From Incision to Instability: Amniotic Fluid Embolism in Cesarean Delivery

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Faculty Disclosure

I have nothing to disclose

Case Summary

- 39yo G3P1011 @39.4 weeks gestation presented for scheduled rLTCS
- Pregnancy complicated by accelerated fetal growth, history of cesarean x1, and AMA
- PMH: Migraines, asthma
- PSH: Cesarean (2009), cholecystectomy
- Meds: Prenatal vitamin
- Allergies: NKDA
- FH: Denied family history of bleeding or clotting disorders
- SH: No SAD use in pregnancy

Amniotic Fluid Embolism

- Cesarean was uncomplicated until just after delivery of neonate when the patient became unresponsive
- Seizure-like activity was noted by CRNA, who immediately called for help
- Hypotension was noted
- TEE performed in OR that showed significant right heart strain - pulmonary embolism vs AFE suspected
- Pt intubated, IV fluids and epinephrine administered x3
- Arterial line and central line placed
- Pulse not detected - CPR begun with achievement of ROSC after 3 minutes
- Arrangements made for immediate CT following surgery

Completing Cesarean and Immediate Post-operative Period

- AFE occurred prior to hysterotomy closure
- BSG performed and muscles closed
- Methergine and TXA given intraoperatively
- At close of procedure, pt was immediately taken to radiology for CTA and up to the cath lab to await read
- CTA negative for pulmonary emboli, pt transferred to PACU
- Pt family notified by anesthesiologist throughout
- In PACU, persistent vaginal bleeding noted - JADA placed, PRBCs/FFP/ and cryoprecipitate administered
- ICU team called to PACU
- Seizure-like activity noted - Lorazepam administered and pt taken for head CT (negative for focal intracranial findings)
- Transferred to ICU from CT

Complications

Hematologic

- JADA removed after 24 hours
- Fibrinogen 184, PT/PTT 17.7/37, platelets 81
- DIC - 8u PRBCs, 5u platelets, 2u FFP, 1u cryoprecipitate
- By the next day, Fibringogen was 237 and PT/PTT had normalized

Neurologic

- Seizures - treated emergently with Lorazepam, started on Keppra
- Pt discontinued Keppra outpatient without further seizure activity
- Agitation and waxing/waning responsiveness in the first 48 hours post-partum - EEG showed abnormal findings suggestive of encephalopathy

Hemodynamic and Respiratory

- Distributive shock - norepinephrine and vasopressin support, stress dose steroids x 48 hours
- Aspiration pneumonia - broad spectrum antibiotics

Post-operative

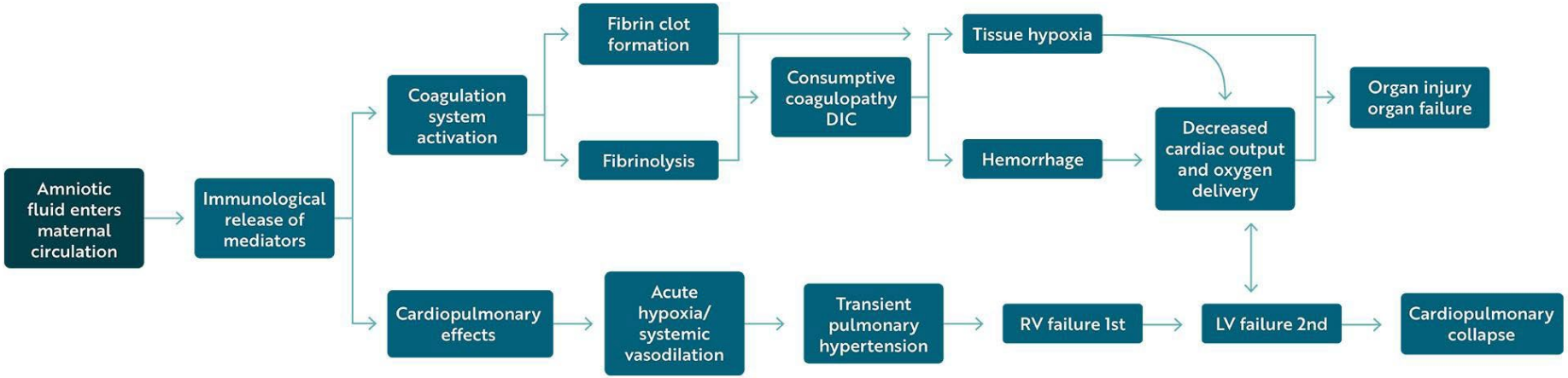
- Rectus abdominis hematoma - abdominal binder placed, did not require operative repair

Outcome

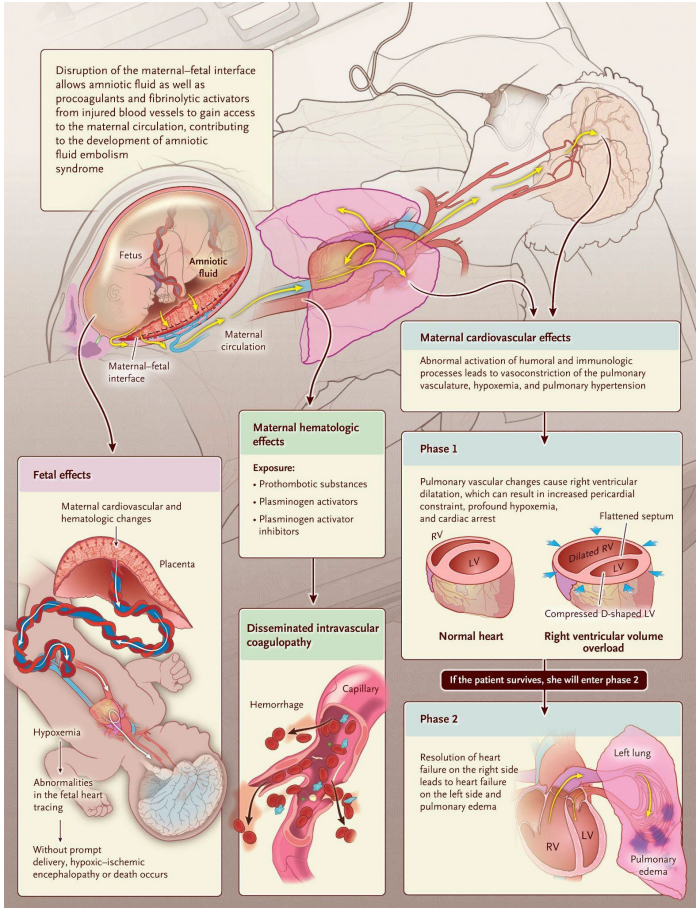
- Mental status gradually normalized
- Patient was extubated on postoperative day #2
- She made a remarkable full recovery and discharged home on hospital day 11
- Follow up was scheduled with OBGYN, Neurology, and primary care

Pathophysiology

- Anaphylactic reaction to amniotic fluid entering maternal circulation
- Not an actual embolus



Pathophysiology



Clinical Presentation

Typical AFE Presentation

1. Sudden onset cardiopulmonary arrest, or hypotension and respiratory compromise
2. Overt DIC following appearance of initial signs and symptoms
3. Clinical onset during labor or within 30 minutes of placenta delivery
4. No fever during labor

- There are also “atypical” presentations that cannot be explained by an etiology other than AFE
- ⅓ of patients report an “aura” prior - sense of doom, chills, anxiety, nausea/vomiting
- Differential - PE, pulmonary edema, hemorrhage, sepsis, stroke, MI, anaphylaxis, eclampsia

Treatment

The Three Bs

Breathing

- Early intubation
- Ventilator settings are different in pregnant women
  - Synchronized Intermittent Mandatory Ventilation (SIMV) with pressure support
  - 14-16 breaths/min
  - Tidal volume 6-10
  - PEEP 5cm H_2O
  - FiO_2 100%
- Goals: PaO_2 >60, SaO_2 >95%, $PaCO_2$ 27-32, FiO_2 <0.5

Blood Pressure

- Side lying position, elevate lower extremities
- IV access
- Crystalloid bolus
- Continuous hemodynamic assessment
- Vasopressors

Bleeding

- DIC occurs due to activation of the coagulation cascade leading to intravascular fibrin deposition and platelet depletion leading to tissue hypoxia and bleeding, respectively

1. Vascular access
    - Two large bore IVs
    - Central line (right IJ or subclavian)
    - Arterial line
    - CVP/PA catheter
2. Crystalloid and colloid (albumin) infusion
3. Massive transfusion
    - PRBCs, cryoprecipitate, platelets, FFP (has to be thawed)
    - Whole blood with plasma restores endothelial glycocalynx
    - Pressure bags and rapid infuser
4. Keep patient warm
5. Correct labs
    - Including electrolytes (Ca, K, glucose)

Cardiac Arrest

- OB team must be able to handle the first five minutes of a code

1. Call code and start CPR
2. Airway/breathing
3. Manual uterine displacement
4. Delivery if no response within 4-5 minutes -
    - Get ready at 4 mins with goal of delivery by 5 minutes
    - Perform at site of arrest
    - Continue CPR
    - No prep, only need a scalpel
    - Can stop after hysterotomy is closed and pack abdomen

What Went Well

- Immediate recognition by anesthesia team while still considering other diagnoses on the differential
- Quick initiation of intubation, pressor support, and CPR
- Family kept informed
- Early volume replacement and transfusion
- ICU contacted quickly
- Collaborative effort for care after the event

Improvements

- Should cesarean been completed?
- A-OK protocol?
- Communication could have been improved with cath lab and imaging
- Improved communication and collaboration with obstetrics and ICU team
- Would we be able to handle this in a vaginal delivery setting?
- What changes will need to be made in the new building?

Action Items

AFE EMERGENCY STABILIZATION CHECKLIST: 307-END-AFES

BREATHING

BLOOD PRESSURE

SPECIMEN RESEARCH

BLEEDING

- Staff training to ensure immediate AFE recognition
- ACLS refreshers
- Easily accessible code carts on labor and delivery
- Multidisciplinary team approach
  - Including OBGYN, anesthesiology, critical care, neurology, cardiology, MFM, and internal medicine
- Hands on simulations to ensure preparedness
- AFE checklists

Sources

Amniotic Fluid Embolism Foundation. *Amniotic fluid embolism: A practical approach* [Internet]. Available from: https://afe.mykajabi.com/products/amniotic-fluid-embolism-a-practical-approach

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