

Sudden maternal cardiac arrest: A case of amniotic fluid embolism

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Introduction

Amniotic fluid embolism (AFE) is a life-threatening obstetric emergency which is associated with significant maternal mortality. The incidence of AFE ranges from 1.9 to 6.1 per 100,000 maternities around the world¹. Clinical features of AFE can vary and it is a diagnosis of exclusion².

Case Summary

This was a 28-year-old Black African nulliparous woman with a background of uterine fibroids, Haemoglobin S trait and irritable bowel syndrome. Her booking BMI was 44. All other booking investigations and subsequent tests were normal. Her partner was not a sickle cell carrier.

A growth scan at 38 weeks showed that the estimated fetal weight was above the 97th centile on gestation related optimal weight (GROW) curve. At 39 weeks she underwent inpatient induction of labour (IOL) using osmotic dilators and two doses of vaginal prostaglandin. She then underwent artificial rupture of membranes (ARM), had an epidural and oxytocin was commenced. Her care was escalated to the obstetric registrar due to a suspicious CTG which showed signs of evolving hypoxia. In view of this and lack of progression of IOL, the option of C-section and continuing IOL process of discussed with both parents. Parents opted to go forward with C-section.

Mother underwent a spinal anaesthetic in theatre with 0.5% Heavy Bupivacaine 2.3 mls and 20 mcg of Fentanyl. The block level was tested with cold spray to T2. Fetal bradycardia was noted in theatre.

Following the opening of the rectus sheath the anaesthetist noted the mother became unresponsive to voice. Maternal observations were as follows: pulse 120 bpm, BP 110/50 mmHg, oxygen saturations 96%. Trial of oxygen with Hudson mask and the bag ventilation was carried out. There was no response hence the mother and the ECG monitor showed asystole and the blood pressure was not recordable. A cardiac arrest call was put out and the mother was intubated. Two doses of adrenaline were given in total. Return of spontaneous circulation was achieved after less than five minutes. HR initially 180 with SVT rhythm which spontaneously reverted to sinus tachycardia. Oxygen saturations returned to 95%, heart rate 140 bpm and a feeble carotid pulse was palpable. The mother was admitted to ITU.

During the events of the maternal cardiac arrest the obstetric team delivered a female baby. The baby was delivered within four minutes of maternal arrest. The APGAR scores for the baby were 3 at 1 minute, 4 at 5 minutes and 4 at 10 minutes. Arterial cord pH was <6.80. Venous cord sample could not be obtained. At birth the baby was limp with no spontaneous respirations but with a heart rate of >100. She was intubated, transferred to the local neonatal intensive care unit and passive cooling was initiated.

Investigations

The mother had blood tests carried out during her admission as listed on table 1.

The mother underwent an echocardiogram (ECHO) which showed normal bi-ventricular size and function. A CT pulmonary angiogram (CTPA) showed no evidence of a pulmonary embolism. However, bi-basal lung collapse and bilateral ground glass haziness was noted. She had several COVID 19 PCR tests which were negative. Histology report of the placenta, umbilical cord and membranes showed no signs of inflammation or infection.

	Day 0	Post	Day 2	post	Day 3	Post	Day 4	Post	Day 5	Post	Day 6	Post	Day 7	Post
	op		op		op		op		op		op		op	
Albumin	31		27		26		28				31		30	
ALT	16		15		19		24				42		32	
Adjusted calcium	2.47		2.25		2.16		2.17							
Creatinine	84		68		62		61		67		72		81	
Haemoglobin	116		107		93		91		98		100		99	
Hi Sens CRP	58.6		151.3		218.3		189.0		97.6		135.1		94.3	
INR	1.0		1.0		1.1		1.1							
Potassium	3.7		4.3		3.8		4.4		3.8		4.3		4.5	
Magnesium	0.72		0.81		0.71		0.70							
Sodium	135		133		136		142		139		139		136	
Platelet Count	140		140		140		171		263		296		311	
Mast cell Tryptase	2.0													

Outcome

The patient was extubated day one post-operatively. She was stepped down to ward-based care on day three post-operatively. The baby was extubated on day two post c-section. She underwent a brain MRI which showed no evidence of acquired injury. Both mother and baby were discharged on day nine post event.

Discussion

The UK Obstetric Surveillance System (UKOSS) has set out a diagnostic criterion for AFE³. This states that a diagnosis of AFE can be made if there is no other clear cause if there is presence of acute maternal collapse and one of more of: Seizure, acute fetal compromise, cardiac arrest, cardiac rhythm problems, coagulopathy, hypotension and shortness of breath³. Alternatively, the diagnosis can be made in women following post-mortem examination who have the presence of fetal squamous cells or hair in the lungs⁴. There are numerous differential diagnoses including anaphylaxis, eclampsia, pre-eclampsia, pulmonary embolism, cardiac pathologies and high/total spinal block were considered. CTPA did show evidence of ground glass appearance which is suggestive of early respiratory distress which is associated with AFE⁵⁻⁸. Therefore, CT imaging demonstrating ground glass changes could be a useful tool in diagnosing AFE alongside clinical findings.

Conclusion

CT imaging could be a useful tool in diagnosing AFE alongside clinical findings. To investigate this further following up the patient with an additional CT to track recovery. A case series to demonstrate such CT chest findings in cases of suspected AFE where the mother survives.

References

1. Knight M, Berg C, Brocklehurst P, et al. Amniotic fluid embolism incidence, risk factors and outcomes: a review and recommendations. BMC pregnancy and childbirth 2012.
2. Kaur K, Bhardwaj M, Kumar P, et al. Amniotic fluid embolism. Journal of Anaesthesiology, clinical pharmacology 2016.
3. Metodiev Y, Ramasamy P and Tuffnell D. Amniotic fluid embolism. BJA education 2018.
4. 4. Knight M, Tuffnell D, Brocklehurst P, et al. Incidence and risk factors for amniotic-fluid embolism. Obstetrics & Gynecology 2010.
5. Sivanandan S and Surendran A. Clinical A. Obstetric Anaesthesia 2019.
6. Plowman RS, Javidan-Nejad C, Raptis CA, et al. Imaging of pregnancy-related vascular complications. Radiographics 2017.
7. Imanaka H, Takahara B, Yamaguchi H, et al. Chest computed tomography of a patient revealing severe hypoxia due to amniotic fluid embolism: a case report. Journal of Medical Case Reports 2010.
8. Gonzalo-Carballes M, Ríos-Vives MÁ, Fierro EC, et al. A pictorial review of postpartum complications. Radiographics 2020.