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Obstetric anesthesia: Not just for cesareans and labor

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ABSTRACT

The scope of obstetric anesthesia practice ranges far beyond the delivery of care to women for vaginal and cesarean deliveries. Increasingly, obstetric anesthesiologists are involved in the management of anesthetics for new procedures and for new indications. Anesthesia is frequently needed for maternal procedures, as well as fetal procedures, and at varying times in the intrapartum period. Maternal-specific procedures include cerclage, external cephalic version (ECV), postpartum bilateral tubal ligation (BTL), and dilation and evacuation (D and E). Fetus-specific procedures include fetoscopic laser photocoagulation and ex-utero intrapartum treatment (EXIT). This review will not include discussion of the anesthetic management of non-obstetric surgery during pregnancy, such as appendectomy or cholecystectomy.

Cerclage

Obstetric anesthesiologists often provide anesthesia for cerclage in patients with cervical insufficiency. At our institution, cerclage is traditionally performed through a transvaginal approach, although transabdominal cerclage may be used in certain circumstances or at other centers around the country. The anesthetic choices for cerclage placement include spinal, epidural, or general anesthesia. To our knowledge, there have been no large, randomized controlled trials comparing general with regional anesthesia for cerclage. One small study of 37 patients compared spinal with general anesthesia for women scheduled for elective cervical cerclage placement during the second trimester. While systolic blood pressure was significantly lower postoperatively in the spinal group compared to the general group, there were no differences in postoperative oxytocin levels, fetal loss before 20 weeks gestation, or preterm delivery rates.[1]

Spinal anesthesia is usually preferred to general anesthesia in pregnancy for well-established maternal and fetal reasons.[2] In our experience, most of the women who present for cerclage wish to avoid general anesthesia anyway. Often, they are also concerned about drug effects on the developing fetus, although there is no clear evidence for teratogenicity in humans.[3] Spinal anesthesia has the benefit of being relatively easy to perform (in most patients), while providing reliable, rapid, and dense surgical anesthesia. The operation is usually of short duration, so an epidural catheter, which allows for repeated dosing is not necessary. Since there are additional risks with epidural catheter placement, including accidental dural puncture and post-dural puncture headache, and probably an increased incidence of inadequate block, this technique is only used in very specific situations or for specific indications.

Because, at most, a T10 sensory level is necessary for cervical anesthesia, it is reasonable to decrease the dose of

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local anesthetic compared to that used for cesarean delivery, where a T4 level is recommended. Similar to practice for cesarean anesthesia, most anesthesiologists add 5–20 μg of fentanyl to the local anesthetic in order to augment the degree of sensory blockade, which works especially well for "visceral" stimulation from manipulation of the cervix, without concern for negative effects on the mother or fetus. And, since cerclage is typically an outpatient procedure, both the patient and hospital benefit from a decreased stay in recovery, as a lower dose of local anesthetic may recede more rapidly. Historically, lidocaine was the short-acting drug of choice for outpatient spinal anesthesia, but since the mid-1990s it has been associated with transient neurologic symptoms (TNS), especially in patients placed in lithotomy position.[4,5]

TNS can result in significant postoperative morbidity, with pain in the buttocks or legs. Bupivacaine is generally considered a long-acting local anesthetic, but it is associated with less risk of TNS than lidocaine and has been shown to have similar efficacy when used in relatively low doses for cerclage placement.[6] For this reason, we utilize bupivacaine 5–10 mg for anesthesia for cerclage.

Not only is a lower dermatomal level required for cervical cerclage compared to cesarean delivery but also the same dose of local anesthetic administered intrathecally to women in the second trimester of pregnancy provides a higher dermatomal level compared to non-pregnant women. One study showed that the maximum number of dermatomes blocked was greater by three levels.[7] There is evidence that this increase in spinal anesthesia level or effect occurs during the second trimester. When divided into early second trimester (mean = 13 weeks of gestation) and late second trimester (mean = 22 weeks of gestation), the same dose of spinal bupivacaine provided a significantly higher dermatomal level for cerclage performed in the late second trimester.[8] This phenomenon conveniently allows a lower dose of bupivacaine to be administered to these patients, which thereby reduces its side effects and may also facilitate its regression. The importance of regression time in this setting, though, may be less important anyway since most women having cerclage typically undergo somewhat prolonged fetal monitoring.

Unlike women undergoing cesarean delivery at or near term, it is uncommon for women undergoing cerclage with low-dose spinal anesthesia to require vasopressor support.[6] When cerclage is performed within the typical time frame of 12–18 weeks of gestation, the uterus tends to be small enough that significant compression of the inferior vena cava does not occur, making the supine, lithotomy position acceptable. A single intravenous catheter is sufficient for access, and standard monitors—electrocardiogram, blood pressure cuff, and pulse oximeter—are all that are needed in routine patients. Patients should fast for 6–8 h prior to elective procedures, and gastric acid aspiration prophylaxis (clear oral antacid), although not absolutely necessary, should be considered, especially if the gestational age is beyond 18–20 weeks.

Occasionally, cervical cerclage is performed in a more emergent setting when the cervix is dilated and the fetal membranes are bulging. In this setting, it is important to prevent an increase in both intra-abdominal and intrauterine pressure that could lead to premature rupture of membranes. Consideration should be given to the administration of general anesthesia because the halogenated inhalation anesthetics relax uterine smooth muscle, which thereby decreases intrauterine pressure. However, general anesthesia requires placement of an endotracheal tube, which can lead to coughing on emergence. This can increase intrauterine pressure, as well as cause higher rates of postoperative nausea and vomiting, which ultimately leads to the same. Unfortunately, there are no recent studies to support better fetal outcomes based on the type of anesthetic in these circumstances; because of this, the choice is left to the anesthesiologist and patient.[1] Regional anesthesia with judicious administration of nitroglycerin to relax the uterus during cervical manipulation is a common strategy at Columbia University Medical Center (CUMC).

A transcervical cerclage is usually removed at 37–38 weeks of gestation without the use of neuraxial anesthesia. Some patients, however, are unable to tolerate the cerclage removal without anesthesia. In our practice, we favor spinal anesthesia, usually with hyperbaric bupivacaine, for patients who are not in labor and for whom the likelihood of going into labor is low. For those patients who are in labor or who have had rupture of membranes and require cerclage removal, either an epidural or combined spinal–epidural (CSE) technique is used at the discretion of the anesthesiologist. This allows the surgical anesthetic to regress, yet provides a means for initiating labor analgesia without having to perform another neuraxial procedure.

External cephalic version

Singleton breech presentation occurs in 3–4% of term pregnancies. It would seem inappropriate to discuss any aspect of ECV without reference to the Term Breech Trial.[9] Since the publication of this study, obstetric opinion and practice has maintained that breech vaginal delivery is associated with increased risk of injury to the neonate compared to elective cesarean delivery. Despite much harsh criticism of its methodological and clinical design,[10] the Term Breech Trial has been responsible for a dramatic change in obstetric practice. Although the American College of Obstetricians and Gynecologists (ACOG) currently recommends that ECV be offered and performed whenever possible,[11] the majority of fetuses in breech presentations in the United States are delivered by cesarean section.[12] This is only one of several reasons for the increase in cesarean deliveries over time, yet it highlights the need to consider ECV as an alternative. It is well recognized that the risk for abnormal placentation and peripartum hemorrhage substantially increases with each additional cesarean delivery,[13,14] which is equally concerning for obstetricians and anesthesiologists.

If the common goal is to decrease the number of cesarean deliveries, then the role of the obstetric anesthesiologist is to contribute to an environment that will facilitate this endeavor. According to several studies, factors found to be associated with successful ECV are multiparity, posterior location of the placenta, and a greater amount of amniotic