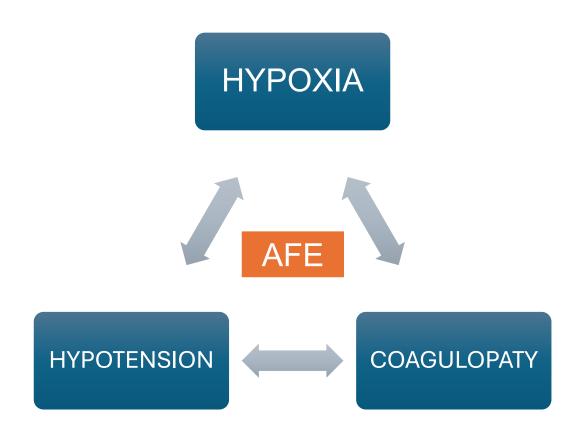


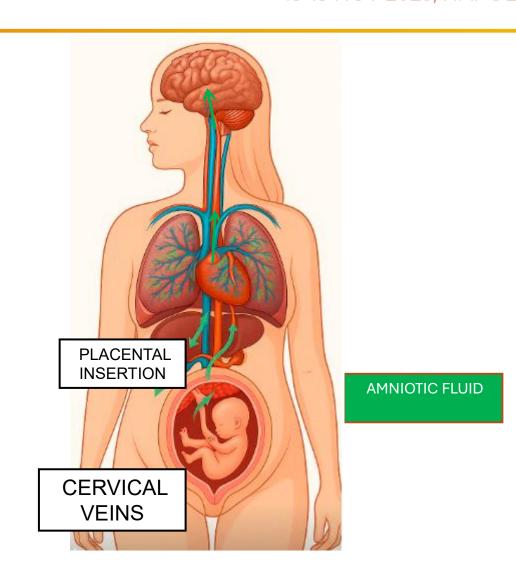
AMNIOTIC
FLUID
EMBOLISM
AFE
or
ANAPHYLACTOID
SYNDROM of PREGNANCY
ASP

RAPID RESPONSE AND MANAGEMENT

Chiara Spina MATER DEI-Bari









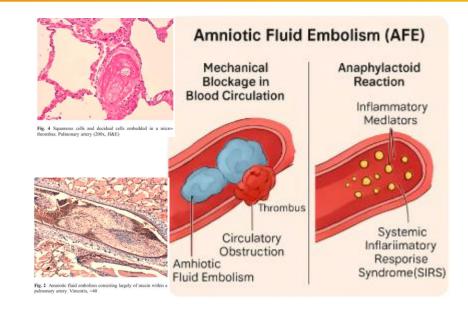
PATHOPHYSIOLOGY

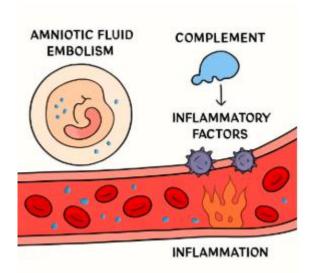
Not a true embolism, but an anaphylactoid / inflammatory syndrome.

Rupture of the maternal-placental barrier→ Fetal antigens enter maternal circulation → immune activation.

Complement activation, mast cell degranulation, cytokine storm → activation of Fibrinolysis and coagulation

SIRS-like response → pulmonary vasospasm → acute right heart failure →Left Ventricular function





(Sources: Clark et al., Young BK, Benson et al., SMFM 2021).



Phases of Amniotic Fluid Embolism (AFE)

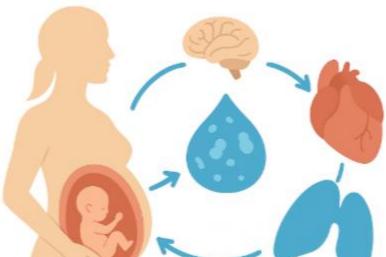
Phase 1 – Cardiopulmonary Collapse

Pulmonary artery vasospasm → acute pulmonary hypertension and increased right ventricular pressure.

Consequent hypoxia, myocardial and pulmonary capillary damage, left ventricular failure, and acute respiratory distress syndrome (ARDS).











Phase 2 – Hemorrhagic Phase

Massive hemorrhage due to uterine atony and overt disseminated intravascular coagulation (DIC).

In some cases, fatal consumptive coagulopathy may be the *initial* presentation of the syndrome.

Tables

Scoring system for DIC during pregnancy

SCORE	0	1	2
Platelets	>100,000/mL	< 100,000/mL	< 50,000/mL
Prothrombin time or INR	< 25% increase	25-50% increase	>50% increase
Fibrinogen	>200 mg/L	< 200 mg/L	

Maternal age >35 years

Multipairty

Race

Allergy

Operative delivery

Placenta Previa/ Abruption

Induction of labor/ uterine overdistension

Eclampsia/Preeclampsia

Cervical or uterine trauma/ abortion

Genetic or thrombophilic predisposition

male fetus

EPIDEMIOLOGY

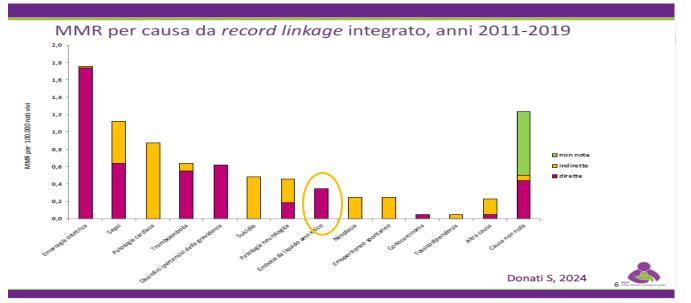
Rare but catastrofic event

Incident: 1,9-6,1/100.000 deliveries (Europe, USA, Australia)

Maternal Mortality:7-10% of all maternal deaths in high-income country

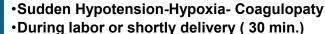
True incidence likely underestimated due to diagnostic uncertainty

Sources: Clark 2016; Young 2023; ItOSS; INOSS; BMC Pregnancy & Childbirth 2012).





Algorithm for Suspected Amniotic Fluid Embolism(AFE)



Recognize

No fever no clear trigger



CALL FOR MULTIDISCIPLINARY

Resuscitation

Airway and breathing Early intubation 100% O 2, mechanical ventilation (Volume!) Left uterine displacemen tor High quality CPR if arrest-Perimortem cesarean within 4 min, Early Echo-Cardiography assesment RV/LV, Vasopressors, Inotropes, pulmonary vasodilatators. **Consider ECMO**



Coagulopathy

Management

•Activate the Massive Transfusion Protocol- RBC:FFP:PLT=1:1:1, Ionized Calcium > 1,1mmol/L,T >36°C pH ≥ 7.3

- · Fibrinogen target> 2g/L- Give cryoprecipitate /Fibrinogen
- Tranexamic acid 1 g IV
- Use ROTEM/TEG

Avoid Fluid overload





Advanced Support

- Stabilize and protect organs
- Transfer to ICU
- Debrief Team and Family
- Report case to AFE Foundation



SIMULATE!



ESRA ITALIAN CHAPTER | 30° NATIONAL MEETING 13-15 NOV 2025, NAPOLI



SMFM Statement

smfm.org

Society for Maternal-Fetal Medicine Special Statement: Checklist for initial management of amniotic fluid embolism



Patient Safety and Quality Committee, Society for Maternal-Fetal Medicine; C. Andrew Combs, MD, PhD; Douglas M. Montgomery, MD; Lorraine E. Toner, MD; Gary A. Dildy, MD



This checklist is a sample only. Each facility should modify it to fit the facility-specific circumstan	ces
Manage circulatory collapse ABCs: manage airway, breathing, and circulation Designate a timekeeper to call out times at 1-min intervals If no pulse, start CPR Manually disolace uterus or lateral tilt	
Use backboard Consider move to operating room only if this can be accomplished in 2 min or less If no pulse at 4 min, START perimortem cesarean delivery (resuscitative hysterotomy) Splash prep only, do not wait for antibiotics Goal is to improve chances of resuscitation	
Anticipate uterine atony, DIC, hemorrhage Oxytocin prophylaxis plus other uterotonics as needed Consider intraosseous line if needed for large-bore IV access Initiate massive transfixion protocol Cryoprecipitate preferred over FFP to reduce volume overload Consider thromboelastometry if available Tranexamic acid (1 g IV over 10 min) if DIC or hemorrhage occurs	
Manage pulmonary hypertension and right ventricular failure (Anesthesiology, Critical Care, or Cardiology) Consider echocardiography (thoracic or esophageal) Avoid fluid overload (eg, 500 mL boluses and reassess) Vasopressor if needed: norepinephrine 0.05—3.3 μg/kg/min Inotropes if needed: Dobutamine 2.5—5.0 μg/kg/min or Milrinone 0.25—0.75 μg/kg/min Pulmonary vasodilator if needed to unload right ventricle Inhaled nitric oxide 5—40 ppm or Inhaled epoprostanol 10—50 ng/kg/min) or V epoprostanol 1—2 ng/kg/min (via central line) or Sildenafil 20 mg orally (if awake/alert) Consider ECM0 if prolonged CPR or refractory right heart failure Wean FiO₂ to maintain O₂ saturation 94% to 98%	
Postevent debrief (entire team) Identify opportunities for improvement including any need for revisions to checklist Discuss family and staff support needs Report case to Amniotic Fluid Embolism Registry	Version February 17, 2021

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International criteria for diagnosis of amniotic fluid embolism

United Kingdom:

Clinical diagnosis of AFE (acute hypotension or cardiac arrest, acute hypoxia, or coagulopathy in absence of any other potential explanation for signs and symptoms observed) OR pathologic diagnosis of fetal squames or hair in lungs.11

Clinical diagnosis of AFE (acute hypotension or cardiac arrest, acute hypoxia, or coagulopathy in absence of any other potential explanation for signs and symptoms observed) OR pathologic/postmortem diagnosis (presence of fetal squames/debris in pulmonary circulation). 15

- Symptoms appeared during pregnancy or within 12 h of delivery;
- Intensive medical intervention was conducted to treat ≥1 of following symptoms/diseases: (a) cardiac arrest, (b) severe bleeding of unknown origin within 2 h of delivery (>1500 mL), (c) DIC, or (d) respiratory failure; and
- 3. If findings or symptoms obtained could not be explained by other diseases. Consumptive coagulopathy/DIC due to evident etiologies such as abnormal placentation, trauma during labor, and severe preeclampsia/eclampsia should be excluded.

Uterine AFE was considered to have occurred when fetal debris and amniotic fluid components were found in uterus in pathological examination of cases of severe uterine hemorrhage after placental removal (eg, atonic bleeding) in absence of other obstetric hemorrhagic complications such as abnormal placentation, trauma during labor and delivery, and severe preeclampsia/eclampsia.

AFE, amniotic fluid embolism; DIC, disseminated intravascular coagulation.

Clark. Case definition of amniotic fluid embolism to improve quality of clinical and translational research. Am J Obstet Gynecol 2016.

TABLE 2

Uniform diagnostic criteria for research reporting of amniotic fluid embolism

- Sudden onset of cardiorespiratory arrest, or both hypotension (systolic blood pressure < 90 mm Hg) and respiratory compromise (dyspnea, cyanosis, or peripheral capillary oxygen saturation $[S_nO_2] < 90\%$).
- 2. Documentation of overt DIC following appearance of these initial signs or symptoms, using scoring system of Scientific and Standardization Committee on DIC of the ISTH, modified for pregnancy. 19 Coagulopathy must be detected prior to loss of sufficient blood to itself account for dilutional or shock-related consumptive coagulopathy.
- Clinical onset during labor or within 30 min of delivery of placenta.
- No fever (>38.0°C) during labor.

DIC, disseminated intravascular coagulation; ISTH, International Society on Thrombosis and Hemostasis.

Clark. Case definition of amniotic fluid embolism to improve quality of clinical and translational research. Am J Obstet Gynecol 2016.

Amniotic fluid embolism: a reappraisal

Bruce K. Young , Pascalle Florine Magdelijns, Judith L. Chervenak and Michael Chan

Published/Copyright: December 13, 2023

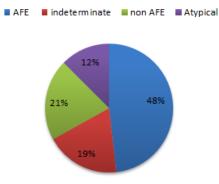
Include partial or atypical forms (with gradual onset or non-classic coagulopathy). Focus on **triad** rather than rigid sequence:

- 1. Sudden cardiovascular collapse
- 2. Hypoxia / respiratory distress
- 3. Coagulopathy or massive hemorrhage

Evaluation of proposed criteria for research reporting of amniotic fluid embolism

Irene A. Stafford, MD 🖾 · Amirhossein Moaddab, MD · Gary A. Dildy, MD · ... · Michael A. Belfort, MD, PhD · Roberto Romero, MD, DMedSci

Steven L. Clark, MD ... Show more



AFE Classification by diagnostic Cryteria

Amniotic fluid embolism classification by diagnostic criteria Stafford. Research reporting of amniotic fluid embolism. Am J Obstet Gynecol 2019.



Differential Diagnosis — Sudden Maternal Collapse in Labor or Cesarean

Condition	Distinguishing features	Key diagnostic clues / notes
Amniotic Fluid Embolism (AFE)	Sudden hypoxia, hypotension, DIC; may progress biphasically (cardiopulmonary → hemorrhagic)	Coagulopathy disproportionate to bleeding; normal temperature; no obvious trigger
Pulmonary Embolism (PE)	Dyspnea, chest pain, cyanosis; collapse possible	Risk factors for DVT; abnormal CT angiography; right heart strain on echo
Anaphylaxis	Hypotension, bronchospasm, erythema, airway edema	Trigger (latex, antibiotics, oxytocin); ↑ serum tryptase; rapid response to epinephrine
Eclampsia / Severe Preeclampsia	Hypertension, headache, seizures, visual symptoms	High BP, proteinuria, elevated LFT1, uric acid
HELLP Syndrome	Hemolysis, Elevated Liver enzymes, Low Platelets; may overlap with eclampsia	Right upper quadrant pain, jaundice, severe coagulopathy; ↑ AST/ALT, ↓ PLTs
Air Embolism	During C-section or uterine manipulation	Venous air visible on echo; mill-wheel murmur; rapid onset
Myocardial Infarction / Cardiomyopathy	Chest pain, arrhythmia, cardiogenic shock	Troponin rise, ECG ischemia, LV wall motion abnormality
Sepsis / Septic Shock	Fever, prolonged labor, uterine tenderness	Leukocytosis, lactate ↑, positive cultures
High Spinal Block	Rapid bradycardia, apnea after neuraxial anesthesia	Block level ≥ C4, temporal link with spinal injection
Local Anesthetic Systemic Toxicity (LAST)	CNS prodromes (tinnitus, metallic taste, agitation) → CV collapse	After LA injection; treat with 20% lipid emulsion (1.5 mL/kg bolus + infusion)
Aspiration	Hypoxia, cyanosis, secretions, respiratory failure	Echo: B-lines consolidation,bronchoscopy
Palcental Abruption	Sudden Hypotension, Collapse ,painful bleeding, uterine hypertonus DIC	ultrasound for retroplacental hematoma, fetal monitoring.





Treat the collapse first

label it later.

AFE is rare, but survival depends on speed, structure, and teamwork."

AMNIOTIC FLUID EMBOLISM FOUNDATION



