

Trauma in Pregnant Women

Unique aspects:

- Whats good for the fetus is whats good for the mother. Resuscitate the mother.
- Lifesaving xrays should not be delayed by thinking about fetal radiation injury

CHANGES OF PREGNANCY:

- uterus is intrapelvic until week 12, then it rises into the abdomen
- by week 20, its reached the umbilicus
- at week 34, it reaches the costal margins
- the bowel gets pushed into the upper abdomen – thus, more protected

FIRST TRIMESTER: uterus is thick walled and small

SECOND TRIMESTER: uterus is larger, but the fetus is cushioned with lots of amniotic fluid

THIRD TRIMESTER: uterus is huge and thin-walled, there is less amniotic fluid

- Placenta receives 20% of maternal blood flow in late pregnancy
 - Fetal head is usually protected by the pelvic rim
 - If the rim fractures, the fetal head is at risk
- The placenta is not elastic – shear forces can cause abruptio placentae
 - The placental vessels are EXQUISITELY SENSITIVE TO VASOCONSTRICTORS
 - THUS: maternal hypovolemia = massive loss of fetal blood flow

HEMODYNAMICS

- Blood volume increases throughout pregnancy, plateaus at 34 weeks
- At that stage, hematocrit of 31-35% is normal
- WCC increases during pregnancy
- Fibrinogen and clotting factors are elevated
- Serum albumin falls
- Cardiac output increases in pregnancy, by 1.0-1.5 litres per minute
- Heart rate increases in pregnancy, maximal in 3rd trimester
- Blood pressure falls in pregnancy, by 5 to 15mmHg
- There is venous hypertension of the lower limbs in the third trimester
- Ectopic beats are increased

EVERYTHING ELSE

- Tidal volume increases in late pregnancy, PaCO₂ falls to 25-30
- Oxygen consumption is increased in pregnancy
- Gastric emptying is prolonged
- Renal blood flow and glomerular filtration rate increase
- Pituitary gland swells, shock = necrosis
- Pubis symphysis and the sacroiliac spaces widen
- Eclampsia can mimic head injury (seizures etc)

Unique risks:

- Blunt injury may cause fetal injury
- Lap belts cause more uterine injury than shoulder belts
- Penetrating trauma to the uterus is usually fatal to the foetus, and benign to the mother because the uterus protects the other organs
- 80% of pregnant women who survive hemorrhagic shock will lose the baby

Assessment and treatment:

- Assess the mother, then the fetus... then move on to secondary survey

MOTHER: PRIMARY SURVEY

- Most common cause of fetal death is **MATERNAL SHOCK**
- The issue is that of circulation; the inferior vena cava is compressed by the uterus
- **THUS: either displace the uterus to the left by manual pressure, or roll the mother 15 degrees on a stiff spine board**
- The mother will **APPEAR STABLE** even after 1.5 litres of blood loss because she has an expanded volume. Thus, start IV fluids very quickly.
- **DO NOT** use vasopressors – the placenta is more sensitive than the mother

FETUS: PRIMARY SURVEY

- second most common cause of fetal death is **ABRUPTIO PLACENTAE**
- Signs of this:
 - Vaginal bleeding in 70% of cases
 - Uterine tenderness
 - Frequent uterine contractions
 - Uterine tetany
 - Uterine irritability (contracts when touched)
- Late in pregnancy, this happens with minor trauma
- Very occasionally, the uterus will rupture:
 - Oblique or transverse fetal lie
 - Direct palpation of fetal bodyparts through the abdominal wall
 - Inability to palpate the fundus
- Fetal heart sound can be heard at 10 weeks with Doppler
- Continuous fetal monitoring should be performed after 20 weeks gestation
- **RISK FACTORS FOR FETAL LOSS:**
 - Maternal heart rate over 110
 - Injury Severity Score > 9
 - Evidence of placental abruption
 - Fetal heart rate over 160
 - Ejection from a motor vehicle
 - Pedestrian or motorcycle collision

ADJUNCTS TO PRIMARY SURVEY

- Monitor the mother on her left side
- CVP is useful here
- Monitor fetal heart rate – normal is 120-160
- Perform the necessary radiological studies- benefit outweighs the risk

SECONDARY SURVEY: WHATS DIFFERENT IN PREGNANCY

- if you do a DPL, make the incision **ABOVE** the umbilicus
- look for amniotic fluid in the vagina – test it, the pH will be 7 to 7.5
- look for consumptive coagulopathy of amniotic fluid embolism
- give RH immunoglobulin to Rh–negative mothers within 72 hrs

PERIMORTER CAESARIAN

- only effective within 4-5 minutes of the mother arresting
- if the mother had died of hemorrhagic shock, the fetus has already had a long period of hypoxia