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Step-by-step bleeding management in cesarean section



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ABSTRACT

Cesarean sections have recently increased dramatically worldwide in the last 50 years. Unfortunately, the post-cesarean section maternal morbidity rate is reported to be relatively high, which is as high as 36%. Some of the most common complications of cesarean section are fever (25%), bleeding (4%), hematoma (4%), and urinary tract infection (3%). Among these complications, obstetric hemorrhage is one of the most common causes of maternal death worldwide. Excessive hemorrhage associated with a cesarean section is defined as blood loss above 1000 ml is frequently underestimated, but is documented as occurring in more than 5–10% of cesarean sections. In most cases, this can be treated with conservative treatment such as vaginal packing and administration of uterotonic drugs. However, some persistent bleeding cases require specific treatment and techniques during the operation. Therefore it is essential to understand the steps and procedures for handling bleeding during cesarean section to reduce maternal mortality. This article review aims to summarize some techniques that can be used to control bleeding during cesarean section.

Keywords: *bleeding, cesarean section, management.*

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INTRODUCTION

Today, 15% of deliveries worldwide are cesarean sections. The percentage of women who give birth by cesarean varies greatly between nations. One of the leading causes of maternal morbidity and mortality is still obstetric hemorrhage. An estimated 529,000 maternal deaths occurred globally in 2000. Most of these fatalities happened in nations with inadequate resources. In developed regions, the lifetime chance of maternal death for a woman is 1 in 2800. In underdeveloped areas, the likelihood is one in 61. There are regional variations in the percentage of these deaths that can be attributed to bleeding. Hemorrhage is Africa and Asia's leading cause of maternal death (33.9% and 30.8%, respectively). Maternal deaths in affluent countries are 13.4% due to bleeding. Post-partum hemorrhage (PPH) is defined as the loss of more than 500 milliliters of blood from the vaginal tract within the first twenty-four hours following the baby's birth. This definition is commonly recognized. Applying this criterion to cesarean births presents challenges because the average blood loss after an elective lower segment cesarean, which is 487 mL, is close to this

loss threshold. Though a commonly cited number from earlier data is 1000 mL, no comparable current studies have attempted to measure typical blood loss at emergency cesarean following a time of labor. General anesthesia, amnionitis, extended labor, pre-eclampsia, multiple pregnancies, fetal macrosomia, blood disorders, premature birth, leiomyomata, placenta previa, and antepartum or intrapartum bleeding have all been identified as risk factors for PPH during cesarean.¹

This article review outlines procedures step by step-by-step bleeding management in the cesarean section, from using medications in the cesarean section to conservative and radical surgery, and the abdominal packing to control bleeding in the cesarean section is also described.

MEDICAMENTOSA

The optimal preventive uterotonic drug would be simple to use, have few adverse effects, and reduce serious bleeding after cesarean sections. General anesthesia or regional anesthesia can be used for Caesareans. The use of general anesthesia increases the risk of PPH. In the developed world nowadays, regional anesthetic is used

for most elective and emergency cesarean sections. Maternal hypotension can result from spinal anesthesia in particular. One common uterotonic drug used during cesarean sections is oxytocin. Following ingestion, ergometrine has been known to induce vomiting and hypertension. Misoprostol may result in chills and fever. Difficulties in administering misoprostol intraoperatively by the rectal or oral route would hinder the routine use of the medication for prophylaxis during cesarean sections. Women having cesarean sections are a cohort with significant clinical variability. The length of labor before a cesarean section may have a substantial impact on the optimal dose or drug used for prophylaxis. Increased oxytocin receptor expression in myometrial tissues with advancing gestation has also been shown, suggesting that the response to uterotonic medications provided at extremely early gestations may be markedly different from the response at term.¹

It has been shown that antifibrinolytic drugs, primarily tranexamic acid (TXA), lessen blood loss and the need for transfusions during cesarean delivery.

Hemoglobin drop, postpartum blood loss, PPH and severe PPH, need for extra uterotonic medications, and blood transfusion are all significantly reduced when TXA is added to the normal oxytocin prophylaxis during cesarean delivery. We therefore recommend adding tranexamic acid, 1 g (or 10 mg/kg) i.v. 10–20 min before skin incision or spinal anesthesia, given its benefit in preventing one of the most common and severe pregnancy complications, as well as its safety and now demonstrated effectiveness in pregnancy. Additionally, oxytocin prophylaxis is given after the neonate is delivered as prophylaxis to further reduce blood loss at cesarean delivery.^{1,2}

CONSERVATIVE SURGERY

Arterial Ligation

Ligation of uterine and utero-ovarian arteries

By lowering the perfusion pressure in the myometrium, ligation of the uterine and utero-ovarian arteries can reduce uterine hemorrhage. While it won't stop bleeding from the placenta accreta spectrum or uterine atony entirely, it might lessen blood loss while other treatments are being tried. It doesn't seem to affect reproductive function or cause injury to the uterus.²

Internal iliac (hypogastric) artery ligation

Even a skilled pelvic surgeon may find this method difficult, particularly in cases involving a big uterus, limited exposure from a transverse lower abdominal incision, pelvic hemorrhage that is still occurring, or obese patients. When an experienced surgeon tries to perform a successful and safe bilateral internal iliac artery ligation, things are even more challenging because they are rarely operating deep in the pelvic retroperitoneal compartment. These factors have led to the general replacement of this operation with uterine compression sutures, uterine artery ligation, and arterial embolization. The pulse pressure of blood going to the uterus is decreased by bilateral ligation of the internal iliac arteries. If there are large collateral vessels, the procedure's usefulness could be affected (such as in the placenta percreta). There have been reports of reverse filling of the internal iliac arteries through the inferior epigastric, obturator, deep circumflex

iliac, and superior gluteal arteries, which are branches of the external iliac artery, beyond the point of closure.³

B-Lynch

Like physical uterine compression, the B-Lynch suture (named for Christopher Balogun-Lynch) envelops and compresses the uterus. It has successfully stopped uterine bleeding from atony in case reports and small series when other treatments have failed.^{4,5} Although the procedure may raise the risk of developing Asherman syndrome, it is reasonably easy to learn, seems safe, protects future reproductive potential, and does not increase the likelihood of placental-related bad outcomes in later pregnancy.^{6,7} It should only be used in cases of uterine atony; it will not control hemorrhage from the placenta accreta spectrum. It will not prevent PPH in future pregnancies.⁶

Laterally in the lower uterine segment, a large Mayo needle is used to enter and exit the uterine cavity using 1 or 2 chromic catgut (or any absorbable suture if catgut is not available). After the uterus has been involuted, a large suture is utilized to prevent breaking, and quick absorption is crucial to preventing bowel herniation through a suture loop. The suture is wrapped around the fundus and passes through the posterior wall to re-enter the lower uterine cavity. The suture then enters the anterior lateral lower uterine segment opposite and parallel to the original bites, crosses to the other side of the lower uterine segment, escapes through the posterior wall, and is looped back over the fundus. With the use of bimanual compression, the loose ends are drawn tightly and fastened down firmly to compress the uterus. By improving the assessment of chronic vaginal bleeding, proper patient placement (e.g., legs apart, patient flat, or, if stable, in modest reverse Trendelenburg) would improve the capacity to evaluate the effectiveness of these measures. Both by itself and in conjunction with balloon tamponade, the method has been employed. It has been referred to as the "uterine sandwich".⁷

Hayman Technique

For surgical treatment of atony following vaginal delivery, Hayman described

placing two to four vertical compression sutures from the anterior to the posterior uterine wall without hysterotomy. If necessary, a transverse cervicoisthmic suture may be inserted to stop the lower uterine segment's hemorrhage.⁸

Cho Technique

Cho gave an example of a method involving several squares or rectangles. The endometrial cavity is compressed by passing a straight needle through bleeding sites in the Cho's square suture technique phase. The needle was first inserted between the anterior and posterior walls, then it was inserted back through the posterior to anterior walls 2–3 cm laterally. After that, the needle was raised by two to three centimeters, and the process was repeated in the other direction. I tied the knot as firmly as I could. After twin cesarean delivery, uterine atony can be treated with several square sutures using Cho's suture.⁹

Pereira

Initially, Pereira sutures were reported as utilizing absorbable Vicryl #1 with multifilament. As with the B-Lynch suture, the possibility of success of the Pereira suture is evaluated before the procedure is carried out. The patient is placed in a semi-lithotomy or Lloyd Davies position (frog's legs). Ascertain whether bleeding is there and how much of it. Following externalization of the uterus, bimanual compression is carried out. It will be successful to put Pereira sutures if the bleeding ceases while the compressions are being applied. Transverse and longitudinal sutures encircle the uterus in the Pereira suture (Figures 1 and 2). To put sutures, a succession of superficial bites must be made, removing just the serous membrane and subserosal myometrium and leaving the uterus cavity intact (Figure 2). Starting from the anterior aspect of the uterus, two or three transverse circumferential sutures are first placed. They are then tied over the anterior aspect of the uterus, crossing the opposing broad ligament towards the posterior aspect of the uterus and crossing it again towards the anterior aspect. The uterus has different numbers of bites depending on how big the organ is. The fallopian tube, utero-ovarian

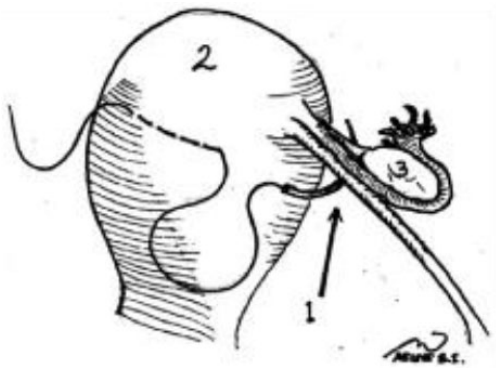


Figure 1. Method of applying transversal sutures. The needle is passed through the avascular area of the broad ligament (1), uterus (2), and ovary (3).¹⁰

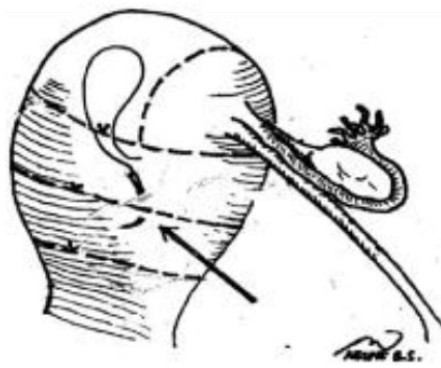


Figure 2. Three transverse circular sutures are placed first, followed by longitudinal sutures (arrow). All sutures applied with superficial intramyometrial bites.¹⁰

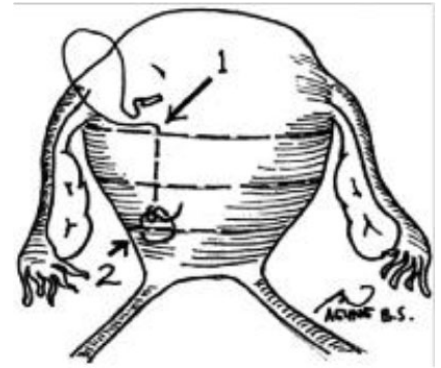


Figure 3. Posterior aspect of the uterus. The first longitudinal suture (1) and first knot to fix longitudinal with transversal sutures (2).¹⁰

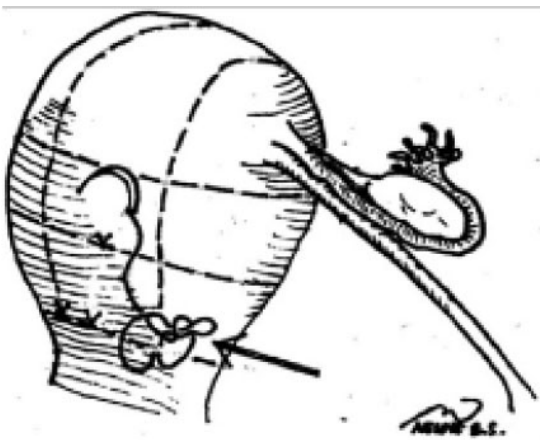


Figure 4. Last knot of longitudinal sutures (arrow).¹⁰

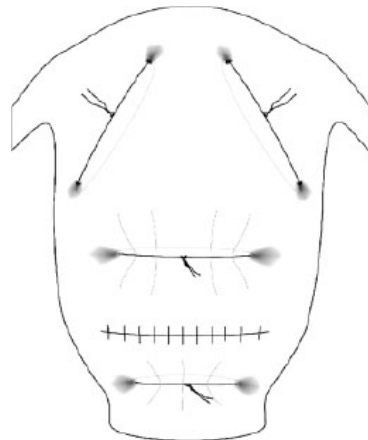


Figure 5. Ouahba suture.

ligament, and round ligament cannot be in the future when it crosses the broad ligament, which allows for the selection of an avascular region (Figure 1). Two or three longitudinal sutures are anchored by the final transverse circular suture in the lower uterine region. Beginning on the dorsal side of the uterus and ending on the ventral side with another knot tied to the lowest transverse suture (Figure 4), each longitudinal suture is connected to the lowest circular suture (Figure 3).¹⁰

Ouahba

Ouahba suture is also called four cross stitches. The uterus is clamped using a through suture. Two transverse sutures should be made, one in the lower segment of the uterus (a) and the other in the middle of the body of the uterus (b). Then, a transfix suture is placed 2–3 cm medial to

the uterine horn (c and d). This procedure was performed on 20 women with PPH, 19 of whom achieved hemostasis. Of 19 women, eight women expected to become pregnant and six later became pregnant, all of whom delivered at term. Ouahba et al. claimed that this suture, a modification of the Cho suture, was easier and less invasive than the Cho suture. This stitch has not been used much.¹¹

Hackethal

Hackethal also called multiple transverse U-sutures. Approximately 6–16 transverse sutures 2 to 4 cm long (U sutures) are made. Hackethal et al. performed this suture on seven women with PPH, all achieved hemostasis and showed no side effects. None of the patients were pregnant at the time of reporting. Hackethal et al. claim that “multiple” stitches can provide

an alternative solution if one stitch loosens. Insufficient research has resulted in this procedure not being adequately evaluated.¹²

Makino Takeda

Double vertical compression suture, or Makino-Takeda suture. Three women with placenta previa who experienced atonic hemorrhage following cesarean sections were treated with this approach, and all of them experienced hemostasis. The suture is knotted anteriorly and a needle is introduced into the cervical-isthmus location from anterior to posterior and then posterior to anterior. Apply the same technique to the other side, and then use two vertical sutures to compress the cervical-isthmus area. After that, the uterus's body is sutured twice vertically using the Hayman suture. Makino et al. conduct vertical cervical-isthmus sutures rather than transverse ones, but Hayman et al. also used transverse cervical-isthmus suturing to achieve hemostasis in a patient with placenta previa accreta. Cervical canal closure may be avoided using vertical sutures. “Double” refers to the requirement for vertical sutures to be placed on the uterine body (for atonic hemorrhage) and lower segment (for previa). More information is needed to determine the novel suture's safety and efficacy.¹³

Matsubara Yano

There were several problems with the B-Lynch Suture. Initially, a uterine incision

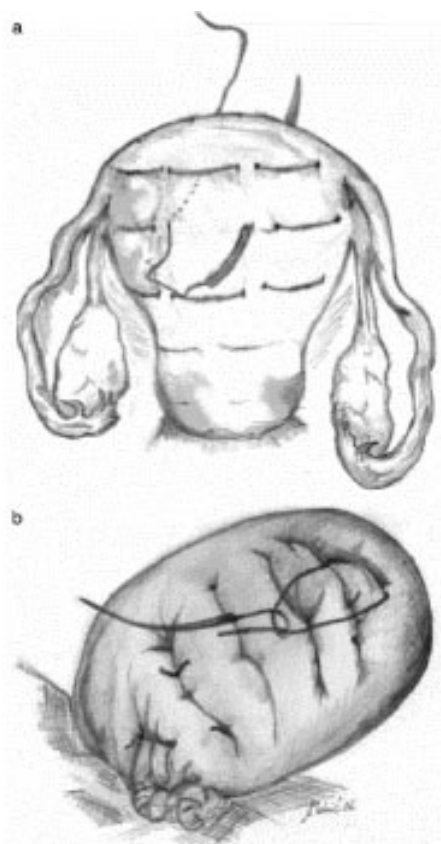


Figure 6. (a) Posterior view of the uterus showing the U-suturing technique. (b) Anterior view of the uterus showing the U-suturing technique.

or reopening of the section cesarean scar is necessary for the B-Lynch suture. Before closing the CS incision, a B-Lynch suture should be done if one is necessary as soon as the placenta is delivered during a cesarean section. Even though performing an incision or reopening an existing one can offer a chance to verify the state of the uterus, these operations are intrusive. Furthermore, closing the incision after a cesarean section should be done as quickly as possible to avoid the B-Lynch suture delaying incision closure because it typically causes an increase in uterine contractions. Second, as Hayman et al. have noted, the longitudinal sutures can occasionally “slide.” On the other hand, the longitudinal suture may “slide in” to the uterine fundus’s core, preventing compression at its periphery. Although Mondal et al. saw this “sliding in” with the Hayman suture but not with the B-Lynch suture, “sliding in” can also be

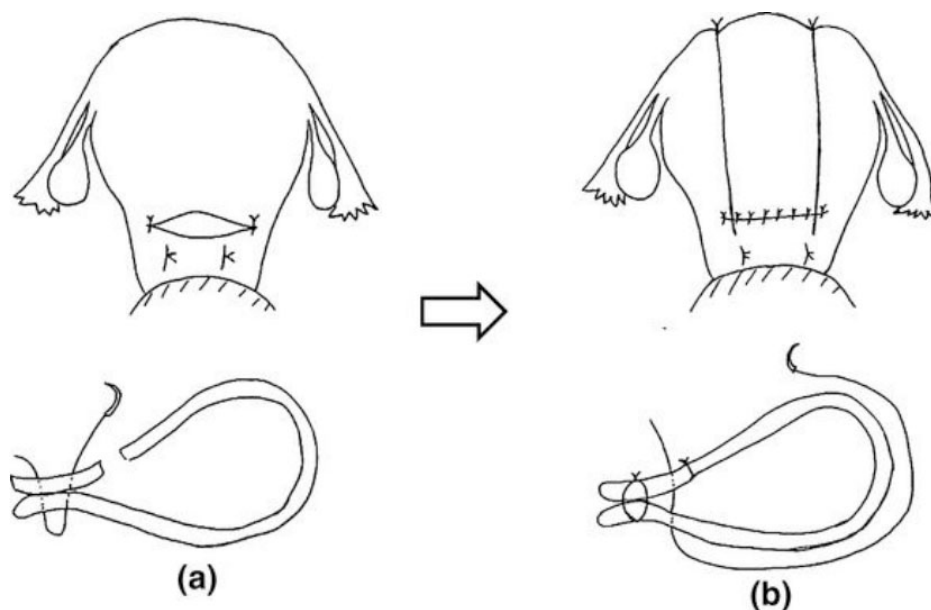


Figure 7. Double vertical compression suture.

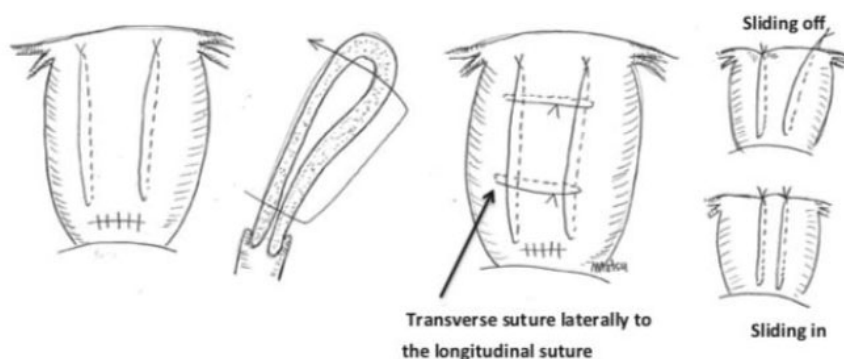


Figure 8. Matsubara-Yano (MY) suture. The arrow indicates the route, “the transverse suture should penetrate laterally to the longitudinal suture.”

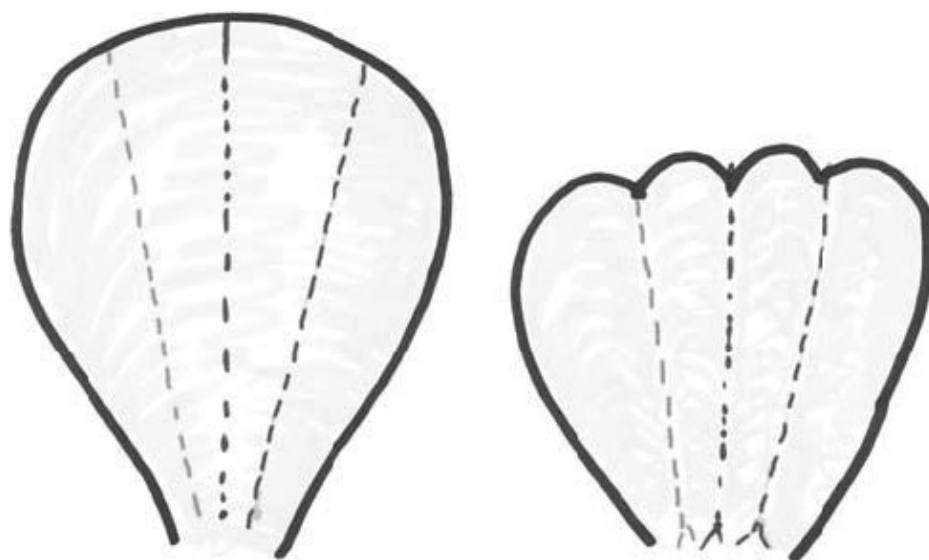


Figure 9. Surabaya method illustration.

a disadvantage of the B-Lynch suture because the “brace” is the same in both sutures. Third, an overly tight B-Lynch suture may result in “folding of the uterus,” in which the uterine body may “bend” forward and produce insufficient compression. Fourth, the fundus may turn over as a result of the longitudinal suture pushing it cephalad in a caudal direction.¹⁴

All four of these B-Lynch suture disadvantages can be remedied with the MY suture. After tying the longitudinal suture, a needle is introduced into the lower uterine segment from anterior to posterior and then into the uterine fundal edge from posterior to anterior. Either twice (recently) or three times (originally) was the same action done. As shown, two transverse sutures are formed. The longitudinal seam is penetrated by the transverse suture through the “lateral” location. The longitudinal suture can’t “slide off,” “slide in,” “bow” or reinvert if the uterine fundus is retrieved using the longitudinal suture and the transverse suture is stretched laterally to the longitudinal suture. Compression sutures should not be performed before removing or closing section cesarean scars. Eight PPH cases underwent MY suturing; all patients experienced full hemostasis and no short-term problems were noted. Two ladies were later revealed to have gotten pregnant. Even though B-Lynch et al. claimed that although B-Lynch sutures are simple to execute, an unskilled clinician may find the procedure challenging, especially when dealing with an emergency case that calls for compression sutures. These qualifications are also described by Hayman et al. The MY suture is simpler to execute than the B-Lynch suture if one keeps in mind the idea “to put pressure on the uterus.”^{15,16}

Surabaya Method (Modified B-Lynch suture)

The Surabaya method is carried out using a brace suture technique with 3 parallel longitudinal sutures. This technique uses “Chromic catgut no.2” with curved needles that have been straightened. The uterus is exteriorized and one of the assistants pulls the uterus out to make the lower uterine segment thinner and easier to pass the needle from the lower segment

wall anterior to posterior. The first suture is inserted into the lower uterine segment ± 2 cm below the cesarean incision and medial-lateral margin or in the same plane as PPH after vaginal delivery. The uterine isthmus’ posterior wall is punctured by the needle, which is placed on the ventral wall. Using the same method, a second suture with a new suture is made on the contralateral side, and a third suture, also with a new suture, is made in between the first and second sutures. While the operator tightens the sutures ties the fundus 3 cm medial to the left and right lateral edges, and ties a third between them, the assistant manually compresses the uterine fundus to produce an anteflexed-inferior position. The second assistant looks at the vagina; if there is no blood, the abdominal wall is closed; if there is bleeding, more surgery is necessary.¹⁷

RADICAL SURGERY

Supra vaginal hysterectomy

The only permanent treatment for uterine bleeding is a hysterectomy. No matter what causes postpartum hemorrhage (PPH), excessive loss of coagulation factors from blood loss might result in severe coagulopathy. Acidosis, severe hypovolemia, hypothermia, tissue hypoxia, and aberrant electrolyte levels can all worsen the patient’s condition. If the patient has not undergone a laparotomy already and has experienced these extra problems, rectifying the severe physiological deficiencies before the hysterectomy may prove to be a lifesaver. When managing bleeding in individuals with placenta accreta spectrum or uterine rupture, an early hysterectomy may be the least morbid method. It might stop the fatalities and illnesses brought on by waiting while ineffectual methods of preserving fertility are tried.

Thanks to advancements in the prenatal detection of placental attachment problems, patients can now expect and discuss a hysterectomy with their doctor before a scheduled cesarean delivery. On the other hand, uterotonic drugs alone or in conjunction with fertility-preserving treatments (such as intrauterine balloon tamponade, uterine compression sutures, uterine artery/utero-ovarian artery ligation, arterial embolization),

may typically control uterine atony. Upon resuscitation and reversal of the coagulopathy, a hysterectomy might not be necessary to manage bleeding. But if treatments aimed at maintaining fertility fail to stop the bleeding at a level that can be controlled, a hysterectomy must be performed.¹⁸

ABDOMINAL PACKING

By compressing the abdomen or pelvis, recurrent uterine bleeding can be stopped as easily as possible. In the abdominal vault, low-pressure veins and capillaries are compressed by the abdominal packing, which reduces or stops bleeding. In a patient who is bleeding profusely, disseminated intravascular coagulation may occur with acidosis, hypovolemic shock, and hypothermia. Because these symptoms are associated with other conditions that impact pregnancy, the patient needs to be stabilized in the intensive care unit before these difficulties can be addressed. Abdominal packing, which compresses the uterine vascular sinuses mechanically, is a fast, effective, and reasonably priced hemostasis technique in many cases. Two abdominal packing techniques for reducing bleeding after a hysterectomy are pads or roller gauze (sterile pads bound by suture threads or wrapped in a sterile bag or piled gauze) and balloon packs (Foley catheter or Bakri balloon). The physical structures of the two types are not the same. The balloon pack may be inflated and used right away, making it easier and faster to assemble and use. However, the pad pack needs to be set up and attached. Second, it is easier to adjust the balloon packs’ sizes to correspond with the hemorrhagic areas by inflating or deflating the balloon. On the other hand, removing or adding a pad from the constructed pack could be challenging.^{19,20}

CONCLUSION

Obstetric hemorrhage remains a significant cause of maternal morbidity and mortality. Though a commonly cited number from earlier data is 1000 mL, no comparable current studies have attempted to measure typical blood loss at emergency cesarean following a time of labor. General anesthesia, amnionitis, extended labor,

pre-eclampsia, multiple pregnancies, fetal macrosomia, blood disorders, preterm birth, leiomyomata, placenta previa, and antepartum or intrapartum bleeding are among the identified risk factors for PPH during cesarean. Antifibrinolytic medicines, primarily tranexamic acid (TXA), and uterotonic agent oxytocin are the medications used to control bleeding during cesarean sections. It has been shown that these medications can minimize blood loss and the need for transfusion after cesarean birth. The conservative surgery to manage bleeding in a cesarean section is arterial ligation, such as the ligation of uterine and utero-ovarian arteries and Internal iliac (hypogastric) artery ligation. Other conservative surgery steps are the B-Lynch, Hayman, and Cho techniques. There is also radical surgery for managing hemorrhage, such as supravaginal hysterectomy. By compressing the abdomen or pelvis, recurrent uterine bleeding can be stopped as easily as possible. The abdominal packing compresses low-pressure veins and capillaries in the abdominal vault, reducing or stopping bleeding.

CONFLICT OF INTEREST

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ETHICAL STATEMENT

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AUTHOR CONTRIBUTION

All authors contributed equally to this study.

REFERENCES

- Kellie FJ. Medical methods for preventing blood loss at caesarean section. Cochrane Database of Systematic Reviews. 2018; Available from: <http://dx.doi.org/10.1002/14651858.cd007576.pub2>
- Doumouchtsis SK, Nikolopoulos K, Talaulikar VS, Krishna A, Arulkumaran S. Menstrual and fertility outcomes following the surgical management of postpartum hemorrhage: a systematic review. BJOG: An International Journal of Obstetrics & Gynaecology. 2013;121(4):382–8. Available from: <http://dx.doi.org/10.1111/1471-0528.12546>
- Joshi VM, Otiv SR, Majumder R, Nikam YA, Shrivastava M. Internal iliac artery ligation for arresting postpartum haemorrhage. BJOG: An International Journal of Obstetrics & Gynaecology. 2007;114(3):356–61. Available from: <http://dx.doi.org/10.1111/j.1471-0528.2006.01235.x>
- Allam MS, B-Lynch C. The B-Lynch and other uterine compression suture techniques. Vol. 89, International Journal of Gynecology and Obstetrics. John Wiley and Sons Ltd; 2005. p. 236–41.
- Fuglsang J. Later reproductive health after B-Lynch sutures: a follow-up study after 10 years' clinical use of the B-Lynch suture. Fertil Steril. 2014;101(4):1194–9. Available from: <http://dx.doi.org/10.1016/j.fertnstert.2014.01.015>
- Cowan AD, Miller ES, Grobman WA. Subsequent Pregnancy Outcome After B-Lynch Suture Placement. Obstetrics & Gynecology. 2014;124(3):558–61. Available from: <http://dx.doi.org/10.1097/aog.0000000000000418>
- Sentilhes L, Gomez A, Razzouk K, Resch B, Verspyck E, Marpeau L. B-Lynch suture for massive persistent postpartum hemorrhage following stepwise uterine devascularization. Acta Obstet Gynecol Scand. 2008;87(10):1020–6. Available from: <http://dx.doi.org/10.1080/00016340802380750>
- Nanda S, Singhal SR. Hayman uterine compression stitch for arresting atonic postpartum hemorrhage: 5 years experience. Taiwan J Obstet Gynecol. 2011;50(2):179–81. Available from: <http://dx.doi.org/10.1016/j.tjog.2009.12.001>
- Kim M-L, Hur Y-M, Ryu H, Lee MJ, Seong SJ, Shin JS. Clinical outcomes of prophylactic compression sutures for treatment of uterine atony during the cesarean delivery of twins. BMC Pregnancy Childbirth. 2020;20(1):40. Available from: <https://pubmed.ncbi.nlm.nih.gov/31948415>
- Setiyono AB, Aziz A, Sulistyono A, Mose JC. Pereira Suture: an Alternative Compression Suture to Treat Uterine Atony. Indonesian Journal of Obstetrics and Gynecology. 2016; Available from: <http://dx.doi.org/10.32771/inajog.v3i3.50>
- Ouahba J, Piketty M, Huel C, Azarian M, Feraud O, Luton D, et al. Uterine compression sutures for postpartum bleeding with uterine atony. BJOG: An International Journal of Obstetrics & Gynaecology. 2007;114(5):619–22. Available from: <http://dx.doi.org/10.1111/j.1471-0528.2007.01272.x>
- Hackethal A, Brueggmann D, Oehmke F, Tinneberg H-R, Zygmunt MT, Muenstedt K. Uterine compression U-sutures in primary postpartum hemorrhage after Cesarean section: fertility preservation with a simple and effective technique. Human Reproduction. 2007;23(1):74–9. Available from: <http://dx.doi.org/10.1093/humrep/dem364>
- Makino S, Tanaka T, Yorifuji T, Koshiishi T, Sugimura M, Takeda S. Double vertical compression sutures: A novel conservative approach to managing post-partum haemorrhage due to placenta praevia and atonic bleeding. Australian and New Zealand Journal of Obstetrics and Gynaecology. 2012;52(3):290–2. Available from: <http://dx.doi.org/10.1111/j.1479-828x.2012.01422.x>
- Matsubara S, Yano H, Taneichi A, Suzuki M. Uterine compression suture against impending recurrence of uterine inversion immediately after laparotomy repositioning. Journal of Obstetrics and Gynaecology Research. 2009;35(4):819–23. Available from: <http://dx.doi.org/10.1111/j.1447-0756.2008.01011.x>
- Mondal PC, Ghosh D, Santra D, Majhi AK, Mondal A, Dasgupta S. Role of Hayman technique and its modification in recurrent puerperal uterine inversion. Journal of Obstetrics and Gynaecology Research. 2012;38(2):438–41. Available from: <http://dx.doi.org/10.1111/j.1447-0756.2011.01720.x>
- Matsubara S, Yano H. Uterine compression suture for acute recurrence of puerperal uterine inversion: Hayman suture? Journal of Obstetrics and Gynaecology Research. 2012;38(10):1272–3. Available from: <http://dx.doi.org/10.1111/j.1447-0756.2012.01912.x>
- Sulistyono A, Saur E, Gultom M, Dachlan G, Prabowo P. Conservative Surgical Management of Postpartum Hemorrhage (PPH) Using “Surabaya Method” (Modified B-Lynch Compression Suture) Manajemen Bedah Konservatif pada Perdarahan Pascapersalinan dengan Menggunakan Metode Surabaya (Jahitan Kompresi Modifikasi B-Lynch).
- Govindappagari S, Wright JD, Ananth C V, Huang Y, D'Alton ME, Friedman AM. Risk of Peripartum Hysterectomy and Center Hysterectomy and Delivery Volume. Obstetrics and Gynecology. 2016;128(6):1215–24.
- Winata IGS, Asmara AD. Abdominal Packing for Obstetric Surgical Uncontrollable Hemorrhage. European Journal of Medical and Health Sciences. 2022;4(4):70–4. Available from: <http://dx.doi.org/10.24018/ejmed.2022.4.4.1446>
- Simonazzi G, Bisulli M, Saccone G, Moro E, Marshall A, Berghella V. Tranexamic acid for preventing postpartum blood loss after cesarean delivery: a systematic review and meta-analysis of randomized controlled trials. Acta Obstet Gynecol Scand. 2015;95(1):28–37. Available from: <http://dx.doi.org/10.1111/aogs.12798>



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