Review of Amniotic Fluid Embolism

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Amniotic fluid embolism is an unpredictable, rare, and often rapidly fatal complication of pregnancy where amniotic fluid or fetal cells enter the maternal circulation and cause an allergic-type reaction. This usually occurs around the time of birth.
Rare conditions in Obstetrics

- **INOSS**: International network of obstetric surveillance systems
  prospective population based studies of rare serious illnesses in pregnancy and childbirth, uncommon and difficult to study.

- **UKOSS**
  UK obstetric surveillance system

- **AMOSS**
  Australasian obstetric surveillance system
AMOSS conditions studied

- Antenatal pulmonary embolism
- Eclampsia
- Influenza ICU admissions
- Peripartum hysterectomy
- Placenta Accreta
- Gestational breast cancer
- Rheumatic heart disease
Case Controlled Study
Incidence, risk factors, management and outcome of AFE  BJOG 2016;123:100-109

• Identification through UKOSS (Feb 2005-Jan 2014)
• 23 women died (19%) 7 (7%) permanent neurological damage
• Women who died or had neurological damage were more likely to present with cardiac arrest, be from ethnic minority groups, have a hysterectomy, have a shorter time interval between AFE and hysterectomy and less likely to receive cryoprecipitate
Cause specific MMR: Direct deaths

NZ v UK

<table>
<thead>
<tr>
<th>Direct cause of death</th>
<th>NZ2006-2013</th>
<th>UK2006-2011</th>
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<tbody>
<tr>
<td>AFE</td>
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<tr>
<td>PPH/haemorrhage</td>
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<td>VTE</td>
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<td>Preecclampsia</td>
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<td>Sepsis</td>
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<td>Early pregnancy deaths</td>
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<td>Other direct*</td>
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The potential explanations for this 5.6-fold discrepancy in mortality

- AFE is over-diagnosed in New Zealand
- Higher rates of risk factors for AFE such as induction of labour and caesarean section in New Zealand
- Cases in New Zealand are more severe
- Is there potential for improvement in the management of AFE in New Zealand to reduce the case fatality rate?
Review of 13 cases of mortality and 5 morbidity

- Subgroup of MMWG reviewed case notes
- Maternal deaths reported to PMMRC 2006-2014, AMOSS AFE 2010-2013
- Extracted agreed data set to review diagnosis and management
- Cases discussed with wider group if doubt about diagnosis
- 3 of 8 morbidity cases excluded
AMOSS definition

EITHER

Clinical diagnosis
acute hypotension or cardiac arrest
acute hypoxia (restlessness, respiratory distress, chest tightness) and coagulopathy
no other explanation

AND/OR

Pathological / Postmortem diagnosis (fetal squames / debris in pulmonary circulation)
Case reviews: results

- 10/18: induction of labour (7PGs, 4 Synt)
- 8/18: Caesarean section (4 perimortem)
- 4.5 medium number of presenting features
- 12/13 fatal cases, cardiac arrest, 2 presenting feature
- 5/18: fetal distress, 2 presenting feature
- Premonitory symptoms, in 11 cases and were recognised as the first sign in two cases
Case reviews

- Demographics
- Pregnancy and delivery details
- Timing of first symptom, collapse, CPR, resuscitation, transfusion
- Fetal outcome
- ICU/HDU admission
- Products administered
Case review: findings

• 5/13 premonitory symptoms not recognised as being due to AFE before another event occurred: seizure (1), acute fetal compromise (2), hypotension (1), haemorrhage (1).

• Five women had seizures and this was the first presenting sign for two women, both of whom died.
Case reviews

- First symptom to AFE considered (median time 27mins (0-145)    UKOSS: 33mins
- NZ AFE deaths: AFE at home (1), birthing unit (1), level 2 (5), level 3 (6)
- Median time of AFE to death: 3 hours 22 mins in NZ (4mins-23days)    UKOSS: 1 hr 42 mins
Case review: management

- 5 women hysterectomy; all died
- All women who survived received cryoprecipitate
- 6 women given cryoprecipitate who died (median of 38 hrs and 9 mins after AFE)
- 7 who died did not get cryoprecipitate (median 99 minutes after AFE)
Case Review: Management

• All survivors received cryoprecipitate, platelets and fresh frozen plasma
• 46% (7/13) of those who died received Cryoprecipitate
• 69% (9/13) of those who died received platelets and fresh frozen plasma
• Resuscitation suboptimal in 5/13 deaths and 1/5 survivors
What have we learnt?

Small numbers so difficult to draw conclusions

Pathways of AFE:
Sudden severe: collapse and coagulopathy,
Delayed: coagulopathy and bleeding
What have we learnt?

- Risk factors not more common in NZ
- Cases are not more severe in NZ
- AFE not over-diagnosed in deaths
Practice Points

• Note AFE practice point in 10\textsuperscript{th} report (pg121)
• Note previous practice point on perimortem caesarean section (pg 122 9\textsuperscript{th} report)
• Consider caesarean at start of CPR, deliver by 5 minutes
• No need to check fetal heart, no need for transfer to theatre, life-saving for mother
What can we do?

Survival related to early recognition and aggressive resuscitation

If home or 1° unit: transfer ASAP if consider
What can we do?

Perimortem caesarean section: consider at onset CPR, deliver baby by 5 minutes

Activation of Massive Transfusion Protocol

FFP, platelets and cryoprecipitate important
Continue to collect information on AFE
Argument for multidisciplinary training on obstetric emergencies for all practitioners involved in intrapartum care.

Different but similar argument for multidisciplinary training in fetal surveillance for those involved in intrapartum care
Acknowledgements

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• Families
• LMCs and DHB staff