Review Article

Caesarean Hysterectomy

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ABSTRACT

BACKGROUND: Caesarean hysterectomy is an obstetric emergency procedure performed to save maternal life in uncontrollable haemorrhage and few elective indications. It could be a planned procedure but more often it is an emergency operation.

OBJECTIVE: To ensure adequate exposure and mastery of this emergency procedure by residents in training in Obstetrics and Gynaecology in Nigeria.

METHODS: Review of the pertinent literature, selected references, and internet services through Medline search on caesarean hysterectomy.

RESULTS: The incidence for emergency caesarean hysterectomy is 0.01-0.05%. The maternal death rate associated with caesarean hysterectomy from all causes is 0.7% compared to 0.05% for all caesarean sections.

Porro's operation was a subtotal amputation but opinion now favours a total hysterectomy where practicable. Inexperienced surgeons may encounter identification of the lower margin of the cervix as limiting factor, for fully effaced and dilated cervix. Subtotal hysterectomy may therefore be the more prudent, safest and fastest option, but the potential problems of a residual cervical stump must always be borne in mind.

CONCLUSION: Caesarean hysterectomy though a rare procedure is a life saving obstetric emergency. There is need for adequate exposure and mastery by the residents and a must for all obstetricians in their practice.

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INTRODUCTION

Caesarean hysterectomy is an obstetric surgical procedure that results in removal of the uterus after delivery of the fetus by caesarean section or following vaginal delivery[1,2]. The operation may be performed as planned procedure but more often it is an emergency operation to save maternal life[2].

In modern obstetric practice opinion favours postponing hysterectomy until after puerperium when the procedure is less hazardous. Pelvic tissue in pregnancy is very lax, oedematous with increased vascularity, the ovarian and uterine vessels may be dilated up to six times their normal calibre[1], therefore, care is needed especially in tying pedicles, and the uterine side of the pedicle may also need to be ligated as back bleeding may be considerable[2].

Currently, with the newly introduced modes of uterine closure with sutures, improved aseptic surgical techniques, improvement in blood bank technology and antibiotic therapy, the indications for caesarean hysterectomy reduced while mortality and morbidity improved.

The aim of this review is to ensure adequate exposure and mastery of this emergency procedure by residents in training in obstetrics and gynaecology in Nigeria.

HISTORICAL PERSPECTIVE

The operation of caesarean hysterectomy was originally proposed by Joseph Cavallini in 1768. Based on experimental caesarean hysterectomy in laboratory animals, he suggested that there might be instances in which such procedure would be necessary as a lifesaving measure for the gravid patient[3,4].

The works of Cavallini's stimulated other scientists to investigate caesarean hysterectomy. James Blundell in 1823 published his study of caesarean hysterectomy in the rabbit model[5]. In 1869 Horatio Storer performed and documented the first subtotal caesarean hysterectomy in a living patient[6]. Abdominal delivery was necessary because the patient had obstructed labour due to a large pelvic tumour and removal of the uterus was performed because of life-threatening haemorrhage. The subsequent haemorrhage was so great that in order to save the woman he removed the uterus and tumour. This he achieved by ligating the cervix, excising the uterus, cauterizing the stump and attaching a clamp. The infant survived, the woman died on the third day after surgery. The operation was not named after Horatio Storer because his patient died.

In 1876, Eduardo Porro from Pavia reported the first caesarean hysterectomy in which both infant and mother survived[7]. Porro's patient (Julia Cavallini) was a 25-year old primiparous dwarf of only 144cm in height with a pelvis markedly distorted by rickets. The operation was a subtotal amputation similar to that described by Storer with unilateral salpingo-oophorectomy utilizing a snare called a "cintrat's constrictor". Porro personally observed his patient for 24 hours, feeding her with champagne and laudanum. She survived a turbulent 40-day postoperative course[8,9].

Porro despite lack of blood products, intravenous fluids and antibiotics published the details in a famous memoir

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entitled "Della amputazione utero-ovarica complements ditaglio caesareo".

The news of Porro's operation stimulated widespread interest and other surgeons like Inzana and previtali in Italy and Hegar in Germany presented single-case reports of caesarean hysterectomy. Although two of the three infants survived, all three mothers died in the immediate operative period. These deaths are not surprising in view of the fact that one patient had osteosarcoma affecting the bones of the pelvis, one had eclampsia, and one had chorioamnionitis[3,10].

In 1878, 2 years after Porro's publication, Muller of Switzerland described a modification of Porro's technique. His patient was in labour for three days, chorioamnionitis had developed, resulting in fetal death. Muller's innovation was to remove the uterus from the peritoneal cavity and elevate it onto the abdominal wall before making the hysterectomy incision[3,4,10].

In 1880, Robert Harris of the United States reviewed the world literature and collected 50 cases of caesarean hysterectomy, reported from seven countries[11]. The cumulative maternal mortality was 58%, fetal survival was 86%[11].

In 1881, Richardson performed the first successful caesarean hysterectomy in United States. His patient was a young dwarf like Porro's case. His patient was 122cm tall. Richardson utilized Muller's technique of exteriorizing the uterus. After delivery of the fetus, the uterus was amputated, and the cervical stump was cauterized with carbolic acid and placed into the pelvis. Both mother and baby survived[3,4].

In 1881, the first caesarean hysterectomy was performed in Great Britain by Croom, Hart and Caird[12]. Still in 1881, Wells of Great Britain completed the first total caesarean hysterectomy[13].

All previous operations had been supra cervical procedures. The indication for surgery in Wells patient was invasive cervical carcinoma[4].

The first two British patients died in the immediate postoperative period[9].

In 1884, Godson performed the first caesarean hysterectomy in Great Britain that resulted in maternal survival[14]. Additional modifications in Porro's operative technique were made by Lawson Tait of Birmingham, and Von Waerz and Weiss[4,15].

By 1890 Tait had performed seven operations, six of which were successful, using a modification of Porro's amputation technique. There was a special attention to management of the cervical stump after supracervical hysterectomy. Tait recommended exteriorization of the uterus, excision of the corpus and suture of the cervical stump to the abdominal wall. Von Waerz and Weiss advocated leaving the cervical remnant within the pelvis and reapproximating the visceral peritoneum over the stump.

Another modification in technique was suggested by several obstetricians including Reymond and Cazalis in 1911, LeCog in 1917, and Solleri and Rogers in 1922. These surgeons described performance of hysterectomy before caesarean delivery and reported survivals in both mother and infant[3,4,10].

With recent advancement in uterine closure with sutures, improved aseptic surgical techniques, improved blood bank technology and antibiotic therapy, there is a marked reduction in the indications for hysterectomy[9]. The associated morbidity and mortality is equally reduced[9].

INCIDENCE

The incidence for emergency caesarean hysterectomy is 0.01-0.05%[16]. The incidence is low, currently there are alternative medical and surgical options available for both emergency and elective indications for caesarean hysterectomy. The maternal death rate associated with caesarean hysterectomy from all causes is 0.7%[17] compared to 0.05% for all caesarean sections[17].

INDICATIONS

There are non-emergency procedures and emergency procedures for caesarean hysterectomy. The most common indication for caesarean hysterectomy is uncontrollable maternal haemorrhage especially associated with a morbidly adherent placenta, intractable uterine atony, placenta praevia, placenta abruptio. The second most common indication is ruptured uterus (from reports in developing countries)[18]. In the developed countries, the incidence continues to fall[16]. It may also be performed for coexisting cervical or uterine carcinoma and sterilization[9].

ELECTIVE PROCEDURES: The indications for elective procedures are:
Invasive cervical carcinoma.
Prior caesarean and history of chronic pelvic pain not amenable to medical treatment.
Prior caesarean and large uterine leiomyoma.
Prior caesarean and severe endometriosis not responsive to medical management.

Prior caesarean and severe dysfunctional uterine bleeding not responsive to medical management.

Emergency Procedures: Most caesarean

HYSTERECTOMIES ARE DONE As an emergency. The indications are:
Uncontrolled haemorrhage.
Uterine atony (unresponsive).
Placenta accreta, increta or percreta.
Coagulopathy due to abruption placentae, severe preeclampsia, amniotic fluid embolism.
Overwhelming infection.
Uterine rapture not amenable to surgical repair.

Recently, most authors agreed that morbidity associated with caesarean hysterectomy is high, that the procedure should be performed only when there is a clear indication for caesarean hysterectomy[17]. In most instances, the procedure will be required on an emergency basis.

OPERATIVE TECHNIQUE:
Haemodynamic stability should be established preoperatively, and 4 units of blood should be available. The patient should be counseled and informed consent is mandatory. In developing countries, prophylactic antibiotics reduce the chance for infection. Foleys catheter insertion prior to the procedure is very valuable to note bladder injury, to help localize the bladder neck at surgery and to check urine output.

The reported operating time required for caesarean hysterectomy ranges from 65 to 132 minutes with a mean of 100 minutes[17].

SKIN INCISION:
A Vertical incision is preferred for quick entry, wide exposure to allow thorough exploration of the abdominal viscera and upper periaortic lymph nodes. When surgery is performed because of an obstetric emergency, a vertical incision should be used since it permits the most rapid abdominal entry and ensures maximal surgical exposure. For elective caesarean hysterectomy, either a transverse incision or a vertical incision is acceptable. Operative exposure may be limited with transverse incision especially when surgery is performed under regional anesthesia without muscle blockage.

DISSECTION OF THE BLADDER:
Injury to the bladder is a common surgical complication. Many patients will present with a previous caesarean section with adhesions of the bladder to the lower uterine segment, so that mobilization of the bladder may be difficult. However, when a bladder injury is identified at operation, it should be repaired properly and the bladder drained postoperatively for 10days, fistula formation is rare[17]. Bladder dissection should be gentle. A sharp dissection technique using scissors to free the bladder is recommended, keeping in the midline as far as possible to avoid the highly vascular bladder pillars. Initial dissection should be just far enough inferiorly to allow safe ligation of the uterine vascular pedicle and further dissection that can cause severe venous oozing, should be delayed until required to allow the ureters to fall away laterally prior to securing the transverse cervical ligament and vaginal angles. Fine-tip scissors are essential for this dissection. For bladder repair, a two-layer closure usually is adequate to repair the bladder defect. The most important precaution is to empty the bladder, open the peritoneum in a transverse plane and identify the urachus, free the bladder on the surface of the cervix in your plane of dissection.

UTERINE INCISION:
A classical uterine incision (vertical uterine incision) may be quicker and more appropriate than a transverse incision, but either should be closed or adequately clamped prior to proceeding to hysterectomy. The most serious complication associated with transverse incision is extension into the uterine vessels and broad ligament, resulting in severe intraoperative haemorrhage. Lateral extension may occur in patients in whom the lower uterine segment is poorly developed. A low vertical incision provides a good access for delivery of the fetus, facilitates exposure of the cervix and separation of the cervix from the vagina during removal of the uterus and finally minimizes the risk of lateral extension of the incision into the broad ligament. A significant blood loss can come from an atonic uterus for which intravenons oxytocic agents and uterine massage is helpful.

IDENTIFICATION OF THE URETER:
With meticulous surgical technique and a good mastery of the anatomy of the pelvis, ureteral injuries are preventable. This is achieved by opening the visceral peritoneum and ureter should be identified in the base of the broad ligament and palpated below the uterine vessels up to the bladder. This will help to isolate the uterine vascular pedicle without risk of injury to the adjacent ureter. When there has been uterine rupture or extension of the caesarean incision laterally to involve the uterine vessels the ureters may be difficult to visualize so that palpation is essential. Careful separation of the bladder from the lower uterine segment also ensures that the ureters are displaced laterally away from the uterine vascular structures. Ensure that the ureter is palpated in the distal third of its course to be sure that it is lateral to the point where clamps and ligatures are applied to the cardinal ligaments, uterosacral ligaments and upper vagina. If it is thought that the ureter has been tied, urological advice should be sought immediately[19].

ACHIEVEMENT OF HAEMOSTASIS
Intraoperative haemorrhage is a common complication in caesarean hysterectomy. This is as a result of uncontrolled bleeding from uterine or ovarian vascular

pedicle. Unilateral or bilateral adnexectomy may be indicated to manage this complication. Intraoperatively, all vascular pedicles must be clearly identified and isolated and then securely clamped and ligated. Minimize the amount of tissue in each pedicle. Both leaves of the broad ligament should be incorporated into the pedicle to prevent retraction of vessels and bleeding from the denuded peritoneal surfaces. Prevent retrograde bleeding from the uterine side of the pedicles by clamping or ligating the proximal side of pedicle.

TOTAL OR SUBTOTAL HYSTERECTOMY

Porro's operation was subtotal amputation (hysterectomy), but opinion now favours a total hysterectomy where practicable. Inexperienced surgeons may encounter identification of the lower margin of the cervix as a limiting factor, for fully effaced and dilated cervix, subtotal hysterectomy may therefore be the more prudent, safest and fastest option[20,21], but the potential problems of a residual cervical stump must always be borne in mind[8]. To ensure a total hysterectomy in a fully effaced and dilated cervix, exploration of the cervical canal by a finger passed down through the uterine incision from above may help to identify the margin of the cervix and also avoid more extensive dissection of the bladder than is necessary from the very vascular vagina[1,22,23].

ANAESTHESIA FOR CAESAREAN HYSTERECTOMY:

Emergency caesarean hysterectomy requires endotracheal intubation and general anaesthesia but elective caesarean hysterectomy may be carried out under regional or general anaesthesia. Regional anaesthesia requires preload with intravenous fluids and takes more time to administer and may exacerbate maternal haemodynamic dysfunction in obstetric emergency.

The agents required for general anesthesia are those that produce the least depressive effect on the cardiovascular system of the mother and fetus[18]. Another factor in anaesthesia for caesarean hysterectomy is the experience of the anaesthetist and the ability to perform the surgery under that anaesthetic technique[18].

COMPLICATIONS ASSOCIATED WITH CAESAREAN HYSTERECTOMY:

(1) PERIOPERATIVE HAEMORRHAGE: This is the most common surgical complication in caesarean hysterectomy. Perioperative haemorrhage is not always the result of an underlying obstetric disorder but more often due to technical difficulty with the surgical procedure itself[9].

There are avoidable factors related to haemorrhage in caesarean hysterectomy namely underestimation of the total blood loss, inadequate transfusion and delay in performing life-saving surgery[8].

Most emergency hysterectomies will require transfusion for the initial indication but the operation itself is inevitably accompanied by further haemorrhage[8].

Many elective procedures will also require transfusion. Many caesarean hysterectomies are performed because of life threatening haemorrhage due to obstetric disorders such as placenta praevia, morbidly adherent placenta, placenta abruptio and uterine rupture. There is need for multiple blood transfusions in the range of 2 to 4 units[17,24].

(2) URINARY TRACT INJURIES: Urinary tract injury is 5 to 10 times more likely to occur during caesarean hysterectomy than abdominal hysterectomy or caesarean delivery. Incidence of injury to the bladder at the time of caesarean hysterectomy is 0.9 6.7% (mean 3.5%)[9]. Most injuries occur in patients with history of prior caesarean section with extensive adhesions between the bladder and lower uterine segment. Bladder injuries may occur during reflection of the bladder, extensions of the uterine incision or uterine rupture[19]. The incidence of ureteric injury varies from 0 to 1.8% (mean 0.6%)[9]. Ureteric injury most commonly occurs at three anatomic sites (1) At the infundibulopelvic ligament, (2) As ureter passes under the uterine artery, (3) As ureter courses through the paracervical tissue and enters the bladder[25].

Ureteric injuries are most commonly associated with attempts to control haemorrhage after extension of the uterine incision into the broad ligament. Such injuries are more likely to occur on the left ureter due to the rotation of the uterus. Ureteral injury is relatively rare. A high index of suspicion should always be borne in mind. If recognized promptly, most ureteral injuries may be managed by either reanastomosis or ureteroneocystostomy[17,25,26].

(3) INFECTION: Postoperative infection is a common complication of caesarean hysterectomy. The infections include postoperative soft tissue pelvic infection, urinary tract infection and abdominal wound infection[27]. The true incidence of perioperative infection is under reported and difficult to assess because of subjective febrile morbidity, uncontrolled and prolonged use of prophylactic antibiotics and varying criteria used for the diagnosis of pelvic infection[9,28].

(4) OPERATIVE MORTALITY: The operative mortality in caesarean hysterectomy ranges from 0 to 10.1% (mean 0.9%)[9]. The deaths related to caesarean hysterectomy occur in patients undergoing emergency caesarean hysterectomy. Acute haemorrhagic shock and

pulmonary embolism are the leading causes of perioperative death[9,29,30,31,32]. With the advent of modern blood banking technology, improvement in anaesthetic techniques and use of broad-spectrum antibiotics, the operative mortality associated with caesarean hysterectomy has reduced significantly[9,33].

Factors that contribute to high maternal mortality in caesarean hysterectomy include uncontrollable haemorrhage, sepsis, poor access to facilities, lack of equipment and poorly trained person[17,18,34,35].

CONCLUSION: Caesarean hysterectomy though a rare procedure is a life-saving surgery which requires mastery by senior residents and obstetricians in our poor resource setting. All obstetricians should be familiar and well exposed to the procedure especially when unforeseen emergency develops that may precipitate the need for such life-saving surgery.

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