

EMERGENCY RESPONSE FOR THE CRITICALLY ILL OBSTETRICAL PATIENT

Potential Etiology for Maternal Cardiac Arrest:

- Anaesthetic Complication
- Bleeding
- Cardiovascular
- Drug
- Embolic
- Fever
- General nonobstetric causes of cardiac arrest (H's and T's)
- Hypertension

EMERGENCY RESPONSE:

1. Anticipate rapid respiratory decline and difficult airway

- Provide 100% oxygen early
- Obtain difficult airway cart and prepare equipment
- Page OB-Anaesthesia STAT; intubation or support for intubation by OB anaesthesia

2. IV Therapy Above the Abdomen

- Maintain adequate IV access above the diaphragm

MATERNAL CARDIAC ARREST:

3. Hand Position and Uterine Displacement Technique During CPR

- CPR should be performed with hands in the standard position as recommended for non-pregnant patients.
- Manual left lateral uterine displacement should be maintained continuously using either one-handed (pushing with one hand from the patient's right side) or two-handed (pulling from the left side using two hands) technique. Lateral bed tilt is not recommended as it makes effective CPR more difficult.

In a 2015 study, 34 healthy pregnant women were evaluated with cardiac MRI in the third trimester and again at a minimum of 3 months Postpartum (to determine baseline position). No significant vertical displacement of the heart was identified. Third trimester evaluations were done in the one-half left lateral displacement position^{1,2}.

A 2017 combined swine and mannequin simulation study examined compression quality in supine, supine with manual left lateral uterine displacement, supine with 30 degree left lateral positioning and supine with 30 degree right lateral rotation, Hand position accuracy, depth of compressions and coronary perfusion was significantly better when in supine position with manual left lateral displacement. Responders also found compressions easiest to perform in this position^{1,3}.

4. Remove Fetal Monitoring during Cardiac Arrest

- Remove internal (OBCU nurse will be present) and external monitor

5. Perimortem Cesarean Section

- Perimortem Cesarean Section should be initiated at 4 minute following initiation of CPR if no Return of Spontaneous Circulation (ROSC)

In maternal cardiac arrest where there is a “visibly gravid uterus”, vena caval and aortic compression may compound maternal circulatory collapse, regardless of fetal viability despite manual uterine displacement.

When cardiorespiratory deterioration in a pregnant patient is evident, a CODE OB should be called early. The duration of maternal shock and hypoxemia prior to cardiac arrest correlates to both maternal and fetal outcome.

The primary purpose of a Perimortem Cesarean Section is effective maternal CPR/circulation. Maternal survival and/or prompt reversal of shock correlates to neonatal outcome¹.

A 2013 simulation study was consistent with previous published data regarding the diminished effectiveness of CPR during patient transport. When a perimortem cesarean delivery is indicated, it should be performed prior to patient transport whenever possible^{1,4}.

6. Antidote to Magnesium Toxicity Induced Arrest

- If the patient is receiving magnesium sulphate at the time of cardiac arrest, the infusion should be stopped and 10 ml of calcium chloride 10% or 20 ml calcium gluconate 10% administered.

7. Standard ACLS

Provide all other standard ACLS interventions including defibrillation, cardioversion and medications. Maternal survival is always the first priority.

Vasopressin may cause uterine contractions. Consultation with Obstetrics required.

8. Consider Possible Causes for Persist Arrest or Shock

Causes for ongoing maternal cardiac arrest or shock should be sought out and treated. The BEAU-CHOPS mnemonic may be a helpful way to think of other causes during resuscitation of a pregnant patient.

Bleeding/DIC
Embolism cardiac/pulmonary/amniotic fluid
Anaesthetic complications
Uterine atony
Cardiac disease: MI/ischemia/aortic dissection/cardiomyopathy
Hypertension/preeclampsia/eclampsia
Other: All the standard ACLS guidelines (Hs and Ts)
Placental abruptio, previa
Sepsis

9. Emergency response at Victoria Hospital are divided into 3 situations below:

1. **Code OB:** activated when BOTH maternal and neonatal resuscitation may be required. This would include maternal cardiac arrest or any emergency in a pregnant woman where birth could be imminent.
2. **STAT OB Page:** for Postpartum emergencies or emergencies where gestation age is non-viable or uterus is below the umbilicus (neonatal resuscitation is not a consideration).
3. **Massive Transfusion Pathway:** may be required for any antenatal or Postpartum hemorrhage.

NOTE: there is no CODE OB at University Hospital. A CODE Blue plus STAT call to General Surgery should be made.

11. CODE OB:

Code OB is indicated when a multidisciplinary team is needed urgently, to respond to a life-threatening maternal event with high likelihood of risk to, or imminent delivery of a potentially viable fetus. Code OB should not be used if neonatal resuscitation is not desired (see #2).

Indications: Maternal Cardiac Arrest if the fundal height is at or above the umbilicus (regardless of fetal viability), or if there is potential IMMEDIATE or unplanned birth of a viable fetus.

In CCTC, emergency delivery (vaginal and C-Section) and neonatal resuscitation equipment will be maintained at the bedside at all times for gestational age > 23 weeks or as directed by Obstetrics.

Emergency Response:

- a. Continue maternal CPR and ACLS protocol. Review modifications above.
- b. Dial 55555 and request "**CODE OB**". CALL BEFORE THE PATIENT ARRESTS IF CONDITION IS DETERIORATING!

"Code OB" will activate all of the following pagers (DO NOT ASK FOR THESE PAGERS INDIVIDUALLY):

- Obstetrical resident
- OB/GYN Consultant on-call
- OB Anaesthesia Resident on-call
- OB Anaesthesia Consultant on-call
- Obstetrical Care Unit Charge Nurse
- NICU senior resident or nurse practitioner
- NICU RN
- NICU RRT
- NICU Charge Nurse
- PCCU resident
- Pediatric Rapid Response Team (PCCOT)
- Adult Code Blue
- CCOT

- c. Ensure infant warmer is on (manual). Turn on infant wall suction
- d. Ensure someone is stationed at **both** locked doors to provide access and directions by emergency teams.

- e. PCCU will usually arrive before NICU due to geography. They will provide initial neonatal resuscitation as required. The NICU team will take over the neonatal resuscitation upon their arrival.
- f. Assign one member of the team to “crowd control”. Be firm. No one should enter the maternal or neonatal resuscitation room who does not have a specific task. All others need to be instructed to leave the room and Bay.

If you have extra help, they may be needed to care for other patients.

Thank those who are not needed and release them (e.g., CCU team).

2. EMERGENCY OBSTETRICAL RESPONSE WHERE NEONATAL RESUSCITATION WOULD NOT BE REQUIRED:

This includes any maternal emergency where an obstetrician’s support is required urgently, but neonatal resuscitation is not desired. This could include antenatal hemorrhage with a non-viable fetus or Postpartum hemorrhage.

- a. Continue maternal resuscitation
- b. Dial 55555 and request **all** of the following individuals STAT (**do not use OB STAT if a decision has been made not to offer neonatal resuscitation**).
 - i. STAT OB Resident
 - ii. STAT OB Consultant
 - iii. STAT OB Anaesthesia Resident
 - iv. STAT OB Anaesthesia Consultant
 - v. STAT OBCU Charge Nurse
- c. Ensure someone is stationed at both locked doors to provide access to emergency teams

3. MATERNAL HEMORRHAGE:

A physician must contact the Blood Transfusion Lab to activate the Massive Transfusion Pathway. Be sure to identify this as an obstetrical bleed and consider ordering fibrinogen replacement early (cryoprecipitate is currently the usually ordering standard).

Unlike the Trauma Pathway, blood transfusion lab will ensure products are available and keep up with your needs, but each product will require a physician order (in Trauma Pathway, BTL automatically releases them per protocol).

It is essential to assign a “runner” who will run to the BTL for blood products once the pathway is activated. [Activate the Massive Transfusion Pathway Kit](#).

4. Neonatal Delivery, Fetal Death or Stillbirth

The determination of stillbirth is based on a combination of gestational age and the presence or absence of breathing. The Obstetrical Care Unit (OBCU) will look after all of the requirements (including: paper work, memory box, contact of on-call photographer, baby presentation to family etc). This may include notification of NICU. The social worker from OBCU may also be involved.

References

MRI evaluation of maternal cardiac displacement in pregnancy: implications for cardiopulmonary resuscitation. [Am J Obstet Gynecol](#). 2015 Sep;213(3):401.e1-5. doi: 10.1016/j.ajog.2015.05.018. Epub 2015 May 14.

1. Farida M. Jeejeebhoy et al. (2015). Cardiac arrest in pregnancy: A scientific statement from the American Heart Association. *Circulation*. 2015;132:1747-1773. DOI: 10.1161/CIR.0000000000000300
2. Holmes S, Kirkpatrick ID, Zelop CM, Jassal DS. MRI evaluation of maternal cardiac displacement in pregnancy: implications for cardiopulmonary resuscitation. *Am J Obstet Gynecol*. 2015 Sep;213(3):401.e1-5. doi: 10.1016/j.ajog.2015.05.018. Epub 2015 May 14. PubMed PMID: 25981849.
3. Dohi S, Ichizuka K, Matsuoka R, Seo K, Nagatsuka M, Sekizawa A. Coronary perfusion pressure and compression quality in maternal cardiopulmonary resuscitation in supine and left-lateral tilt positions: A prospective, crossover study using mannequins and swine models. *Eur J Obstet Gynecol Reprod Biol*. 2017 Sep;216:98-103. doi: 10.1016/j.ejogrb.2017.07.019. Epub 2017 Jul 16. PubMed PMID: 28743074.
4. Lipman SS, Wong JY, Arafeh J, Cohen SE, Carvalho B. Transport decreases the quality of cardiopulmonary resuscitation during simulated maternal cardiac arrest. *Anesth Analg*. 2013 Jan;116(1):162-7. doi: 10.1213/ANE.0b013e31826dd889. Epub 2012 Dec 7. PubMed PMID: 23223106.