The Pregnant Trauma Patient

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Objectives

1. Review physiologic and anatomic changes in pregnancy and how that alters stabilization and management of the pregnant patient
2. Discuss the primary and secondary survey with respect to evaluating the pregnant patient
3. Discuss adjuncts to the trauma resuscitation such as radiologic imaging
4. Describe when and how to perform a peri-mortem c-section
About those A’s and B’s

Tiny, Squished Stomach
About those A’s and B’s

http://en.wikipedia.org/wiki/Reinke%27s_edema

Moving on to C...
Hypotension in Pregnancy

Is it normal, or is it shock?

HR by 5-15 bpm
MAP by 10-15 mmHg
Blood vol by 1L
Hgb by 1-3 mg/dL

Patient Positioning

Does Pelvic Position Matter?

Where is the Max IVC diameter?

LLT 48%
Supine 24%
RLT 28%

No correlation to patient age, BMI, EGA
Primary Survey

- No different than for the non pregnant patient
- Keep in mind positioning as discussed

Adjuncts

- Use chest and pelvis radiographs as needed for major trauma
- Ultrasound - use early and often
  - FAST has the same sensitivity and specificity as the non pregnant patient
  - Depending on the stability of the patient, use ultrasound to quickly assess fetal well being and gestational age

Secondary Survey

- Same as for the non pregnant patient
- Again, assess fetal well being. Consider external fetal monitoring.
Radiologic Imaging

- Plain radiographs should be used as needed for traumatic workup
- CT can and must be used in the severely injured pregnant trauma patient that is stable enough to go to the scanner
- Don’t forget ultrasound!

Traumatic Injury

Perimortem C-section

“There are few data to support perimortem cesarean section in pregnant trauma patients who experience hypovolemic cardiac arrest. At the time of maternal hypovolemic cardiac arrest, the fetus already has suffered prolonged hypoxia. For other causes of maternal cardiac arrest, perimortem cesarean section occasionally may be successful if performed within 4 to 5 minutes of the arrest.”

“Based on isolated case reports, cesarean delivery should be considered for both maternal and fetal benefit 4 minutes after a woman has experienced cardiopulmonary arrest in the third trimester.”
Indications for Perimortem C-Section

**Maternal Considerations**
- No pulse by 4 min with CPR
- Potential reversible cause of arrest
- Deliver fetus of 20 weeks to assist with hemodynamics

**Fetal Considerations**
- No pulse by 4 min with CPR
- Do not delay if there is nonreversible cause of arrest
- Deliver fetus of 24 weeks to improve survival

**Contraindications**
- ROSC within 5 minutes of cardiac arrest
- Potentially reversible maternal cardiac arrest with fetal age < 20 weeks
- Nonreversible cause of maternal arrest with fetus below age of viability
Are Medical and Trauma Resuscitations the Same?


Infants who meet criteria and are delivered by Perimortem C-Section are Extremely rare.

In appropriate patients, the procedure should be Carried out without delay.

The Key Question - How Old is the Fetus?

- Measurement of Fundal Height. How good is it?
  - EP measured Fundal Height
    - $r = 0.808 \ (0.733-0.833)$ to OB measurements
    - $r = 0.712 \ (0.615-0.809)$ to True Gestational age
  - Determination of $>24$ weeks was 88.5% sensitive, 93.6% specific
  - Overestimated GA by avg 8.07 days

From "Military Obstetrics and Gynecology" The Brookside Assoc Medical Education Division c. 2009
What about Ultrasound?

$r = 0.995$ (0.937-0.973)
Underestimated GA by 0.32 d

$r = 0.973$ (0.962-0.984)
Underestimated GA by 2.096 d

Cardiac Arrest in Gravid Female
Optimal Positioning
ET Intubation
IV Access (Upper Torso)
ACLS
Prepare for Perimortem C-Section

GA > 20 wks?

Yes
Perform C-Section

No
Continue Maternal Resuscitation

Fetal Resuscitation
Continue Maternal Resuscitation

Obstetrics
NICU
Adult ICU
Infant Warmer
Instruments
What to do afterwards?

Success, Now What?

Post Procedural Considerations
- Bleeding
- Infection
- Post-resuscitative Care

Thank You!
References


11. Lange Anesthesiology, Section IV. Physiology, Pathophysiology, & Anesthetic Management, Chapter 22: Respiratory Physiology: The effects of anesthesia.


