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Case Report

Bilateral ascending uterine arteries ligation for conservative management of complete placenta previa: three case reports

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Summary

Placenta previa (PP) is considered one of the major causes of both antepartum and intrapartum bleeding, which necessitates preterm delivery typically by cesarean section. The optimal management is controversial. Surgical techniques to control severe bleeding after placental removal include uterine/internal iliac artery ligation, compression sutures, and embolization of pelvic vessels; however, cesarean hysterectomy remains the ultimate rescue procedure for uncontrolled maternal hemorrhage. The authors present a modified surgical technique of the uterine arteries ligation for successful management of complete PP. The method was effective and hysterectomy was avoided in all cases. Serious complications such as hypovolemic shock, disseminated intravascular coagulopathy, urinary tract injuries, febrile infections, and uterine necrosis were not recorded. Double bilateral ligation of the ascending uterine arteries before placental removal constitutes a prophylactic method that prevents postpartum hemorrhage and emergency obstetric hysterectomy. This method has an additional advantage as if it proves ineffective for hemorrhage control, the basic steps for cesarean hysterectomy would have been done.

Key words: Placenta previa; Cesarean section; Bilateral ligation of uterine arteries.

Introduction

Placenta previa (PP) is considered one of the major causes of both antepartum and intrapartum bleeding, which necessitates preterm delivery typically by cesarean section (CS) [1]. The contemporary term placenta previa refers to the implantation of placental tissue over the internal cervicalos [2]. The overall prevalence rate is 4 per 1,000 births, with highest prevalence occuring among Asian women compared to Caucasians [3, 4]. Important risk factors for PP occurrence include prior CS, multiparity, advanced maternal age, and infertility treatments [5]. Placenta previa is associated with serious pregnancy complications such as placenta accreta, premature rupture of membranes, malpresentation, vasa previa, intrauterine growth restriction and congenital malformations [6, 7]. The optimal management of pregnancies complicated by PP is controversial and depends largely on patient's clinical setting; thus it is individualized [8]. Common surgical techniques to control severe bleeding after placental removal include uterine/internal iliac artery ligation, compression sutures, and embolization of pelvic vessels. In the event of uncontrolled maternal hemorrhage, cesarean hysterectomy remains the ultimate rescue procedure [9, 10].

The authors present three case reports of 3rd trimester complete PP delivery by CS. Peripartum hysterectomy was avoided via bilateral ligation of the ascending branches of the uterine arteries, before placental removal. Blood loss during theatre, blood transfusions, additional surgical interventions, postoperative complications, and perinatal outcome were recorded.

Case Report

All three women were informed about the specific risks of CS in the presence of PP, signed the consent form, and received general anesthesia.

Case Report 1

A 35-year-old woman G2P1 with a history of prior CS was admitted to the Department of Obstetrics and Gynecology of the University Hospital of Heraklion at 25^{+2} weeks of pregnancy due to pulmonary embolism. Diagnosis of complete placenta previa was confirmed with transvaginal ultrasound (TVS) earlier, in the context of painless mild vaginal bleeding. She was treated with LMWH, tocolytics, corticosteroids, and remained asymptomatic. Magnetic resonance imaging (MRI) at 31 weeks revealed abnormal uterine bulging, heterogenous signal intensity within the placenta, and suspicious myometrial invasion at the anterior wall of the lower uterine segment (strong evidence of accreta) but no evidence of bladder invasion. The cervicalos was covered for 6 cm anteriorly by the PP. Although an elective CS was scheduled for 36 weeks gestational age, emergency CS was performed at 32^{+5} weeks due to uterine contractions. A live 1910-gram female newborn was delivered. Blood loss during surgery was minimal, there was no need for blood transfusion, and the patient was transferred immediately to the ward. Routine postpartum care was performed. TVS on the 5th postoperative day showed normal uterine vascularity. MRI on the 8th postoperative day confirmed no uterine necrotic areas and no retained trophoblastic tissue. She was discharged on the 10th postoperative day, as no complications occurred. Normal menstruation returned six months later.

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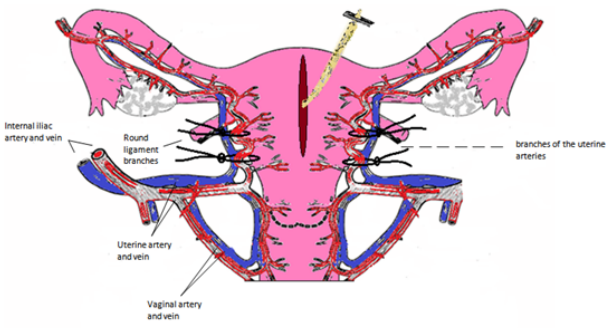

Figure 1. — Uterine artery ligation.

Case Report 2

A 29-year-old woman G3P2 with two prior CS was admitted to the University Hospital of Heraklion at 24^{+4} weeks of gestation for mild vaginal bleeding associated with PP. TVS revealed complete cover of the internal os with the two-thirds of the placenta located in the anterior lower segment of the uterus. The patient had conservative management until 30^{+2} weeks when an emergency CS was performed due to significant vaginal bleeding and contractions. A live 1460-gram female newborn was delivered, using the same surgical technique without complications. New TVS imaging on postoperative day 4 showed retained placental tissue inside the cervical canal. Subsequently, the patient underwent a curettage procedure resulted in excessive hemorrhage and transfusion with three units of packed red blood cells and two units of fresh frozen plasma. Her recovery was uneventful and she was discharged on the 12^{th} postoperative day.

Case Report 3

A 32-year-old primigravida of 29^{+2} weeks of pregnancy diagnosed with placenta previa was transferred to the Department of Obstetrics and Gynecology due to mild vaginal bleeding. MRI at 32 weeks of pregnancy documented central PP (anteroposterior symmetrical) but there was no evidence of invasion to adjacent structures. Her clinical course was uncomplicated, thus an elective CS was performed at 34 weeks. The same operative procedure was carried out and a live 2,310-gram female neonate was born. Bleeding from the implantation site was profuse and the patient received nine units of packed red blood cells, four units of fresh frozen plasma, and four grams of fibrinogen to achieve hemodynamic stability. Estimated blood loss during surgery was more than 5 lt. Finally the patient was transferred to the intensive care unit for 48-hour close monitoring. The postoperative course was uncomplicated and she was discharged on the 14th postoperative day.

Laparotomy was done following a supraumbilical midline skin incision. A classical vertical uterine incision was performed high onto the fundus and away from the placental bed. The bladder flap was not deflected downwards. The baby was rapidly delivered through this incision and the umbilical cord was cut close to its base. Placenta was not removed at this point. The upper and lower angles of the uterine incision and the lateral cut edges were clamped quickly with Allis forceps for instant hemostasis. The round ligaments close to the uterus were then divided between Kocher clamps and ligated by #1 suture. After bilateral dissection of the broad ligaments to anterior and posterior leaf, the major ascending branches of the uterine arteries were identified on either side. The uterine vessels were doubly clamped adjacent to the uterus, cut and doubly sutureligated with #1 Vicryl. Special care was taken to avoid injury of the dilated ureters, inferiorly and close to the dilated cervix. At this time placenta was removed manually and the endometrial cavity was wiped out carefully with a gauze pack. Uterotonics (carbetocin and methylergonovine) were administered in proper doses to avoid uterine atony. Hegar dilators were used for the dilatation of the internal cervicalos. The uterine incision was then closed in a two-layer way by a running #2 Vicryl suture. The uterine serosa was closed by a running #0 Vicryl. Haemostatic support of the lower uterine segment was achieved after four additional sutures #2.0 Vicryl on either side of the descending uterine branches. The procedure was completed by connecting the dissected leafs of the broad ligament and the cut edges of the round ligaments with #0 Vicryl. Meticulous hemostasis was achieved using electrocautery (Figure 1).

Discussion

Placenta previa is one of the main factors leading to increased incidence rate of emergency peripartum hysterectomy (ranging from 0.06% to 0.48% of all deliveries). Obstetric hysterectomy is a major operation performed in the presence of uncontrolled bleeding and is associated with significant maternal and neonatal morbidity and mortality worldwide [11, 12].

The authors present a modified surgical technique of the uterine arteries ligation for successful management of PP. What the authors found was that this method was evidently effective in all cases and also hysterectomy was avoided. Serious complications such as hypovolemic shock, disseminated intravascular coagulopathy, urinary tract injuries, febrile infections, and uterine necrosis were not recorded. History of previous CS was clearly the most common risk factor for complete placenta previa. Blood transfusion was required in 33% of the cases. Survival rate was 100%. In addition, rapid recovery time after surgery coupled with uterus preservation contributed to the overall patient's satisfaction.

Bilateral ligation of the ascending branches of the uterine arteries with the placenta in situ is primarily a costless and simple surgical method. First of all, the technique "perse" can be carried out safely by any experienced surgeon/obstetrician, so as to avoid uncontrollable massive hemorrhage, leading to peripartum hysterectomy. In fact, it comprises a prophylactic procedure for postpartum hemorrhage (PPH) against both bilateral uterine vessels ligation (O' Leary stitch) and bilateral uterine/uteroovarian vessels ligation [13-15]. Moreover, it is preferred over internal iliac artery ligation because the uterine arteries are more readily accessible, the procedure is technically easier, and there is less risk of injury to major adjacent vessels and the ureter [16]. Similarly, the authors' technique is superior over B-Lynch and other uterine compression sutures that are related with complications such as uterine necrosis, pyometra, erosion, and adhesions [17-19]. The technique is comparable with Bakri balloon tamponade, a new alternative for PPH arising from PP (success rate 88%), which poses risks of displacement, transfusions, and hysterectomy [20, 21]. Uterine packi-

ng, which is another effective technique for Bilateral ascending uterine arteries ligation for conservative management of complete placentaprevia: three case reports intractable hemorrhage , is associated with a higher rate of postpartum hysterectomy [22]. Recently pelvic vessels embolization (PVE) is considered as an alternative choice to surgical intervention in well-equipped hospitals. Despite the high success rate (more than 90%) in controlling PPH, PVE has the disadvantage of fetal radiation exposure, while uterine necrosis and lumbosacral-plexopathy have been reported in some cases [23-25].

In conclusion, double bilateral ligation of the ascending uterine arteries before placental removal constitutes a prophylactic method that prevents PPH and emergency obstetric hysterectomy. Not only can this method be easily implemented in CS for PP, but it can also reduce substantially adverse maternal/neonatal outcomes and preserve the uterus. This method has an extra, very important advantage; even if it finally proves ineffective for hemorrhage control, the basic steps for cesarean hysterectomy would have been done. However there are many issues to be addressed in this study: 1) Indication: is this method effective in all cases of PP or PP/accreta? 2) Technique: should curettage procedure and ureteral stents be a standard? should bladder flap deflection be performed if ligation of the descending uterine arteries is needed? 3) should we use this method alone or in combination with other vascular ligation techniques, Bakri balloon, uterine compression sutures in case of uncontrollable bleeding? 4) What about future fertility?

Overall, the authors advocate that prophylactic double bilateral ligation of the ascending uterine arteries is an optimal strategy for the conservative management of PP. However further studies in large case series, improvement interventions, and future fertility outcomes are necessary for this method to be established.

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