

Non-delivery Obstetric Procedures



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Cervical Cerclage

Cervical incompetence complicates up to 1% of all pregnancies. It is characterized by premature dilation of the internal cervical os and shortening of the cervix from the internal os to the uterine cavity. It is associated with early pregnancy loss and premature birth. Cervical cerclage is a procedure performed at least 23,000 times annually in the United States.¹

There are three techniques in use at the present time: McDonald transvaginal approach, Shirodkar transvaginal approach, and the abdominal cerclage. The first two techniques are technically easier and much more popular. All cerclage procedures involve a circumferential suture or band tied around the cervical os to strengthen and support the cervix and prevent further dilation. The McDonald technique is simpler and is simply a purse-string suture placed in the neck of the cervix as high

in the vagina as possible. The Shirodkar involves dissection of the bladder and rectum away from the anterior and posterior aspects of the cervix to allow a imbedded band to be placed higher on the cervix, closer to the internal os. The abdominal approach allows an even higher placement of the suture but requires an abdominal incision both at placement and removal, and is reserved for cases of extreme cervical scarring or other pathology.

The effectiveness of cerclage in preventing early pregnancy loss or preterm delivery is questionable. One large multicenter randomized trial found a 25% decrease in delivery before 34 weeks (13% vs. 17%) and very low birthweight infants (10% vs. 13%).² Other trials have failed to find any advantage of cervical cerclage in women with cervical incompetence detected on examination or by ultrasound.^{3,4}

Anesthetic Options

Both regional and general anesthesia techniques are acceptable choices for placement of a cervical cerclage.⁵ As with most pregnant patients, at Brigham and Women's Hospital we usually favor regional anesthesia. Cerclage placement is usually performed as an outpatient at 16–24 weeks' gestation, which affects the choice of anesthetic. A Shirodkar takes somewhat longer than a McDonald, but both should generally require less than 30–45 min of surgical anesthesia. Postoperatively, patients are monitored for signs of uterine activity as well as anesthetic recovery before discharge.

Regional Anesthesia

At Brigham and Women's Hospital, we prefer short-duration spinal anesthesia for most cases. Hyperbaric mepivacaine 45–60 mg, lidocaine 45–50 mg, procaine 100 mg, or bupivacaine 7.5–10 mg will provide adequate coverage and duration for the procedure. *Some anesthesiologists no longer favor lidocaine due to its association with Transient Neurologic Symptoms (TNS) following ambulatory spinal anesthesia in the lithotomy position, but pregnant patients may be at lower risk of this*

complication during cerclage placement.⁶ A level at least to T10 is required to ensure coverage of the cervix. Because there is little visceral stimulation, opioids are not as important as during intra-abdominal cases, but fentanyl 10–20 µg may be added to deepen the block and reduce the total dose of local anesthetic required (e.g., 30 mg lidocaine or 5.25 mg bupivacaine⁶). Low-dose epidural analgesia has also been reported for cervical cerclage.⁷

General Anesthesia

General anesthesia is an appropriate and safe choice for properly fasted patients who do not desire regional anesthesia or in whom it is contraindicated.⁵ Induction with propofol and fentanyl and maintenance with a volatile anesthetic, alone or with nitrous oxide, is a reasonable regimen. *Whether the airway must be secured with an endotracheal tube is a matter of controversy. Otherwise healthy, fasted pregnant women in the first or second trimester are probably not at increased risk for aspiration (see Chapter 1). Therefore, we believe it is acceptable to use spontaneous breathing by mask or laryngeal mask airway during maintenance.* If endotracheal intubation is performed, succinylcholine is used to facilitate the procedure, but neuromuscular blockade is not necessary during the operation. Intubation is indicated in emergency cases or when spontaneous breathing or maintenance of a patent airway may be difficult (e.g., morbid obesity).

Cerclage Removal

Cerclage removal can usually be done without anesthesia, frequently as an outpatient as the parturient approaches term gestation. Occasionally, due to patient discomfort or growth of granulation tissue around the knot in the cerclage suture, anesthesia is required for removal. If the patient will be remaining in the hospital for labor, an attractive option is to place an epidural for the cerclage removal and leave it in place without infusing further local anesthetics until the patient is in active labor. Lidocaine 2% (with or without epinephrine), 10 ml, will

often suffice for cerclage removal. Alternatively, CSE with short-acting local anesthetic may be employed. If the procedure is to be performed as an outpatient with expectant management until the patient enters labor spontaneously, anesthetic options include short-duration spinal anesthesia (e.g., lidocaine or mepivacaine, 30 mg) or intravenous sedation. The latter should be considered only in fasted, non-laboring patients with no additional risk factors for aspiration.

Dilation and Evacuation (D&E)

Dilation of the cervix for evacuation of the uterine contents may be required in a number of circumstances. Most commonly, D&E is used in cases of first-trimester incomplete, inevitable, or missed abortion. Occasionally, a postpartum patient experiencing hemorrhage due to retained products of conception (i.e., placental fragments or membranes) will require the procedure. In many cases in obstetrics, the procedure will be done on an emergency basis.

The procedure is performed in the lithotomy position. After aseptic preparation of the perineum, a weighted speculum is placed in the vagina to expose the cervix. We prefer that a paracervical block be performed by the obstetrician (Fig. 16-1). Typically 1% chloroprocaine is injected to achieve rapid onset of anesthesia with a low chance of systemic toxicity due to absorption or unintentional intravascular injection. In first-trimester cases, dilation of the cervix with progressively larger dilators is performed next; in most postpartum cases this step can be omitted. Suction curettage (evacuation) is performed to remove the intrauterine contents. In postpartum cases, this is usually accomplished under ultrasound guidance to reduce the chance of uterine perforation, which complicates approximately 5% of such cases.

Anesthetic Options

The procedure may be performed in an operating room or in a less fully-equipped procedure room. In either case, standard monitors and resuscitation equipment should be immediately

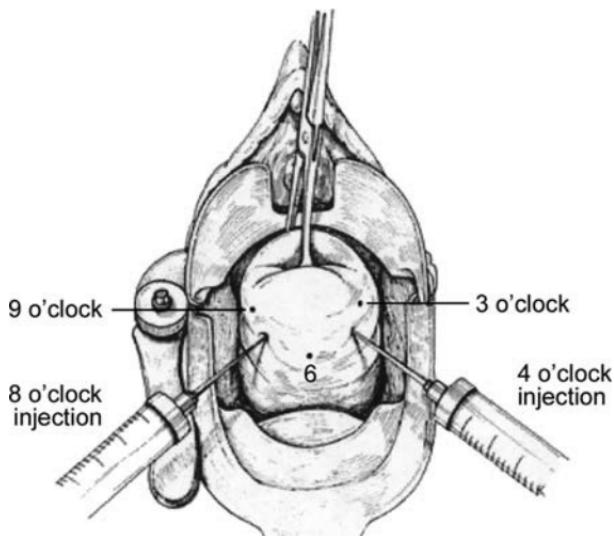


Figure 16-1. Technique for paracervical block. Anesthetic, typically 1% chloroprocaine, is injected laterally at the 4- and 8-o'clock positions of the cervix. (From Shulman and Ling.²⁰ Used with permission.)

available. At Brigham and Women's, we prefer that cases of postpartum hemorrhage be treated in the OR in case more extensive intervention is required. A standard history and physical examination is performed, with particular attention to the severity of bleeding or hemodynamic compromise and the interval since the last oral intake. In cases of stable patients in the first or second trimester who have been NPO for at least 6–8 h we prefer intravenous sedation combined with paracervical block. Routine monitors are applied and an IV secured. Intravenous midazolam (1–2 mg) and fentanyl (50–100 µg), followed by small boluses of propofol (10–20 mg/min) are usually sufficient. Unless the patient is actively bleeding heavily, we favor ketorolac, 30 mg IV, at the end of the procedure, to help control postoperative pain from uterine cramps. If a more extensive procedure is contemplated, either general endotracheal anesthesia or spinal anesthesia is an appropriate choice.

Postpartum patients with *in situ* epidural catheters can undergo the procedure under epidural analgesia. The block can be extended if necessary with 2% lidocaine with epinephrine or 3% chloroprocaine, 5–10 ml to achieve a T10 sensory level and dense sacral anesthesia. *Postpartum patients without epidural analgesia pose a dilemma. Although the procedure is likely to be short and uncomplicated, most anesthesiologists consider women in the immediate postpartum period to be at risk for aspiration, irrespective of the time since last oral intake.* We generally favor short-acting spinal anesthesia in these cases (e.g., lidocaine or mepivacaine, 30–45 mg).

Postpartum Tubal Ligation

Timing of Tubal Ligation

Many obstetricians prefer to perform postpartum tubal ligation immediately after the delivery or before the women are discharged from the hospital. This procedure has a few *distinct advantages*:

1. Immediately after delivery, the uterine fundus lies between the umbilicus and symphysis pubis, so the fallopian tubes remain easily accessible via a periumbilical mini-laparotomy incision
2. Uncomplicated postpartum sterilization does not increase the length of the hospital stay.
3. There is less medical cost.

On the other hand, one can find a few *disadvantages* in performing this procedure immediately after delivery:

1. The physiological changes of pregnancy do not revert back to normal for at least 6 weeks.
2. Tubal ligation is an elective procedure.⁸ Anesthetizing women at higher risk of aspiration (with a “full stomach”) for elective surgery is controversial.
3. Success of the procedure may be less and patient may regret her decision more frequently than interval procedures performed 6 or more weeks postpartum.⁹
4. Performing postpartum tubal ligation may be a resource drain in busy obstetric units, particularly outside normal hours, and should not prevent anesthesiologists from providing more urgent obstetrical services, including labor analgesia.¹⁰

Physiologic Changes of Pregnancy in the Postpartum Period

Many physiologic changes of pregnancy (see Chapter 1) persist in the immediate postpartum period, when tubal ligation is performed. The principal change of interest to anesthesiologists relates to gastric acidity and motility. Classically, a *gastric volume of more than 25 mL and a pH of less 2.5 is considered "at risk" for aspiration.*¹¹ Using these criteria, there is controversy regarding whether women are more frequently at risk in the first postpartum day. Blouw compared gastric volume and pH between parturients undergoing tubal ligation 8 h postpartum vs. nonpregnant women having laparoscopic tubal ligation. Thirty-three percent of the postpartum women and 64% of the control women were found to be at risk.¹² James et al. compared three groups of postpartum women undergoing tubal ligation at 1–8 h, 9–23 h, and 24 h or more hours, and nonpregnant controls. There were no differences in the proportion of women who were at risk among any of the groups. Sixty percent of the women were at risk. Conversely, an ultrasound study found 40% of postpartum women had solid food particles in their stomachs when presenting for tubal ligation. In an experimental study, the same group found 95% of postpartum women fed a standard meal had solid food in the stomach at 4 h, compared to 19% in nonpregnant volunteers.¹³ Therefore, most anesthesiologists consider postpartum women to be at risk for aspiration. It is not clear what the optimal time after delivery for tubal ligation should be. *At Brigham and Women's Hospital we urge the obstetric team to encourage women to have epidural anesthesia for labor and delivery if they are contemplating postpartum tubal ligation.*

Anesthetic Techniques

Epidural Anesthesia

An in-situ epidural catheter used for labor analgesia can usually be reactivated to provide surgical anesthesia for the procedure. An observational study demonstrated >90% success up to 24 h after delivery, but a decline in successful reactivation after 24 h.¹⁴ However, epidural reactivation is more time consuming, and a failed attempt at reactivation even more

so, compared to elective spinal anesthesia.¹⁵ The choice of drug and dose should take into account the heightened sensitivity to local anesthetics in pregnancy. However, there is controversy regarding the duration of this increased sensitivity after delivery. A sensory level to at least T5–6 is necessary when performing postpartum tubal ligation to prevent discomfort from peritoneal traction. There are no comparative trials of different local anesthetic solutions for tubal ligation. We prefer 2% lidocaine with epinephrine, with or without fentanyl 50–100 µg. 2-Chloroprocaine 3% and plain lidocaine are reasonable alternatives.

Spinal Anesthesia

As with epidural anesthesia, less local anesthetic is required in parturients than in nonpregnant women when a subarachnoid block is performed (Fig. 16-2). This decreased requirement does not reach prepregnant values for at least 24 h.¹⁶ The usual precautions and preparations for spinal anesthesia, including

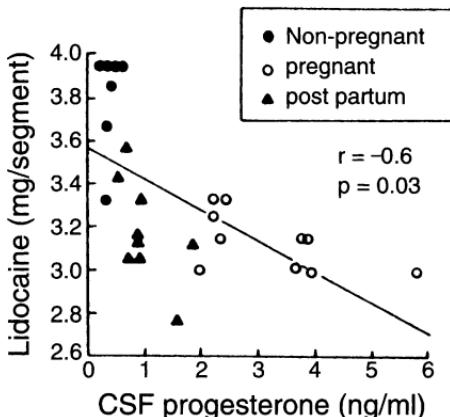


Figure 16-2. Correlation between cerebrospinal fluid (CSF) progesterone (ng/mL) and lidocaine (milligrams per segment) in nonpregnant patients, parturients having cesarean section, and patients 24 h after delivery. (Adapted from Datta et al.¹⁶)

consideration of aspiration prophylaxis, fluid loading, routine monitoring, are indicated. Hyperbaric local anesthetic is used to ensure a midthoracic level of anesthesia. Bupivacaine (9–12 mg) or lidocaine or mepivacaine (45–60 mg) are suitable choices. These doses are similar to those used for cesarean section, though the shorter duration of the procedure allows a modest reduction in dose. Fentanyl 10 µg added to local anesthetic can intensify the sensory anesthesia. Because of the possibility of TNS, use of lidocaine has been controversial. However, the incidence of TNS in pregnant and immediate postpartum patients is low.¹⁷ Recently in response to the declining popularity of lidocaine spinal anesthesia we have also employed mepivacaine, in doses similar to lidocaine, with success as noted above for cervical cerclage. Some centers have used intrathecal meperidine (1 mg/kg) for postpartum tubal ligation. The duration of surgical anesthesia was observed to be 30–60 min and the duration of postoperative analgesia was over 6 h.¹⁸

General Anesthesia

At Brigham and Women's Hospital we try to avoid general anesthesia for postpartum tubal ligation. If general anesthesia is necessary, one should be aware of the reduction in the minimum alveolar concentration in parturients; again it is not known how long this reduction in the minimum alveolar concentration lasts following delivery. As discussed, it is prudent to consider the postpartum patient to be at risk for aspiration irrespective of the fasting interval preceding the procedure.

The techniques for general anesthesia for postpartum tubal ligation are as follows:

1. Intravenous line and routine monitors, careful preoxygenation
2. Metoclopramide, 10 mg intravenously (unless contraindicated), plus nonparticulate antacid
3. Rapid-sequence induction with thiopental, propofol, or ketamine plus succinylcholine, and endotracheal intubation
4. Ventilation with O₂ alone or with N₂O and a low concentration of inhalation anesthetics (to prevent uterine relaxation and bleeding)

5. Neuromuscular blockade after induction is not always required but a short-acting agent is preferred.
6. Opioids (fentanyl, morphine, or hydromorphone)
7. Some authorities advocate routine decompression of the stomach via orogastric tube
8. Oxytocin for maintenance of uterine tone may counteract relaxing effects of volatile anesthetics.

Postoperative Pain Relief

Tubal ligation is usually a painful procedure. Hence, adequate postoperative pain relief is important. Small doses of intrathecal or epidural morphine have been used in a few centers. Others have used infiltration of bupivacaine of the tubes and infiltration of local anesthetic in the wound, combined with parenteral ketorolac, with success.¹⁹ Intravenous, intramuscular, or oral opioids are also useful for postoperative pain relief.

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