

Introduction

Amniotic fluid embolism (AFE) is a rare but serious complication of pregnancy, occurring in approximately 1.7 in 100,000 pregnancies¹, with significant morbidity and mortality. It is one of the leading causes of maternal mortality worldwide.

AFE should be considered in cases with sudden maternal collapse secondary to hypotension or hypoxaemia, and Disseminated Intravascular Coagulation (DIC). There is no current diagnostic assay available, therefore it remains a diagnosis of exclusion.

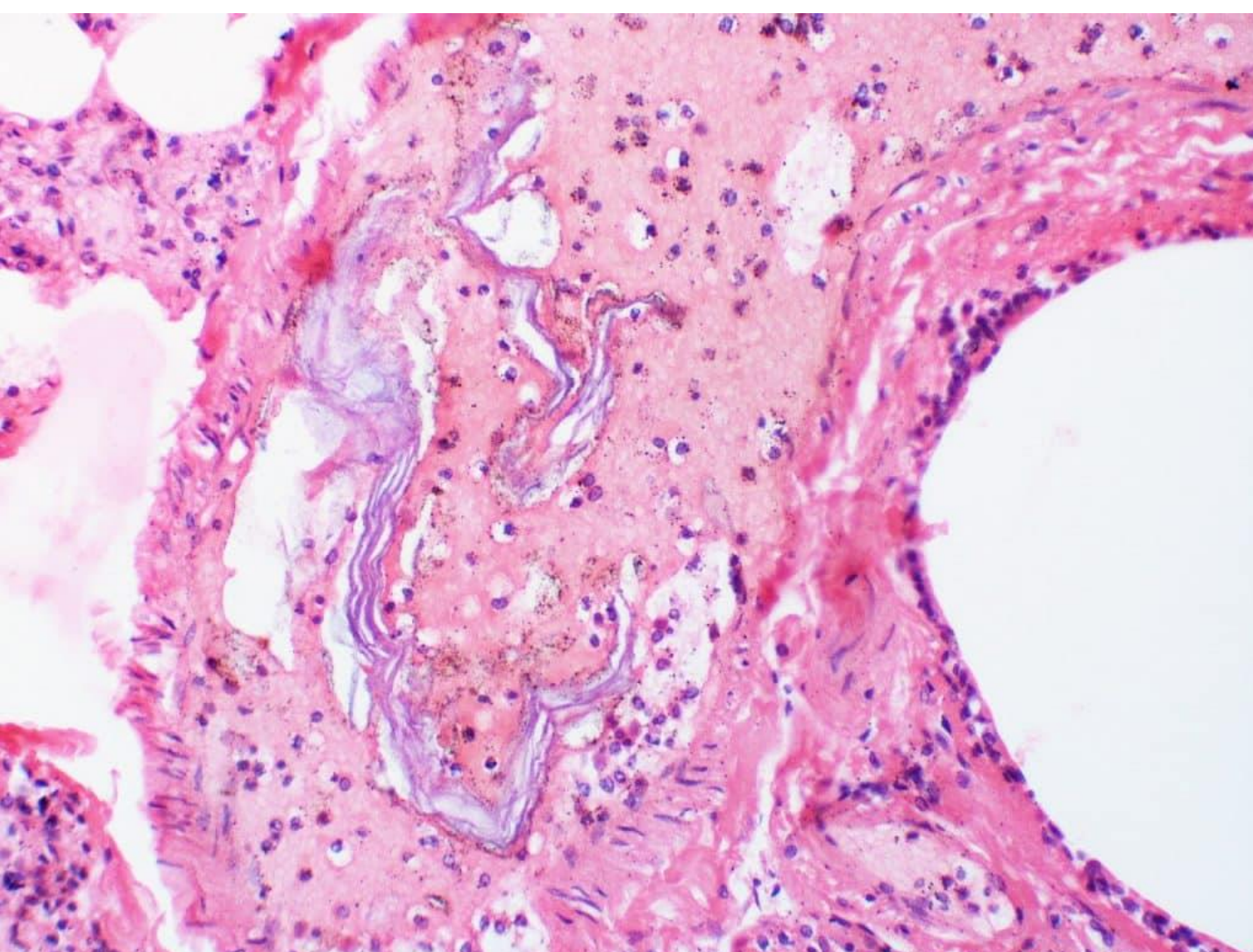


Figure 1.²
Intravascular fetal squamous cells present within the pulmonary vasculature

Pathophysiology

The pathophysiological basis for AFE remains unclear, however there are two theories which may explain the sequence of presentation and subsequent deterioration. There is a likely overlap between the two.

Mechanical theory:

- Fetal squamous cells from amniotic fluid enters the maternal circulation, causing physical obstruction in the pulmonary circulation³
- Histological example of this in Figure 1.

Immune-mediated theory:

- Anaphylactoid-like syndrome from immunological activation from systemic exposure to fetal antigens³

Case Report

Patient Background and Presentation:

33 year old primigravid woman, with no past medical history – green pathway pregnancy.

Admitted to labour ward in established labour and started on a syntocinon infusion. An epidural was inserted with good analgesia provided.

The patient reported sudden onset headache and abdominal pain, despite a working epidural. Headache quickly resolved but ongoing abdominal pain, and new hypotension and tachycardia (BP 78/40, HR 120).

The CTG showed a fetal bradycardia – a decision was made to urgently proceed to theatre for an unplanned caesarean birth (UCB).

Initial Management:

General anaesthetic to facilitate category 1 UCB. A live baby was delivered and cared for by the neonatal team. No evidence of placental abruption or uterine rupture during the surgery.

Uterine atony requiring multiple uterotonics. Measured blood loss of 740ml.

The patient remained hypotensive despite fluid resuscitation and peripheral vasopressor support, requiring invasive lines and central vasoactive support.

Admission to the Intensive Care Unit (ICU) was required due to ongoing haemodynamic instability, persistent metabolic acidosis and concern about developing multi-organ failure and Disseminated Intravascular Coagulation (DIC)

Key Issues During Intensive Care Unit Admission:

Major obstetric haemorrhage:

- Total blood loss >4000ml including delivery
- Required several uterotonics
- Mass transfusion of blood products (11 PRBC, 8 FFP, 2 cryoprecipitate, multiple pools of platelets)
- Bakri balloon insertion
- Lactate peaked at 18.9 during this

Left ventricular systolic dysfunction:

- Accepted for transfer to Golden Jubilee National Hospital (GJNH) for management of cardiogenic shock – this was abandoned in light of the above post-partum haemorrhage (PPH).

Continuous Venovenous Haemodiafiltration (CVVHDF):

- Required to manage oligoanuric acute kidney injury (AKI)
- Eventually required transfer to high acuity renal unit for dialysis

References:

1. Fitzpatrick, K.E, Tuffnell, D, Kurinczuk, J.J. Incidence, risk factors, management and outcomes of amniotic fluid embolism: a population-based cohort and nested case-control study *BJOG*.2016;**123**:100-109
2. Yale Rosen. Digital image accessed 24/10/2024. <<https://teachmeanobgyn.com/wp-content/uploads/2017/10/Amniotic-Fluid-Embolism-1024x768.jpg>>
3. Metodiev Y, Ramasamy P, Tuffnell D. Amniotic Fluid Embolism. *British Journal of Anaesthesia*. 2018; **18**: 234-238

Discussion:

In this case, many differential diagnoses were considered:

- There was no evidence of sepsis beyond an incidental pyrexia – negative blood cultures, other growths not felt to be clinically significant.
- A CT angiogram excluded pulmonary embolism and aortic pathologies.
- Thrombotic Thrombocytopenic Purpura (TTP) was excluded by an ADAMTS13 >30.
- A panel of multi-specialty experts felt that AFE was the most likely unifying diagnosis.
- The early provision of supportive care, and input from multi-disciplinary teams, including specialists on other sites across Scotland, contributed towards a good outcome in this case.

Outcome:

The patient's condition gradually improved with supportive care and multi-disciplinary team input.

She was extubated on day 13 post-birth and transferred to a high-acuity renal ward for ongoing renal replacement therapy (RRT). Renal function continued to improve and there is no ongoing need for RRT.

Liver function tests also continued to improve.

She was eventually discharged from hospital and is caring for her baby at home

Other Issues During Intensive Care Unit Admission:

Large liquefied hepatic infarcts:

- requiring empirical IV antibiotics
- Ultrasound-guided pigtail drain insertion
- Severely deranged LFTs – discussion with and advice sought from the liver unit at Edinburgh Royal Infirmary.

Acute subdural haemorrhage (3mm):

- conservatively managed
- Likely secondary to DIC

Right hand ischaemia and necrosis:

- likely from a combination of hypoperfusion and arterial line insertion
- eventually underwent debridement under plastics