Antenatally Ultrasound-impressed Placenta Percreta Complicated with Massive Hemorrhage Despite a Combinational Arterial Embolization and Two-stage Surgery

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Morbidly adhered placentas include the spectrum of accreta, increta, and percreta. Abnormal placentation carries a significant risk of hemorrhage when late in gestation especially at peripartum. Many measures including extirpative surgery, selective arterial embolization, and methotrexate have been proposed either as a single method or in combination in the literature. We report a woman with placenta percreta who suffered from massive hemorrhage despite being treated with two-stage surgery plus intervening prophylactic uterine artery embolization. Classical incision at cesareans followed by selective uterine artery embolization and delayed hysterectomy still resulted in a failure to control bleeding. The patient survived after prolonged surgery and hospitalization in the intensive care unit. Treatment of placenta percreta needs to be considered on an individual basis and carries a significant risk of morbidity.

KEY WORDS — arterial embolization, placenta percreta, postpartum hemorrhage

Introduction

Placenta percreta was once an uncommon disorder of abnormal placental implantation characterized by penetration of the trophoblast through the myometrium or even into the adjacent organs. However, it is becoming more common due to the prevalence of cesarean sections in contemporary obstetric practice [1]. Patients with placenta percreta are at a significant risk from potentially life-threatening catastrophic bleeding from abundant collaterals and neovascularization. The maternal mortality rate was approximately 7% and this was related to profound blood loss and half of those occurred with gestations later than 35 weeks [2]. Cesarean hysterectomy, arterial embolization, and inflation of a balloon catheter within the lumen of the anterior division of the internal iliac artery, the internal iliac artery main trunk, or the common iliac arteries after the baby was born by cesarean, are
the commonly-used therapeutic modalities applied to treat this condition in order to avoid catastrophic hemorrhage [3]. In those women who wished to preserve future fertility, conservative management involving methotrexate and selective arterial embolization was also reported [4,5].

Here we report a woman who had undergone two previous cesareans and suffered from placenta previa and percreta in her third pregnancy, in which recurrent massive vaginal bleeding was noted from 26 weeks’ gestation. Classical cesarean section was chosen to terminate the pregnancy with the placenta left in situ. A total hysterectomy was arranged 4 days after the baby was born. Unfortunately, massive bleeding arisen from the vasculature supplying the urinary bladder still occurred despite prophylactic uterine artery embolization being performed prior to the operation.

**Case Report**

A 26-year-old woman, gravida 3, para 2, who had 2 prior cesareans, was noted to be suffering from massive vaginal bleeding and lower abdominal pain from 26 weeks’ gestation and was referred from the regional hospital to our tertiary referral center. On admission, her hemoglobin level was 8.1 g/dL. Fetal cardiotocography revealed marked uterine contraction at a frequency of three times per 10 minutes. A detailed ultrasound scan with color Doppler flow studies revealed anterior placenta previa totalis with a highly suspected placenta percreta (Fig. 1). After a prompt blood transfusion and tocolysis with an intravenous infusion of Ritodrine for 3 days, the vaginal bleeding and uterine contraction subsided. She was discharged after being given a detailed explanation of her condition and receiving counseling concerning her risks in childbearing. The second episode of massive vaginal bleeding occurred when she was at about 30 weeks’ gestation. During this admission, her hemoglobin was 6.4 g/dL, and a blood transfusion was considered. MgSO4 and Indomethacin were used to stabilize the contracted uterus. In addition, we also prescribed Betamethasone for improving fetal lung maturity. Poor uterine contraction, a cessation of active vaginal bleeding and reassuring fetal heart rate tracings were noted after several hours of initial management, and the condition became stable. Unfortunately, non-reassuring fetal heart rate tracing was noted one week later during her hospitalization. We discussed with the family the strategy of two stage surgery by delivery of the baby without the removal of the placenta in order to avoid massive hemorrhage, followed by transarterial embolization of bilateral uterine arteries, and finished with the removal of the morbidly adhered abnormal placenta. After we obtained their informed consent, delivery of the fetus by classical cesarean incision while the placenta left in situ was performed smoothly, the uterus then repaired and the abdomen closed. The blood loss was estimated to be 400 mL. Four days later, prophylactic uterine artery embolization by injecting large amount of gel foam pieces mixed with cefamezin through a 4.1 Fr catheter via the right femoral artery was carefully performed until the vascular flow supplied to the placenta was noted to be markedly reduced (Fig. 2). To prevent ureteral injuries during the hysterectomy, both ureters were also stented with double J catheters in the operative room before laparatomy started.

During the hysterectomy, the morbidly adhered placenta was visually confirmed. It appeared with a thinned-out, engorged vascular and bulky lower segment extending into the bladder serosa (Fig. 3).
The operation was smooth and involved little hemorrhage until we tried to separate the placenta with the adhered bladder base from the low segment of the uterus. Massive and active bleeding was noted immediately from the separated site of the uterus and bladder. Hemostasis was achieved by partial cystectomy with ligation of the supplying vasculature after a tiresome and lengthy operation and the calculated blood loss was 8,000 mL. The patient received a massive blood transfusion with the majority of the blood loss occurring during manipulation of the bladder base. The patient was sent to the surgical intensive care unit for 3 days, then transferred to ward after her condition became more stable. Intermittent mild fever and a pelvic hematoma with a diameter of 8 cm were noted one week after the major operation. The hematoma was treated with antibiotics and CT-guided drainage, and the patient finally discharged after another week later.

Comment

Many surgical techniques have been used to control obstetric hemorrhage. Surgical measures such as bilateral internal iliac (hypogastric) artery ligation, a concomitant ligation of bilateral uterine and ovarian arteries when conducting cesareans, and cesarean or postpartum hysterectomy were traditionally favored. However, internal iliac artery ligation is much less frequently used than it was in the last decade due to the fact that the younger
generation of practitioners are less familiar with this technique and also because its success rate was not as high as previously thought, largely due to the abundant anastomoses among the pelvic vasculatures [6]. The obturator artery may serve as an important anastomosis bridging internal and external iliac arteries [3]. Various conservative management such as the use of methotrexate have also been tried in women who wish to preserve future fertility. However, potential complications such as sepsis are always a concern [5].

Transcatheter arterial embolization has been developed as an alternative technique and has a superior effect when compared with the traditional surgical methods used to treat intractable obstetric hemorrhage. In the case of placenta percreta which is one of the major causes of peripartum hysterectomy, preoperative and prophylactic artery embolization therefore becomes an effective and useful method for treating this distressing and potentially lethal condition in pregnant women [3].

The incidence of failure in uterine artery embolization has been reported to be approximately 5% when used in treating postpartum hemorrhage, with half of these attributed to placenta accrete/increta/percreta. The successful rate of uterine artery embolization in treating postpartum hemorrhage was reported to be 62–71% [8,9].

In the case presented here, the bulky low segment of uterus looked pale from cyanosis which indicated the good effect of reducing blood flow into this part by selective arterial embolization, and no active bleeding occurred while manually removing the placenta from its adherence onto the lower segment of uterus. However, profuse bleeding occurred while separating the placenta from the bladder base. It was apparently that massive blood loss was due to the incomplete occlusion in collateral vessels, or the occlusive effect was removed by the drift of the gelfoam while manipulating the uterus during the operation. The distal parts of multiple branches of the arteries supplied to the uterus were occluded by large pieces of gelfoam. The plugs would drift away from the terminal exit of the small arteries after cutting and ligating the arterioles and vigorously manipulating the uterus at the procedure of hysterectomy [7]. This meant that the proximal parts of selective arteries were not occluded by the remaining gelfoam, which could have precipitated the hemorrhage. In the cases of placenta percreta, where high pressure flow and marked dilated vessels surrounding the invasive placenta with large amounts of gelfoam used during the procedure of embolization, the occlusive effect may still be unsatisfactory and inadequate in preoperative preparation for the patient.

A case of failure to control severe postpartum hemorrhage by proximal embolization of internal iliac artery, due to numerous collateral vessels in distal parts, was reported from another group from Taiwan [7]. Spasm of the branches of the internal iliac artery meant that selective embolization was less complete. This resulted in no extravasation of the dye which mimicked the complete occlusion of the supplying branches. Additional use of steel coils was proposed to provide a more definitive devascularization of the rich collateral pelvic vasculature which may have interfered with the efficacy of selective arterial occlusion [10]. However, we need to remember that even balloon occlusion of the internal iliac artery carries a possibility of failure which results in significant morbidity and hemorrhage [11].

In this report, we provide a painful example to show the inadequacy of uterine artery embolization to reduce the blood loss in a morbidly adhered placenta, despite the fact that neovascularization looked markedly decreased. Occlusion of the internal or even common iliac artery is necessary to avoid catastrophic obstetric hemorrhage and massive blood transfusion in such patients. This is despite the fact that ischemia-related morbidity, such as reperfusion injury and thromboembolism which theoretically exist, both remain a serious concern when occluding such major arteries. Meanwhile, the number of cases receiving temporal balloon catheter occlusion of internal or common iliac arteries is not large enough for us to totally exclude the side effect of organ ischemia since one case complicated with iliac artery thrombosis was reported recently when occluding balloon catheters placed in the internal.
iliac artery [12]. Despite quite a few successful reports of conservative management available in the medical literature, we need to be reminded that in certain cases with extensive vasculature, and especially when the urinary bladder is involved, embolization of the bilateral uterine artery only, or even occluding bilateral internal iliac arteries, still carries a risk of massive hemorrhage. We did not adopt the method proposed by a group from Israel in which they also adopted a two-stage surgery intervened by uterine artery embolization. They only performed subtotal hysterectomy in which the placenta, which adhered densely to the urinary bladder, was left in situ awaiting spontaneous resolution [13]. However we did not adopt this procedure because we regarded a risk of infection and that the unexpected bleeding would not lessen. Morbidly adhered placenta is still a potentially life-threatening condition that may cause serious morbidity and mortality despite multidisciplinary approaches applied in modern medicine.

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References