Amniotic Fluid Embolism and Multisystem Organ Failure

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Introduction

- Amniotic fluid, fetal cells, hair, or other debris enters the maternal pulmonary circulation
- Rare (est. ~1/8000 to 1/80,000 pregnancies) but catastrophic
- Mortality rate: 10-61%
- Presentation: classic triad of hypotension, hypoxia, and coagulopathy
  - May include fetal heart rate abnormalities or sudden cardiovascular collapse
- Pathophysiology: fetal antigen entering maternal circulation causes a sepsis like activation of pro-inflammatory mediators > acute pulmonary vasospasm with ensuing heart failure + coagulopathy
- Clinical diagnosis and diagnosis of exclusion

Table 1. Differential diagnosis of amniotic fluid embolism [4]

Anesthetic related	Pregnancy related	Other causes
• High/total regional block • Local anesthetic toxicity • Pulmonary aspiration of gastric contents	• Uterine rupture • Uterine atony • Placental abruption • Acute severe bleeding • Peripartum cardiomyopathy • Eclampsia	• Air embolism • Pulmonary embolism • Sepsis • Anaphylaxis • Arrhythmia • Myocardial infarction • Transfusion reaction • Cerebrovascular accident

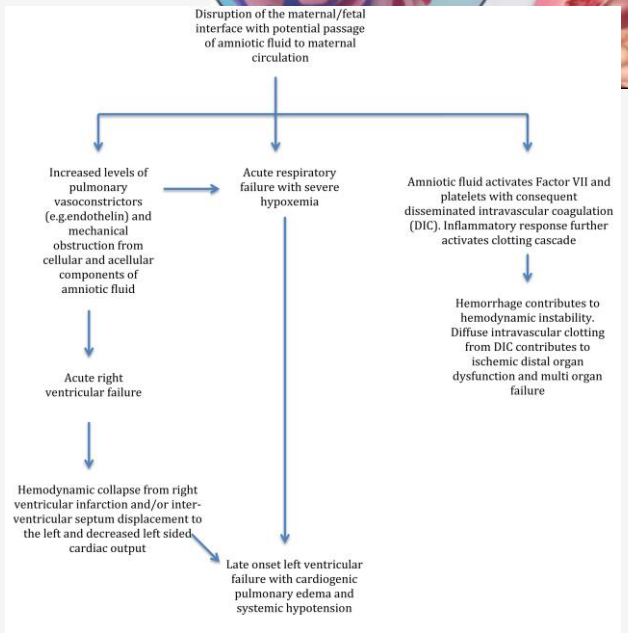

Figure 1. Pathophysiology of amniotic fluid embolism [3]

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Case: 32-year-old G1P0 at 38w5d with gestational diabetes mellitus

Admitted for BP 146/93

Oxytocin

Nitrous oxide > CSE

20 hours later:

Emergent Cesarean delivery for fetal bradycardia

Hematuria in Foley

9:13 am:

Delivery of healthy baby boy

Tachycardia into 120s with persistent severe range blood pressures

Treated with labetalol boluses and nicardipine infusion

Magnesium infusion for seizure prophylaxis

10:15 am:

"Diffuse oozing"

Additional IV and arterial access obtained

ROTEM with coagulopathy and FIBTEM A5 3mm

Resuscitation with 3u PRBC, 1 FFP, 8g fibrinogen concentrate, 1u platelets

11:27 am:

Acute spO2 drop to 70s

PaO2 49 noted on ABG

> Nasal CPAP on FiO2 100%

12:46 pm:

PaO2 65 on nasal CPAP

Emergent intubation

Transfer to MICU

AFE diagnosed by MICU:

EKG: no ischemic changes

XR: B/L interstitial edema

CT PE: enlarged right heart

TTE: Severely dilated RV with reduced function, moderate tricuspid regurgitation, moderate pericardial effusion

NICOM: cardiac index of 2.0

Dobutamine & inhaled nitric oxide for inotropic support

Swan Ganz catheter placed

Serial TTEs to monitor cardiac recovery

Transfused as needed for DIC

Extubated on POD5

ICU course complicated by renal failure requiring dialysis and atypical hemolytic uremic syndrome

Discharged home on POD15

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Discussion

- Consider in pregnant or recently postpartum patients who present with respiratory distress, hemorrhage, and/or cardiovascular collapse
- Right ventricular pressures become acutely elevated and may cause right ventricular failure, left ventricular failure, and acute hypoxic respiratory failure
- Labs: elevated D-dimer, low fibrinogen, and thrombocytopenia (suggesting DIC)
- XR: bilateral infiltrates
- CT and/or echocardiography: right heart enlargement with septal flattening or bowing
- Treatment: advanced cardiac life support, vasopressors, inotropic agents, respiratory support, and transfusion
- Multidisciplinary management (MFM, OB anesthesiology, and critical care teams) is crucial
- AFE may affect every organ system and result in severe maternal morbidity and mortality

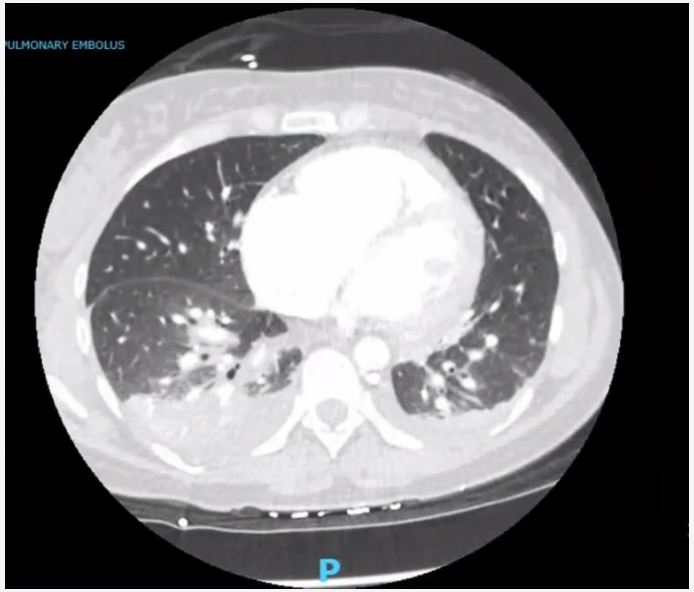

Figure 2. CT Pulmonary Embolus with right heart enlargement

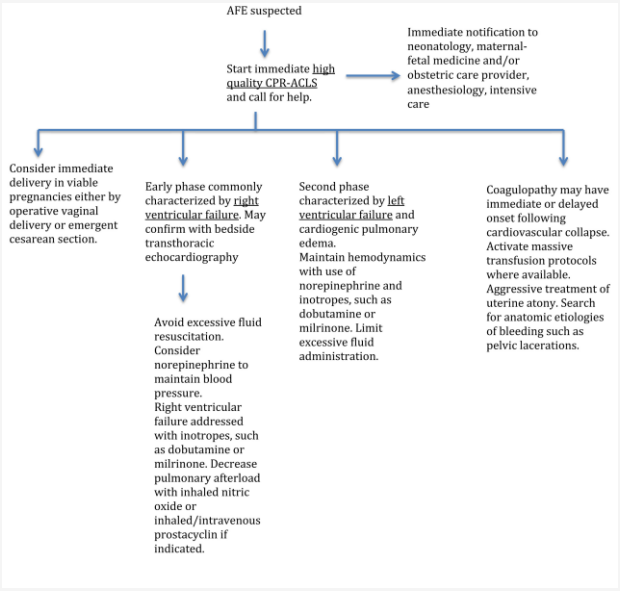

Figure 3. Immediate supportive treatment for AFE [3]

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