

Lipid Emulsion Infusion After Suspected Amniotic Fluid Embolism At 18 Week Spontaneous Abortion

Samantha Malak¹, Tanjina Jalil², Christine McLaughlin^{3,4}, Oseriemen Omoike³ and Enrico Camporesi^{3,4*}

¹Morsani College of Medicine, University of South Florida, Tampa, FL, 33606, USA

²TeamHealth Anesthesia and University of South Florida, Tampa, FL, 33606, USA

³TeamHealth Anesthesia, Tampa General Hospital, Tampa, FL, 33606, USA

⁴Department of Anesthesiology and Perioperative Medicine, Morsani College of Medicine, University of South Florida, Tampa, FL, 33606, USA

*Corresponding author: Enrico Camporesi, MD, Department of Anesthesiology and Perioperative Medicine, Morsani College of Medicine, University of South Florida, Tampa, FL, 33606, USA; E-mail: ecampore@usf.edu

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Abstract

A 40-year-old G3P2 at 18w2d presented with fever and vaginal discharge one day before a scheduled D&E for spontaneous abortion. Following induction of general anesthesia and a paracervical block with lidocaine, pulseless ventricular tachycardia developed. Local anesthetic systemic toxicity (LAST) was suspected, and 20% lipid emulsion bolus and infusion were administered during resuscitation, restoring circulation. Subsequently, heavy uterine bleeding and thromboelastogram findings consistent with DIC suggested amniotic fluid embolism (AFE). CT angiography later revealed small pulmonary emboli. After transfusion, coagulation normalized and the patient was extubated the same day. Experimental data support lipid emulsion's protective vascular effects in AFE.

Keywords: *Local systemic toxicity (LAST); Amniotic fluid embolism (AFE); Lipid emulsion; AFE during early pregnancy*

1. Introduction

Amniotic fluid embolism (AFE) is a rare but often devastating obstetric emergency characterized by sudden cardiovascular collapse and severe coagulopathy [1-3]. The true incidence of AFE is uncertain but is estimated to be approximately 1 in 40,000 births [4]. Reported maternal case fatality rates range from 13% to 30%, with perinatal mortality rates between 9% and 44% [4,5]. AFE remains the second leading cause of maternal death on the day of delivery in the United States [4]. It is usually

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described as occurring in the late stages of pregnancy, although it has been documented even during the second trimester [4]. This report discusses an early occurrence of AFE. Although its etiology is not completely understood, the diagnosis is clinical, and management remains supportive. As no targeted therapies exist, there is growing interest in adjunctive treatments such as intravenous lipid emulsion (ILE), which has shown success in treating other causes of cardiovascular collapse [3]. Informed written consent has been obtained from the patient for the purpose of publication.

2. Case Description

A 40-year-old woman, gravida 3, para 2, was at 18 weeks and 2 days of gestation when she presented with fever and thick vaginal discharge one day before a scheduled dilation and evacuation (D&E) for a spontaneous abortion. She was diagnosed with septic abortion, consented to an urgent D&E, and was started on broad-spectrum antibiotics.

General anesthesia was induced without complications. After positioning her in dorsal lithotomy, a paracervical block was performed using 20 mL of 1% lidocaine with four units of vasopressin. Uterine evacuation commenced, during which amniotic fluid and placental tissue were aspirated. Within 60 seconds, the patient developed pulseless ventricular tachycardia (see FIG. 1).

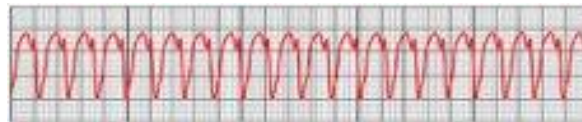


FIG. 1. **Pulseless ventricular tachycardia recorded at event.**

After repositioning the patient supine, cardiopulmonary resuscitation (CPR) was initiated immediately. Given the recent administration of lidocaine, local anesthetic systemic toxicity (LAST) was suspected. A 1.5 mL/kg bolus of 20% lipid emulsion was administered, followed by a continuous infusion. Epinephrine and ongoing CPR led to the return of spontaneous circulation. The post-arrest electrocardiogram showed QT prolongation (>600 ms). Shortly after, the patient began to experience brisk uterine bleeding, which raised strong suspicion for AFE. Thromboelastography (TEG) indicated disseminated intravascular coagulation (DIC). Uterine tamponade with a Foley balloon partially controlled the bleeding. A second unit of Intralipid was infused, and the patient was transported to the intensive care unit (ICU).

In the ICU, CT angiography revealed right upper lobe subsegmental pulmonary emboli without evidence of right heart strain. After transfusion and correction of coagulopathy, TEG results normalized, and the patient was extubated later that day.

3. Discussion

AFE typically presents with acute changes in mental status, respiratory distress, hypoxemia, and hemodynamic instability [4-6]. Management focuses on supportive care, including airway stabilization, oxygenation, hemodynamic resuscitation, and correction of coagulopathy. Adjunctive treatments such as pulmonary vasodilators (e.g., epoprostenol, sildenafil) and, in refractory cases, extracorporeal membrane oxygenation (ECMO) may be considered [7].

Lipid emulsion therapy was first introduced for LAST and has since shown efficacy in reversing cardiovascular toxicity caused by various lipophilic drugs. The proposed mechanisms include the “lipid sink” effect, which sequesters lipophilic toxins; enhanced myocardial delivery of energy substrates; modulation of ion channel function; and improved inotropy [2,8]. Its safety and effectiveness for LAST have been confirmed through experimental models and clinical practice. The small volume of local anesthetic administered, along with other clinical findings, quickly pointed to AFE in this case. Several case reports suggest a potential benefit of lipid emulsion in AFE-related cardiovascular collapse [6,7]. The first documented case in 2017 described rapid hemodynamic recovery and restoration of spontaneous circulation following lipid administration in a patient with AFE complicated by DIC [5,7]. Animal studies support its use in pulmonary hypertension and right ventricular failure, suggesting possible cardioprotective properties in cases of AFE-related hemodynamic collapse [6,9].

Other pharmacologic approaches have also been described. For example, anticoagulation with rivaroxaban was successfully used in a patient with AFE complicated by disseminated intravascular coagulation [10]. However, ILE is not without risks. Reported complications include lipemia, thrombosis, and renal or pulmonary injury; serious adverse effects remain uncommon [6,7]. Survival rates exceeding 50% have been reported in cases of drug-related cardiac arrest treated with lipid emulsion [3]. While robust data specific to AFE are limited, the existing evidence and biological plausibility justify considering early ILE administration in cases of suspected AFE with cardiovascular collapse, especially when LAST cannot be ruled out [2].

4. Conclusion

This case demonstrates successful maternal resuscitation following suspected AFE, managed with lipid emulsion therapy. Although definitive evidence remains limited, the biological rationale and positive outcomes in related contexts suggest that lipid emulsion may serve as a valuable adjunct in AFE-related circulatory failure. Systematic data collection and controlled studies are necessary to define optimal indications and dosing strategies. Until then, aggressive resuscitation and supportive management remain essential.

5. Consent to Publish Declaration

Written informed consent was obtained from the patient for the publication of this case report, including all clinical details and images. The patient was informed about the purpose of the report, its intended scientific audience, and the measures taken to preserve anonymity.

6. Consent to Participate/Ethics Declaration

The requirement of ethical approval was waived by the Institutional Review Board of the University of South Florida, Tampa, Florida, in accordance with the U.S. Common Rule, 45 CFR 46, and the study was determined to be exempt under 45 CFR 46.104(d)(4). The study was conducted in accordance with the Declaration of Helsinki. Written informed consent to participate in this report was obtained from the patient.

7. Data Availability

The data that support the findings of this study are available on request from the corresponding author, EC. The data are not publicly available due to containing information that could compromise the privacy of the research participant.

8. Funding Statement

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9. Conflict-of-Interest Statement

The authors declare no commercial associations that represent a conflict of interest in connection with this manuscript.

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