRACE-UK
MBBRAISE key points

209 women died during or up to 6 weeks after pregnancy, 9.2 per 1000,000

Statistically insignificant decrease in mortality from previous 3 year period

Anaesthesia 0.4 per 100,000 (1 woman)

Higher rate of deaths in ethnic minorities (Black women 5x, Asian women 2x), older women and those with more social deprivation

Key messages

- ensure heart disease is considered during pregnancy,
- aspirin is prescribed for those at risk of pre-eclampsia (high and moderate risk groups)
- awareness of morbidity from breast cancer
Q 2

a) Define pre-eclampsia

b) List 5 risk factors for pre-eclampsia

c) What symptoms and signs might suggest severe pre-eclampsia?

d) Describe the maternal complications of pre-eclampsia

e) What drugs are used in the management of pre-eclampsia?

f) What are the important considerations before siting a labour epidural in a patient with pre-eclampsia

g) What are the considerations when taking a patient with pre-eclampsia for operative delivery?
a) Define pre-eclampsia

- Essential hypertension
  - Hypertension diagnosed before pregnancy or before 20/40
  - Continues during pregnancy
  - No proteinuria

- Gestational hypertension (PIH)
  - New diagnosis of hypertension after 20/40
  - No proteinuria

- Pre-eclampsia
  - New hypertension > 20/40 + significant proteinuria
    - Urinalysis >= 1+, or PCR > 30mg/mmol

- Severe pre-eclampsia
  - Severe hypertension (160/110) +/- symptoms +/- haematological or biochemical disturbance
b) List 5 risk factors for pre-eclampsia

High and moderate risk factors for development of pre-eclampsia

<table>
<thead>
<tr>
<th>High risk factors</th>
<th>Moderate risk factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertensive disease in previous pregnancy</td>
<td>First pregnancy</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>Age ≥40 yr</td>
</tr>
<tr>
<td>Autoimmune disease (e.g. antiphospholipid syndrome)</td>
<td>Pregnancy interval ≥10 yr</td>
</tr>
<tr>
<td>Type 1 or 2 diabetes mellitus</td>
<td>Family history of pre-eclampsia</td>
</tr>
<tr>
<td>Chronic hypertension</td>
<td>Multiple pregnancy</td>
</tr>
</tbody>
</table>
c) What symptoms and signs might suggest severe pre-eclampsia?

- Blurred vision, papilloedema, visual disturbance
- Epigastric tenderness
- Interstitial oedema
- Headache – inc BP, intracranial oedema
- Clonus
- Proteinuria - signifies endothelial damage
- Elevated liver enzymes
- Low platelets
d) Describe the maternal complications of pre-eclampsia

- Intracranial haemorrhage
  - Leading cause of death from severe PET in UK
- Placental abruption & DIC
- Eclampsia
- HELLP syndrome
  - Haemolysis, elevated liver enzymes & low platelets
- Renal failure
- Pulmonary oedema
- Acute respiratory arrest
Fetal complications of pre-eclampsia

- Intrauterine growth restriction
- Oligohydramnios
- Hypoxia from placental insufficiency
- Placental abruption
- Preterm birth
### e) What drugs are used in the management of pre-eclampsia?

<table>
<thead>
<tr>
<th>Condition</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Moderate pre-eclampsia</strong></td>
<td>- Oral labetalol if systolic BP reaches 150-160 mmHg</td>
</tr>
<tr>
<td><strong>Severe pre-eclampsia</strong></td>
<td>- Oral/iv labetalol (check for contra-indications)</td>
</tr>
<tr>
<td></td>
<td>- Oral nifedipine</td>
</tr>
<tr>
<td></td>
<td>- iv hydralazine</td>
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<tr>
<td></td>
<td>- Aim to lower the systolic BP to 150mmHg</td>
</tr>
<tr>
<td></td>
<td>- Ideally, both consultant obstetrician &amp; anaesthetist contributing to care</td>
</tr>
<tr>
<td></td>
<td>- Consider invasive monitoring</td>
</tr>
</tbody>
</table>
f) What are the important considerations before siting a labour epidural in a patient with pre-eclampsia?

- Reduction in maternal blood pressure – reduced hypertensive response to pain, sympathetic block
- Improves placental perfusion
- Avoids systemic opioids
- May avoid general anaesthesia if operative delivery required

- Check timing of thromboprophylaxis
- Check platelets (and clotting if platelets <100)
  - Avoid if platelets <80, or platelets<100 and INR>1.5
- Pre loading with fluid not required and autious use of vasopressors
  - BP usually maintained
f) What are the important considerations when taking a patient with pre-eclampsia for operative delivery?

- Coagulopathy
- Avoid ergometrine
- High risk of significant blood loss
- Fluid management
  - High risk of iatrogenic pulmonary oedema
- Early consideration of invasive monitoring
- Early input senior anaesthetic/ITU staff
- Potential difficult airway
- Exaggerated response to intubation and extubation
  - Alfentanil, remifentanil, labetalol, magnesium sulphate
- Hypotensive anaesthetic agents may complicate intra-operative blood pressure control
- Potentiation of NDMRs with magnesium
Immediate management of eclampsia

- **ABC**
- Left lateral tilt position if pregnant
- **Magnesium**
  - 4g loading dose over 5 minutes
  - Repeat with 2mg if necessary
  - 1g/hr until 24 hours post delivery or after last seizure
  - Monitor for signs of toxicity
- Delivery should be considered after maternal stabilisation and may be CS or VD depending on maternal/fetal and organisational factors
Magnesium Sulphate Toxicity

- Signs of toxicity
  - Loss of deep tendon reflexes
  - Respiratory depression
  - Respiratory arrest
  - Cardiac arrest
- Therapeutic levels 2.0-4.0 mmol/l
- ECG changes, prolonged PR, QRS 3.0-5.0 mmol/l
- Loss of tendon reflexes >5.0 mmol/l
- Heart block, CNS and respiratory depression >7.5 mmol/l
- Cardiac arrest >12 mmol/l

- Follow emergency protocol
  - Call for help
  - Stop Magnesium Sulfate
  - Start BLS
  - Give iv Calcium Gluconate 1g (10ml of 10%)
  - Intubate early and ventilate until respiration resumes
Q3

a) What are the indications for general anaesthesia in obstetrics?

b) What steps can be taken to provide intrauterine resuscitation for the foetus?

c) List 5 risk factors for difficult intubation in obstetrics

d) Outline the management of failed intubation in obstetrics

e) What considerations are made when deciding whether to wake up or proceed
a) What are the indications for general anaesthesia in obstetrics?

- Severe maternal or fetal compromise requiring immediate emergency birth
- Regional anaesthesia contraindicated (e.g. coagulopathy, haemodynamic instability)
- Failed or inadequate regional anaesthesia
- Maternal request
**b) What steps can be taken for intrauterine fetal resuscitation**

<table>
<thead>
<tr>
<th>S</th>
<th>Stop syntocinon®: stop any oxytocin infusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>Position - left lateral: to minimise aortocaval compression</td>
</tr>
<tr>
<td>I</td>
<td>Intravenous fluid bolus: 250-500mL crystalloid to improve uteroplacental perfusion (if not contraindicated)</td>
</tr>
<tr>
<td>L</td>
<td>Low blood pressure: treat (e.g. with fluids, vasopressors) if low</td>
</tr>
<tr>
<td>T</td>
<td>Tocolysis: consider tocolytic to improve uteroplacental blood flow (terbutaline)</td>
</tr>
</tbody>
</table>
c) **Risk factors for difficult intubation**

- Known previous difficult intubation
- Pre-eclampsia (airway oedema)
- Congenital airway difficulties:
  - e.g. Klippel-Fiel, Pierre Robin
- Acquired airway difficulties
  - restricted neck movement, limited mouth opening:
  - e.g. rheumatoid arthritis, ankylosing spondylitis, cervical spine fusions
- Inc BMI > 35, Neck circumference >50
- Poor dentition
Failed intubation

**Master algorithm – obstetric general anaesthesia and failed tracheal intubation**

**Algorithm 1**
Safe obstetric general anaesthesia

- Pre-induction planning and preparation
- Team discussion

**Algorithm 2**
Obstetric failed tracheal intubation

- Declare failed intubation
- Call for help
- Maintain oxygenation
- Supraglottic airway device (maximum 2 attempts) or facemask

**Algorithm 3**
Can’t intubate, can’t oxygenate

- Declare CICO
- Give 100% oxygen
- Exclude laryngospasm – ensure neuromuscular blockade
- Front-of-neck access

Success
- Verify successful tracheal intubation and proceed
- Plan extubation

Fail
- Is it essential / safe to proceed with surgery immediately?*

- Yes
  - Proceed with surgery

- No
  - Wake

*See Table 1, †See Table 2
Algorithm 1 - safe obstetric general anaesthesia

Pre-theatre preparation
Airway assessment
Fasting status
Antacid prophylaxis
Intrauterine fetal resuscitation if appropriate

Plan with team
WHO safety checklist / general anaesthetic checklist
Identify senior help, alert if appropriate
Plan equipment for difficult / failed intubation
Plan for / discuss: wake up or proceed with surgery (Table 1)

Rapid sequence induction
Check airway equipment, suction, intravenous access
Optimise position – head up / ramping + left uterine displacement
Pre-oxygenate to $F_{\text{ET}}O_2 \geq 0.9$ / consider nasal oxygenation
Cricoid pressure (10 N increasing to 30 N maximum)
Deliver appropriate induction / neuromuscular blocker doses
Consider facemask ventilation ($P_{\text{max}}$, 20 cmH$_2$O)

1$^{st}$ intubation attempt
If poor view of larynx optimise attempt by:
• reducing / removing cricoid pressure
• external laryngeal manipulation
• repositioning head / neck
• using bougie / stylet

Success
Verify successful tracheal intubation
Proceed with anaesthesia and surgery
Plan extubation

Fail
Ventilate with facemask
Communicate with assistant

2$^{nd}$ intubation attempt
Consider:
• alternative laryngoscope
• removing cricoid pressure

3$^{rd}$ intubation attempt only by experienced colleague

Fail
Follow Algorithm 2 – obstetric failed tracheal intubation

Algorithm 2 – obstetric failed tracheal intubation

Declare failed intubation
Theatre team to call for help
Priority is to maintain oxygenation

Supraglottic airway device
(2nd generation preferable)
Remove cricoid pressure during insertion
(maximum 2 attempts)

Facemask +/- oropharyngeal airway
Consider:
- 2-person facemask technique
- Reducing / removing cricoid pressure

Is adequate oxygenation possible?

No
Follow Algorithm 3
Can’t intubate, can’t oxygenate

Yes
Is it essential / safe to proceed with surgery immediately?*

No
Wake§

Yes
Proceed with surgery§

*See Table 1, §See Table 2
# Failed intubation – wake up or proceed

<table>
<thead>
<tr>
<th>Factors to consider</th>
<th>WAKE</th>
<th>PROCEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal condition</td>
<td>• No compromise</td>
<td>• Hypovolaemia requiring corrective surgery</td>
</tr>
<tr>
<td></td>
<td>• Mild acute compromise</td>
<td>•  Critical cardiac or respiratory compromise, cardiac arrest</td>
</tr>
<tr>
<td>Fetal condition</td>
<td>• No compromise</td>
<td>•  Continuing fetal heart rate abnormality despite intrauterine</td>
</tr>
<tr>
<td></td>
<td>• Compromise corrected with intrauterine resuscitation, pH &lt; 7.2 but</td>
<td>resuscitation, pH &gt; 7.15</td>
</tr>
<tr>
<td></td>
<td>&gt; 7.15</td>
<td>•  Sustained bradycardia</td>
</tr>
<tr>
<td>Anaesthetist</td>
<td>• Novice</td>
<td>•  Fetal haemorrhage</td>
</tr>
<tr>
<td></td>
<td>• Junior trainee</td>
<td>•  Suspected uterine rupture</td>
</tr>
<tr>
<td>Obesity</td>
<td>• Supermorbid</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>• Morbid</td>
<td>•  Normal</td>
</tr>
<tr>
<td>Surgical factors</td>
<td>• Complex surgery or major haemorrhage anticipated</td>
<td>•  Single uterine scar</td>
</tr>
<tr>
<td></td>
<td>• Multiple uterine scars</td>
<td>•  No risk factors</td>
</tr>
<tr>
<td>Aspiration risk</td>
<td>• Recent food</td>
<td>•  No recent food</td>
</tr>
<tr>
<td></td>
<td>• In labour</td>
<td>•  Not in labour</td>
</tr>
<tr>
<td></td>
<td>• Opioids given</td>
<td>•  Antacids given</td>
</tr>
<tr>
<td></td>
<td>• Antacids not given</td>
<td>•  Fasted</td>
</tr>
<tr>
<td>Alternative anaesthesia</td>
<td>• No anticipated difficulty</td>
<td>•  Fasted</td>
</tr>
<tr>
<td>regional</td>
<td>• Predicted difficulty</td>
<td>•  Surgery started</td>
</tr>
<tr>
<td>securing airway awake</td>
<td>• Relatively contraindicated</td>
<td>•  Surgery started</td>
</tr>
<tr>
<td>Airway device / ventilation</td>
<td>• Difficult facemask ventilation</td>
<td>•  Second generation supraglottic airway device</td>
</tr>
<tr>
<td></td>
<td>• Adequate facemask ventilation</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>• Front-of-neck</td>
<td>•  First generation supraglottic airway device</td>
</tr>
<tr>
<td>Airway hazards</td>
<td>• Laryngeal oedema</td>
<td>•  None evident</td>
</tr>
<tr>
<td></td>
<td>• Stridor</td>
<td>•</td>
</tr>
</tbody>
</table>

Criteria to be used in the decision to wake or proceed following failed tracheal intubation. In any individual patient, some factors may suggest waking and others proceeding. The final decision will depend on the anaesthetist's clinical judgement.

### Table 2 – Management after failed tracheal intubation

<table>
<thead>
<tr>
<th>Wake</th>
<th>Proceed with surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintain oxygenation</td>
<td>Maintain anaesthesia</td>
</tr>
<tr>
<td>Maintain cricoid pressure if not impeding ventilation</td>
<td>Maintain ventilation - consider merits of:</td>
</tr>
<tr>
<td>Either maintain head-up position or turn left lateral recumbent</td>
<td>- controlled or spontaneous ventilation</td>
</tr>
<tr>
<td>If rocuronium used, reverse with sugammadex</td>
<td>- paralysis with rocuronium if sugammadex available</td>
</tr>
<tr>
<td>Assess neuromuscular blockade and manage awareness if paralysis is</td>
<td>- Anticipate laryngospasm / can’t intubate, can’t oxygenate</td>
</tr>
<tr>
<td>prolonged</td>
<td>- Minimise aspiration risk:</td>
</tr>
<tr>
<td>Anticipate laryngospasm / can’t intubate, can’t oxygenate</td>
<td>- maintain cricoid pressure until delivery (if not impeding ventilation)</td>
</tr>
<tr>
<td>After waking</td>
<td>- after delivery maintain vigilance and reapply cricoid pressure if signs of</td>
</tr>
<tr>
<td>Review urgency of surgery with obstetric team</td>
<td>regurgitation</td>
</tr>
<tr>
<td>Intrauterine fetal resuscitation as appropriate</td>
<td>- empty stomach with gastric drain tube if using</td>
</tr>
<tr>
<td>For repeat anaesthesia, manage with two anaesthetists</td>
<td>second-generation supraglottic airway device</td>
</tr>
<tr>
<td>Anaesthetic options:</td>
<td>- minimise fundal pressure</td>
</tr>
<tr>
<td>- Regional anaesthesia preferably inserted in lateral position</td>
<td>- administer H₂ receptor blocker i.v. if not already given</td>
</tr>
<tr>
<td>- Secure airway awake before repeat general anaesthesia</td>
<td>- Senior obstetrician to operate</td>
</tr>
<tr>
<td></td>
<td>- Inform neonatal team about failed intubation</td>
</tr>
<tr>
<td></td>
<td>- Consider total intravenous anaesthesia</td>
</tr>
</tbody>
</table>

Q4

a) List the differential diagnosis of a post-dural puncture headache

b) What are the characteristics of the headache?

c) What other symptoms might the patient experience

d) Outline the key points in your assessment and management of the patient with PDPH

e) What are the possible complications of an epidural blood patch
### Differential diagnosis of post dural puncture headache

- **Infective** – meningitis, encephalitis
- **Neoplastic** – SO
- **Migraine**
- **Vascular** – SAH, SDH, stroke, cerebral vein thrombosis
- **Metabolic** – dehydration, caffeine withdrawal, hypoglycaemia
- **Other** – stress, sleep deprivation, lactation headache, hypertension, pre-eclampsia, BIH
b) What are the characteristics of the headache?

- Occurs within 72 hours
- Frontal or occipital
- Postural – worse on standing or sitting, straining and coughing, improves with lying flat
c) What other symptoms might the patient experience?

- Neck stiffness
- Nausea and vomiting
- Photophobia
- Visual disturbance
- Auditory symptoms, tinnitus
- Non-specific features – gen unwell, lethargy
d) Approach to assessment

- History and exam
  - Neurological features – bladder/ bowel dysfunction, altered hearing, sensory or motor deficit
- Investigations
  - Bloods – FBC, CRP, Coag
- If concerns consider MRI Head +/- neuro referral
d) Management

• Conservative
  • Bed rest
  • Hydration
  • Simple analgesics (paracetamol, ibuprofen, +/- opioids)
  • Occipital nerve block

• Pharmacological
  • Caffeine, sumatriptan, theophylline

• Epidural blood patch
  • Gold standarded, 70% successful in one patch, 90% in 2
  • Consent
e) What are the possible complications of EBP?

- Second dural puncture
- Cranial nerve palsy
- Irritation of the meninges
- Radicular pain
- Raised core temperature
- Seizure
Q5

• Define
  • i) antepartum haemorrhage
  • ii) intrapartum haemorrhage
  • iii) primary postpartum haemorrhage,
  • iv) secondary postpartum haemorrhage

• What are the risk factors for PPH?

• List the four main causes for PPH?

• What drugs are used to treat uterine atony?

• What are the other key aspects in management of major obstetric haemorrhage?
Obstetric haemorrhage definitions

- **Antepartum Haemorrhage (APH)**
  - Bleeding from the genital tract > 24 weeks gestation - labour

- **Intrapartum Haemorrhage**
  - Genital tract bleeding during labour

- **Primary postpartum Haemorrhage (PPH)**
  - Blood loss of 500 ml or more within 24 hours of birth
    - Major PPH = blood loss greater than 1000ml

- **Secondary PPH**
  - Blood loss of 500 ml or more from 24 hours to 12 weeks postpartum
<table>
<thead>
<tr>
<th>Risk Factors for PPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple pregnancy</td>
</tr>
<tr>
<td>Uterine fibroids</td>
</tr>
<tr>
<td>Polyhydramnios</td>
</tr>
<tr>
<td>Uterine anomalies</td>
</tr>
<tr>
<td>Birth weight &gt; 4.5kg</td>
</tr>
<tr>
<td>Previous PPH due to atony</td>
</tr>
<tr>
<td>Failure to progress in second stage</td>
</tr>
<tr>
<td>GA</td>
</tr>
<tr>
<td>Pyrexia in labour</td>
</tr>
<tr>
<td>Induction of labour with oxytocin</td>
</tr>
<tr>
<td>Placental abruption</td>
</tr>
<tr>
<td>BMI &gt; 40</td>
</tr>
<tr>
<td>Grand multiparity</td>
</tr>
<tr>
<td>Causes of PPH</td>
</tr>
<tr>
<td>---------------</td>
</tr>
<tr>
<td><strong>Tone</strong></td>
</tr>
<tr>
<td>- Uterine muscle contracts to prevent bleeding</td>
</tr>
<tr>
<td>- Atony causes bleeding and predisposes to uterine inversion</td>
</tr>
<tr>
<td><strong>Tissue</strong></td>
</tr>
<tr>
<td>- Retained placenta or membranes or blood clots within the uterus prevents good contraction</td>
</tr>
<tr>
<td><strong>Trauma</strong></td>
</tr>
<tr>
<td>- Vaginal / cervical lacerations</td>
</tr>
<tr>
<td><strong>Coagulation Defects (Thrombin)</strong></td>
</tr>
</tbody>
</table>
Management of PPH

- Resuscitation
- Monitoring
- Medical Tx
- MOH
- Surgical Tx
- Ongoing care
Resuscitation

- 2x large bore cannulae
- Bloods FBC, Coag, G&S, TEG, Haemocue
- Crystalloid – warmed, pressure bags
- O Neg
- Cell salvage
Monitoring

- MEOWS (HR, BP, Sats etc)
- Catheterise
- ABG, Lactate
- A line, CVP
- (CTG)
Initial and Medical management

- APH – Deliver
- PPH – Rub up contraction, bimanual compression
- Uterotonics
- Tranexamic acid
# Uterotonics

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntometrine</td>
<td>Active 3&lt;sup&gt;rd&lt;/sup&gt; stage - give 2&lt;sup&gt;nd&lt;/sup&gt; dose IM</td>
<td>Contraindicated with hypertension</td>
</tr>
<tr>
<td></td>
<td>Physiological 3&lt;sup&gt;rd&lt;/sup&gt; stage - give 1&lt;sup&gt;st&lt;/sup&gt; dose</td>
<td></td>
</tr>
<tr>
<td>Oxytocin</td>
<td>10 units IM or 5 units IV</td>
<td>Alternative to Syntometrine</td>
</tr>
<tr>
<td>Ergometrine</td>
<td>500mcg IM (if Syntometrine has not been given)</td>
<td>Contraindicated with hypertension</td>
</tr>
<tr>
<td>Oxytocin infusion</td>
<td>40 units in 500ml Normal Saline over 4 hours</td>
<td>Will not initiate uterine contraction, but may maintain it</td>
</tr>
</tbody>
</table>
# Uterotonics

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carboprost / Haemobate</td>
<td>250mcg IM At least 15 minutes between doses To a maximum of 8 doses</td>
<td>Contraindicated in severe asthma SE - pyrexia &amp; diarrhoea</td>
</tr>
<tr>
<td>Misoprostol</td>
<td>800mcg PR</td>
<td>Less effective than Carboprost SE - pyrexia &amp; diarrhoea</td>
</tr>
</tbody>
</table>
Tranexamic acid

• WOMAN trial published in Lancet April 2017:
  • RCT with over 20,000 women from more than 21 countries randomised to tranexamic acid or placebo
  • Significant reduction in maternal deaths from haemorrhage following vaginal or caesarean birth & reduction in women needing laparotomy to control bleeding
  • Tranexamic acid should be given early, alongside uterotonics, after the onset of primary PPH (and definitely within 3 hours)
  • No increase in vascular occlusive events
Anaesthetist/OPD will perform TEG (Thromboelastography) the results will then guide which products to give

Fibrinogen Concentrate should be considered and is kept in the blood fridge near theatres.
Activate MOH Protocol at 1500ml loss

Give Products as guided by TEG/ Lab

| Normal TEG and Platelets $>75 \times 10^9$/l | No Products |
| Platelets $<75 \times 10^9$/l | Platelets 1 unit |
| Clauss Fibrinogen $<2$ g/l or TEG Functional Fibrinogen Level FLEV $<200$ mg/dl | Fibrinogen Concentrate 4g |

Therapeutic Targets

- Haemoglobin - $>80$ g/L
- Platelets - $>75 \times 10^9$/L
- PT - $<1.5$ x mean control
- APTT - $<1.5$ x mean control
- Fibrinogen - $>2$ g/L
## Surgical tx

- EUA, repair of tears
- Manual removal of placenta
- Packing
- Bakri balloon
- B-lunch suture
- Uterine / IA ligation
- Hysterectomy – ideally before coagulopathy
- Interventional Radiology
Ongoing care

- HDU / ICU
- Consider antibiotics
- Consider IV iron
- VTE prophylaxis
Any questions