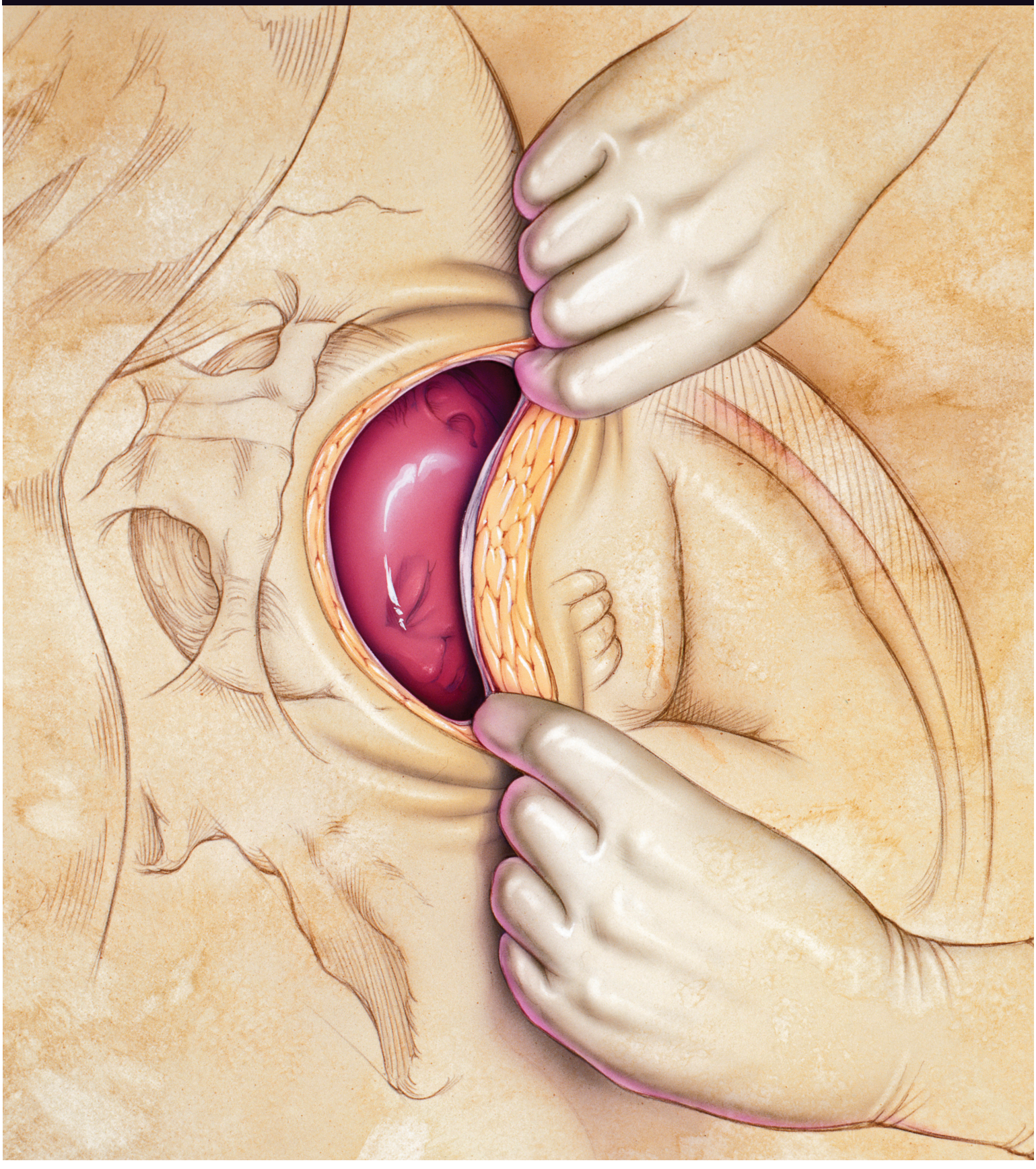
SPECIAL DELIVERY



Know the risks of cesarean section

By Carol Roberts, RNC, CNS, MN
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ANCC CONTACT HOURS

In many facilities, cesarean delivery is performed in ORs within the hospital's perinatal unit. A cesarean delivery may be performed in the main OR if the facility's obstetrics department doesn't handle their own surgeries. These are often smaller obstetric services that don't have the volume of births to support the staffing required to perform their own cesarean deliveries.

Cesareans in medically comhplex or trauma patients may also be performed in the main OR in the interest of patient safety. In cases such as this, a collaborative effort of both OR and obstetrics personnel is ideal.

Although the term, "cesarean" is commonly believed to be derived from the surgical birth of Julius Caesar, this is now considered unlikely. At that time, cesarean delivery was typically performed postmortem to save the life of the fetus.[1] Cesarean delivery was first documented in 1020 AD. The modern cesarean delivery era began around 1882 when Max Saenger advocated closure of the uterus after surgical delivery.[2] Today, cesarean delivery is also referred to as cesarean birth and is defined as the delivery of the fetus through an incision made in the abdomen and uterus.[3]

Cesarean delivery is considered a safe option. With the advent of electronic fetal monitoring, the cesarean delivery rate climbed from 5% in 1970 to around 24% in 1985. During the 1990s, there were increased instances of vaginal birth after cesarean (VBAC) and the rate of cesarean delivery slowly began to decline. However, in recent years, the incidence of cesarean delivery has steadily climbed once again. The national cesarean delivery rate for 2005 was 30.2%,[4] with some tertiary care centers reporting over a 40% rate.

There are several reasons for the sharp increase in the cesarean delivery rate. Concern about serious complications with VBAC has caused a shift from encouraging this practice to increasing the safety requirements for VBAC.[5] The result has been a decrease in VBAC and an accompanying increase in repeat cesarean delivery. The highly litigious nature of obstetrical practice has also contributed to the escalating cesarean rate.

Medical indications for cesarean delivery[3]

Maternal
- Cephalopelvic disproportion
- Failure to progress in labor
- Active genital herpes or papilloma
- AIDS or positive HIV status
- Maternal medical complications
- Previous cesarean birth by classic incision
- Uterine rupture

Placental
- Placenta previa
- Premature separation of the placenta
- Umbilical cord prolapse

Fetal
- Fetal intolerance to labor
- Fetal malpresentation
- Macrosomic fetus
- Fetal anomaly such as severe hydrocephalus

Indications for cesarean delivery

The most common indications for cesarean delivery are maternal, medical, or obstetrical complications that preclude a timely or safe vaginal delivery, and complications of labor. Complications of labor include failure to progress, cephalopelvic disproportion, fetal malpresentation, umbilical cord prolapse, nonreassuring fetal status, placenta previa, placental abruption, and uterine rupture (see *Medical indications for cesarean delivery*).

Cesarean delivery on maternal request and without a medical or obstetrical indication is currently a controversial topic in obstetrics.[6] Potential reasons for cesarean delivery per maternal request include fear of the pain associated with vaginal delivery, the unfounded belief that cesarean delivery maintains vaginal integrity and protects against future bladder or bowel incontinence, and a desire to schedule delivery for psychosocial reasons.

Approximately 60% of physicians who responded to a survey by The American College of Obstetricians and Gynecologists in 2006 reported that they were receiving an increase in requests for cesarean delivery without a medical indication from their patients, and almost 50% reported that they had performed at least one.[7]

Complications

Cesarean delivery poses significant risks to both mother and infant. Every delivering woman is at risk for bleeding with uterine atony as the primary cause for postpartum hemorrhage (PPH). Women who deliver via cesarean are at a four to seven fold increased risk for requiring a blood transfusion as compared with vaginal delivery.[8] The average blood loss during cesarean delivery is approximately 1,000 mL.[9] Nonelective cesarean deliveries have a higher risk of PPH than elective cesarean deliveries.[9] Oxytocic medications to contract the uterus, such as oxytocin (Pitocin), methylergonovine maleate (Methergine), and carboprost tromethamine (Hemabate) must be immediately available. Misoprostol (Cytotec) is a synthetic prostaglandin E_1 analog that has been used off-label for control of PPH.

Oxytocin, an amino acid peptide, may be administered as an I.M. injection or as an I.V. infusion to control postpartum uterine bleeding. Oxytocin, 10 units, may be administered I.M. after the delivery of the placenta. An I.V. infusion may be administered at a rate adjusted to control uterine atony. I.V. push oxytocin is contraindicated because of its association with acute hypotension.[10]

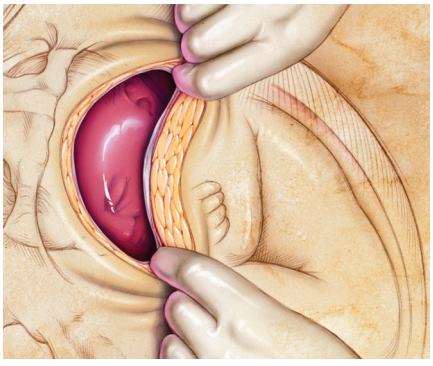
Methylergonovine maleate, a semisynthetic ergot alkaloid, may be administered I.M., I.V., or orally for the prevention and control of PPH. Methylergonovine maleate is contraindicated in women with hypertension and in women with a history of asthma. Ampules must be stored in the refrigerator and protected from light.[10]

Carboprost tromethamine is a prostaglandin that acts as an oxytocic agent. It's given I.M. when used to control PPH. Adverse reactions include flushing, nausea, vomiting, diarrhea, and elevated temperature.[10]

Misoprostol is administered rectally to control PPH unresponsive to oxytocin or methylergonovine maleate. The off-label use of misoprostol has been found to be generally very effective at controlling hemorrhage and sustaining uterine contractility within 3 or 4 minutes and has minimal adverse reactions. Some shivering or temperature elevation may be observed.[11]

In addition, cesarean delivery is associated with an increased risk of uterine and surgical wound infection and thromboembolic complications for the mother.[8,12–14] Women who have had a primary cesarean birth are at increased risk for abnormal placental implantation such as placenta previa or accreta, placental abruption and uterine scar dehiscence, or uterine rupture in subsequent pregnancies.[15]

Infants born via cesarean delivery are at increased risk for resuscitation, respiratory complications, and injuries, such as lacerations, bruising, nerve injuries, and fractures, and may require admission to the neonatal intensive care unit.[16–19] Delay in maternal-infant attachment and difficulty establishing lactation are associated risks with cesarean delivery.[20] Hospital length of stay increases with cesarean delivery as compared with vaginal delivery for both mother and infant.



Approximately 60% of physicians reported an increase in patient requests for cesarean delivery without a medical indication.

Types of cesarean delivery

Cesarean deliveries are generally classified as primary, repeat, elective, and emergent. A woman's first cesarean delivery is a primary cesarean. A repeat indicates a previous cesarean delivery. The term "elective" cesarean may be used to indicate a scheduled procedure in either of the former categories or may refer to a cesarean by maternal request. An emergent cesarean is indicated when there's immediate need for intervention and delivery for maternal or fetal well-being.[21,22] Most emergent cesarean deliveries can't be anticipated and usually result from an intrapartum development in low-risk women).[21] The most common indications are failure to progress and fetal intolerance to labor. It's recommended that emergent cesarean deliveries be performed within 30 minutes (decision to incision).[23] However, in some obstetrical emergencies, such as hemorrhage, placental abruption, uterine rupture, or umbilical cord prolapse, optimal maternal/neonatal outcome is facilitated if delivery is accomplished more expediently.[23]

Preoperative considerations

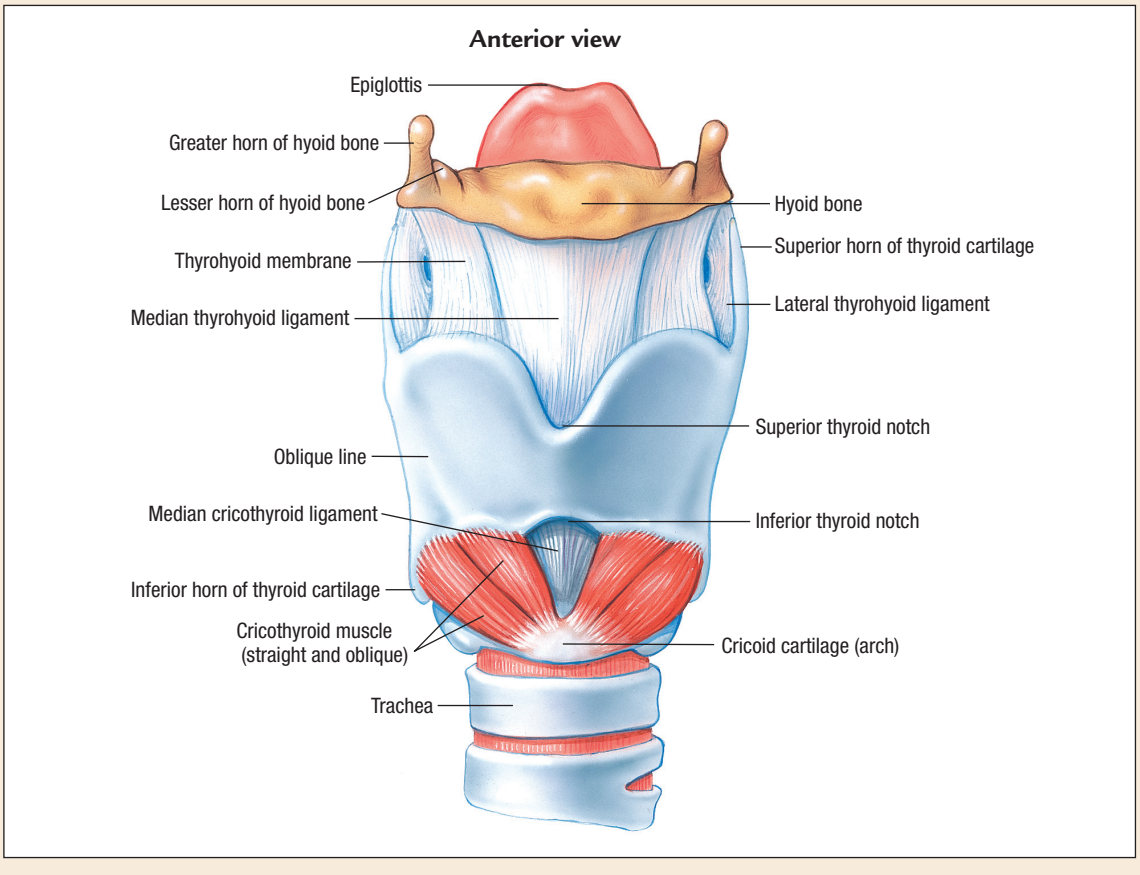
Prior to a scheduled procedure, a 20- to 30-minute fetal heart rate tracing should be obtained to validate reassuring fetal status. Fetal surveillance is then maintained appropriate to fetal status. If the fetal heart rate is nonreassuring, continuous fetal monitoring should be attempted via external or internal fetal scalp electrode in the OR until the woman is prepped and draped. If the initial fetal heart rate tracing is reassuring, fetal heart rate may be assessed via Doppler every 15 (high-risk mother) to 30 minutes (low-risk mother). Assess and document fetal heart rate following regional anesthesia placement and just before prepping and draping the patient.[24]

Careful assessment of preoperative lab values is critical with the obstetrical patient. A platelet count less than 100,000/mm^3 is indicative of severe preeclampsia and potential HELLP follows. HELLP is a syndrome of pregnancy identified by the presence of hemolysis, elevated liver enzymes, and platelets less than 150,000/mm^3 and should be immediately reported to both the primary obstetric provider and the anesthesia provider. Pregnant and delivering women are at higher risk for developing disseminated intravascular coagulation than the general population and should be carefully observed for signs and symptoms throughout the surgery and recovery period. Occasionally, and often unpredictably, cesarean delivery proceeds to hemorrhage, disseminated intravascular coagulation, emergent hysterectomy, and even maternal cardiac arrest.

Ringer's Lactate is the I.V. fluid of choice for pregnant women. I.V. solutions containing dextrose are generally not used in this population to avoid potential neonatal hyperglycemia with resultant reactive hypoglycemia following delivery.[24] A 1,000-mL Ringer's Lactate bolus is standard within 30 minutes prior to administration of regional anesthesia to minimize the incidence of maternal hypotension and the resulting adverse impact on uteroplacental perfusion and the fetus. Regional anesthesia is the preferred anesthesia to allow the woman to participate in her birth experience and to minimize anesthesia complications.[25] The sitting position during administration of regional anesthesia has been shown to decrease

Locating the cricoid cartilage

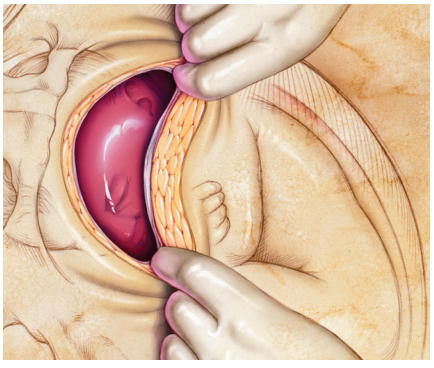
The illustration below is an anterior view of the larynx and surrounding structures. The cricoid cartilage is the only complete cartilage and is located below the thyroid cartilage.



Source: Asset provided by Anatomical Chart Company.

incidence of hypotension following placement.[26] Urinary drainage catheter insertion may be delayed until after placement of the epidural catheter in the case of a nonemergent delivery.

In an obstetrical emergency requiring an emergent or "crash" cesarean delivery, certain procedures, while important, may need to be omitted or expedited to get the baby out as quickly as possible. Examples include the initial surgical count and/or full abdominal prep. In instances where the surgical count is omitted, an abdominal X-ray is performed before the patient leaves the OR.[24] Maintaining accurate timelines is vital and documentation must be completed postprocedure as soon as possible.



Extra-abdominal repair of the uterus has been shown to decrease surgical time and use of sutures, but increases postoperative pain at 6 hours.

Assume the laboring pregnant woman has a full stomach due to delayed gastric emptying in pregnancy. Many anesthesia providers prefer a pregnant woman to be N.P.O. for a minimum of 8 hours before an elective cesarean delivery. Intubation for general anesthesia may be complicated due to anatomical changes during pregnancy or obesity. An assistant to provide cricoid pressure and the availability of equipment for difficult intubation is highly advantageous (see *Locating the cricoid cartilage*). Consideration should be given to the use of antiembolic pneumatic compression stockings for thromboprophylaxis.[14,23] Position the woman with a wedge under her right hip to displace the uterus and maximize uteroplacental perfusion. Maintain normothermia with warmed blankets[27] or forced air-warming device.[28] In addition, consider administering warmed I.V. fluids during surgery.

Procedural considerations

The time from incision to delivery should be noted. In an emergent cesarean delivery with general anesthesia, timely delivery of the infant is particularly important to avoid initial neonatal depression. Ensure that neonatal resuscitation equipment and personnel are present for the delivery. The American Academy of Pediatrics (AAP) and American Heart Association (AHA) Neonatal Resuscitation guidelines emphasize that an individual with sole responsibility for the newborn and with the necessary skills to initiate a complete neonatal resuscitation, including endotracheal intubation and administration of medication, be present at every delivery.[29] Ten percent of infants require some assistance at delivery and 1% require extensive resuscitation.[29] It's imperative that neonatal resuscitation be initiated immediately to ensure optimum neonatal outcome. When cesarean delivery is performed for fetal indications, consideration should be given to obtaining umbilical cord blood gases and sending the placenta for pathology evaluation.[23]

Prophylactic antibiotics are generally recommended for cesarean delivery.[2,30] Antibiotics are typically administered to the mother after the delivery of the infant; however, there's an emerging trend of administration before surgery begins.[31]

A low transverse incision is the most common surgical incision during cesarean delivery (see *Incisions at cesarean section*). Extra-abdominal repair of the uterus has been shown to decrease surgical time and use of sutures, but increases postoperative pain at 6 hours.[32] Evidence indicates that closure of the rectus muscle or the parietal peritoneum during a primary cesarean decreases formation of adhesions.[33–35]

Although complications during cesarean delivery are rare, it's best to be prepared. It's very helpful to have an additional circulating nurse, scrub person, and anesthesia provider to respond during such situations. The surgeons are frequently grateful to have assistance from other specialists, such as urology, gynecologic oncology, or trauma, during these times. Interventional radiology may be enlisted in an attempt to control bleeding through the use of uterine artery embolization.[36]

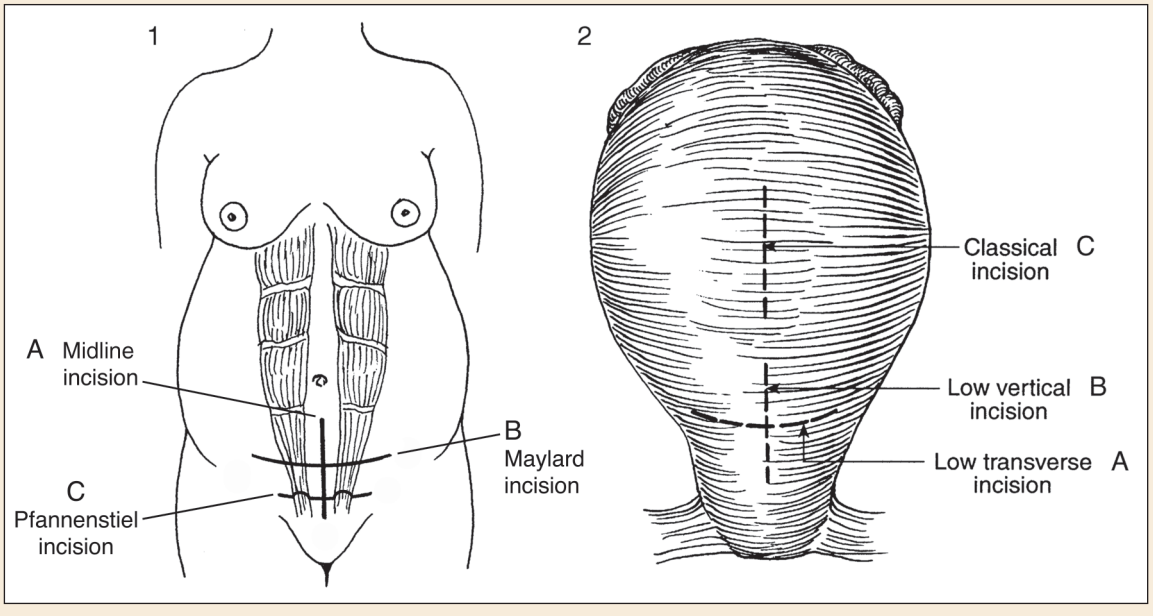
Postprocedure care

Managing the new baby and mother in the postanesthesia care unit (PACU) may be a challenge. In the surgical PACU, a nurse would assume care of the newborn. Routine postoperative assessments are performed in the PACU as well as checking the

Incisions at cesarean section

Figure 1 illustrates the three most common abdominal incisions: (A) the midline incision through the less vascular midline space, (B) the Maylard incision, which involves incision of the rectus sheath and muscles, and (C) the Pfannenstiel incision, where the rectus sheath and muscles are retracted away rather than incised.

Figure 2 illustrates the uterine incisions by which cesarean sections are classified: (A) the lower segment transverse (lower segment transverse cesarean section [LSTCS]), (B) the lower segment vertical cesarean section (LSVCS), and (C) the classical cesarean section where the incision is through the thick contractile upper uterine segment.



Source: From Beckmann CRB, Ling FW, Laube DW, Smith RP, Barzansky BM, Herbert WN. *Obstetrics and Gynecology*, 4th ed. Baltimore: Lippincott Williams & Wilkins; 2002.

uterine fundus and the lochia, or vaginal flow. The uterine fundus should be firmly contracted and around the level of the umbilicus. The uterus must remain contracted after delivery to compress the large vessels that supported the placenta and minimize bleeding. The lochia should be light to moderate with few clots. An I.V. infusion with oxytocin added may be maintained to assure a firm fundus without aggressive fundal massage, which may be very painful as anesthesia wears off. Women requiring cesarean delivery for the arrest of labor after an oxytocin induction require more oxytocin to achieve uterine contraction after delivery.[37] This is probably due to the saturation of oxytocin receptor sites. Alternative agents to assure contraction of the uterus may be effective.

In addition to normal postoperative care, the breastfeeding mother should optimally have the newborn to the breast within the first hour after birth. Positioning for feeding can be challenging with the mother lying flat on a stretcher. Raising her head slightly may help. Use of pillows and the help of a significant other or family member may help keep the baby positioned correctly with the baby's stomach facing the mother's stomach, and assure the newborn's head is aligned with the nipple so that a successful latch may occur.

Often, family members will want to see the patient and baby as soon as possible. Obstetrical recovery areas often allow limited visitation during recovery. This may not be feasible in a main PACU depending on its location and unit policy. Keeping mother and baby together during recovery as much as possible is the goal.

Postoperative pain management is very important not only for patient comfort,[38] but also because the mother needs to be comfortable so she can concentrate on her time with the baby and

begin the attachment process. Postoperative pain can decrease success at breastfeeding and may reduce mobility, increasing the risk of thromboembolic complications.[39] Continuous epidural infusion, injection of a long-acting opioid toward the end of the case, and patient-controlled analgesia are acceptable options. A newer technique is continuous intrawound infusion of analgesia. Either a nonsteroidal anti-inflammatory agent or an opioid may be used. These are often effective, and nonsteroidal agents have shown a good opioid-sparing effect.[40]

When a patient and family expect a normal vaginal delivery and unexpectedly face a cesarean, there may be significant social and emotional concerns. Some new mothers face serious feelings of grief if a vaginal delivery is not possible. Women may feel helpless and a sense of loss of control over the birth experience. Family members frequently have to quickly adapt to an emergent situation while frightened for their loved one and the unborn child. Patient and family support is very important during these times. Providing information and time for discussion as much as possible, allowing the significant other to remain with the mother, and assigning a staff member to communicate with the other family members may help families cope better with the situation.

Although they're relieved to have delivered a healthy baby, mothers who've had a cesarean delivery are at risk for lowered self-esteem related to feelings of failure at not being able to accomplish a vaginal delivery.[24] They may feel their body has failed them or that they didn't try hard enough, or that they did something wrong during their pregnancy that caused this sequence of events. This can have long-term effects on a family and on the mother's ability to nurture her baby. Sensitive interaction with patients and their families, reassurance that their feelings are normal, and helping them understand the events that have occurred may help.

Maintaining good operative technique while providing family-centered care is a challenge for the OR nurse caring for the cesarean delivery family. Maternal and newborn health and safety are critical, but so is helping establish a new baby into a family. At least two cesarean procedures are started every minute in the United States.[2] As cesarean rates continue to increase, staff will be caring for cesarean delivery families more frequently. While striving to provide the best evidence-based care, we can also promote attachment for the newborn and the patient and her family.[41] Families will remember every aspect of their birth experience for many years, if not for their entire lifetime. Staff should count it a privilege to be a part of such a life-changing event. **OR**

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