



## Perimortem C-section

**Effective Date: 03/05/2025**

**Retires Policy Dated: N/A**

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- Call a MATERNAL code blue for early notification of OB and NICU and OB anesthesia provider is accomplished
- If the uterus is at or above the umbilicus, manually displace the uterus laterally and to the left to minimize aortocaval compression
- Prepare for quick bedside ultrasound by qualified OB-GYN if indicated or viability is uncertain, or fundal height is difficult to discern
- A dedicated timekeeper should alert the team when 4 minutes have elapsed after maternal arrest. If no return of spontaneous circulation with the usual resuscitation measures and the uterine fundus is at or above the umbilicus, at four minutes begin perimortem cesarean birth and complete delivery of the newborn by five minutes following arrest
- Cesarean section recommended if spontaneous maternal circulation has not returned within 4 minutes of maternal collapse and delivery by 5 minutes – normal neonatal neurological outcome is most likely when delivery was completed within 5 minutes of maternal collapse
- If the uterus is at or above the umbilicus, ineffective resuscitation may become effective when the uterus is no longer gravid and potentially causing aortocaval compression
- Although counterintuitive to operate on a hemodynamically unstable patient, c-section may be lifesaving for both mother and fetus in this situation. Given these variables perimortem hysterotomy is a reasonable option for pregnancies >20 weeks of gestation/uterine size at or above the umbilicus to relieve aortocaval compression and facilitate spontaneous return of circulation regardless of fetal status (alive or demised)
- Transporting the patient to the operating room is not a priority. Emergency c-section delivery kit with basic supplies can be utilized at the location of the maternal arrest
- Midline vertical incision recommended to provide fast entry, adequate uterine exposure, and to access the diaphragm which may be useful for further resuscitative interventions. Vertical uterine incision starting just above the rectouterine peritoneal fold on the lower uterine segment to avoid performance of a bladder flap. Incision extended superiorly toward the fundus with bandage scissors to create a sufficiently large opening to extract the fetus. Surgeons may consider transverse hysterotomy with blunt extension if delivery can be rapidly performed (i.e. term patient, laboring uterus).
- Can consider operative vaginal delivery if can be completed safely and within 5-minute window
- Extraction of placenta and closure of hysterotomy are important steps in maternal resuscitation



- Pregnancy considerations
- Both intubation and bag mask ventilation can be more difficult in the late stages of pregnancy due to narrowing of upper airways (particularly third trimester) and decreased thoracic compliance
- Pregnant patients are at increased risk of rapidly developing hypoxemia because of decreased functional residual capacity and increased oxygen consumption as well as increased intrapulmonary shunting
- A large uterus (fundus above umbilicus) that elevates the diaphragm may increase resistance to ventilation. Lower ventilation volumes (350-500 mL) are used compared with non-pregnant females (600 ml)
- In pregnancy, non-physiologic respiratory alkalosis) normal pregnancy is associated with mild respiratory alkalosis) can cause uterine vasoconstriction which can lead to fetal hypoxia and acidosis
- Chest compression technique is the same as non-pregnant adults< high quality chest compressions should continue uninterrupted until spontaneous return of circulation
- IV access should be established above the diaphragm since drug administration via the femoral vein may not reach the maternal heart until the fetus has been delivered.
- Manual uterine displacement is recommended to avoid aortocaval compression and to preserve supine positioning of the upper torso for optimal compression vector forces. A hand is used to apply maximal leftward push to the upper right border of the uterus to achieve displacement of approx. 1.5 inches from the midline (avoid pushing the uterus downward). If manual uterine displacement is not possible, position patient to achieve a tilt of no more than 30 degrees
- Left lateral uterine displacement is necessary in the pregnant patient with fundal height at or above the umbilicus to minimize aortocaval compression 9 supine hypotensive syndrome), optimize venous return (preload) and generate adequate stroke volume during CPR
- Current energy requirements for adult defibrillation are appropriate for use in pregnant patients
- Before delivering the shock, remove fetal monitoring equipment to prevent electrocution injury to the patient or rescuers
- All medications (including amiodarone) used for treatment of cardiac arrest in the non-pregnant patients are used in the pregnant patient at the same doses
- In general, the status of the mother should guide management during the resuscitation process. If the status of the mother is poor and deteriorating, the status of the fetus will be further compromised. Therefore, fetal heart rate monitoring is not recommended during the recusation process
- If CPR is successful and the mother becomes hemodynamically stable, fetal heart rate monitors can be applied to access status of a fetus who is at a potentially viable gestational age

Version Control Record			
Version	Date	Author / Reviewer	Description of Changes
1	03/05/2025	Paul Wisniewski, D.O. Sarah Noppen, M.D.	Initial review and update to reflect latest evidence/practice



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