

Amniotic Fluid Embolism

A Practical Approach To Treatment and Support

Miranda Klassen, AFE Foundation

Lea Ann Stephens, OK State Liaison, AFE Foundation, Jacie's Mom

We have no disclosures to share.





ORGAN AND TISSUE DONATION

Corneas, skin, and bone
 Jacie's tissue/organs was also sent to the biorepository for Amniotic Fluid Embolism Research.



MEMORIAL BLOOD DRIVES

Seven blood drives in her memory have collected a total of 350 units of blood saving nearly 1,000 lives!



LIVE JACIE BIG FACEBOOK GROUP

A way to remember and memorialize her



FUNDRAISERS

The Jacie Cochrane Memorial Golf Tournament has raised awareness of AFE and raised funds to support educational and athletic scholarships in Jacie's honor.



MEMORIALS

Memorial benches in Jacie's honor have been placed at Washington High School, Goldsby Town Park, and the Cashion High School football field.
 Pink Crepe Myrtle Tree at Washington Public Schools Softball Field along with a memory stone from her graduating class of 2013.



AFE FOUNDATION DONATIONS

Countless donations in Jacie's honor have been made to the AFE Foundation totalling over \$10,000



OKLAHOMA LIAISON FOR THE AFE FOUNDATION

Jacie's mother, Lea Ann is the State Liaison for the AFE Foundation sharing Jacie's story and AFE education with Oklahoma healthcare providers.



SCHOLARSHIPS

Emporia State University Softball Scholarship- Annually
 Washington, Ok Public Schools- Annual Senior Scholarship
 Cashion, Ok Public Schools- Annual Senior Scholarship



PAINTED ROCKS

Painted rocks have been placed all over the world to tell Jacie's story and learn about her life. Her rocks have been found all over the world!
International: Greece, Jamaica, Ireland, London, Russia
United States: Kentucky, Alabama, Arkansas, Alaska, Hawaii, Texas, Kansas, Florida, Missouri, New Hampshire, Nevada, New York, Delaware and all over Oklahoma!

IN MEMORY OF
Jacie Stephens Cochrane



Learning Objectives

Outline

Immediate response to an AFE

Execute

AFE specimen procurement and case submission to the AFE Registry and Biorepository

Utilize

Resources to best support the patient and their family

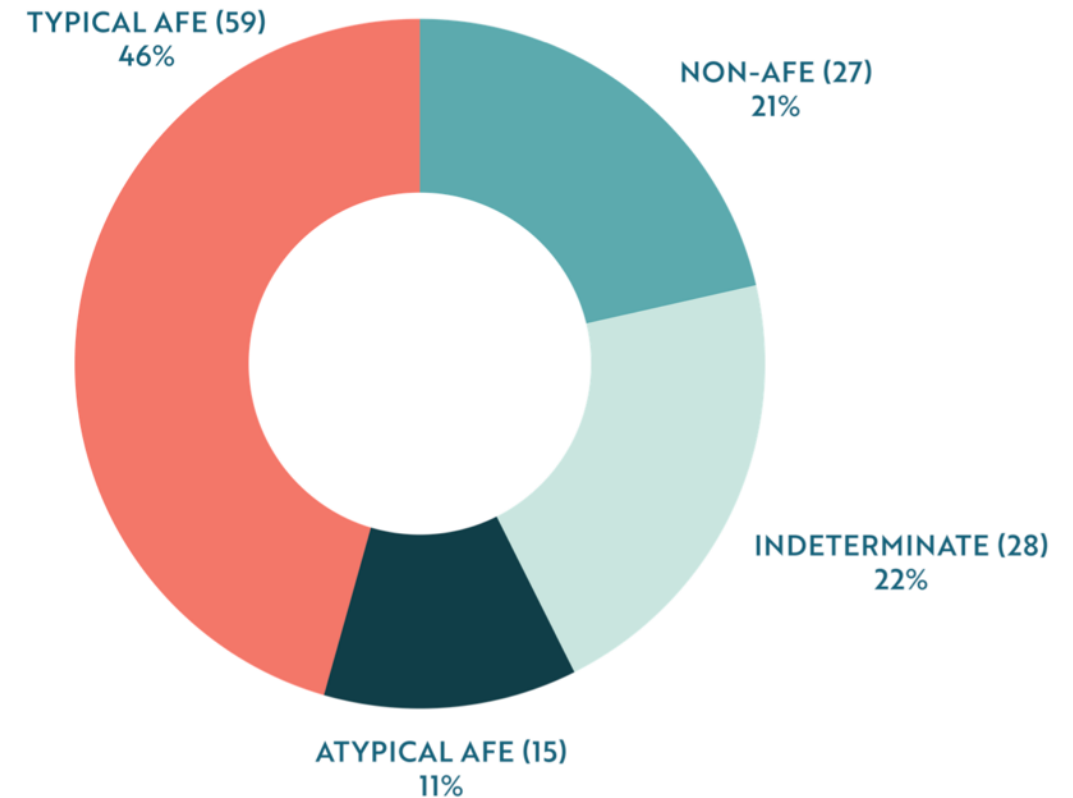
AFE Facts

- Estimated to be 1 in 40,000
- Mortality rate ranges from 20-40%
- 87% of cases will experience maternal arrest
- Clinical diagnosis of exclusion
- No recurrence in subsequent pregnancies
- AKA Anaphylactic Syndrome of Pregnancy (ASP)



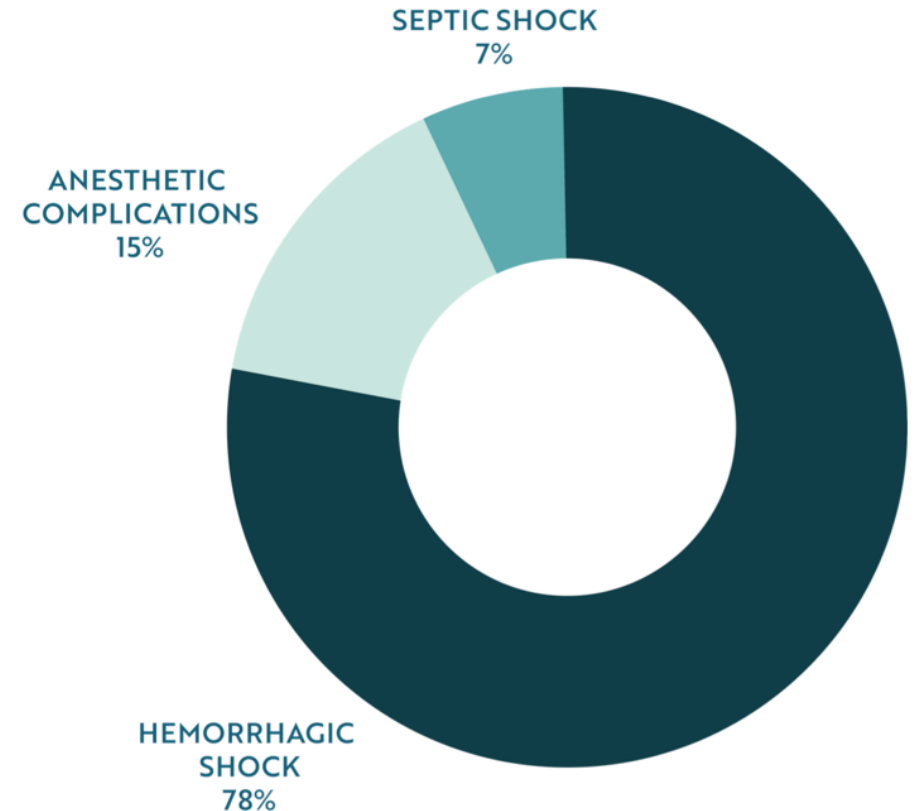
Amniotic Fluid Embolism

- Classic AFE
 - Hypoxia
 - Hypotension
 - Coagulopathy
- Atypical AFE
 - Missing one of above triad



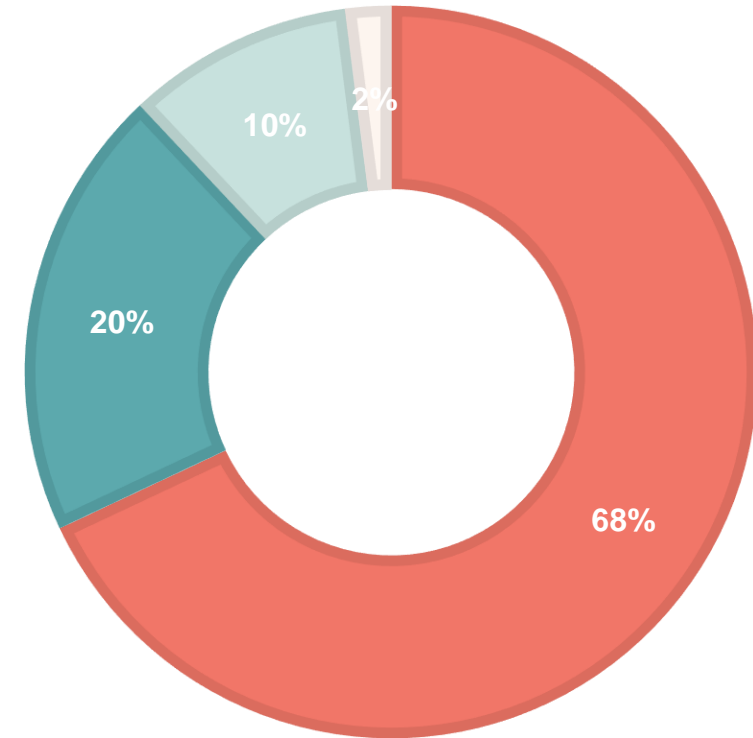
Differential Diagnoses

- Hemorrhage
- Pulmonary embolus
- Anaphylaxis
- High spinal anesthesia
- Cardiomyopathy
- Eclampsia
- Septic shock
- Uterine rupture



AFE Timing

- During labor (60-70%)
- During cesarean section (20%)
- Immediate postpartum (10%)
- Amnio, abortion, D&E (2%)



■ During Labor ■ During C/S ■ Immediate Postpartum ■ Other



Signs and Symptoms

- Impending sense of doom
- Fetal compromise
- Altered mental status
- Hypotension
- Respiratory distress, hypoxia
- Nausea and vomiting
- Seizure
- Cardiopulmonary arrest

“Something feels strange”

“I’m not feeling well”

“I can’t breathe”

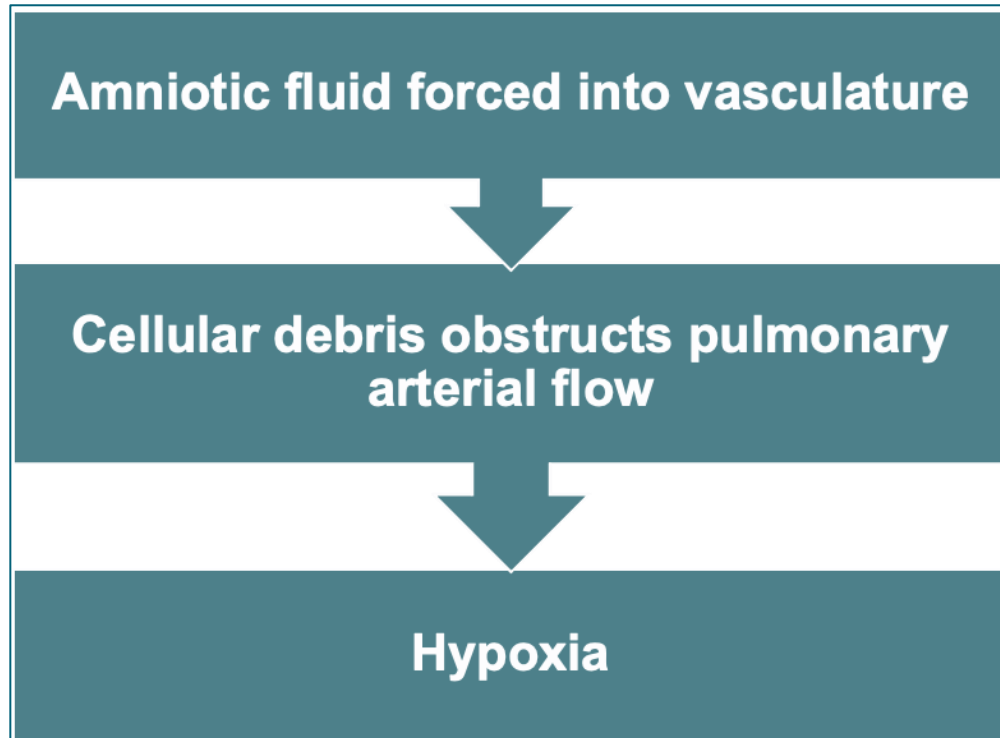
“I feel like I am dying”



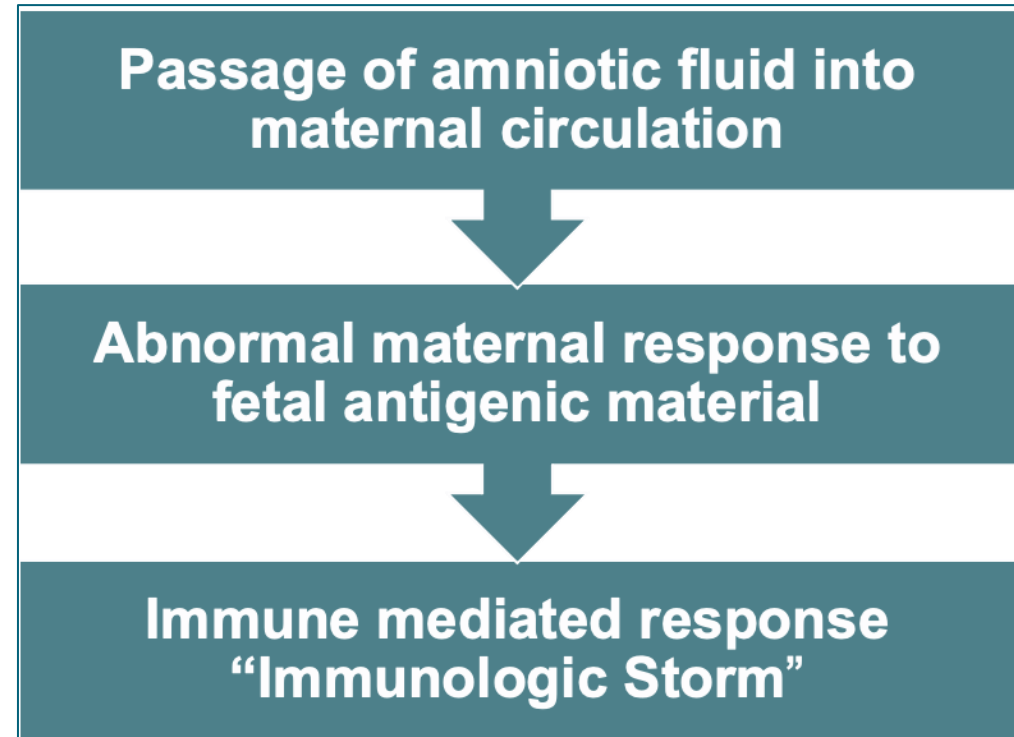
Pathophysiology

Theories of Cause

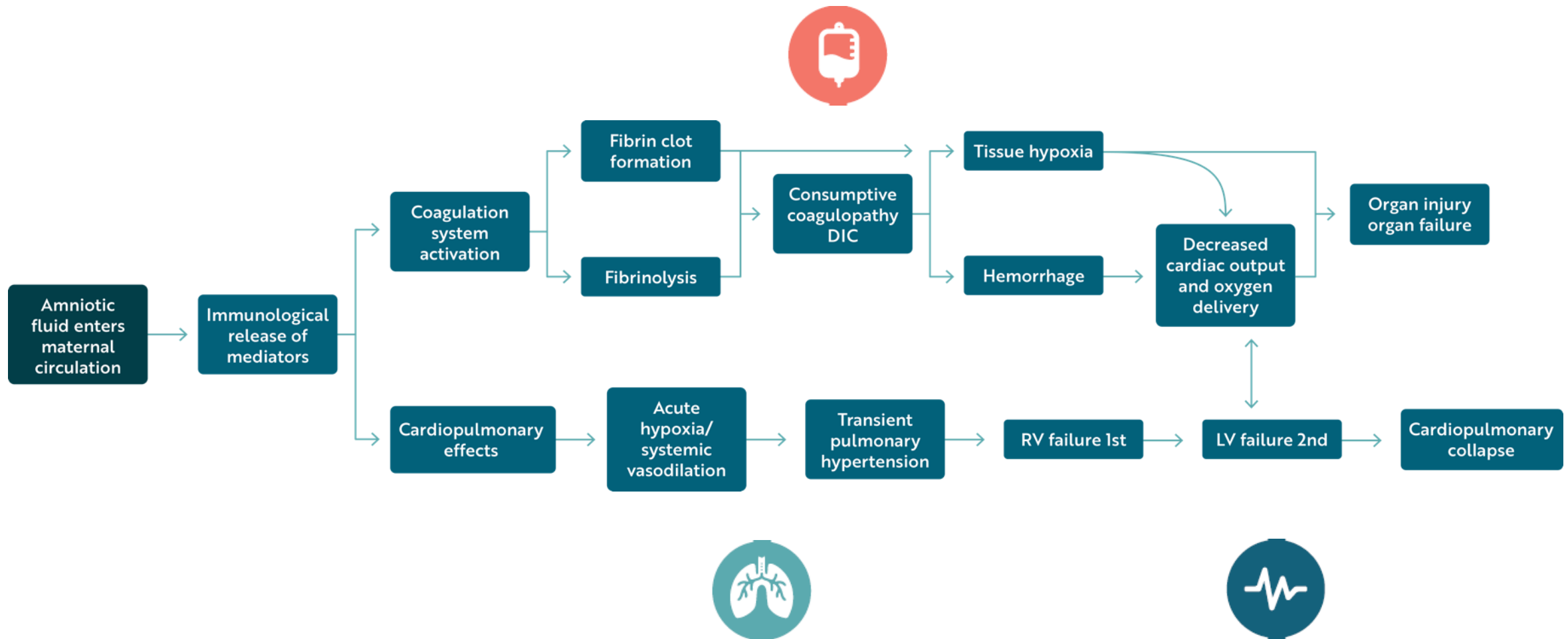
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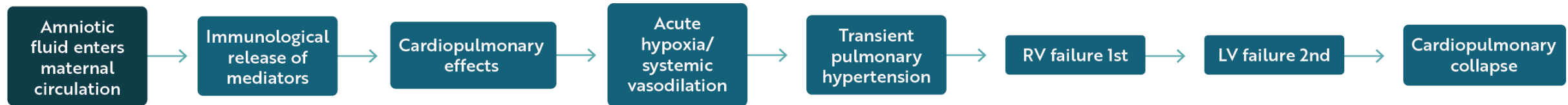
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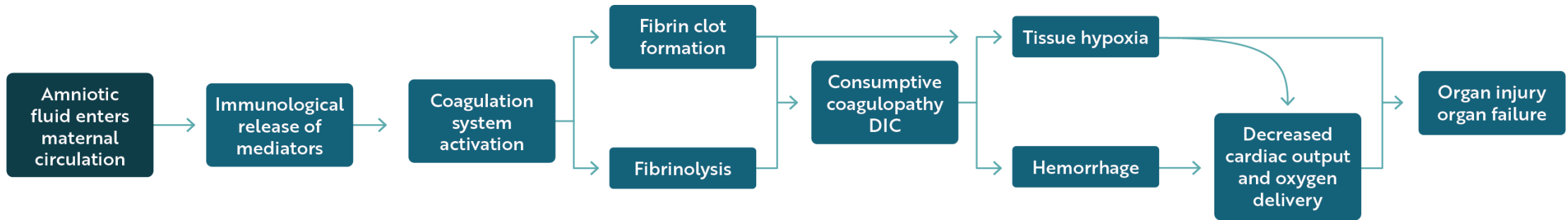
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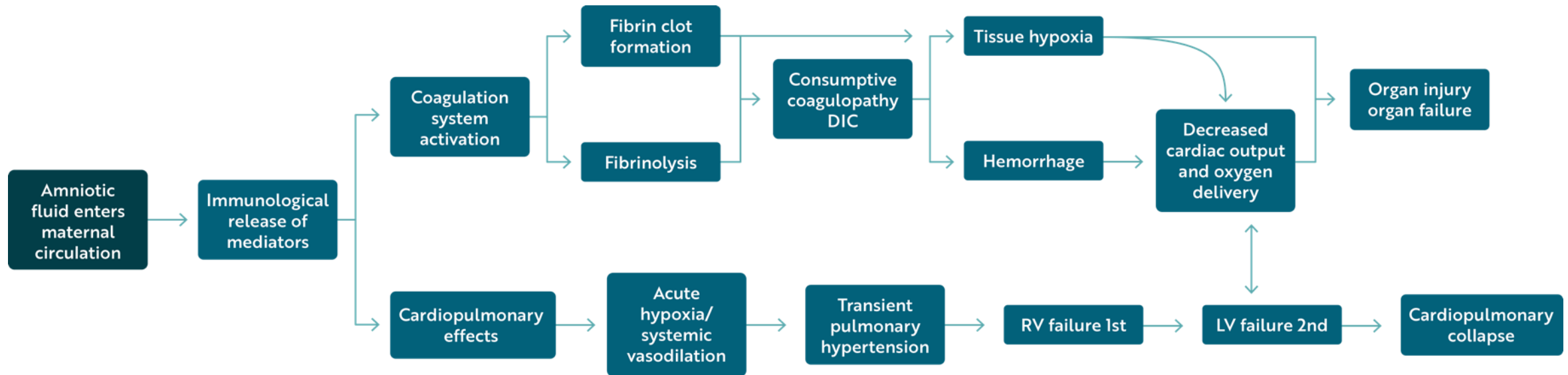
Pathophysiology



Pathophysiology



Pathophysiology



Response

Your Many Roles



Patient

- Acute
- Subacute
- Post acute
- Postpartum



Family

- Communicator
- Advocate



Unit

- Debrief /RCA
- Peer support



Research

- Procurement
- Call
- Consent



Acute & Subacute

- Rapid recognition and intervention at first symptoms
- Call for help, continue to assess, prepare room
- Participate in the code
- Aid in differential diagnosis
- Procure AFE specimens
- Contact AFE Foundation Hotline

BREATHING

Recognition: Acute shortness of breath, increasing respiratory rate and need for oxygen to keep SpO2 at >95%

Response:

- Activate Rapid Response Team (RRT)
- Crash cart to bedside
- Move bed away from headwall
- Frequent vital signs including respiratory rate
- Auscultate breath sounds
- Set up ambu bag and suction
- Start O2 by non-rebreather face mask
- Plan for ongoing ventilation if intubated
- Continuous SpO2



BLOOD PRESSURE

Recognition: Unexplained acute onset hypotension (MAP <65mmHg) or cardiac arrest

Response:

DECLINING BLOOD PRESSURE

- Activate Active Rapid Response Team (RRT)
- Frequent vital signs
- Uterine displacement
- Functioning 18 g IV
- IV fluid bolus

CARDIAC ARREST

- Call Obstetric Code Blue (ensure Neo/Peds team is notified)
- Note time of pulselessness and begin chest compressions
- Manual left uterine displacement, remove fetal monitor
- Assemble ambu bag, begin CPR per BLS guidelines
- Crash cart to bedside
- Roll patient to place backboard and apply defibrillator leads
- Analyze rhythm (can use AED)
- Follow AED instructions or ACLS algorithm for identified rhythm
- Prepare for intubation ASAP
- Deliver within five minutes of pulselessness if >20 weeks gestation or fundus at umbilicus



SPECIMEN RESEARCH

Before transfusion, draw 5mL in a red and purple top and set aside. Consent is not needed to draw labs. Call the hotline when you are able: 307-END-AFES.



BLEEDING

(SBP-DBP=PP)

Recognition: Pulse pressure <30mmHg or declining blood pressure, maternal tachycardia, bleeding

Response:

- | | | |
|--|--|--|
| <ul style="list-style-type: none"> <input type="checkbox"/> Notify physician, anesthesiologist, & charge RN or activate Rapid Response Team (RRT) <input type="checkbox"/> Activate Massive Transfusion Protocol (MTP) | <p>Order Labs:</p> <ul style="list-style-type: none"> <input type="checkbox"/> BNP <input type="checkbox"/> Cardiac enzymes <input type="checkbox"/> CBC <input type="checkbox"/> CMP <input type="checkbox"/> Coagulation panel <input type="checkbox"/> Fibrinogen <input type="checkbox"/> Type and Cross | <p>Products Given:</p> <ul style="list-style-type: none"> <input type="checkbox"/> 6 PRBC <input type="checkbox"/> 6 FFP <input type="checkbox"/> 6 Platelets <input type="checkbox"/> Cryo as needed <input type="checkbox"/> TXA as needed |
|--|--|--|



BREATHING

Recognition: Acute shortness of breath, increasing respiratory rate and need for oxygen to keep SpO₂ at >95%

Response:

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- Crash cart to bedside
- Move bed away from headwall
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- Auscultate breath sounds
- Set up ambu bag and suction
- Start O₂ by non-rebreather face mask
- Plan for ongoing ventilation if intubated
- Continuous SpO₂



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TABLE 1

Components of high-quality cardiopulmonary resuscitation in pregnancy

Components

Rapid chest compressions (100 × minute)

Perform hard compressions, achieving a depth of at least 2 inches

Assure adequate chest recoil between compressions

Minimize interruptions of chest compressions

Avoid prolonged pulse checks (no more than 5–10 seconds)

Resume chest compressions immediately after defibrillating

Switch provider of compressions every 2 minutes to avoid fatigue

Lateral displacement of uterus during resuscitation

SMFM. Amniotic fluid embolism: diagnosis and management. Am J Obstet Gynecol 2016.

Remember chest compressions only deliver 30% CO!

Resuscitative Delivery

- Consider at 4 minutes
- Relieve aortocaval compression
- Improves CPR effectiveness
- Improves maternal and infant survival
- Perform where patient is
- Anesthesia or abdominal prep not necessary



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Response:

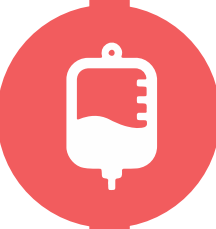
- Notify physician, anesthesiologist, & charge RN or activate Rapid Response Team (RRT)
- Activate Massive Transfusion Protocol (MTP)

Order Labs:

- BNP
- Cardiac enzymes
- CBC
- CMP
- Coagulation panel
- Fibrinogen
- Type and Cross

Products Given:

- 6 PRBC
- 6 FFP
- 6 Platelets
- Cryo as needed
- TXA as needed



•Serum Fibrinogen maintain above 150–200 mg/dL

REV 2023

Your Many Roles



Patient

- Acute
- Subacute
- Post acute
- Postpartum



Family

- Communicator
- Advocate



Research

- Procurement
- Call
- Consent



Post Acute (Trauma Response)

- Debrief
- Communicate with family
- Develop interprofessional plan of care
- Staff support
- Self-care

AMNIOTIC FLUID EMBOLISM FOUNDATION

Amniotic Fluid Embolism

We are here to help. Our organization was created to support families like you.

Amniotic fluid embolism (AFE) is a complex medical condition that can be difficult to understand. This handout includes answers to frequently asked questions, a place to keep important information, and things you can do right now.

Amniotic fluid embolism or AFE is a rare birth complication that can cause sudden and life-threatening breathing, blood pressure, and bleeding issues.

WHAT CAUSES AN AFE?
The exact cause of an amniotic fluid embolism (AFE) is not well understood. It is believed to be the result of a severe, allergic-like reaction to something in the amniotic fluid. There are no known risk factors for AFE.

HOW IS AN AMNIOTIC FLUID EMBOLISM TREATED?
Immediate life-saving care is necessary to treat the breathing, blood pressure and bleeding symptoms. This care may include medications, breathing tubes, chest compressions, blood transfusions, and/or surgeries. If the baby was not delivered before the AFE event, the baby may also require life-saving treatment.

IS THERE ANY WAY TO PREDICT OR PREVENT AN AFE?
Since it is not understood what causes an AFE, it is impossible to know who may be at risk. The words unpreventable and unpredictable are often used to describe AFE.

HOW IS AFE DIAGNOSED?
There is no diagnostic test for AFE. It is diagnosed based on the timing of symptoms and ruling out other causes. It may take several days for the healthcare team to determine the diagnosis and often will include the words "proposed" or "suspected".

HOW RARE IS AFE?
The true rate of AFE is unknown but is estimated to be 1 in every 40,000 births. There are ~4 million births a year in the U.S. and ~100 will experience an AFE.

WHAT IS THE SURVIVAL RATE?
Similar to incidence rates, rates of survival are not well understood. Survival rates are estimated to be between 40-60%. Survival depends on many factors, but most significantly is the severity of the initial immune response.

QUICK TIPS FOR FAMILY MEMBERS:

1. Contact immediate family members, loved ones and clergy/spiritual advisors who you may want to come to the hospital.
2. Identify someone who will help share information to others. You will be very busy and cannot update everyone.
3. Ask someone to help take care of other children and/or pets.
4. Take pictures and videos of your baby (even if critically ill or deceased) and of your loved one. You may think you don't want these pictures now, but someday you may want them.
5. Take notes and/or audio recordings if allowed. You will be receiving a lot of information and making many decisions that you may want to reference later.

If you are trying to explain this to family and friends, here are some quick facts you can share:

- Rare, 1 in 40,000 Births
- No Known Risk Factors Unpredictable
- Unpreventable
- No way to diagnose an AFE other than to rule out any other conditions it could have been

Scan this QR code to get a digital version of this handout that you can quickly share with friends and family. Visit our website for more information and support.

KEEP TRACK OF IMPORTANT INFORMATION AND NOTES ON THE BACK OF THIS HANDOUT →

AFE Research: We need your help

If you are open to it, *please ask your healthcare provider to not throw away any of the blood that was taken during your loved one's care and may still be in the lab.* These blood samples are usually discarded as medical waste, but can instead be sent to our organization to further AFE research.

Learn more about our research at afesupport.org/research

AFESUPPORT.ORG AFE HOTLINE 1-307-363-2337

Interprofessional Plan of Care

- Maximize maternal-infant bonding
- Preservation of memories
- Arrange breastfeeding opportunities if aligned with patients' goals
- Anticipate, assess, and respond to signs of mental health symptoms
- Support assessment
- Complete AFE Clinical Summary Form

AMNIOTIC FLUID EMBOLISM		AMNIOTIC FLUID EMBOLISM FOUNDATION	
SURVIVOR CLINICAL SUMMARY			
This document is intended to summarize the most significant aspects of treatment to aid in patient and family understanding, continuity of care, and to minimize the triggers associated with retelling the event.			
PATIENT NAME	PHONE	DATE OF EVENT	
PRIMARY CLINICIAN(S)			
AFE SYMPTOMS		OTHER COMPLICATIONS	
<input type="checkbox"/> Acute Hypotension <input type="checkbox"/> DIC		<input type="checkbox"/> Pulmonary/Saddle Embolus <input type="checkbox"/> Stroke <input type="checkbox"/> Renal Failure	
<input type="checkbox"/> Cardiac Arrest		<input type="checkbox"/> Other: _____	
DELIVERY INFORMATION			
PREGNANCY OUTCOME		NICU ADMISSION	
<input type="checkbox"/> Live Birth <input type="checkbox"/> Still Birth/Fetal Demise		<input type="checkbox"/> Yes # of days _____ Reason _____	
TYPE OF DELIVERY		GA (IN WEEKS)	WEIGHT & LENGTH
<input type="checkbox"/> Vaginal <input type="checkbox"/> Vacuum <input type="checkbox"/> C-Section			TIME OF BIRTH(S)
<input type="checkbox"/> VBAC <input type="checkbox"/> Forceps <input type="checkbox"/> Emer. C-S			
CLINICAL SUMMARY			
HYSTERECTOMY	SURGERIES / INTERVENTIONAL RADIOLOGY		SURGERIES / INTERVENTIONAL RADIOLOGY
DATE _____	DATE _____	DATE _____	
TYPE <input type="checkbox"/> Supracervical <input type="checkbox"/> Total	TYPE _____	TYPE _____	
	RESULTS _____	RESULTS _____	
<small>*THIS PATIENT SHOULD NOT BE ASKED ABOUT THE LAST MENSTRUAL PERIOD (LMP)</small>			
IMAGING TESTS			
<input type="checkbox"/> X-Ray	DATE _____	RESULTS _____	
<input type="checkbox"/> MRI	DATE _____	RESULTS _____	
<input type="checkbox"/> CT	DATE _____	RESULTS _____	
BLOOD TRANSFUSIONS: TYPE OF BLOOD PRODUCTS + NUMBER OF UNITS			
<input type="checkbox"/> Packed Red Blood Cells (PRBC) _____		<input type="checkbox"/> Plasma _____	
<input type="checkbox"/> Platelets _____		<input type="checkbox"/> Cryoprecipitate _____	
MEDICATIONS AT DISCHARGE			
NAME _____	DOSAGE _____	FREQUENCY _____	
NAME _____	DOSAGE _____	FREQUENCY _____	

Why is This Patient So Unique?

- Differ from typical ICU patients
 - Require extensive collaboration
 - SMM associated with PMADS /PTSD
 - SMM extends into the 4th trimester and challenges a full recovery
 - **Strong emotional/trauma connection**
- Mean age is 29 vs. 64 years
 - Other wise healthy
 - Altered maternal physiology
 - Psychosocial characteristics and expectations
 - Concerns of infant(s) viability or health, separation, and feeding
 - Fertility implications

Your Many Roles



Patient

- Acute
- Subacute
- Post acute
- Postpartum



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Research

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- Call
- Consent



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SPECIMEN RESEARCH

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AFE Registry and Biorepository

- International registry
- Largest database of AFE cases 250+
- Retrospective case review
- Specimen studies underway
- 13 publications + abstracts



Transform AFE to be predictable, preventable, and treatable

AFE Specimens

- Maternal blood previously collected for clinical care before onset of symptoms (i.e., T&S, Coags)
- Research dedicated blood taken during event before MTP
- Pathological specimens from the placenta
- Autopsy specimens

Collecting Research Dedicated Specimens During An AFE

During a possible or presumed AFE event, AND before transfusion:

1. Collect/Draw 5ml in red top tube
2. Collect /Draw 5 ml in purple/lavender tube
3. Set aside and finish clinical care
4. Have a team member call the AFE Hotline

AFE diagnosis is not needed before specimen collection

Immediately begin to degrade

Timing is critical to collect and process

AFE Hotline



1-307-END-AFES

- 24/7 support
- Guidance on specimen collection
- No HIPPA violation
- Crisis support for all impacted

Your Many Roles



Patient

- Acute
- Subacute
- Post acute
- *Postpartum*



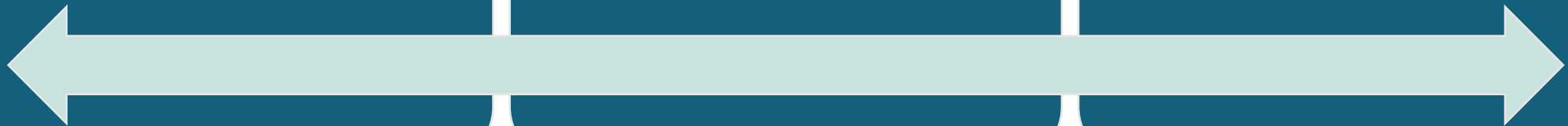
Family

- *Communicator*
- *Advocate*



Research

- Procurement
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Effective Communication

A

Acknowledge Emotions

F

Formulate Plan

E

Execute Communication

EFFECTIVE COMMUNICATION WHEN DELIVERING BAD NEWS TO THE PATIENT

Communicating effectively with a patient who experienced a severe maternal event requires you to first recognize their perspective. These are otherwise healthy individuals who came with expectations of joy and unexpectedly faced a rare and life-threatening condition they have likely never heard of. Commonly, the patient has no recollection of the event, is heavily medicated, and may have a cognitive impairment, thus making them especially susceptible to further trauma. Additionally, they recognize the emotions on their loved ones' faces and begin to understand the seriousness of their condition.

The initial interaction with the patient is not the time to explain all the medical details and terminology. We suggest an iteration of, "Your body has been through a lot. When you are ready I will go over all of the details. In the meantime, let's focus on getting you rested." Below are recommendations to assist you in making sure your interactions limit further trauma.

ACKNOWLEDGE YOUR EMOTIONS

- o Allow yourself to express your feelings with trusted colleagues
- o Accept you may not have all of the answers about the event or diagnosis
- o Recognize and anticipate emotional responses from the patient

FORMULATE A PLAN

- o Discuss with clinical team to get a consensus of the overall clinical picture for both mom and baby
- o Identify key clinical points to be communicated in a clear and concise manner
- o Prepare for any language barriers
- o Determine timing of the conversation based on feedback of ICU team and family
- o Assess the patient's readiness for more detailed information
- o Coordinate with the NICU team to disseminate infant status with the patient

EXECUTE PATIENT COMMUNICATION

- o Use clear, lay language with empathetic tone- avoid dramatic language and statistics
- o Present basic facts, current condition, brief definition of AFE (see below)
- o Explain 1-2 next steps for the patient - avoid overwhelming them with too much information
- o Assess understanding and repeat any key information
- o Inform patient they will receive printouts, guides, and that there is a community to assist them
- o Document discussion in medical record



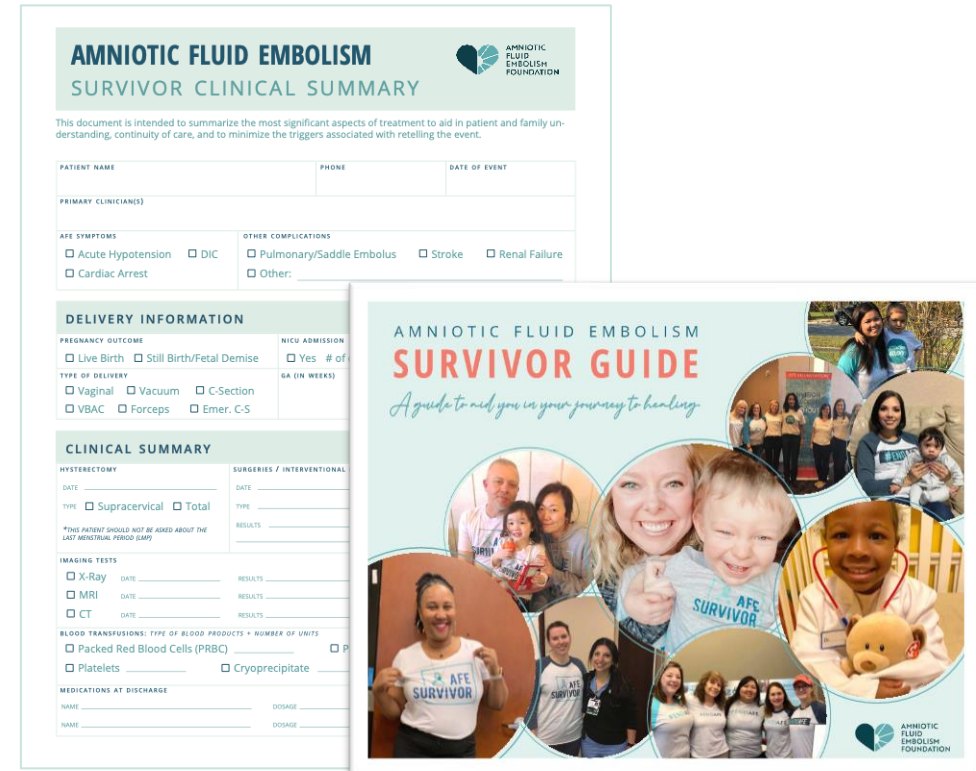
AMNIOTIC
FLUID
EMBOLISM
FOUNDATION

WHAT IS AN AFE?

Amniotic fluid embolism (AFE) is an unexpected life-threatening complication. It can affect both mother and baby. It is thought to be the result of an allergic-like reaction to the fluid that enters the mother's bloodstream. This is a normal part of the birth process for most mothers. It can occur during labor or soon after delivery and can cause serious breathing, blood pressure, and bleeding problems.

Patient Education and Discharge

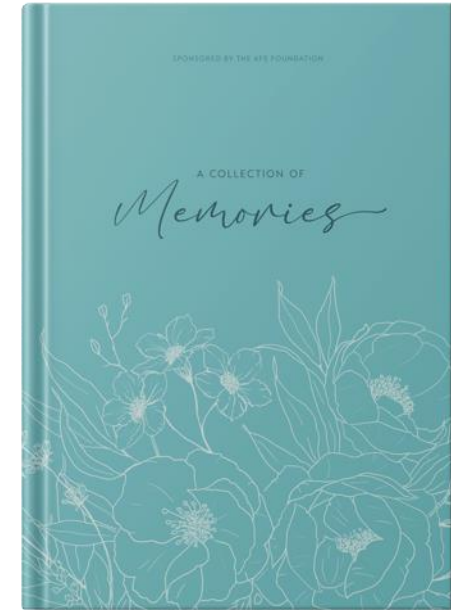
- Assess patient's readiness and emotions
- Coordinate continuity of care to enhance understanding
- Utilize AFE Clinical Summary Form
- Invite care team to be introduced
- Provide support resources
- Consider home health
- Schedule 6 week debrief with OBGYN



The image displays two documents from the Amniotic Fluid Embolism Foundation. The top document is the 'AMNIOTIC FLUID EMBOLISM SURVIVOR CLINICAL SUMMARY' form, which includes sections for patient information, primary clinicians, AFE symptoms (such as Acute Hypotension, DIC, Cardiac Arrest, Pulmonary/Saddle Embolus, Stroke, Renal Failure, and Other), delivery information (pregnancy outcome, NICU admission, type of delivery, and VBCAC/Forceps/Emer. C-S), and clinical summary (hysterectomy, surgeries/interventional, imaging tests like X-Ray, MRI, and CT, blood transfusions, and medications at discharge). The bottom document is the 'AMNIOTIC FLUID EMBOLISM SURVIVOR GUIDE', a colorful brochure with the subtitle 'A guide to aid you in your journey to healing'. It features several circular photographs of survivors and their families, some wearing 'AFE SURVIVOR' t-shirts, and the Amniotic Fluid Embolism Foundation logo.

When a Loss Occurs

- Determine primary family and staff contact
- Advocate for autopsy
- Preserve memories
- Assess support system
- Provide AFE Crisis Handout
- Attend service if appropriate
- Participate in RCA
- Family debrief



Stages of Grief

DENIAL
Following a devastating loss, denial and shock is a normal response as we struggle to come to terms with what has occurred. Denial can help by giving our feelings of grief and allowing us to cope and process our feelings in a more manageable way.

ANGER
A necessary and often misunderstood part of grieving is anger, which can help us to react to the reality of our loss. Anger can help us to feel and release anger and help release tension and aid the healing process.

BARGAINING
The belief that we can exchange one set of circumstances for another or wish to undo an event that has occurred. Bargaining forces us to acknowledge that the event occurred as well as to negotiate our circumstances.

DEPRESSION
Depression is a normal, natural response to loss and may intensify as you begin to accept the reality of your loss. Please seek assistance from medical health professionals or social supports when you feel overwhelmed by the normal emotions and physical responses following a devastating loss.

ACCEPTANCE
During this stage you may begin to understand the permanence of your loss. Accepting your loss can be painful and is not the same as being alright, moving on, or forgetting your loss. You may continue to experience sadness and longing as you accept this new normal and work towards having more good days than bad days.

FINDING MEANING
The stage of grief where you can work towards finding meaning in the loss you continue to feel for a person after their death. Finding your individual way to sustain the love you feel following death can help you move forward in your own life.

COMPLICATED GRIEF

The experience of grief varies from one individual to another. The stages of grief are not linear and you may not experience every stage.

It is common to move back and forth between different stages over time and there is no time limit on the grieving process. Lingering symptoms of grief can turn into complicated grief, which feels more intense and can hinder the healing process.

Risk Factors for Complicated Grief

- Loss of a child, spouse, partner, or anyone with whom the person had a very strong and fulfilling relationship
- Negative circumstances surrounding the death
- Financial hardship related to the loss
- History of mood, anxiety disorder or PTSD
- History of trauma or loss
- History of Substance Abuse Disorder or Alcoholism
- Deployed or combat veteran

MANIFESTATIONS OF GRIEF

Physical: Fatigue, Shortness of Breath, Headaches, Sore Muscles, Digestive issues, Sleep disruptions, Trouble concentrating or staying focused, Changes in Appetite, Sleep, and Concentration

Emotional: Denial, Anger, Guilt, Sadness, Yearning, Loneliness, Anxiety, Depression, Numbness

Preparing For the Unexpected

AFE Simulation

- AFE is a rare and catastrophic event
- No actual patient care
- Limited practice with maternal arrest
- Coordinated care and decisive action are necessary
- Uncover gaps or system-based issues before an event





AFE SIMULATION TOOLKIT

A comprehensive guide for all levels of care with the option to increase fidelity.

Toolkit includes:

- AFE Checklist
- Sample agenda
- Supply list
- Case scenario
- Guidelines for skills review
- Metrics and evaluation tools

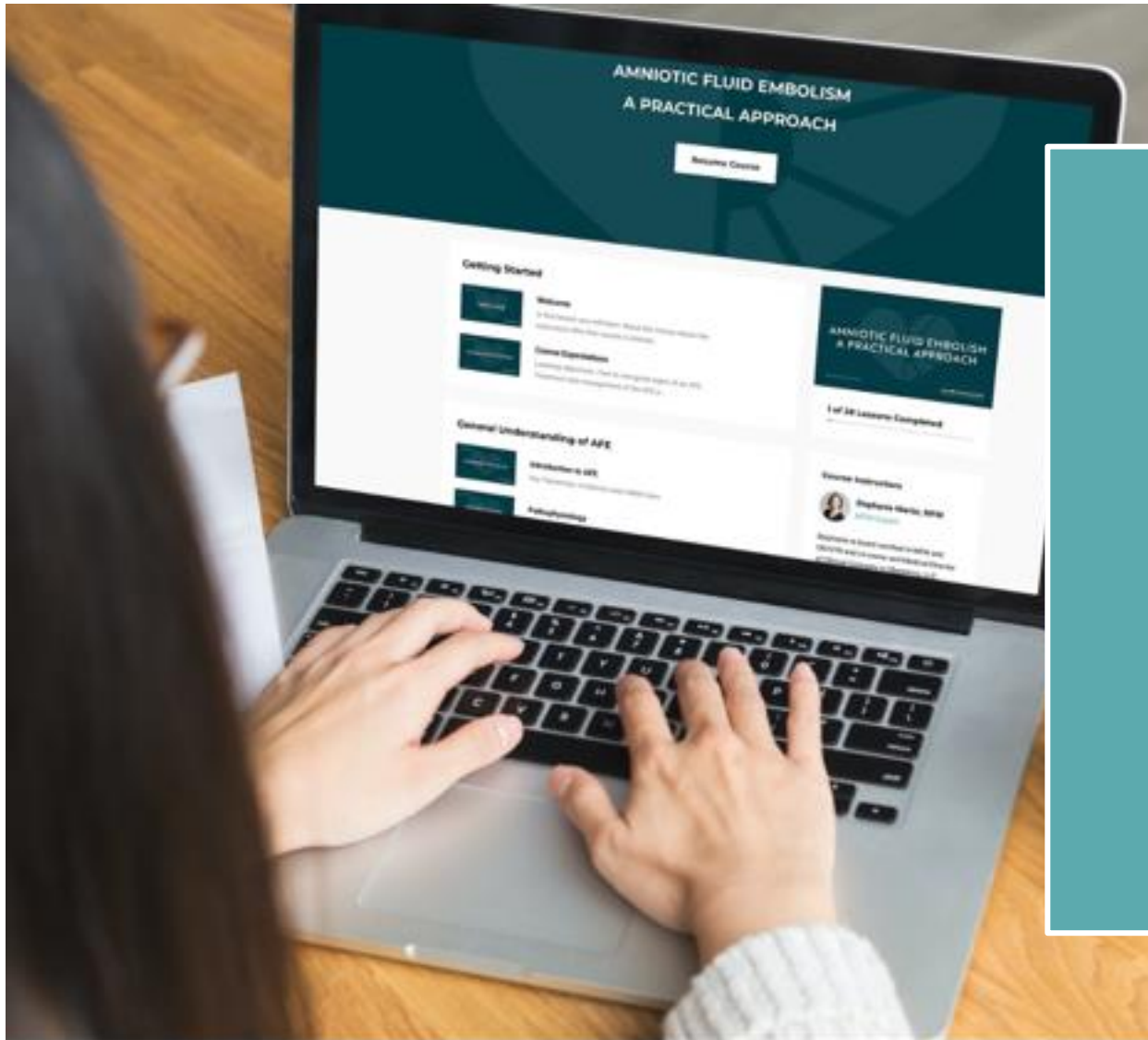
Amniotic Fluid Embolism *Simulation Toolkit*



1st Edition

AFE  FOUNDATION
AMNIOTIC FLUID EMBOLISM





AFE: A PRACTICAL APPROACH COURSE

Course covers:

- Historical context
- Pathophysiology
- Treatment and management
- Research opportunities
- Support AFE patients and families

**CNE credit available*



AMNIOTIC
FLUID
EMBOLISM
FOUNDATION

If you think it's an AFE, call us! 1-307-363-2337 (1-307-END-AFES)

- ABOUT
 - EDUCATION ▾
 - RESEARCH
 - SUPPORT
- [DONATE](#)

CLINICIANS ARE KEY TO ENDING AFE.
Immediate response.
Research for the future.



NO ETIOLOGY. NO RISK FACTORS.
EVERY patient is at risk for an AFE.

Dedicated Clinician Website
amnioticfluidembolism.org



AFE Hotline



1-307-END-AFES

- 24/7 support
- Guidance on specimen collection
- No HIPPA violation
- Crisis support for all impacted

Key Takeaways

Outline

Immediate response to an AFE

Execute

AFE specimen procurement and case submission to the AFE Registry and Biorepository

Utilize

Resources to best support the patient and their family

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