Amniotic Fluid Embolism (AFE)
Definition of AFE

- AFE is a rare obstetric emergency in which amniotic fluid, fetal cells, hair, or other debris enter the maternal circulation, causing cardiorespiratory collapse.
The incidence of clinically detectable AFE is low estimated to be 1 in 20,000 to 80,000 live births. Maternal mortality approaches 80%. 5%-10% of maternal mortality in the United States is due to AFE. Of patients with AFE, 50% die within the first hour of onset of symptoms. Of survivors of the initial cardiorespiratory phase, 50% develop a coagulopathy. Neonatal survival is 70%. 

**epidemiology**

- The incidence of clinically detectable AFE is low estimated to be 1 in 20,000 to 80,000 live births.
- Maternal mortality approaches 80%.
- 5%-10% of maternal mortality in the United States is due to AFE.
- Of patients with AFE, 50% die within the first hour of onset of symptoms.
- Of survivors of the initial cardiorespiratory phase, 50% develop a coagulopathy.
- Neonatal survival is 70%.
Current data suggest that the process is more similar to anaphylaxis than to embolism.

term anaphylactoid syndrome of pregnancy has been suggested
Major causes and factors

- occurs in obstetric terms or during labor
- multiparous woman with a large baby
- a short tumultuous labor
- use of uterine stimulants
- occurred during abortion
- amnioinfusion
- Amniocentesis
- caesarian section
- placenta accreta
- ruptured uterus
pathology

- Amniotic fluid and fetal cells enter the maternal circulation, possibly triggering an anaphylactic reaction to fetal antigens.
- (1) Clinical symptoms result from mast cell degranulation with the release of histamine and tryptase,
- (2) Clinical symptoms result from activation of the complement pathway.
Progression usually occurs in 2 phases.

- **Phase I:**
  - pulmonary artery vasospasm with pulmonary hypertension and elevated right ventricular pressure cause hypoxia.
  - Hypoxia causes myocardial capillary damage and pulmonary capillary damage, left heart failure, and acute respiratory distress syndrome.
Women who survive these events may enter phase II:

- This is a hemorrhagic phase characterized by massive hemorrhage with uterine atony and DIC.
- However, fatal consumptive coagulopathy may be the initial presentation.
The clinical presentation of AFE is generally dramatic.

In the late stages, acutely dyspnea and hypotension with rapid progression to cardiopulmonary arrest.

In 40% of cases, followed by some degree of consumptive coagulopathy,
- **Hypotension**: Blood pressure may drop significantly with loss of diastolic measurement.
- **Dyspnea**: Labored breathing and tachypnea may occur.
- **Seizure**: The patient may experience tonic-clonic seizures.
- **Cough**: This is usually a manifestation of dyspnea.
- **Cyanosis**: As hypoxia/hypoxemia progresses, circumoral and peripheral cyanosis and changes in mucous membranes may manifest.
- Pulmonary edema: identified on chest radiograph.
- Cardiac arrest
- Uterine atony:
- Fetal bradycardia: In response to the hypoxic
- Uterine atony usually results in excessive bleeding after delivery.
Differentials

- Anaphylaxis
- Aortic Dissection
- Cholesterol Embolism
- Myocardial Infarction
- Pulmonary Embolism
- Septic Shock
Lab Studies

- Arterial blood gas (ABG) levels: Expect changes consistent with hypoxia/hypoxemia.
  - Decreased pH levels
  - Decreased PO2 levels
  - Increased PCO2 levels
  - Base excess increased
- Hemoglobin and hematocrit
  /Thrombocytopenia is rare/ platelets /
- Prothrombin time (PT)
- Activated partial thromboplastin time (aPTT)
- Fibrinogen (Fg)
- Blood type and screen
- Chest radiograph
- A 12-lead ECG
Treatment

- Administer oxygen to maintain normal saturation.
- Initiate cardiopulmonary resuscitation (CPR) if the patient arrests.
- Treat hypotension with crystalloid and blood products.
- Consider pulmonary artery catheterization in patients who are hemodynamically unstable.
- Treat coagulopathy with fresh frozen plasma (FFP) for a prolonged aPTT, cryoprecipitate for a fibrinogen level less than 100 mg/dL, and transfuse platelets for platelet counts less than 20,000/mL.
- Continuously monitor the fetus.
- Delivery quickly (forceps)
Surgical Care: Perform emergent cesarean delivery in arrested mothers who are unresponsive to resuscitation.

- Hemorrhage was controlled with bilateral uterine artery embolization.
Uterine Rupture

- is one of the most feared complications of pregnancy

- the fetus, placenta, and a lot of blood extruding into the mother's abdomen

- from a weak spot in the uterine wall or uterus scar
Uterine rupture

- Reported in 0.03-0.08% of all delivering women, but 0.3-1.7% among women with a history of a uterine scar
- 13% of all uterine ruptures occur outside the hospital
- Morbidity is hemorrhage and subsequent anemia, requiring transfusion
- Fetal morbidity is more common with extrusion and includes respiratory distress, hypoxia, acidemia, and neonatal death
Risk Factors for Uterine Rupture

- Excessive uterine stimulation
- Previous C/S
- Trauma
- Prior rupture
- Previous uterine surgery
- Multiparity
- Non-vertex fetal presentation
- Shoulder dystocia
- Forceps delivery
Most uterine ruptures occur without symptoms and do not cause problems for the mother or fetus.

This mild type is only noticed when surgery is required for other reasons.
In the most severe form, the laceration is large or cuts across the uterine blood vessels.

The mother may hemorrhage and require a blood transfusion.

The uterus may not be repairable and must be surgically removed (hysterectomy).

Many women will be advised not to get pregnant again, due to the risk of repeated rupture.

The baby may not survive.

The mother's life cannot be saved.
Signs of uterine rupture

- severe, localized pain
- abnormalities of the fetal heart rate
- vaginal bleeding
- the vaginal examination may show that the baby is not as low in the birth canal as he had been earlier.
Preventing and Treatment

- Some uterine ruptures occur before labor and are considered unpreventable.

- Sudden severe abdominal pain in later pregnancy should be reported.

- Women with risk factors (prior classical cesareans, deep fibroid excisions, and other major uterine surgeries) should not attempt labor.

- Should be scheduled for cesarean usually between 36 and 39 weeks' gestation.
If trying for vaginal birth after low transverse cesarean (VBAC), fetal monitoring is important.

When uterine rupture is diagnosed during labor, an emergency cesarean is performed.

Usually the baby's life can be saved.
THANKS FOR YOUR ATTENTION

Lin Jianhua
M.D., Ph.D., Professor
Dep. of Obstet. & Gynecol.
Renji Hospital Affiliated to SJTU School of Medicine