Trauma and Pregnancy

VAEMS
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- Management of trauma during pregnancy is dictated by its severity
  - geared toward maternal stabilization
- Pregnancy should not lead to underdiagnosis or undertreatment of trauma due to unfounded fears of fetal effects
Maternal trauma

• Rate of fetal death is 2.3 per 100K per live birth with placental abruption as the major cause

• 1 in 3 pregnancies admitted for trauma will deliver during this hospitalization
Placenta-Uterus Interface

• Presence of a gravid uterus changes the pattern of injury
• MVC is a major contributor
• mechanisms are strain, tensile failure as shear force increase negative intra-abdominal pressures + forward folding of the body
Penetrating injuries of the gravid uterus are rare complications of pregnancy with gunshot wounds most common than stab wounds. Fetal head injury with growing skull fractures is an unusual sequela of these penetrating traumas.
Preventive

Fetal outcome is significantly associated with crash severity
proper use of a belt restraint by the pregnant occupant has a significant, positive effect on fetal outcome
protecting the mother is the first step to protecting the fetus
Penetrating trauma

9% of hospital admissions
73% handguns
23% knife
4% shotguns
73% fetal mortality compared to blunt trauma
The maternal mortality rate resulting from penetrating trauma is less than 5%.

Fetal mortality, however, can be as high as 70%, which is a result of direct missile injury or the effects of prematurity.
Maternal Adaptation during pregnancy

Cardiac output increases by 30% first trimester

Blood volume, mainly plasma, increases by 50% = dilutional anemia

Enlarged uterine displaces intestines, pushes the diaphragm upwards

Enlarging uterus also elongates the uterine vessels and their lumen size

Auma. 2005;59:1052–1056
Maternal Adaptation during pregnancy

A) Decrease in mean blood pressure of 10 to 15 mm Hg by the second trimester
B) Increase in pulse of 5 to 15 beats per minute by the second trimester
C) Decrease in hemoglobin to 9 to 11 g/dL due to volume expansion and iron deficiency
D) Blood volume increases to approximately 6 liters
Anatomical changes during Pregnancy

Superior displacement of the bowel, with potential for complex and multiple intestinal injuries with penetrating trauma of the upper abdomen

Hypertrophied pelvic vasculature, with potential for massive retroperitoneal hemorrhage in the event of pelvic fracture

Uterine compression of the inferior vena cava, with potential for impairment of up to 30% of cardiac output during supine positioning.
Fetus and Placenta

The growing fetus draws uterine blood flow of up to 600 mL per minute. Therefore rapid maternal exsanguination can result. The placenta is capable of rapid maternal and fetal exsanguination in the case of abrupt separation from the uterus.
Principles of Management

Maternal survival = fetal survival

Aggressive resuscitation of the mother
  – Follow resuscitation principles of the nonpregnant patient

BP, HR, respiratory, control of bleeding and CNS/orthopedic stabilization
Seatbelts

Rear, frontal, side impact in MVC can cause impact with the steering wheel
the force of the injury leads to shearing of the placenta from its attachment to the uterus.

Trauma. 2002;53:946–949
All pregnant women at or above 20-weeks gestation who suffer trauma should have fetal cardiotocographic monitoring for a minimum of 6 hours.
Xrays: Are these needed?

Diagnostic imaging/x-rays should not be delayed out of concern for harmful effects on the fetus.

Exposure to 5 rad has not been associated with an increase in fetal anomalies or pregnancy loss and is herein deemed to be safe at any point during the entirety of gestation.
US exam

Abdominal ultrasound in pregnant patients have an overall accuracy similar to those seen in nonpregnant patients.

The use of ultrasound in pregnant trauma patients has the added advantage of restricting fetal exposure to ionizing radiation.

Minor trauma in pregnancy starting at 24 weeks

It is suggested that without clinical signs of hemodynamic/physiologic/anatomic instability, adopting a practice of physical exam, fetal assessment, and proper discharge instructions are enough.

American Journal of Obstetrics & Gynecology
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Pregnant women need to be mindful that lifestyle choices can contribute to an increased risk of injury at any time during the year.