Amniotic Fluid Embolism:
Pathophysiology and Diagnosis

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Disclosure

I am the Founder and Executive Director of the AFE Foundation. I also hold board positions with Scripps Health and the California Maternal Quality Care Collaborative.

I have no relevant financial relationships to disclose.

Outline

- History
- Clinical presentation
- Pathophysiology
- Diagnostic criteria
- Differential diagnoses

Learning Objectives

To become better acquainted with the clinical presentation and understand the pathophysiology of AFE to aid in early recognition and management of AFE; a leading cause of maternal death and suffering in all developed nations.

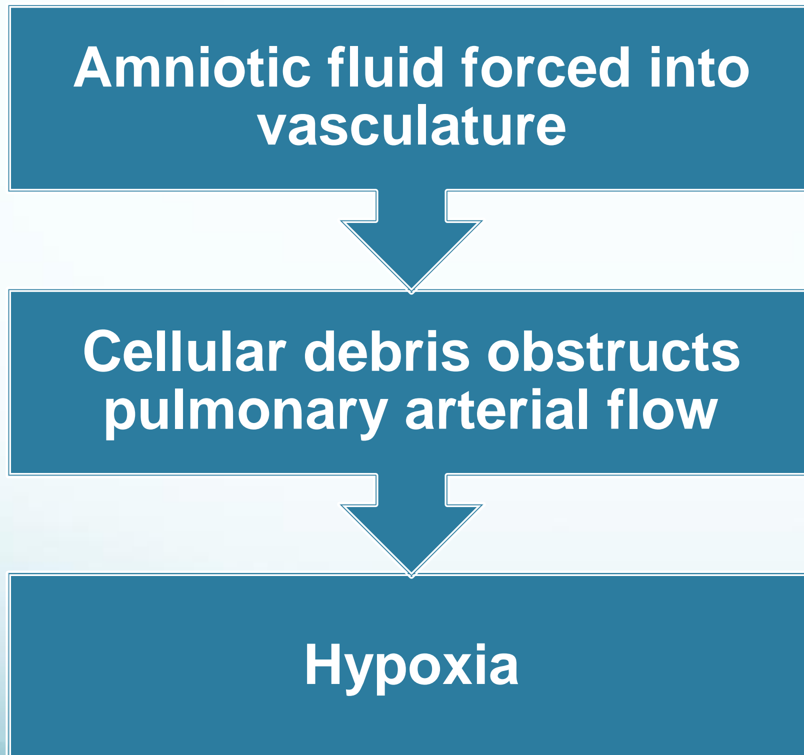
Historical References

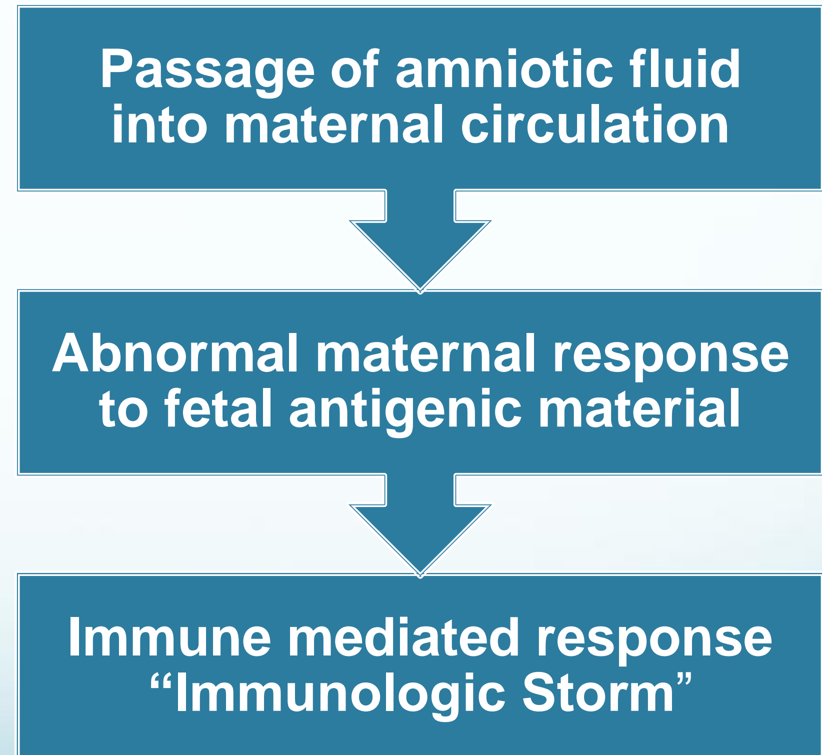
- 1926 First recognized and reported in Brazil
- 1941 Steiner and Lushbaugh define AFE based on post mortem findings of fetal squames in vasculature
- *1948 "Let us be careful not to make it a waste basket for all cases of unexplained death in labor…" Eastman*
- 1980's S.L. Clark registry, increased diagnostics tools, review of cases begins disproves previous theory.
- 1995 Clark proposes new name: Anaphylactoid Syndrome of Pregnancy- despite its greater relevance the name is not widely adopted

General Understanding

- Classic triad:
  - Hypoxia
  - Hypotension or hemodynamic collapse
  - Coagulopathy
- Remains poorly understood:
  - Unpredictable
  - Rare
  - Acute
  - Lacks a gold standard diagnosis
  - Commonly over diagnosed

Theories of Cause





Onset

- Before, during or shortly after labor (30 min)
- Vaginal or Cesarean Birth
- Amniocentesis
- Rupture of Membranes
- D&E
- Abortion
- Intrauterine Pressure Catheter

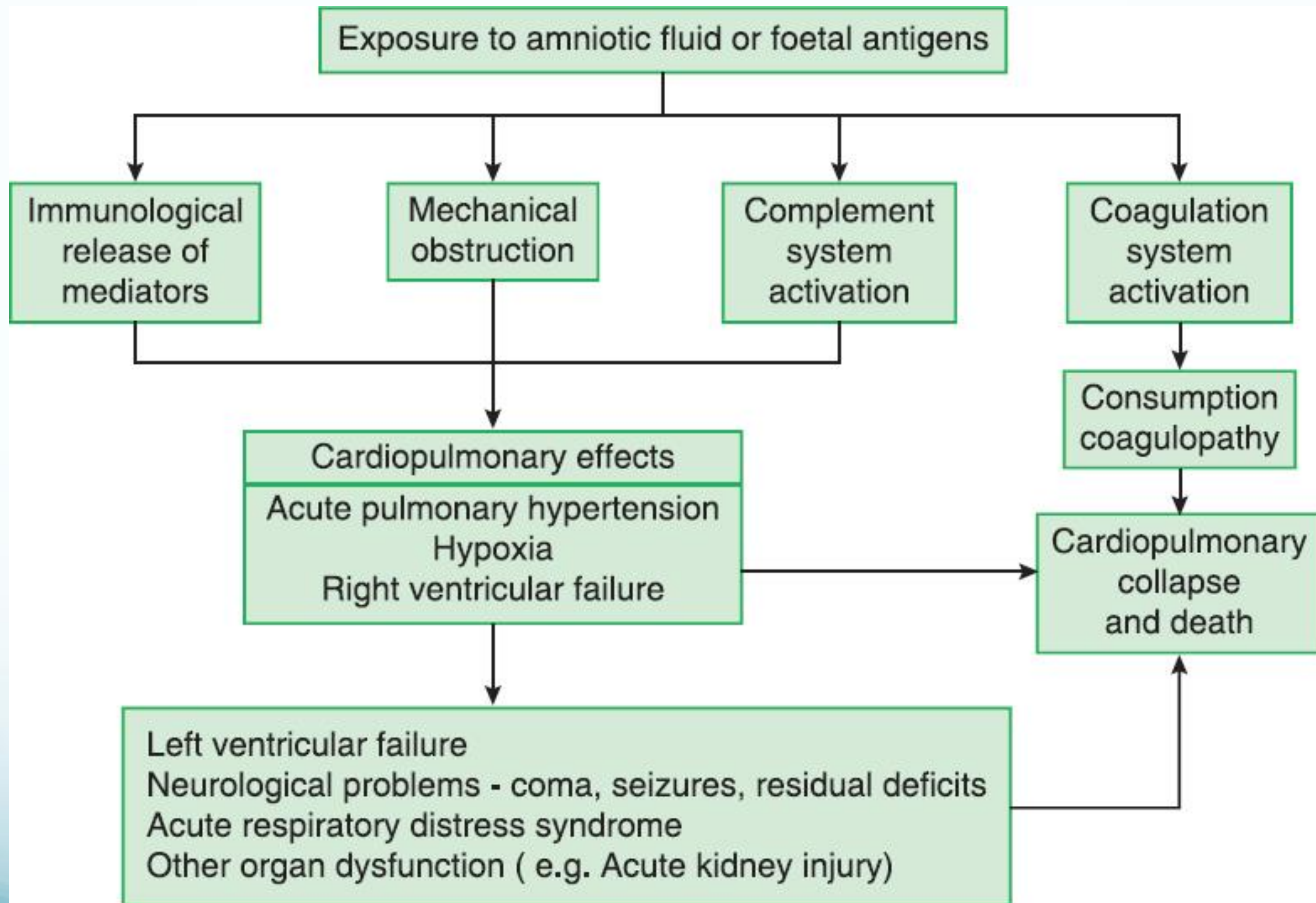
Clinical Presentation

- Shortness of breath
- Nausea
- Impending sense of doom
- Fetal bradycardia
- Profound Hypotension
- Cyanosis
- Seizure
- Cardiac Arrest
- DIC
- Organ Failure
- Death

Hemodynamic Changes

- Complex and variable
- Initially: pulmonary and systemic hypertension
- Subsequent: profound LV dysfunction
  - Contributing factors:
    - RV failure
    - Myocardial ischemia
    - Coronary artery vasospasm
    - Pulmonary injury/hypertension

Pathophysiologic Alterations



Sadera G, Vasudevan B. Amniotic fluid embolism. J Obstet Anaesth Crit Care 2015 [cited 2016 Feb 29];5:3-8

Diagnostic Criteria

- Currently no specific test
- Based on clinical manifestation and exclusion of any other cause
- Onset during labor or within 30 minutes of delivery
- Must include: acute hypotension and/or cardiac arrest followed and DIC (unless unless patient does not survive within the hour to asses clotting status)
- Autopsy or imaging studies must exclude pulmonary thromboembolism, unless coagulopathy was part of the clinical presentation.

AFE Pretenders
Non Obstetric

- Acute myocardial infarction
- Anaphylaxis
- Anesthesia (toxicity/high spinal)
- Arrhythmia
- Aspiration
- Blood transfusion reaction
- Pulmonary edema
- Pulmonary embolism (air, fat, thrombi)
- Septic Shock
- Tension Pneumothorax

AFE Pretenders
Obstetrical Causes

- Ecclampsia
- Placental abruption
- Uterine rupture
- Postpartum hemorrhage
- Peripartum cardiomyopathy

Conclusion

- Early recognition dramatically increases survivability
- Understanding current theories of cause is imperative
- Diagnosis must have thorough review
- Misdiagnosis has lasting impact