



## "PREGNANCY WITH CARDIAC ARREST IN THE EMERGENCY DEPARTMENT: CASE REPORT"

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### ABSTRACT

Cardiac arrest in pregnancy is an uncommon encounter. Here we present, one such patient and a detailed account of how we managed the patient. A 24-year-old, third-trimester pregnant female presented with a history of polytrauma following a road traffic accident. On initial assessment, she was in cardiac arrest. We initiated high-quality cardio-pulmonary resuscitation (CPR) as per advanced cardiac life support (ACLS) protocol. We also performed a perimortem caesarean section within four minutes of cardiac arrest. A male baby was delivered who did not have any signs of life. Neonatal resuscitation was initiated. However, both the mother and the child could not be revived. Cardiac arrest in pregnancy is a unique scenario in resuscitation, and all emergency physicians should know the key highlights in managing such patients.

### KEYWORDS :

#### Case Presentation

A 24-year-old, 36-week pregnant lady, the pillion rider, sustained a road traffic accident. The patient was initially treated at a secondary care centre and was referred to us after 3 hours. She was a multiparous lady, G2P1, with the current pregnancy due in 36 weeks. The patient was found to be in cardiac arrest when received in emergency. Cardiopulmonary resuscitation (CPR) was initiated as per advanced cardiac life support (ACLS) protocols.

The cardiac monitor showed pulseless electrical activity (PEA). After 4 cycles of CPR, the return of spontaneous circulation (ROSC) was achieved. However, after ROSC, the primary survey as per ATLS was carried out. The airway was already secured with an endotracheal tube. Breathing was intact with bilateral equal chest rise with no sign of any chest injury, and the saturation was 100%.

Circulation was inadequate with a heart rate of 132/min and blood pressure of 80mmHg systolic. Hence O negative whole blood was transfused, and the blood bank was alerted for massive transfusion protocol. Urgent call was sent to the duty Obstetrics and Pediatrics team, and fetal ultrasound was done, which showed no cardiac activity.

Meanwhile, the patient went into cardiac arrest, and hence CPR was initiated as per ACLS protocol. Simultaneously arrangements for perimortem C-section were made. After four minutes of CPR, the duty obstetricians proceeded with a perimortem C-section. A lower segment caesarean section was performed with a Pfannenstiel incision.

A lower segment incision in the uterus and a term male fetus was delivered who was fully cyanosed with no cardiac activity. A team of pediatricians resuscitated the fetus, whose attempts were unfruitful. The opened uterus and abdominal cavity were packed and left. High-quality CPR was being continued during the whole procedure and after the procedure.

CPR was performed for about 60 minutes. However, both maternal and fetal resuscitation went unsuccessful. No ROSC was achieved. Hence both the mother and baby were declared dead.

#### DISCUSSION

Timely recognition of pregnant women at risk of potentially life-threatening conditions plays an important role in the appropriate institution of treatment in patient management and triage.

#### Management of the Unstable Pregnant Patient

The patient should be placed in a *full left lateral decubitus position* to relieve aortocaval compression.<sup>1</sup>

Administration of 100% oxygen by face mask to treat or prevent hypoxemia is recommended. *Intravenous access* should be established *above the diaphragm* to ensure that the intravenously administered therapy is not obstructed by the gravid uterus. Precipitating factors should be investigated and treated. *Nurses* are often *first responders* in arrest. Rapid mobilization of expert resuscitation teams and *BLS performed competently until the arrival of these teams* give the woman the best chance for ROSC.

Initiate the usual resuscitation measures simultaneously, including

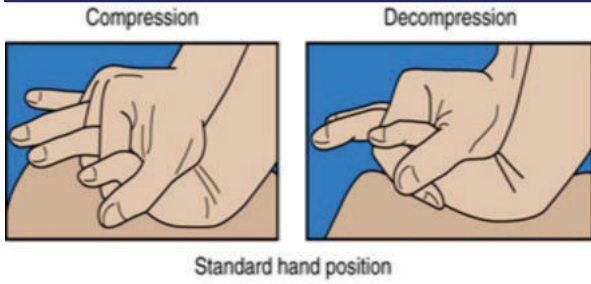
- placement of the backboard
- provision of chest compressions
- appropriate airway management
- defibrillation when appropriate
- manual left uterine displacement (LUD).
- To accomplish all tasks effectively, a minimum of 4 *BLS responders* should be present.

#### Chest Compressions in Pregnancy

For high-quality chest compressions

- the patient must be supine on a hard surface<sup>2</sup>
- the rescuer's hands must be placed correctly
- correct rate and depth of compressions
- interruptions must be minimized.
- The rescuer should place the heel of 1 hand on the center (middle) of the victim's chest (the lower half of the sternum) and the heel of the other hand on top of the first so that the hands overlap and are parallel

Chest compressions performed with the patient in a tilt could be significantly less effective than in the usual supine position. There is no scientific evidence to support changing the recommendation for hand placement for chest compressions in the pregnant patient compared with the nonpregnant patient.



**One hand & Two hand technique**

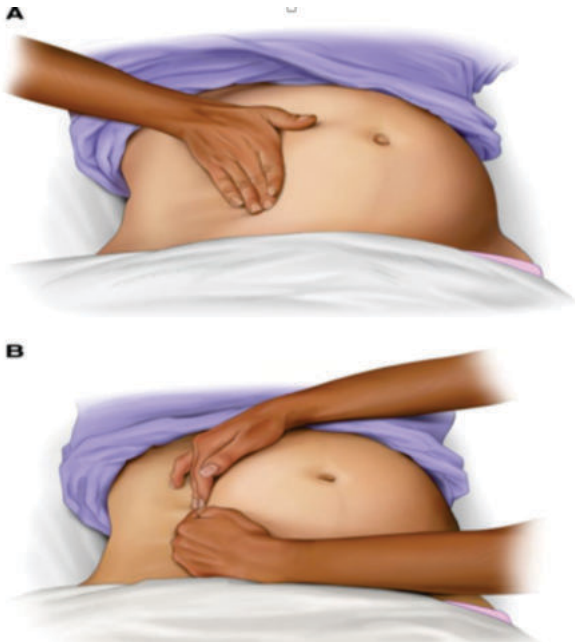


**Manual LUD**

Manual LUD causes

- Less hypotension<sup>3</sup>
- easier access for airway management
- easier access for defibrillation

The rescuer must be careful not to inadvertently push down which would increase the amount of IVC compression and negatively affect maternal hemodynamics.

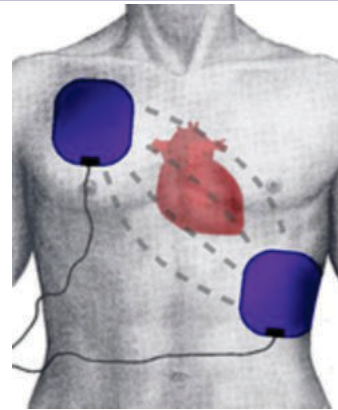


- A. Manual LUD by the 1-handed technique from the right of the patient
- B. Manual LUD by the 2-handed technique from the left of the patient

**Defibrillation**

Prompt application of defibrillation in the setting of VF/ VT is critical to maximize the likelihood of survival. *This is no different in the pregnant patient.*

- Application of defibrillation and cardioversion shocks to the maternal chest would be expected to pass minimal energy to the fetus and is considered safe in all stages of pregnancy.<sup>4</sup> Defibrillation would be unlikely to cause electric arcing to fetal monitors



- The patient should be defibrillated with biphasic shock energy of 120 to 200 J
- Compressions should be resumed immediately delivery of the electric shock
- For in-hospital settings where staff have no ECG rhythm recognition skills or where defibrillators are used infrequently such as in an obstetric unit, the use of an automated external defibrillator may be considered.
- Anterolateral defibrillator pad placement is recommended as a reasonable default. The lateral pad/paddle should be placed under the breast tissue, an important consideration in the pregnant patient.
- The use of adhesive shock electrodes is recommended to allow consistent electrode placement.

**Maternal Risk Factors**

B – Bleeding (hemorrhage) / DIC
E – Embolism (coronary/ pulmonary/ amniotic fluid)
A – Anaesthetic complications
U – Uterine atony
C – Cardiac diseases ( MI/ ischemia/ aortic dissection/ cardiomyopathy)
H – Hypertension (pre eclampsia/ eclampsia)
O – Others/ 5H's and 5T's
P – Placenta praevia/ abruptio placenta
S – Sepsis

**ACLS**

- The ACLS maternal cardiac arrest team will continue BLS tasks
- Perform advanced airway management
- Insert an intravenous access above the diaphragm
- Administer the usual ACLS drugs and doses
- With the arrival of the obstetric and neonatal teams, preparation for PMCD can begin.
- The cause of the arrest needs to be considered and addressed as necessary.

**PMCD**

The critical point to remember is that both mother and infant may die if the provider cannot restore blood flow to the mother's heart.

The purpose of timely perimortem delivery

- Facilitation of resuscitation – relieving aorticaval compression by emptying the uterus significantly improves resuscitative efforts.
- Early delivery of the baby – decreased risk of permanent neurological damage from anoxia.

*In situations in which the mother is nonresuscitatable (e.g. severe trauma is present), timely delivery of the fetus is essential*

**Timing of PMCD**

This time interval was chosen to minimize the risks of

neurological damage, which begins to develop after 4 to 6 minutes of anoxic cardiac arrest if there is no ROSC.<sup>5</sup>

Survival of the mother has been reported with PMCD performed up to 15 minutes after the onset of maternal cardiac arrest.<sup>6,7,8</sup>

*If PMCD could not be performed by the 5-minute mark, it was still advisable to prepare to evacuate the uterus*

#### **Vaginal Delivery During Maternal Cardiac Arrest**

- Obstetric caregivers conduct a vaginal examination
- (CPR is being performed by the medical team)
- Cervix is found to be fully dilated and the fetal head is at an appropriately low station

Immediate assisted vaginal delivery can be considered

#### **Immediate Post-arrest Care**

- If the patient is still pregnant, she should be placed in the full left lateral decubitus position, provided that this does not interfere with additional management issues such as monitoring, airway control, and intravenous access (else manual LUD should be maintained continuously)
- The patient should be transferred to the ICU unless an operation is required
- Multidisciplinary care must continue
- The cause of the arrest should continue to be considered and treated accordingly

#### **CONCLUSION**

Resuscitation of a pregnant patient is not one of the commonly encountered scenarios in the ED. Neither is trauma in near-term pregnancy. However, with the increasing incidence of motor vehicle accidents, these scenarios could change. Hence, all emergency physicians and primary care providers need to know about ACLS recommendations and modifications for pregnant patients. Also, all emergency rooms should be equipped to do an emergency perimortem C-section, and all emergency physicians must be trained to do the procedures. Serial simulation-based training and training in manikins and involving a senior emergency physician who has handled such scenarios and involving other specialties like obstetrics and pediatricians can increase the chances of successful resuscitation.

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