

Anesthesia for the High Risk Parturient

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Parturients are considered to be “high risk” to the anesthesiologist if they have a preexisting medical condition, obstetric complication, a problem that can potentially necessitate an emergent Cesarean delivery, or a potential uncertainty regarding anesthetic management.

Preeclampsia/Eclampsia/HELLP Syndrome

Problems Associated With Preeclampsia

Every organ system can be involved by the vasoconstriction of this disease. Systems which may be impacted include the following: cardiovascular (reduced cardiac output, intravascular depletion, hypertension), renal (oliguria), gastrointestinal (hepatic involvement), Central nervous (seizures), and hematologic (platelet abnormalities, disseminated intravascular coagulation).

Anesthetic Considerations in Preeclampsia

Drug Interactions

Magnesium sulfate—interacts with both depolarizing and nondepolarizing neuromuscular blocking drugs.

Analgesia for Vaginal Delivery

Although several obstetricians have suggested that epidural analgesia should not be performed in the preeclamptic patient, there is growing opinion among anesthesiologists and obstetricians that epidural analgesia, if there is no coagulation abnormality, is the preferred method of providing analgesia to the preeclamptic. Epidural analgesia offers several advantages including the following:

- Helps with blood pressure management.
- Increases uteroplacental perfusion by decreasing endogenous catecholamines.
- Allows a fast route for Cesarean delivery, if necessary, without the use of general anesthesia.

Anesthesia for Cesarean Delivery

General Anesthesia. If general anesthesia is necessary, one should consider the following:

- Laryngeal edema may make endotracheal intubation difficult.
- Hypertension may be worsened by laryngoscopy and should be treated prior to induction of anesthesia. Drugs that have been suggested include labetalol, hydralazine, nitroglycerin, trimethaphan, and nitroprusside.
- Magnesium sulfate interacts with neuromuscular blockade.

Regional Anesthesia. Although spinal anesthesia may be indicated in selected cases (preeclamptic with difficult airway for an emergency Cesarean delivery?) many authors suggest that epidural anesthesia causes less changes in blood pressure and should be used when regional anesthesia is chosen for preeclampsics undergoing Cesarean delivery.

Points to consider when choosing neuraxial blockade in the severely preeclamptic include the following:

- Avoid epinephrine containing local anesthetics.
- Consider central line before initiation of epidural, if volume status is in question (especially if oliguria is present).
- Ephedrine should be used in small incremental doses to treat hypotension.

Assessment of Platelet Function in the Preeclamptic Patient

It is generally accepted that if the platelet count is >100,000 then it is likely that the other indices of coagulation will be normal. However, some preeclampsics may have a normal platelet count with abnormal platelet function. Although in the past the bleeding time had been suggested as the best test to determine platelet function, it is no longer performed by most obstetric anesthesiologists because it has not been shown to predict the risk of hematoma formation. Rogers and Levin stated that “our analysis of bleeding time data from 640 publications reveals that the value of the test in diagnosis remains unclear.”

Thromboelastography can be used as a bedside measure of viscoelastic changes but has not yet been shown to be predictive in preeclamptic women.

Regional anesthesia can be safely performed on the preeclamptic patient, if:

- A recent platelet count is “normal”
- The recent platelet count is not dramatically lower than the previous value
- There is no clinical evidence of coagulopathy.

Antepartum Hemorrhage

Placenta Previa

Actively bleeding/major blood loss—General Endotracheal Anesthesia

- Get help, Second IV placement.
- IV Fluid administration (via rapid infusion device with warmer, if available).
- Rapid Sequence Induction—Consider Ketamine 1 mg/kg.

No active hemorrhage-hemodynamic stability

- If no hypovolemia, epidural or spinal anesthesia may be used.

Placenta Accreta

Because placenta previa in a patient for a repeat Cesarean delivery may be associated with placenta accreta, these patients should be treated as though major blood loss will occur. Two IV lines should be placed, blood should be available, and the patient should be made aware that a Cesarean hysterectomy may become necessary and that general anesthesia may be used to provide appropriate operating conditions and to protect her airway in the event of massive hemorrhage and Cesarean hysterectomy. In an elective repeat Cesarean delivery in a patient with a placenta previa, regional anesthesia may be used and, if hemodynamic variables remain stable, may be continued even if a Cesarean hysterectomy is performed. In a recent multi-institutional study, 12 patients received epidural anesthesia for elective or emergency Cesarean hysterectomy and none required intraoperative induction of general anesthesia. Should the patient become unstable, general anesthesia should be considered.

Abruptio Placenta

1. Actively bleeding/major blood loss—General Endotracheal Anesthesia (as in placenta previa).
2. No active hemorrhage. Regional anesthesia can be initiated if:
 - There is no evidence of maternal hypovolemia.
 - Clotting studies are within normal limits.

Substance Abuse

The use of illicit drugs has become endemic in our society and as a result, anesthesiologists working on

Labor and Delivery are now seeing a dramatic increase in the number of patients abusing illicit drugs. These drug-abusing parturients present many challenges to the anesthesiologist. Of the drugs abused, cocaine has the most profound implications to the anesthesiologist.

The use of illicit drugs has become endemic in our society and, as a result, anesthesiologists are now seeing a dramatic increase in the number of patients who are using these illicit drugs. Although drug abuse is a major problem in large inner-city hospitals, it is being seen in all classes of patients and hospitals. Drug abuse in pregnancy involves a wide range of substances and clinical presentations. Although there is a strong association between lack of prenatal care and drug abuse, identification of the drug-abusing patient is a difficult problem. Patients in whom the anesthesiologists should suspect drug abuse include those women who are unregistered at the time of delivery, those with intrauterine growth retardation, abruptio placenta, or delivery of a depressed neonate.

Most pregnant drug abusers deny drug abuse even when confronted with positive toxicology results. Multiple drug abuse is common, with many adulterants being added to most street drugs. At St. Luke's-Roosevelt Hospital Center in New York City, >50% of our unregistered patients have positive toxicology screens and >75% of these patients deny illicit drug use. The use of these drugs in pregnancy may precipitate life-threatening problems. These problems and the anesthetic and obstetric implications of maternal drug abuse and the use of spinal anesthesia in these patients will be reviewed in this lecture.

Cocaine

Cocaine use has now reached epidemic proportions, with >30 million Americans having tried cocaine at least once. The prevalence of cocaine use in the obstetric population is also increasing, and anesthesiologists, like obstetricians and pediatricians, are now being affected by the abuse of this potentially lethal drug. Positive cocaine toxicology testing has been reported from around the US, crossing geographic, socioeconomic, and cultural boundaries. Because a majority of cocaine-abusing pregnant patients deny drug abuse, the exact extent of perinatal cocaine use is unknown. It has been estimated, however, that >50% of high-risk women who are cared for at urban teaching hospitals may be using cocaine during their pregnancies. Although patients who do not receive prenatal care tend to have the highest rates of cocaine use, registered private patients at suburban hospitals have also been found to be cocaine positive.

Perinatal cocaine abuse has been linked to many maternal and neonatal complications that may have a

profound effect on the patient's response to the administration of anesthesia. The use of cocaine is associated with high morbidity and mortality, especially when the patient is to undergo an anesthetic. There is now adequate data to demonstrate that cocaine use in pregnancy is dangerous to both the mother and fetus. This danger is exaggerated by the misconception on the part of some patients that cocaine does not cross the placenta and is therefore a safe way to achieve a faster and easier childbirth. It has been shown that cocaine causes profound vasoconstriction that may, in turn, cause profound alterations to uteroplacental blood flow and eventually cause uteroplacental insufficiency and "fetal distress."

Cocaine abusers may have a higher incidence of Cesarean delivery for fetal jeopardy than that seen in non-abusing patients. Anesthesiologists often meet these patients in an emergency setting while waiting for an emergency Cesarean delivery to begin. The choice of anesthetic is occasionally dictated by the hemodynamics sequelae of cocaine abuse, such as the commonly seen scenario of abruptio placenta with massive hemorrhage after cocaine use. Even the strongest supporters of regional anesthesia will select a general endotracheal anesthetic for the hypotensive and hypovolemic patient for emergency Cesarean delivery. However, in the more controlled situation, the anesthesiologist will have to choose regional versus general anesthesia based on a comparison of risks and benefits for that individual patient. Epidural or spinal anesthesia, unless contraindicated, is always my first choice when anesthetizing the cocaine-positive patient. Data has been presented recently on life-threatening events that occurred under anesthesia in the cocaine abusing parturient. It showed that life-threatening events were more common during general anesthesia than during regional anesthesia in the cocaine-abusing patient undergoing Cesarean delivery. The most frequently encountered problems in the patients under general anesthesia were severe hypertension and arrhythmias. Because severe hypertension after laryngoscopy may be expected in these patients, I treat cocaine-induced hypertension before initiation of a general anesthetic to avoid the exaggerated response to laryngoscopy. Propranolol is relatively contraindicated in the cocaine-abusing patient because β blockade may cause unopposed α adrenergic stimulation and therefore worsen the hypertension. Labetalol has been found to be effective in treating the hypertension associated with acute cocaine intoxication but may also trigger a paradoxical exacerbation of hypertension resulting from relative α stimulation.

Neuraxial anesthesia may be safely administered to the stable cocaine abusing parturient, but may also be associated with certain risks. These risks include:

1. Thrombocytopenia has been associated with cocaine abuse and therefore these patients may be at risk of developing an epidural hematoma.
2. Profound hypotension may occur because of a sympathectomy in an intravascularly depleted patient with abnormal compensatory mechanisms.
3. The response to pressor agents in these patients is unpredictable. Ephedrine may not be an effective treatment in the cocaine abuser.
4. These patients may be uncooperative.

Difficult Airway

Failed intubation remains a major problem facing the obstetric anesthesiologist. Studies have shown that failed intubation occurs more commonly in obstetric than in nonpregnant patients. Difficult intubation in the obstetric patient may be caused by increased weight, increased breast size, easy bleeding of oral cavity, and pharyngeal/laryngeal edema. In addition, the use of cricoid pressure to minimize aspiration risk may make visualization more difficult.

To minimize difficult intubations in the obstetric patient:

- Always perform a preoperative airway examination.
- Position the patient in the sniffing position. Place a wedge to achieve left uterine displacement.
- Preoxygenate to insure appropriate denitrogenation.
- Have a trained assistant administer cricoid pressure.
- Use a small endotracheal tube with a stylet, even if you don't think it is necessary. Your first attempt is your best chance!
- Do not initiate laryngoscopy until the patient is relaxed.
- Confirm endotracheal tube position with ETco₂ monitoring and auscultation before allowing the surgeon to begin.
- Have algorithm and equipment for failed intubation ready.

Management of the failed intubation in the pregnant patient:

- Call for help.
- Maintain cricoid pressure.
- Communicate with obstetrician. Determine if surgery can be delayed (e.g., fetal distress or no fetal distress).
- Ventilate with 100% oxygen.

If surgery can be delayed:

- Ventilate with 100% oxygen until patient awakens.
- Perform a regional anesthetic or an awake fiberoptic intubation.

If surgery cannot be delayed:

- Maintain cricoid pressure throughout.
- Ventilate with oxygen and a volatile agent.
- If any difficulty with ventilation, consider LMA.
- In the event of a lost airway and inability to use LMA or Combitube, consider placement of an IV canula through the cricothyroid membrane to administer transtracheal oxygenation and ventilation.

Prematurity

Prematurity is defined as birth occurring between 20–37 wk of gestation. The incidence in the US is approximately 7% but it accounts for the majority of perinatal deaths.

Anesthetic Implications

- Patients are often placed on tocolytic therapy, which may have profound maternal effects and interact with anesthetics.

Beta adrenergic agents (Terbutaline/Ritodrine). Tachycardia, hypotension, chest pain, myocardial ischemia, arrhythmias, pulmonary edema, anxiety, nausea/vomiting, hyperglycemia, hypokalemia.

Magnesium Sulfate. Pulmonary edema, chest pain, nausea/vomiting, drowsiness, increased sensitivity to muscle relaxants.

Anesthetic Management

Regional anesthesia may be used for labor analgesia the patient who is delivering a premature infant. It has the advantage of obviating the need for parenteral narcotics. This is advantageous because the premature fetus may be more susceptible to the effects of these drugs. It also decreases catecholamine levels, may improve uteroplacental blood flow and gives a route for fast administration of a regional anesthetic should fetal distress occur and require a Cesarean delivery. By allowing the patient (and the obstetrician) more control, a labor epidural can prevent a precipitous delivery that can have devastating effects on a premature infant. Previous administration of a β sympathomimetic tocolytic agent is not a contraindication to a regional anesthetic.

Subarachnoid or epidural anesthesia may be used for Cesarean delivery. Administration of general anesthesia is the same as for the term parturient, except that the general anesthetics may depress the preterm infant more than the term infant. Techniques, dosages, and choices of agents are the same as for the full-term parturient. If general anesthesia is to be initiated shortly after discontinuation of a β sympathomimetic tocolytic, drugs that caused maternal tachycardia (atropine, glycopyrrolate, pancuronium) should be avoided.

Fetal “Distress”

The American College of Obstetricians and Gynecologists (ACOG) has issued a committee opinion entitled “Anesthesia for Emergency Deliveries”. They suggest:

Failed intubation and pulmonary aspiration remain prominent causes of maternal morbidity and mortality from anesthesia.

The obstetric care team should be alert to the presence of risk factors that place the parturient at increased risk for complications from emergency general or regional anesthesia.

When risk factors are identified, the obstetrician should obtain an antepartum anesthesia consultation.

Strategies should be developed to help minimize the need for emergency induction of general anesthesia. Such strategies might include early placement of an epidural or spinal catheter.

“Although there are some situations in which general anesthesia is preferable to regional anesthesia, the risk of general anesthesia must be weighed against the benefit for those patients who have a greater potential for complications.”

“Cesarean deliveries that are performed for a non-reassuring fetal heart rate pattern do not necessarily preclude the use of regional anesthesia.”

Regional Anesthesia For Fetal “Distress”

- Place epidural catheters in patients who are at increased risk for operative delivery (poor fetal tracing, IUGR, preeclampsia, preterm labor, VBAC, multiple gestations, breech position, diabetes).
- If epidural is functioning at the time of Cesarean delivery, administer 15–20 mL of 3% chloroprocaine in 5-mL increments. Onset of block is within 3–5 min. Chloroprocaine is rapidly metabolized in the mother and fetus and placental transfer is not increased in the presence of fetal acidosis.
- The use of spinal anesthesia for “stat” Cesarean delivery remains controversial. Several authors have reported good results with spinal anesthesia in the presence of fetal distress. If the patient is not hypovolemic or acutely bleeding and if anesthesia can be achieved quickly (i.e., the patient is not morbidly obese) spinal anesthesia is an attractive alternative to general anesthesia for emergency Cesarean delivery. If early attempts at dural puncture are unsuccessful, the anesthesiologists must have the discipline to abandon further attempts and proceed with an alternative plan (such as general anesthesia).
- IV fluid should be administered before initiation of a spinal anesthetic, but there is evidence that the anesthetic need not be delayed until the total

1500 mL is administered. Consider having pressure infusion bags available so that fluid can be administered quickly in the scenario where a patient without an IV needs an emergent Cesarean delivery.

- If possible, continue to monitor the FHR in the operating room, while placing the regional anesthetic.
- In the absence of an ongoing epidural or continuous spinal anesthetic in a case of "severe fetal distress" (e.g., profound fetal bradycardia, not resolving) in a patient with a normal airway, general anesthesia (with a rapid sequence induction) should be considered.
- In the event of a history of a failed/difficult intubation, the anesthesiologist should consider an awake intubation or regional anesthetic.
- A large-bore atraumatic needle (such as a 22-gauge Sprotte needle) may speed the initiation of a spinal while still minimizing the risk of post-dural puncture headache.

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