

“Oh, By the Way, the Patient is Pregnant!”

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- 1-3% of pregnant women undergo surgery that is unrelated to their pregnancy
- 5-10% of these patients are involved in trauma
- The majority of procedures are required for urgent and emergent conditions that require surgery despite the risks to the mother and fetus
- When possible, the surgery should be postponed to the second trimester
- In the first trimester, spontaneous abortion is the greatest risk at 12%
- Pre-term labor presents the greatest risk in the second and third trimesters
- The most common need for surgery is associated with appendicitis, biliary tract disease, urinary calculi, bowel obstruction and trauma

Appendicitis

- Appendicitis is the most common surgical problem
- One case of appendicitis is reported for every 550 pregnancies
- Treated immediately, 2-8% incidence of fetal loss
- Fetal loss rises as high as 35% with rupture and peritonitis
- Symptoms of appendicitis mimic symptoms of normal pregnancy
- Elevated temperature is not consistent in pregnant women with appendicitis
- Appendectomy should be carried out in the usual timely fashion

Biliary Tract Disease

- Acute cholecystitis is the second most common emergency in pregnant women
- Increased progesterone levels decrease gallbladder motility resulting in bile stasis
- Surgery is reserved for complications such as
 - Choledocholithiasis
 - Pancreatitis
 - Cholecystitis
 - Biliary Colic

Intestinal Obstruction

- Most bowel obstructions are caused by:
 - Adhesions (80%)
 - Volvulus
- A small bowel obstruction is presumed for a pregnant patient presenting with nausea, vomiting, and a history of abdominal surgery
- If x-rays are required, risks to fetus are weighed against potential morbidity and mortality of a missed diagnosis

Urinary Calculi

- The pregnant patient with an untreated urinary tract obstruction combined with an infection is at high risk for abortion and premature labor
- Ureteral stones may be treated with laser lithotripsy
- Ultrasonic lithotripsy is contraindicated
- Ultrasound may be used for stent placement
- Kidney stones can be removed after delivery

Trauma

- Trauma occurs in 5-10% of all pregnancies:
 - Motor vehicle accidents (60%)
 - Falls (22%)
 - Domestic violence (21%)
- The pregnant patient is managed in the same way as a non-pregnant patient
- The mother is the first priority
- Stabilization of the mother improves both maternal and fetal survival

- The fetus becomes hypoxic very quickly
- Fetal demise is 80% in maternal hypovolemic shock
- Indicators of hypovolemic shock are unreliable in the pregnant patient
- Assume the pregnant trauma victim is in shock until proven otherwise
- A cesarian section may be required for a ruptured uterus
- If the maternal condition is critical, the primary concern is to save the mother

Cardiac Arrest

- Standard resuscitative measures
- Standard drug therapy
- The key to resuscitation of the fetus is to resuscitate the mother
- Wedges are used to angle the torso 30-40 degrees
- The uterus may be displaced manually
- VF is treated with standard shock therapy
- The decision to perform a CS should be made within 4-5 minutes
- If gestation is less than 24 weeks, fetal viability is likely
- If hypoxic episodes cause fetal brain damage, intrauterine fetal demise is often the result

Goals of Perioperative Care

1. A thorough preoperative assessment is conducted
 - ? Gestation
 - ? Maternal and fetal condition
 - ? Obstetrics consult
 - ? Patient's anxieties
 - ? X-rays required
2. Reassure the patient
 - Provide explanations
 - Anesthetist provide information

3. Monitor maternal oxygenation and BP
 - Pulse oximetry readings should be above 94%
 - Continuous oxygen
 - Monitor hemoglobin levels closely
 - Maintain BP above 90mm Hg
 - ? Second IV site
4. Use appropriate medications
 - Majority of anesthetic agents enter fetal circulation
 - In first trimester, avoid nitrous oxide, halogenated agents, sedatives, antidepressants and amphetamines
 - Short-acting drugs are preferable
 - Local and regional anesthetics have not shown teratogenicity
 - Lidocaine is preferable to Bupivacaine

5. Prevent aspiration
 - Gastric emptying is delayed
 - An antiemetic or antacid may be prescribed
 - Patient is treated as if she has a full stomach
 - Cricoid pressure is applied during intubation
6. Avoid pre-term labor
 - Medications used to reverse muscle relaxants may stimulate the uterus to contract
 - The use of halogenated agents in the third trimester decreases uterine tone
 - Surgical manipulation of a gravid uterus may initiate pre-term labor

- 7. Minimize time under anesthesia
 - Use local and regional anesthetics when possible
 - Skin prep before general anesthetic induction?
 - Fetal monitors functioning before induction
- 8. Monitor the fetal heart rate (FHR)
 - FHR is most reliable after 22 weeks
 - Fetal tachycardia may indicate maternal hypoxia
 - Search for causes of a FHR <100 or >160
 - Involve competent personnel to monitor FHR
 - Optimize maternal physiological status
- 9. Monitor for pre-term uterine contractions
 - Monitored by experienced personnel

- 10. Positioning
 - Position in left tilt after 20 weeks gestation
 - Use sequential compression stockings and/or TEDS
- 11. Prevent hypothermia
 - Maternal hypothermia should be prevented
 - Theatre temperature about 24 degrees Celsius
 - Pre-warmed solutions
 - Use warming blankets
 - Keep patient's head covered
- 12. Electrosurgery
 - Use general safety principles
 - Use lowest possible settings

- 13. Radiological investigation
 - Radiation doses minimized and carefully documented
 - Clear communication with radiology technician
 - Use CT scans and x-rays cautiously
 - Shield the pregnant uterus from above and below
 - Inform the patient about risks
- 14. Urinary catheter insertion
 - After 12 weeks gestation bladder may be decompressed to allow adequate exposure
 - Catheterize for procedures lasting > 1 hour
 - Urine output should be 25ml/hr

- 15. Laparoscopic surgery
 - Use open technique for the primary trocar
 - Use lowest possible insufflation pressures
 - Trans-vaginal doppler could be used for fetal monitoring
 - Be prepared for laparotomy
- 16. Be prepared for pre-term delivery
 - Prepare for Cesarian section where indicated
 - Notify obstetrician, neonatal team
 - Have neonatal equipment available

- 17. Facilitate postoperative care
 - Inform PACU about the patient's pregnancy
 - Left tilt position on postoperative bed
 - Supplemental oxygen for transport
 - Continue fetal monitoring in PACU
 - ? Monitor for uterine contractions in PACU
 - Abruptio placenta occurs in 40-60% of major trauma victims, occurring after surgery


