

# Obstetric critical incidents

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# Major Obstetric Haemorrhage

# Risk factors for PPH

## Antenatal:

- Previous uterine surgery
- Previous PPH
- $\geq 5$  vaginal births,  $\geq 3$  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

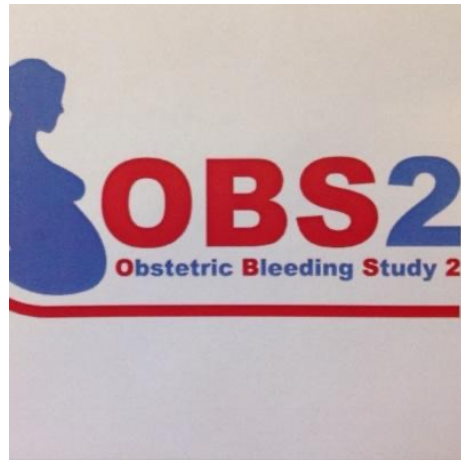
Misoprostol

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?

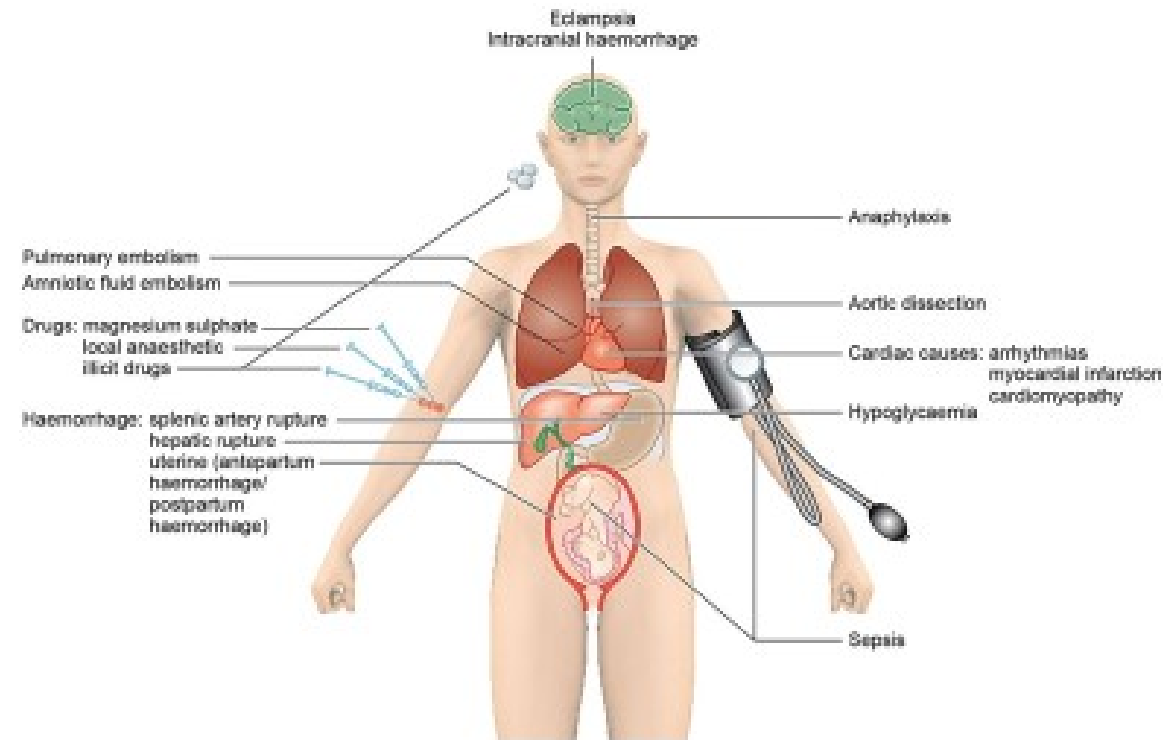
Immediate management?



- 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 FiO<sub>2</sub> 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 colleagues<sup>10</sup>

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



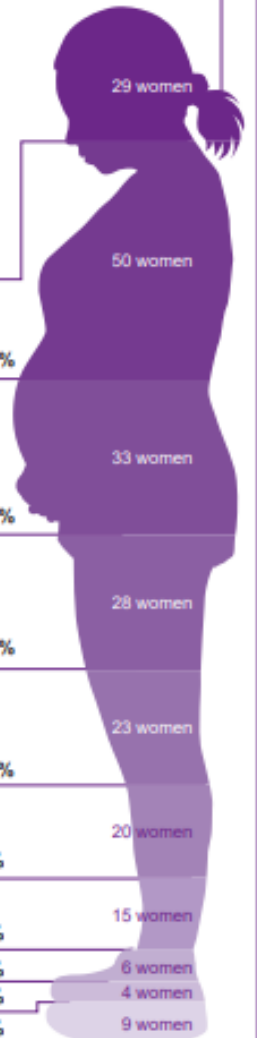
Uncontrolled seizures



Ineffective treatment

Epilepsy and stroke 13%

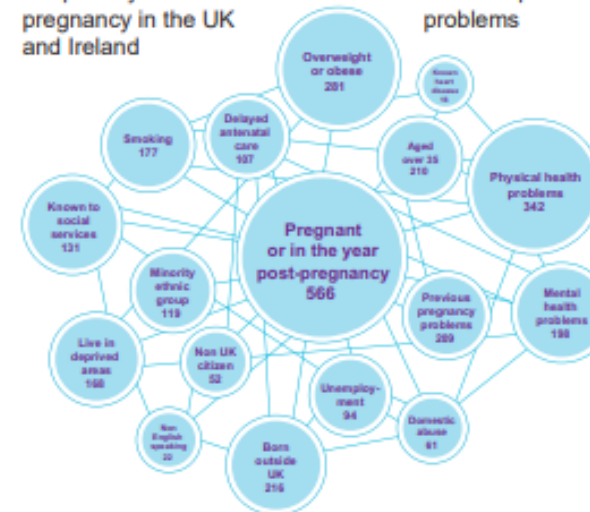
to prevent Sudden Unexpected Death in Epilepsy



## 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%