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CASE REPORT

Cardiac Arrest in Pregnancy and Perimortem Caesarean Section: A Successful Outcome

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Abstract:

Sudden cardiac arrest in pregnancy is a complex terrifying event owing to the presence of two patients (mother and fetus) as well as need for immediate treatment. It's a high-stakes clinical scenario requiring immediate coordination between emergency physicians, obstetricians, and neonatal teams. This case report describes a successful outcome following cardiac arrest in a 28-year-old pregnant woman at 35 weeks gestation. Despite presenting with severe pre-eclampsia and subsequent asystole, immediate multidisciplinary intervention and Perimortem Cesarean Delivery (PMCD) resulted in the survival of both mother and infant.

Keywords: Pregnancy, Cardiac Arrest, Perimortem Caesarean Section.

1. Introduction:

Cardiac arrest during pregnancy is a rare but critical emergency with maternal & neonatal mortality upto 83% and 58% respectively [1]. It demands rapid, coordinated action from a multidisciplinary team well versed in the physiological adaptations of pregnancy and latest guidelines of maternal CPR [2]. PMCD is a life-saving intervention intended to improve maternal hemodynamics by relieving aortocaval compression and to provide a chance for neonatal survival. This case highlights the successful management of such an event in a Tier 3/4 town in India.

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2. Case Report:

Unbooked, 28 years old, Gravida 2 Para 1, previous normal vaginal delivery, attended Emergency Department of Krishna Vikash Multispeciality Hospital, a Tier 3/4 town in Western Odisha, India, at 35 weeks 3 days Gestational age with complaints of orthopnea, restlessness, facial puffiness. BP on arrival was 150/90 mm Hg. She was on Labetalol tablets as prescribed by her booked physician but was not taking it regularly. ABG on arrival showed metabolic acidosis with hypoxia.

The Multidisciplinary team (Obstetrician, Anaesthetist, Pulmonologist, OT, NICU) was alerted and patient was planned for Emergency LSCS after immediate intubation. While preparation for intubation was being made, patient suddenly developed bradycardia and went into asystole. The Emergency team started CPR, intubated the patient and a joint decision between Emergency Physician (EP) and Obstetrician in charge was made to perform PMCD immediately. LSCS was started within 10 minutes after this and a female infant was delivered within 2 minutes' post incision with Apgar score 3 at 1 minute. The baby was actively resuscitated by NICU team requiring 1 minute of CPR, was intubated and shifted to NICU.

Patient had ROSC after 1 full cycle of CPR.Immediate postoperative ECHO of the mother showed severe left ventricular dysfunction. She was shifted to ICU. In ICU, she required a fraction of inspired O2 (FiO_2 100%, PEEP of 6 cm H_2O, high doses of Norepinephrine, epinephrine sodium, bicarbonate, vasopressin, dobutamine, Lasix, broad spectrum antibiotics and thromboprophylaxis. Nephrology consultation was done in view of anuria and continuous renal replacement therapy was initiated.

Her clinical picture was consistent with severe pre-eclampsia resulting in pulmonary edema and cardiogenic shock. HRCT of thorax showed right gross and left moderate pleural effusion and dependent collapse consolidation of bilateral lower lobes. Pleural tapping was done and 600 cc of pleural fluid was drained. Over the next 4 days, the patient's oxygen requirements decreased and BP was stabilized. She was weaned off vasopressors ad her renal function improved and she was extubated.

Daily ABG were performed to taper off oxygen support. The patient was mobilized by Day 6 Postop and was shifted to the ward. Repeat ECHO on Day 10 showed improved left ventricular systolic function with 50 % ejection fraction, normal chamber size, no thrombus or vegetations.

The mother was discharged on Day 12 Postop with scheduled follow up visits at the Cardiology and Obstetric outpatient clinic. Her follow up visits were satisfactory with no fresh complaints. The baby was discharged on Day 21, her follow up visits showed normal growth and development with no morbidities.

3. Discussion:

Cardiac arrest in pregnant women is rare, it occurs one in every 36 000 maternities. The most common causes are heart disease (23%), thromboembolism (16%), epilepsy and stroke (13%), sepsis (10%), mental health conditions (10%), bleeding (8%), cancer (4%) and pre-eclampsia (2%). According to AHA 2020 guidelines for cardiopulmonary resuscitation (CPR), pre-eclampsia/eclampsia is one of the major causes of cardiac arrest in pregnancy.

Physiological changes in pregnancy as well as the complexity of treating a mother and a fetus simultaneously, while prioritising the life of the mother, make the management of maternal collapse complicated [3]. In this case, the patient's clinical picture of orthopnea, facial puffiness, and metabolic acidosis was indicative of severe pre-eclampsia resulting in acute pulmonary edema and cardiogenic shock.

The management of maternal cardiac arrest (MCA) demands a multidisciplinary team response that requires unique coordination among teams [4]. After the maternal cardiac arrest, the survival of both lives depends on several factors including the underlying reason for the arrest, site of the arrest, speed of resuscitation and skills of health care providers [5].

Perimortem Cesarean Delivery (PMCD) is indicated in a pregnant patient (Typically above 20 weeks

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gestation) who does not respond to initial resuscitative efforts within four minutes of arrest.

4. The Physiological Rationale for PMCD Includes:

Relief of Aortocaval Compression: This improves venous return and increases the efficacy of chest compressions during CPR.

Improved Ventilation: Emptying the uterus reduces intra-abdominal pressure, allowing for better diaphragmatic excursion during mechanical ventilation. This increases the chances of both maternal and neonatal survival and reduces the chance of maternal neurological damage [6,7]

In this case, the multidisciplinary team initiated the procedure within 10 minutes of asystole due to delay in equipment and OT personnel who had to bring the trolley from OT, with delivery occurring 2 minutes after the incision. Despite an initial neonatal Apgar score of 3, the rapid intervention by the NICU team and the relief of the mother's hemodynamic burden allowed for a successful Return of Spontaneous Circulation (ROSC) and eventual survival of both patients.

The patient's recovery required intensive multiorgan support, including Continuous Renal Replacement Therapy (CRRT) for anuria and high-dose vasopressors for severe left ventricular dysfunction. The improvement of the mother's ejection fraction from "severe dysfunction" to 50% by Day 10 post-op highlights the reversible nature of some forms of pregnancy-related cardiogenic shock when managed aggressively.

This case underscores the importance of the "four-minute rule" for PMCD; although the delivery occurred slightly outside this window, the immediate initiation of CPR and surgical intervention were pivotal for ROSC and neonatal survival.

5. Conclusion:

Rapid identification of deteriorating maternal status and the immediate availability of a multidisciplinary team (Obstetrics, Anesthesia, Pulmonology, and NICU) are essential for favourable outcomes in maternal cardiac arrest.

This case demonstrates that a successful outcome for both mother and child is possible following maternal asystole, even in a Tier 3/4 medical setting which again highlights the importance of multidisciplinary approach with trained personnel, ability to apprehend possible worse outcomes, emergency preparedness, rapid response and timely intervention contributed hugely to the survival of three lives.

6. Key Takeaways Include:

Multidisciplinary Preparedness: The early alerting of the Obstetric, Anesthesia, Pulmonology, and NICU teams was critical to the rapid response when the patient arrested.

Decisive Action: The joint decision between the Emergency Physician and Obstetrician to perform a PMCD immediately upon asystole was the turning point for resuscitation.

Post-Resuscitative Care: Comprehensive ICU management, including nephrology and cardiology follow-up, is essential to manage the multiorgan sequelae of severe pre-eclampsia and cardiac arrest.

7. Disclosures:

Author Contribution: Conducted perimortem cesarean delivery mentioned in the case report and wrote the whole manuscript

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