Parturients and Non-OB Surgery

Anesthetic Pearls: Non-OB Surgery in Pregnancy / Anesthetic Management

Background and Epidemiology

Approximately 2% of women undergo non-obstetric surgery during their pregnancy. Maternal morbidity and mortality is unchanged from that of non-pregnant women, however fetal mortality ranges from 5% - 35%. Of key importance are the physiologic changes of pregnancy that begin in the first trimester. These changes must be thoughtfully considered in the formation of the anesthetic plan and interpreting vital responses while anesthetized. Parturients undergoing anesthesia and surgery are at an increased risk for premature labor and spontaneous abortion. Additionally, surgery during the second trimester has been shown to increase the risk of spontaneous abortion by approximately five times.

The goals for maternal and fetal safety during non-obstetric surgery:

1. Maintenance of utero - placental blood flow.
2. Maintenance of pregnancy.
3. Avoidance of teratogenic substances.

Surgical Recommendations

Current recommendations for surgery in the pregnant patient include postponing elective surgery until 6 weeks postpartum (when the physiologic changes of pregnancy have returned to normal) and semi-elective procedures until the second or third trimester. Consultation with a high-risk obstetrician pre-operatively must be done for all but the most minor of surgical procedures. Regional techniques must be used whenever possible, especially spinal anesthesia that can minimize fetal exposure to local anesthetics and the risk of aspiration or airway loss. Depending on the operative site, after the 16^{th} week of gestation, continuous fetal monitoring may be employed peri-operatively. A uterine tocodynamometer should also be used to detect the presence of preterm labor (especially in the post-operative period).

Drugs and Interactions

Commonly used anesthetic agents that are given to the mother are rapidly shared with her unborn fetus (except for Heparin, Insulin, Glycopyrrolate, Succinylcholine, and NMB's). Exposure to a teratogen during gestation can bring about significant changes in the form and / or function of the fetus especially during organogenesis that occurs between 3 - 8 weeks post-conception. Because the brain is in continual development, the duration of central nervous system susceptibility probably extends well beyond the first trimester. Timing, dosage, and duration of treatment are the most critical factors that determine whether a given drug exposure will be teratogenic although very few drugs have proved to be teratogenic in humans despite conflicting animal data. Most anesthetic drugs are classified as either Class B - Animal studies have demonstrated no fetal risk, but no controlled studies have been performed in humans (Methohexital, Propofol, Enflurane, Desflurane, Sevoflurane, Lidocaine, Ropivicaine) or Class C - Either studies have shown fetal risk in animals (teratogenic or embryocidal), but no controlled human studies have been performed (Thiopental, Ketamine, Etomidate, Halothane, Isoflurane, Bupivicaine). Nitrous oxide has a long history of apparent safe use for both anesthesia and analgesia in obstetrics; however, recent information about the metabolic effects of nitrous oxide fueled controversy over use in early pregnancy. Although a conservative approach would be to avoid nitrous oxide, a wealth of clinical date support the safe and continued use of it a part of a balanced anesthetic during all aspects of pregnancy. Local anesthetics may have direct neurotoxic effects, but most data suggest that they lack embryo or fetal toxic actions.

Anesthetic Plan

An appropriate anesthetic plan includes the thoughtful consideration of the pre-, intra-, and post-operative issues. Aspiration prophylaxes with a non-particulate antacid like bicitrate shortly before induction. Any parturient at more than 25 weeks of gestation should not be placed or transported in the supine position to avoid aortocaval compression. If fetal heart rate and uterine contraction monitoring are feasible, place external transducers before induction. If fetal heart rate monitoring not feasible, assess fetal heart tones before and after induction of anesthesia and then again at the end of surgery. Carefully denitrogenate the patient with 100% oxygen by mask before induction. Do rapid sequence induction with cricoid pressure and intubation with a cuffed ETT. Make sure patients have intact airway reflexes and motor strength prior to extubation. Make sure to keep $PaCO_2$ within normal pregnancy limits (30-35 mmHg) to avoid decreased uterine blood flow caused by hyperventilation and hypocarbia.