
Management of Cardiac Arrest in the Parturient

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Etiology of Maternal Death

- Cardiac arrest: 1 in 30,000 (۱:۲۰,۰۰۰) deliveries.
- After CPR survival rate of 6.9%.
- Higher risk: adv maternal age, race, lack of prenatal care, unwed mothers
- **PE**: most common **medical** cause
- **Homicide**: most common **overall** cause

Key Interventions to Prevent Arrest in critically Parturient (Class I):

- ***Place the patient in the full left-lateral position*** to relieve possible compression of the inferior vena cava.

- ***Give 100% oxygen.***

- ***Establish intravenous (IV) access above the diaphragm.***

- ***Assess for hypotension***; maternal hypotension that warrants therapy has been defined as a ***systolic blood pressure <100 mm Hg or 80% of baseline.***

In the patient who is not in arrest, both crystalloid and colloid solutions have been shown to increase preload.

- ***Consider reversible causes of critical illness and treat*** conditions that may contribute to clinical deterioration as early as possible.

Etiologies of Maternal C/P arrest

● Obstetric

- Hemorrhage*
 - Uterine atony
 - Placental abruption/previa
 - DIC
- HTN*
- Amniotic fluid embolism

● Iatrogenic

- Failed intubation
- Aspiration
- IV local anesthetic OD
- Drug error, Overdosis, allergy
- Mg Toxicity

Etiologies of Mat C/P arrest (cont'd)

- **PE****

- Thrombus
- Air
- Fat

- **Trauma**

- Homicide*
- Suicide

- **Infection/Sepsis***

- **Stroke**

Modifications of Basic and Advanced Life support for pregnant victims (1)

1 – Airway Management.

2 – Uterin Displacement.

3 – Deeper Chest Compression.

4 – Deliver within 5 min .

Modifications of Cardiovascular Life Support (2)

- **positive-pressure ventilation (BMV) with O₂%100**
Continuous cricoid pressure
- **chest compressions**
should be performed slightly above the midpoint of the sternum
- **Intubation** as early as possible
(0.5-1.0 mm smaller ETT)
- **tidal volume**
may need to be reduced because of elevation of the diaphragm.

Maternal Cardiac Arrest

First Responder

- Activate maternal cardiac arrest team
- Document time of onset of maternal cardiac arrest
- Place the patient supine
- Start chest compressions as per BLS algorithm; place hands slightly higher on sternum than usual

Subsequent Responders

Maternal Interventions

Treat per BLS and ACLS Algorithms

- Do not delay defibrillation
- Give typical ACLS drugs and doses
- Ventilate with 100% oxygen
- Monitor waveform capnography and CPR quality
- Provide post-cardiac arrest care as appropriate

Maternal Modifications

- Start IV above the diaphragm
- Assess for hypovolemia and give fluid bolus when required
- Anticipate difficult airway; experienced provider preferred for advanced airway placement
- If patient receiving IV/IO magnesium prearrest, stop magnesium and give IV/IO calcium chloride 10 mL in 10% solution, or calcium gluconate 30 mL in 10% solution
- Continue all maternal resuscitative interventions (CPR, positioning, defibrillation, drugs, and fluids) during and after cesarean section

Obstetric Interventions for Patient With an Obviously Gravid Uterus*

- Perform manual left uterine displacement (LUD)—displace uterus to the patient's left to relieve aortocaval compression
- Remove both internal and external fetal monitors if present

Obstetric and neonatal teams should immediately prepare for possible emergency cesarean section

- If no ROSC by 4 minutes of resuscitative efforts, consider performing immediate emergency cesarean section
- Aim for delivery within 5 minutes of onset of resuscitative efforts

*An obviously gravid uterus is a uterus that is deemed clinically to be sufficiently large to cause aortocaval compression

Search for and Treat Possible Contributing Factors (BEAU-CHOPS)

Bleeding/DIC
Embolism: coronary/pulmonary/amniotic fluid embolism
Anesthetic complications
Uterine atony
Cardiac disease (MI/ischemia/aortic dissection/cardiomyopathy)
Hypertension/preeclampsia/eclampsia
Other: differential diagnosis of standard ACLS guidelines
Placenta abruptio/previa
Sepsis

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Maternal cardiac arrest algorithm

Limiting Aortocaval Compression

- 1) Manually displace uterus to LEFT
- 2) Tilt pt 15-30° on tilttable
- 3) Place roll or Cardiff wedge under pt's right hip/flank
- Consider “human wedge” bystander CPR





Vanden Hoek T L et al. Circulation 2010;122:S829-S861



Vanden Hoek T L et al. Circulation 2010;122:S829-S861



30°

Vanden Hoek T L et al. Circulation 2010;122:S829-S861

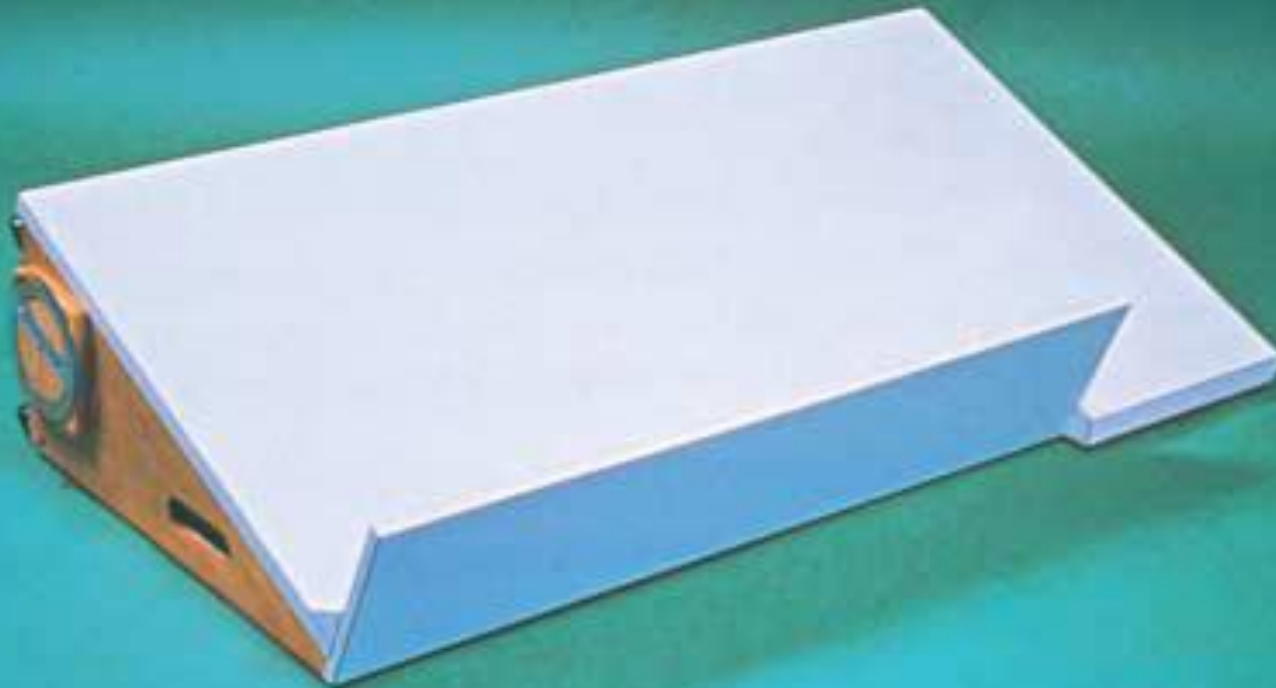
Use of an upturned chair and pillow as a wedge



Cardiff Wedge



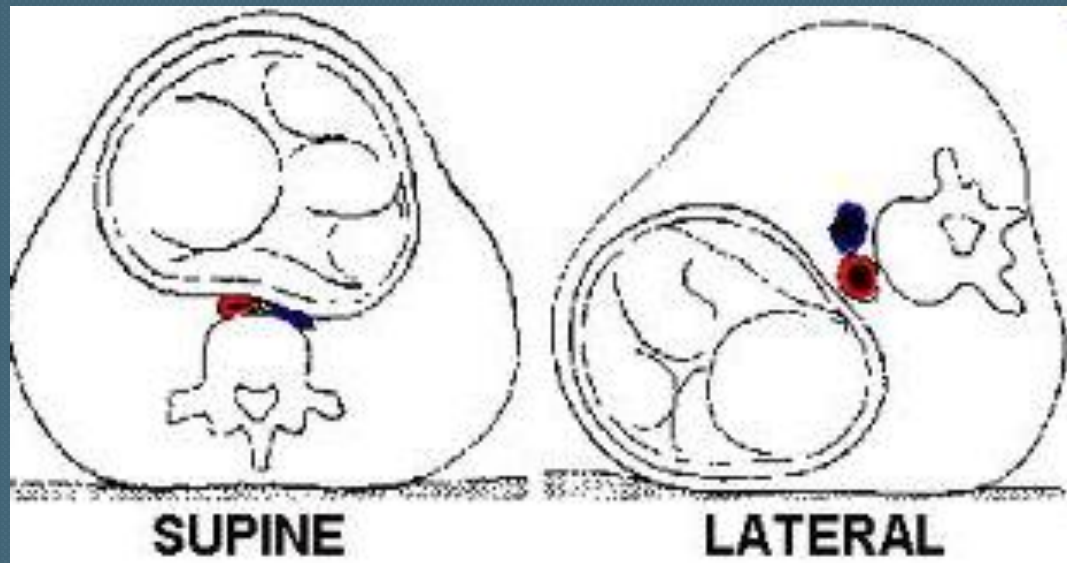
Cardiff Wedge



- A hard surface and a human wedge may also be used.
- A person designated as a human wedge kneels on the floor, sitting on the heels.
- Stabilize the shoulders and the pelvis.



- Cardiac compressions are most efficiently accomplished on a hard surface.
- The Cardiff wedge, provides both relief of aortocaval compression and a firm surface.



Hypotension

- **LR or NS boluses**
- **Ephedrine 5mg IV Q5 min, until response**
- **Avoid dopamine and epinephrine!**

“Maternal resuscitation is the best fetal resuscitation”.

Decision to perform C-section should be made by 4 min post-arrest, with delivery of the fetus by 5 min.

Rapid transport of infant to closest center providing neonatal services

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- *If maternal cardiac arrest occurs before 24 weeks gestation, the rescuers only concern should be directed toward saving the mother.*
 - *Beyond 24 weeks gestation, the resuscitation team must consider the lives of both the mother and the fetus.*
 - It is essential that the resuscitation team maintain left uterine displacement during CPR.

Optimal Outcome

Immediate CPR → ACLS

**IS THIS REALISTIC
OUTSIDE THE OR??**

Early intubation

Left Uterine displacement

Start Cesarean by 4 min
Delivery by 5 min

Post-Cardiac Arrest Care

One case report showed that post-cardiac arrest hypothermia can be used safely and effectively in early pregnancy without emergency cesarean section (with fetal heart monitoring), with favorable maternal and fetal outcome after a term delivery.

Therapeutic hypothermia *may be considered on an individual basis after cardiac arrest in a comatose pregnant patient based on current recommendations for the nonpregnant patient.*

Therapeutic Hypothermia

(32-34 °C)

For improving neurologic outcome in comatose adult patients with ROSC (ie, lack of meaningful response to verbal commands) (**Class I, LOE B**)

3 phases: **Induction** (#5 hrs, 32-34 °C)

Maintenance (12 - 24 h)

Recovery (0.25-0.5 °C/h)

Complications: Shivering- Arrhythmia-
Hypovolemia-Electrolyte imbalance-
SVR ↑ - C.O ↓ - Hyperglycemia-Bleeding-
Infection.

