



## PMCS with twin pregnancy in a non-obstetric medical ICU- Time is life

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### ABSTRACT

Decision of perimortem caesarian section (PMCS) is always difficult specially in a non-obstetric critical care setting. A 32-year-old 2<sup>nd</sup> gravida women with EGA OF 34 Weeks and twin pregnancy was admitted to medical critical care unit of a tertiary care Centre with severe type 1 respiratory failure. Patient suffered a cardiac arrest soon after the admission. Decision of PMCS was taken after 3 minutes of high quality CPR with failure to achieve ROSC (Return of spontaneous circulation). PMCS was done within 5 minutes of cardiac arrest and both the babies were delivered within one minute of incision. Both the babies were discharged after 8 days of birth. The mother however could not survive died in the second event of cardiac arrest. The challenges of performing CPR in pregnancy, facilitating a "Twin Delivery" and managing neonatal resuscitations in an adult critical care unit are discussed in this report.

### INTRODUCTION

Cardiac arrest in pregnancy is one of the most challenging scenarios in a nonobstetric setting. Critical care physicians and first responders must have clear knowledge of maternal mortality to react briskly in such situations. Maternal mortality is defined as the death of woman during pregnancy and up to 42 days after delivery or termination of pregnancy, provided that the cause of death is related to or aggravated by pregnancy [1]. The current MMR (Maternal Mortality rate) in India is a recent data from US suggest that cardiac arrest occurs in 1:12000 females admitted for delivery. Worldwide 800 deaths occur every day [2,3]. PMCD is defined as the birth of the fetus after maternal cardiac arrest, commonly during resuscitation. The purpose of timely perimortem delivery is twofold [1]. The first is facilitation of resuscitation of the mother. Second, the timely delivery of baby ensures decreased risk of permanent early and late neurological deficits [1]. Numerous case reports have proven that PMCD during maternal cardiac arrest resulted in ROSC or improvement in maternal hemodynamics only after uterine evacuation [4-14].

### CASE REPORT

A 32 yrs old second gravida Muslim female with twin pregnancy was referred to our hospital with severe breathlessness

and type 1 respiratory failure. On presentation to Emergency department her GCS was E3V4M6, her respiratory rate was 45 per minute and she was maintaining 82% saturation in 12 lts oxygen by Non-rebreathing mask. Her B.P was 90/50 and H.R was 140 bpm. FHS (FOETAL HEART SOUNDS) were not audible on auscultation. Patient was transferred to the intensive care unit after initial stabilization and securing definitive airway. Our hospital is a 100-bedded tertiary care hospital which is non-teaching institute. The superspecialties are handled by single consultants with minimal support of trained junior doctors.

Patient was put on PCV mode with FiO<sub>2</sub> of 1, Inspiratory pressure of 30 and PEEP of 8. However, she was maintaining Spo<sub>2</sub> of 80-85% and ABG was suggestive of Respiratory acidosis and PO<sub>2</sub> of 60%. An urgent bedside CXR (WITH ABDOMINAL SHIELD) (image 1). USG abdomen confirmed the viability of both the fetuses. She was on norepinephrine infusion at high rate of 20 mcg per minute and dopamine infusion of 15 mcg/kg/min. The obstetrician was immediately informed and all the essential obstetric and neonatal resuscitation measures were summoned. Left uterine displacement was given manually.

However, within fifteen minutes of her presentation to ICU she developed bradycardia (H. R=30) followed by asystole. High quality CPR was started at the onset of bradycardia while one person maintained the left uterine displacement. After 4 minutes

of failure to achieve ROSC, decision of PMCS was taken. The obstetrician performed bedside LSCS using phenesteil incision. High quality CPR as per the ACLS protocols was continued during the procedure.

Baby girl 1 was born in CRA (Complete cardiac arrest) with APGAR score of 1 at birth. Unfortunately, pediatrician was not available in the hospital and the neonate had to be resuscitated by intensive care team. The baby was immediately intubated and ROSC was achieved after 5 mins of continuous CPR. Baby was then transported to NICU and was put on ventilatory support and other supportive care. Baby girl 2 was also born in CRA with APGAR SCORE OF 1 and followed the same course as baby 1. The neonatologist took over the charge of the specialist care from there on. Both the babies were discharged on the 7<sup>th</sup> day of birth with no apparent neurological deficits. However, the mother succumbed to the second cardiac arrest 1 hour after the birth of the babies.

## DISCUSSION

The critically ill are often managed in non-obstetric areas like medical and cardiac ICUs. Anticipating the emergency, well in time these teams should prepare themselves considering following points[15]

1. Education of staff to manage maternal cardiac arrest specially the importance of LUD
2. Preperation of PMCD- Arrangement of necessary equipment and alert the obstetrician
3. Preparation of obstetric complications like PPH and Eclampsia- Drugs like oxytocin and prostaglandin F<sub>2α</sub>, Magnesium sulphate
4. Rapid decision about the fetal viability- Estimation and documentation of gestational age and alerting the neonatology team.

The unstable pregnant patient should be in left lateral decubitus position to relieve aortocaval compression. Maternal hemodynamics must be optimized, hypoxemia must be treated and intravenous access must be established above the diaphragm<sup>16</sup>. Our patient was unstable right from the presentation and despite all the above precautions, she suffered a cardiac arrest shortly after admission to ICU. Our ICU usually caters very sick medical patients but performing CPR in a pregnant patient and PMCS was a great challenge for intensivists, nurses and supportive staff.

Protocol for chest compressions in a pregnant patient remains the same as any other adult patient with compression to ventilation ratio of 30:2 and rate of 100 breaths per minute. [17]

Patient was kept in supine position with CPR board underneath. It is recommended to give manual LUD to relieve aortocaval compression and the same was implemented during the whole resuscitation period. In olden days left body tilt was used for the same purpose, but Rees and Willis<sup>18</sup> found that even at 30° tilt the chest compression was not effective while IVC continued to be compressed. As per the AHA protocols defibrillation should be promptly delivered without hesitation in pregnant patients also. However, our patient never had shockable rhythm, therefore no DC shock was delivered to the patient.

Hypoxemia develops very rapidly in a pregnant patient; therefore, higher partial pressure of oxygen is required to maintain arterial oxygenation as compared to nonpregnant

patients. In the 2010 guidelines for CPR, the recommendations note early supplementation of 100% oxygen. Our patient was in severe type 1 respiratory failure and required Fio<sub>2</sub> of 1 to maintain a PO<sub>2</sub> of 60 mmHg, which is inadequate for a pregnant patient. The patient was ventilated with tidal volume of 8 ml/kg, PEEP of 10 and her Peak inspiratory pressures were 35 mmHg. Still, patient was able to maintain only 80-85% of oxygen saturation.

There are numerous causes of cardiac arrest in pregnancy which include anesthetic complications, bleeding, trauma, sepsis and cardiovascular causes like cardiomyopathy, vascular diseases and congenital anomalies. Embolic causes play a vital role in maternal mortality. Amniotic fluid embolism, venous air embolism and thromboembolic CVA usually precipitate during labor. Pulmonary thromboembolism however can occur in any phase of peripartum period. However since we did not have time for further investigations as the patient had immediately gone into cardiac arrest, based on history and clinical scenario we suspect the likelihood of pulmonary embolism to be high and the cause of mortality.

The 5-minute window that providers have to determine whether cardiac arrest can be reversed by BLS and ACLS was first described in 1986 and has been adopted in obstetric guidelines<sup>19</sup>. It was recommended that PMCD should begin at 4 minutes to effect delivery at 5 minutes after failed resuscitative efforts. This time interval was chosen to minimize the risks of neurological damage, which begins to develop after 4 to 6 minutes of cardiac arrest if there is no ROSC.[20]

## CONCLUSION

In conclusion, to improve the maternal and fetal outcomes following cardiac arrest, there is a need to increase the awareness of urgency of point of care response among first responders. This is achievable if key interventions like correctly performed CPR following up to date protocols for parturients. We believe that, adherence to the protocols for timely intervention saved the fetuses and we strongly recommend following these ACLS guidelines in such a situation.

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