



Spotlight on Lower Segment Caesarean Section Techniques

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Abstract

The principles involved in any surgical procedure should be standardized. We highlight evidence based surgical techniques for Lower segment Caesarean sections. The reported Caesarean section rates across the globe range from 15% in Iceland to 55.6% in Brazil making it one of the most common surgical procedures performed on women. This article relates only to Lower segment caesarean section and uncommon procedures like classical caesarean and other modification as well as Caesarean Hysterectomy are not discussed.

Introduction

Lower segment caesarean section is one of the commonest open abdominal operations, often performed in an emergency setting. The oft repeated statement “see one, do one, teach one” for surgical procedures is no longer valid. Training needs to be more focused and structured especially for procedures like caesarean section. The majority of these proceed smoothly and safely. However the incidence of re-laparotomy after caesarean section is 0.12-1.04% [1,2]. The indications for laparotomy include post operative intra-abdominal bleeding, abscess or bladder and bowel complications. Therefore standardization and evidence based review of techniques on a regular basis is essential. Obstetricians must operate with a meticulous surgical technique and maintain a high index of suspicion for complications.

Pre-operative Considerations

Informed consent should always be obtained after counseling. In the operation theatre, check-lists such as WHO safe childbirth Checklist [3] are duly filled in by the duty nurse/Midwife, Obstetrician and the anesthetist to avoid errors and mishaps.

Hair Removal

Shaving is associated with twice the number of surgical site infections as compared with clipping. Therefore, electric clipper the morning of the surgery is preferred [4] Epilatory cream use is another option.

Antibiotics

Prophylactic antibiotics should be administered before every Caesarean delivery [5]. The first generation cephalosporin's such as Cefazolin and Cephadrine are preferred although their efficacy is equivalent to Ampicillin [6,7]. When administration of antibiotics within 1 h (optimally about 30 min) before skin incision is compared with later injection after cord clamping, the former is associated with a lower incidence of endometritis and wound infection [8].

Venous Thromboembolism Prophylaxis

All women undergoing cesarean delivery should receive mechanical VTE prophylaxis with either pneumatic compression devices or compression stockings. These should be applied preoperatively and continued until full ambulation [9]. Moderate and high risk women should receive prophylactic dose sub cutaneous low molecular weight heparin like enoxaprin for 5 days.

Skin Cleansing

Skin cleansing techniques for Caesarean delivery have been insufficiently studied for an evidence-based recommendation. However, the use of chlorhexidine is currently preferred to povidone-iodine solution [10].

Vaginal Cleansing

Compared with no scrub, vaginal irrigation with povidone-iodine [11] immediately before

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Caesarean delivery significantly reduces the incidence of post-caesarean infectious morbidity especially endometritis.

Maternal Position during Surgery

Recommended maternal position involves tilting the woman toward her left side 10°–15° to avoid vena caval compression by the gravid uterus [12].

Drapes

Adhesive drapes for Caesarean are associated with a higher incidence of wound infection. Therefore, adhesive drapes should be avoided [13].

Surgical Technique

Skin incision

The preferred transverse incisions are the Pfannenstiel (slightly curved, 2 cm to 3 cm or two finger breadths above the symphysis pubis, with the mid portion of the incision lying within the shaved area of the pubic hair) and Joel–Cohen incisions (straight, 3 cm below the line joining the anterior superior iliac spines, and therefore slightly more cephalad than the Pfannenstiel) [14]. The Joel–Cohen incision has significantly shorter time from skin incision to birth of baby, shorter operating time, reduced blood loss, reduced time to oral intake with less postoperative discomfort compared to the Pfannenstiel incision [15]. Abdominal surgical incision size should probably provide about 15 cm (size of a standard Allis clamp) of exposure to assure optimal outcome of both mother and the term fetus.

Subcutaneous tissue

Use of the scalpel should be limited. Opening the subcutaneous layer bluntly from medial to lateral edges avoids injury to tissue and the inferior epigastric vessels. Blunt dissection has been associated with shorter operating times. However, the use of diathermy for abdominal wall opening from subcutaneous tissue till the peritoneum is associated with lower blood loss, shorter skin-to-peritoneum access time, and less post-Caesarean pain compared with the use of No. 22 disposable scalpel blade [16].

Rectus sheath and muscle

A transverse incision is usually performed with the scalpel and then extended with scissors. Digital extension can alternatively be accomplished by separating the forefingers in a cephalad-caudad direction after inserting the fingers into a small, midline transverse fascial incision. Blunt entry with rectus sheath incision extended manually and parietal peritoneum entered and extended bluntly (manually) is associated with less blood loss, shorter operative time, and less post-CD fever and pain, compared with sharp entry [17]. Rectus muscle cutting with Maylard technique is not recommended as it is associated with reduction in abdominal muscle strength at 3 months [18]. Non-dissection of the fascia off the recti muscles inferiorly may result in less pain and similar blood loss as compared with dissection of the rectus sheath inferiorly during cesarean [19].

Peritoneum

As compared with sharp entry, blunt entry and extension of the rectus sheath incision and parietal peritoneum is associated with less blood loss, shorter operative time, and less post-Caesarean fever and pain [17]. There is no difference in the rate of bladder injury, estimated blood loss or hospitalization on comparing development of a bladder flap versus direct uterine incision above the bladder fold [20].

Uterine incision

The transverse incision of the lower uterine segment is usually recommended because there is less blood loss and it allows for trial of labour after cesarean section (TOLAC) in subsequent pregnancies [21]. Blunt expansion of the uterine incision with fingers is recommended and should be preferred to sharp expansion of the uterine incision [22]. It is quicker, with significant reduction of blood loss (approximately 55 mL) and need for blood transfusion. Blunt expansion has the added benefit of reduced risk of inadvertently cutting the neonate or umbilical cord.

Prevention of uterine atony

Uterine massage and cord traction are associated with less blood loss. Regarding oxytocin infusion rates at Caesarean section, women require fewer additional uterotonics when treated with 80 international units (IU) oxytocin/500 mL infused over 30 minutes as compared with those who received 10 IU/500 mL infused over 30 minutes. Misoprostol combined with oxytocin (e.g., 400 mcg sublingual after cord clamping, or rectal) is associated with less post-Caesarean blood loss, fall in hematocrit and need for additional uterotonic agents when compared with oxytocin alone [23].

Placental delivery

Manual removal of placenta is associated with greater morbidity than spontaneous expulsion with gentle cord traction. These include increased endometritis, increased postpartum hemorrhage and decreased hematocrit after delivery. Blood loss in manual removal increases perhaps because dilated sinuses in the uterine wall are not closed yet [24].

Uterine exteriorization and cervical dilation

There is no significant difference in blood loss, intraoperative hypotension, nausea, vomiting, pain, blood transfusion, endometritis or wound infection, with uterine exteriorization (extra-abdominal uterine incision repair) versus repair in situ [25]. Routine cervical dilation at Caesarean delivery before uterine incision repair, although not beneficial, is not associated with any infectious morbidity (UTI, wound infection, endometritis) or change in hemoglobin [26].

Closure of uterine incision

Double layer closure is generally recommended, however it might be reasonable to omit the second layer if the woman is planning no more pregnancies (e.g., receives tubal ligation) [27]. Locking of sutures in the first layer is associated with poorer healing and possibly thinner residual myometrium [28].

Intraoperative interventions to reduce post-operative pain

Intraperitoneal instillation of 10 mL of 2% lidocaine significantly decreases persistent pain postoperatively [29].

Peritoneal non-closure

Peritoneum regenerates in 5–6 days. Closure of both visceral and parietal peritoneal surfaces is associated with an increased risk of adhesion formation, postoperative pain and longer operative time as compared with non closure. Non-closure of the visceral peritoneum when the parietal peritoneum is closed is associated with decreased urinary symptoms of urgency, frequency and stress incontinence [30].

Rectus muscle approximation and fascia closure

Rectus muscles go back to their original anatomic place and suturing them together can cause unnecessary pain when the woman

starts to move postoperatively. Continuous non locking closure with delayed absorbable suture at about 1 cm interval is recommended. Small fascial tissue bites of 5 mm every 5 mm are associated with prevention of incisional hernia [31].

Skin and subcutaneous tissue closure

Subcutaneous tissue closure versus non closure by sutures should be decided by the thickness of the subcutaneous tissue. Suture closure of subcutaneous fat in women with >2 cm thickness is associated with a significant decrease in wound infection [32]. Closure of skin is most commonly performed with either absorbable sutures or non absorbable metal staples. There is no significant difference in hematoma, seroma, readmission, pain perception, patient satisfaction, and incision cosmesis [33].

Conclusion

Standardized practice based on evidence is the key to success. It results in improved outcomes as well as patient satisfaction in this era of increased rates of operative deliveries and litigations.

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