

Obstetric critical incidents

Final FRCA teaching Wednesday 8th September 2021

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Major Obstetric Haemorrhage

Risk factors for PPH

Antenatal:

- Previous uterine surgery
- Previous PPH
- ≥ 5 vaginal births, ≥ 3 LSCS
- EFH > 4.5 Kg
- Multiple pregnancy
- Polyhydramnios
- Abnormal placentation
- Known abruption

Perinatal:

- Chorioamnionitis
- Augmented labour (synto)
- Prolonged labour
- Instrumental delivery
- Retained products

Management of MOH

	Obstetric	Anaesthetic
Human factors	Senior obstetrician Senior midwife Scrub staff Scribe	Senior anaesthetist Scenario lead? Blood bank/products Drugs Liaise with ITU Runner
Procedural factors	MROP Uterine massage Balloon Suture Hysterectomy	Regional Vs GA IV access A-line Belmont?
Pharmacology	Input re: EBL/tone	Uterotonics Blood TXA Calcium Crystalloid?

Targets in MOH

- Hb
 - Platelets
 - INR
 - Fibrinogen
 - Calcium
 - Temperature
 - pH

Uterotonics

5-10 u bolus
Variable infusion

Syntocinon

250mcg IM 15 mins

Carboprost

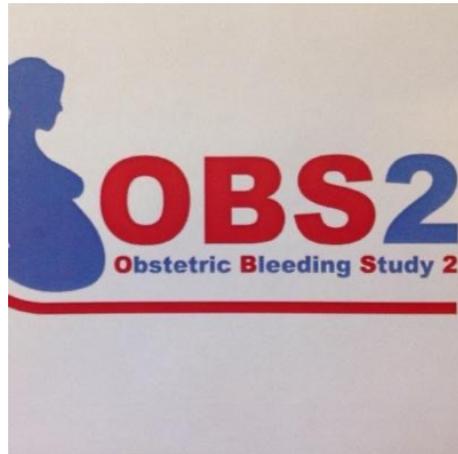
Misoprostol

1000mcg PR

Ergometrine

500mcg IV/IM

Important trials



Scenario

33 years old with no medical problems other than high BMI, 1 previous LSCS wanted to try VBAC. Spontaneous onset labour, struggling with pain relief, lots of abdominal and back pain with contractions. Midwives think baby is OP.

Epidural sited and topped up. Shortly after this she became hypotensive and tachycardic. BP 80/34, HR 130. No evidence of PV loss.

Over the next few minutes the patient she becomes slightly tachypnoeic and feels dizzy before starting to lose consciousness.

The CTG indicates foetal distress and obstetrics are keen to deliver ASAP.

Differentials?

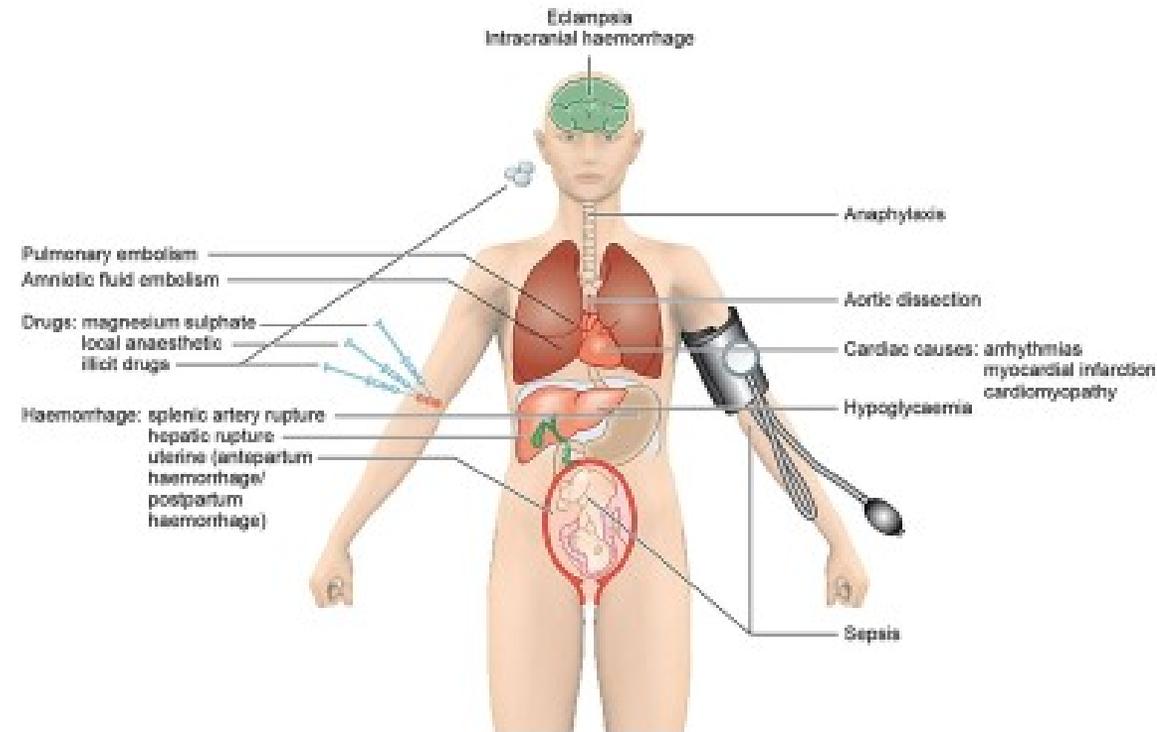
Immediate management?



- Epidural block related.
- Obstetric related.
- Medical/other

- High block from epidural
- Intrathecal catheter
- Subdural catheter
- LA toxicity
- Uterine rupture/scar dehiscence
- Amniotic fluid embolism
- Abruptio
- Aortic dissection
- Anaphylaxis
- VTE
- Undiagnosed cardiac problem – cardiomyopathy/stenotic lesion.

Fig 2 Common causes of collapse in pregnancy. Reproduced from Royal College of Obstetricians and Gynaecologists. ...



Immediate management

- Call for help – ODP, second anaesthetist, obs team.
- Left lateral tilt
- Give O2 15 litres.
- Hartmann's fluid bolus.
- Ensure adequate IV access, minimum 2 wide bore. Consider IO (into humerus)
- Ensure blood available.
- Notify theatres.
- Full monitoring with ECG.
- Allocate someone to look after the birth partner and a scribe.
- Intralipid/adrenaline/massive PE?
- Low threshold for starting CPR if cardiovascular collapse.

Help arrives and you start giving intralipid. Shortly after the patient arrests and CPR is started.

Next step?

Perimortem caesarean section is performed in the room with CPR ongoing. (1:20-30,000 pregnancies suffer cardiac arrest)

- Purpose is to facilitate maternal resuscitation, not protect the foetus.
- For women >20 weeks gestation.
- KTS at 4 minutes/2 cycles of CPR, ideally deliver within 5 minutes.
- <20 weeks there is little evidence that delivery aids resuscitation but it may be considered.
- Consultant obstetrician/anaesthetist/ITU should be informed and involved in decision making.
- Expect little bleeding during CPR, no anaesthetic is required. Post ROSC the patient may be transferred to theatre for haemorrhage control.

ROSC is achieved at 7 minutes and the team transfer the patient to ITU. On ITU the patient has high FiO2 requirements with xray features of pulmonary oedema.

She starts oozing from the wound site and cannula insertion sites. Bloods taken show low end of normal platelets, low fibrinogen, prolonged PT and D-dimer very raised.

Diagnosis?

Amniotic Fluid Embolism

UK obstetric surveillance system UKOSS – 2005-2014 120 cases of AFE.
1.7/100,000 pregnancies, case fatality of 19%.

Risk factors in UK:

Pre delivery: Induction of labour
 Use of oxytocin to induce/augment
Post delivery: Forceps/ventouse/caesarean delivery

Other: Age >35 years, multiple pregnancy, polyhydramnios, male foetus, eclampsia, cervical trauma, abruption, praevia, ethnic minority.

Table 1 Incidence of signs and symptoms of AFE at presentation.
Adapted from Clark and colleagues¹⁰

Signs and symptoms	Incidence (%)
Hypotension	100
Fetal distress	100
Pulmonary oedema or ARDS	93
Cardiopulmonary arrest	87
Cyanosis	83
Coagulopathy	83
Dyspnoea	49
Seizures	48
Uterine atony	23
Bronchospasm	15
Transient hypertension	11
Cough	7
Headache	7
Chest pain	2

70% occur in labour, 19% during caesarean, 11% immediately post vaginal delivery.

Pathogenesis

Mixing of amniotic fluid and maternal circulation – this occurs normally so susceptibility is likely.

Mechanical theory:

fluid contains fetal squamous cells, vernix caseosa, lanugo, trophoblasts, fetal gut mucin and bile-stained meconium. Large AFE may explain some cases, not all.

Inflammatory theory: 'Anaphylactoid reaction'

Immunologically active and prothrombotic substances in AF include platelet-activating factor, interleukins, complement factors, and tumour necrosis factor-alpha. Mast-cell degranulation, which occurs on exposure to foetal antigens, is similar to that in anaphylaxis, but without tryptase elevation.

- Phase 1- ~ 30 min PAP rises and RVF ensues with subsequent microvascular damage and hypotension.
- Phase 2- occurs in patients who survive the initial insult, characterised by LVF, endothelial activation and leakage, DIC. Microthrombi in the pulmonary vasculature from DIC worsen PAH.

UKOSS diagnostic criteria for AFE:

In the absence of any other clear cause the diagnosis of AFE is made by:

Either

Acute maternal collapse with one or more of the following features:

- Acute fetal compromise
- Cardiac arrest
- Cardiac rhythm problems
- Coagulopathy
- Hypotension
- Maternal haemorrhage
- Premonitory symptoms (e.g. restlessness, numbness, agitation, tingling)
- Seizure
- Shortness of breath

Excluding women with maternal haemorrhage as the first presenting feature in whom there was no evidence of early coagulopathy or cardio-respiratory compromise

Or

Women in whom the diagnosis was made at post-mortem examination with the finding of fetal squames or hair in the lungs

Echo – early AFE severe pulmonary HTN, RV failure and cavity obliterated LV. Later stages LVF common.

ECG- various, TWI, ST depression/elevation, dysrhythmia.

Management: entirely supportive.

Early recognition and intervention is key

- A/B: High flow O2 initially, lung protective ventilation
- C: Fluids and vasopressors/ionotropes peripherally initially, then centrally. Early invasive monitoring. Aortic balloon pump, bypass, ECMO all have been used.
- Haemorrhage control: Standard uterotonics, bimanual compression, uterine balloon. Early consideration for hysterectomy. Unlikely time for IR embolization.
- Coagulation: standard blood products and TXA, hypofibrinogenaemia is very common, early cryoprecipitate. Factor rVIIa causes massive thrombosis but may stop uncontrolled haemorrhage.

Summary

- There are numerous causes of maternal collapse, CEACCP 2015 summarises their Mx.
- AFE is rare, early recognition is important and treatment supportive. Involve haematology/ITU.
- In an unconscious obstetric patient with low cardiac output starting CPR is better than waiting until arrest.
- Peri-mortem caesarean section should be started at 4 minutes if no ROSC, deliver within 1 minute of KTS.

References

- BJA ed 2018 amniotic fluid embolism
<https://www.sciencedirect.com/science/article/pii/S205853491830060X>
- BJA ed 2015 An urgent call to labour ward
<https://academic.oup.com/bjaed/article/15/1/44/257544>

Syllabus

Knowledge	
Competence	Description
OB_IK_01	Recalls/describes the influence of common concurrent medical diseases on pregnancy
OB_IK_02	Discusses the obstetric and anaesthetic management of a premature delivery
OB_IK_03	Discusses the obstetric and anaesthetic management of multiple pregnancy
OB_IK_04	Explains the classification of placenta praevia and the associated risk to the patient
OB_IK_05	Recalls/describes the recognition and management of amniotic fluid embolus
OB_IK_06	Describes the recognition and management of inverted uterus
OB_IK_07	Demonstrates understanding of the methods of treating post-dural puncture headache
OB_IK_08	Discusses common causes of maternal morbidity and mortality, including national reports
OB_IK_09	Discusses the particular sensitivity of patient choices in obstetric practice – even when this is not in line with accepted evidence based best practice e.g. choice of birth plan, and refusal of blood products

MBRRACE Dec 2020 summary infographic:

- [https://www.npeu.ox.ac.uk/assets/downloads/mbrance-uk/reports/maternal-report-2020/MBRRACE-UK Maternal Report Dec 2020 - Ex Summary v10.pdf](https://www.npeu.ox.ac.uk/assets/downloads/mbrance-uk/reports/maternal-report-2020/MBRRACE-UK%20Maternal%20Report%20Dec%2020%20-%20Ex%20Summary%20v10.pdf)

In 2016-18, **217 women died** during or up to six weeks after pregnancy, from causes associated with their pregnancy, among 2,235,159 women giving birth in the UK.
9.7 women per 100,000 died during pregnancy or up to six weeks after childbirth or the end of pregnancy.

We need to talk about SUDEP

Act on:



Night-time seizures



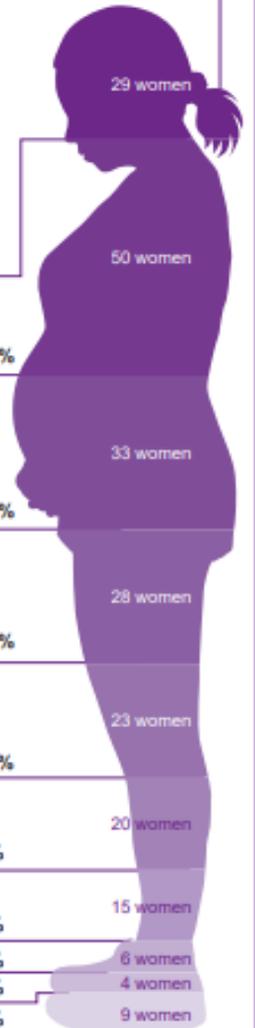
Uncontrolled seizures



Ineffective treatment

Epilepsy and stroke 13%

to prevent Sudden Unexpected Death in Epilepsy



A constellation of biases

566 women died during or up to a year after pregnancy in the UK and Ireland

510 women (90%) had multiple problems



Systemic Biases due to pregnancy, health and other issues prevent women with complex and multiple problems receiving the care they need

Cardiac disease	23%
Blood clots	15%
Mental health conditions	13%
Sepsis	11%
Bleeding	9%
Other physical conditions	7%
Cancer	3%
Pre-eclampsia	2%
Other	4%