Taiwanese Journal of Obstetrics & Gynecology 57 (2018) 276–282

Contents lists available at ScienceDirect

Taiwanese Journal of Obstetrics & Gynecology

journal homepage: www.tjog-online.com

Original Article

The application of uterine wall local resection and reconstruction to preserve the uterus for the management of morbidly adherent placenta: Case series

Xianlan Zhao [a, b, *], Ya Tao [a, b], Yingying Du [a, b], Lei Zhao [a, b], Cai Liu [a, b], Yan Zhou [a, b], Peng Wei [a, b]

[a] Department of Obstetrics, The First Affiliated Hospital of Zhengzhou University, Zhengzhou 450052, China
[b] Obstetric Emergency and Critical Care Medicine of Henan Province, Zhengzhou 450052, China

ARTICLE INFO

Article history:
Accepted 28 December 2017

Keywords:
Abdominal aorta
Balloon occlusion
Cesarean delivery
Hysterectomy prevention
Morbidly adherent placenta

ABSTRACT

Objective: We aimed to evaluate our experience with the application of uterine wall local resection and reconstruction to preserve the uterus in patients with morbidly adherent placenta.
Materials and methods: In a retrospective study, data from patients with morbidly adherent placenta who delivered by cesarean section between January 1, 2013 and May 31, 2016 were analyzed. Prophylactic abdominal aorta balloon occlusion and tourniquet were used to prevent massive hemorrhage in all 62 cases, followed by uterine wall local resection and reconstruction to preserve the uterus. The quantity of estimated blood loss (EBL), operation time, and complications were analyzed.
Results: The placenta penetrated to the myometrium in 10 cases, involved the posterior bladder wall in 46 cases, and penetrated the posterior bladder wall in six cases. For all cases, the mean EBL in the surgery was 1377.3 ± 605.2 mL, the mean EBL in the initial postoperative 24 h was 140.6 ± 66.3 mL, the mean operation time was 72.3 ± 24.5 min, and the mean postoperative hospital stay was 5.8 ± 1.6 days. The six cases of placenta penetrating the bladder underwent bladder repair. Sixty-one cases had preserved uterus, and only one case had a hysterectomy due to amniotic fluid embolism (AFE).
Conclusion: Combined with prophylactic abdominal aorta balloon occlusion and tourniquet, uterine wall local resection and reconstruction is highly effective to reduce the intraoperative blood loss and hysterectomy in morbidly adherent placenta.
© 2018 Taiwan Association of Obstetrics & Gynecology. Publishing services by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Introduction

Morbidly adherent placenta (MAP) is a rare, life-threatening obstetrical complication associated with severe peripartum hemorrhage, massive transfusion, peripartum hysterectomy, coagulopathy and disseminated intravascular coagulation, multi-organ failure, and death [1,2]. Effective methods to control intraoperative bleeding are important for these patients. Recently, more reports about using interventional radiology to control obstetric hemorrhage have emerged. Our previous study [3] found that prophylactic abdominal aorta balloon occlusion (PABO) could reduce intraoperative blood loss and hysterectomy in patients with MAP undergoing cesarean section. However, the application of uterine wall local resection and reconstruction to preserve the uterus, combined with prophylactic abdominal aorta balloon occlusion and tourniquet, has not been reported in MAP cases. In this case series, we present our experiences with these hysterectomy prevention procedures in the management of 62 women with MAP undergoing cesarean section. The efficacy, risks, benefits, and feasibility of this technique are discussed.

Materials and methods

Patients

A retrospective study was carried out at the First Affiliated Hospital of Zhengzhou University, a tertiary medical center. All 62 cases of women with MAP who received PABO, followed by binding the lower uterine segment with a tourniquet, uterine wall local

* Corresponding author. No.1 Jianshe Road, Zhengzhou city, Henan province, 450052, China.
E-mail address: zxl_1016@163.com (X. Zhao).

https://doi.org/10.1016/j.tjog.2018.02.017
1028-4559/© 2018 Taiwan Association of Obstetrics & Gynecology. Publishing services by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

resection, and reconstruction during elective cesarean section, between January 1, 2013 and May 31, 2016 were reviewed.

The inclusion criteria of the study were as follows: (1) Diagnosis of MAP was based on history of previous uterine surgery, pelvic Doppler ultrasound (see Fig. 1) and magnetic resonance imaging (MRI) (see Fig. 2) (detailed signs are shown in Table 1). Details of Patient characteristics are shown in Table 2. (2) Absence of preoperative massive hemorrhage. (3) Desire to preserve uterus. (4) Cases without severe complications, such as organ failure, elevated liver enzymes, and low platelet count (HELLP syndrome).

In fact, the combination of PABO and tourniquet have a very high rate of efficacy, and the blood supply is obstructed substantially. Based on that, the operator can finish the uterine preservation surgery calmly and unhurriedly. According to our records, hysterectomy has been required in only a very few situations [e.g., amniotic fluid (AFE) embolism, patient required].

Preoperative preparation for cesarean section

Written informed consent was obtained from all patients after communicating with patients and their families to keep them informed about the related risks. We confirmed the placental location, implantation depth, and invasion to adjacent organs by ultrasound and MRI examination before surgery. Preoperative discussion and risk assessment in a meeting with a multidisciplinary team were recommended. We treated anemia preoperatively by a transfusion of red blood cells, keeping hemoglobin to a minimum of 90 g/L. Cross-matched blood and blood products were prepared and kept available if necessary. The balloon occlusion of the abdominal aorta was performed in all patients by an interventional radiologist under local anesthesia before cesarean section. This procedure has been described in detail previously [3].

Cesarean section

The in-charge anesthesiologist administered general anesthesia. After laparotomy, the surgeon selected a segment above the upper border of the placenta based on ultrasound scan and direct visualization interoperation, and made a transverse “higher” uterine incision trying to not cut through the placenta, avoiding a midline uterine incision as much as possible (Fig. 3B). After exposing and rupturing the amniotic membrane rapidly, the surgeon and assistant pressed at the uterine margin to arrest bleeding while absorbing amniotic fluid (Fig. 3C). After blunt extension of the uterine incision, delivery of the fetus, and umbilical cord clamping, the pre-positioned occlusion balloon in the aortic balloon was inflated with 0.9% saline 15 mL to reduce blood flow. Next, the lower uterine segment around the circumference was bound with the tourniquet to obstruct the blood supply (Fig. 3D). Successful occlusion was assumed if a lower extremity pulse oximeter ceased to read. The interventional radiologist adjusted the balloon inflating according to the bleeding. The balloon was slowly deflated at 5–10 min after first occlusion if no obvious bleeding was found. However, the balloon was re-inflated and further hemostasis methods were attempted if bleeding continued. These procedures would be repeated until satisfactory hemostasis was achieved.

Local resection and reconstruction of uterine wall

After fetal delivery, two corners of the uterine incision, and the superior and inferior lips, were clamped immediately by four Mayo clamps. Blunt dissection downward to the bladder-uterus peritoneal reflection (Fig. 3E and F) was performed, to the partial anterior wall of the uterine myometrium where the placenta was deeply adherent (a myometrium defect, with only the serous layer of the uterus) was resected, together with the placenta (Fig. 3G). In cases of posterior wall bladder invasion, we will separate the bladder gently, and then the partial anterior wall of the uterus free from the bladder will be resected, together with the adherent placenta. In the case of a centrally located placenta (covering the uterine cervix), we do the same procedure, and proper hemostasis methods are used in the cervix area. We will ask the urologist to help if its invasion comes as far as the bladder mucosae layer. It is important to ensure that sufficient myometrium above the peritoneal reflection is available for an optimum closure (Fig. 3H). Then, as much remaining placenta as possible is removed piecemeal from the edge of the uterine incision. Clamps and multiple hemostatic sutures are applied rapidly, while a small amount of saline is gradually released within the balloon until no active bleeding remains. We remove the tourniquet and the remaining placenta in the cervical canals areas and apply multiple hemostatic sutures in those areas. Then, we suture the superior and inferior lips of the uterine incision to reconstruct a residual uterus (Fig. 3I). Finally, an anti-adhesive absorbable membrane is applied over the reconstruction.

All patients received double lower limb intermittent pneumatic compression, lower limb massage, and application of low-molecular-weight heparin for arterial thrombosis prevention. Patients were given an antibiotic for infection prevention.

Estimation of blood loss

In this study, the measurement of the estimated blood loss (EBL) in cesarean section surgery consisted of three parts: (1) the amount of blood drawn into the storage jar during surgery; (2) the weight of

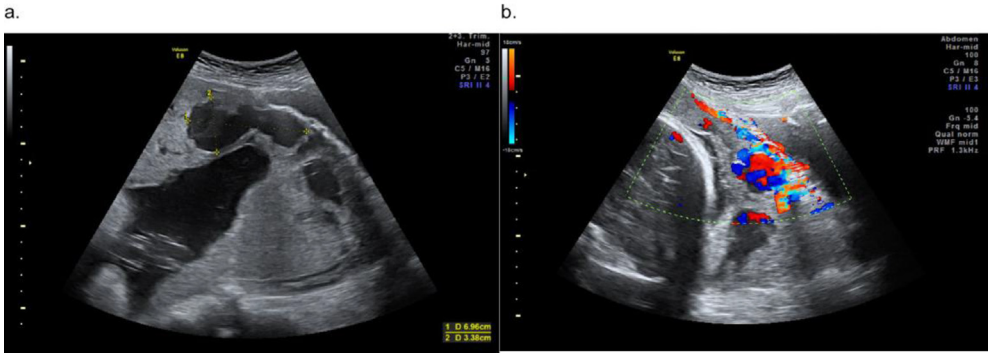

Fig. 1. The characteristic ultrasound images in morbidly adherent placenta. (A) The placenta adhering to the anterior and posterior uterine walls in ultrasound with color Doppler. (B) Hypervascularization surrounding the uterine anterior wall and placenta in color Doppler. In these situations, we perform further MRI scans to evaluate the area and depth of MAP.

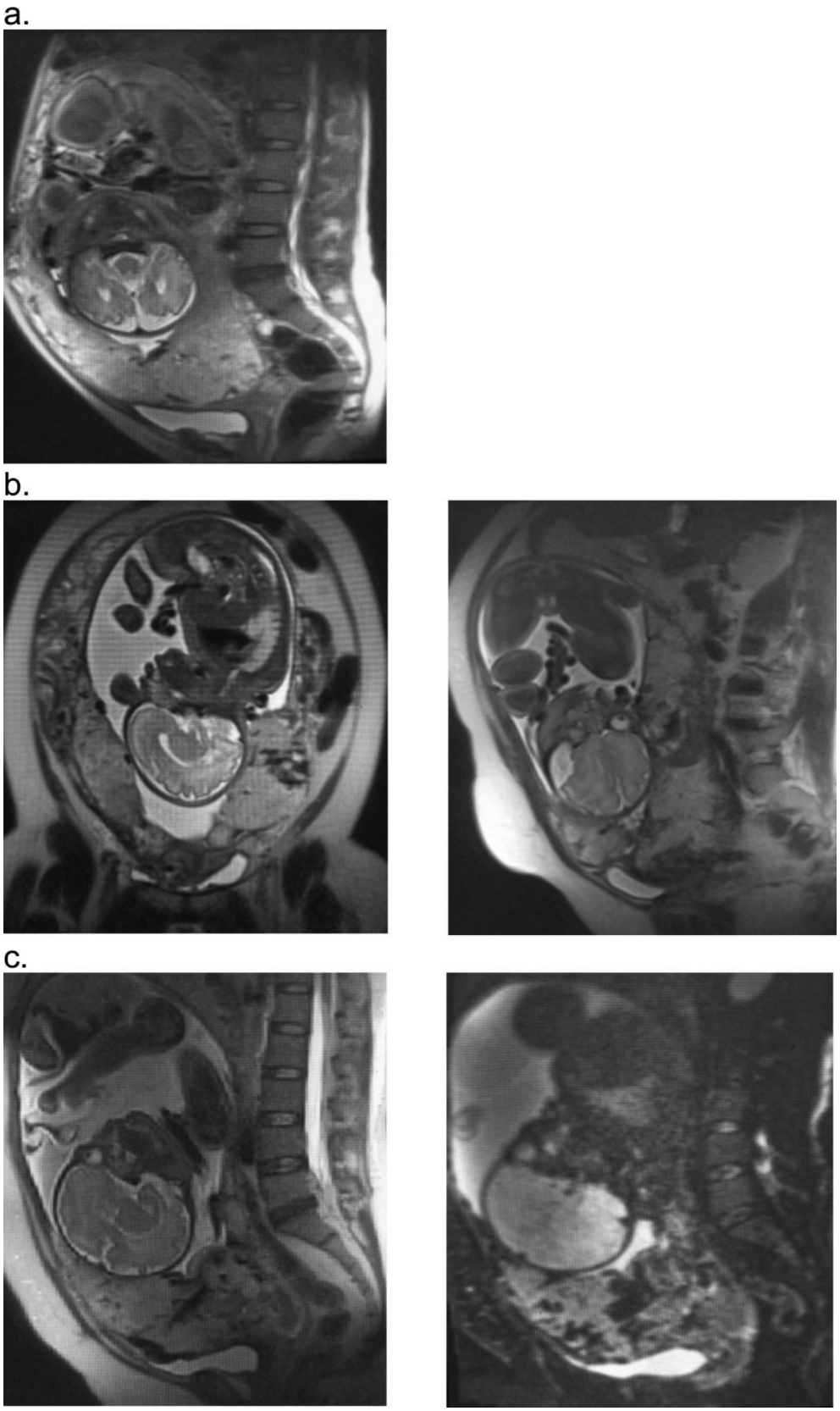

Fig. 2. The characteristic MR images in MAP. (A) Placenta previa with anteroinferior placenta increta, in which uterine preservation surgery will be done; the surgery is typically effective. (B) Placenta previa with a large area and massive placenta increta, for which we will prepare to perform a hysterectomy for all eventualities. In case of a life-threatening hemorrhage, hysterectomy will be performed without hesitation. If the PABO and the tourniquet obstruct the blood supply and hemostasis is reached, hysterectomy will not be performed. (C) Placenta previa that has penetrated the posterior bladder wall. In these cases, we prepare to perform a hysterectomy package if it becomes necessary. If the PABO and the tourniquet obstruct the blood supply and hemostasis is reached, hysterectomy will not be performed.

Table 1
Detailed signs of Pelvic Doppler ultrasound and Magnetic resonance imaging.

Pelvic Doppler ultrasound sign:
i. Myometrium thinning to <1 mm or undetectable
ii. Bladder wall interruption or loss
iii. Focal exophytic mass of placental tissue extending beyond the serosa
iv. Uterovesical hypervascularity between the myometrium and the posterior wall of the bladder
v. Vessels across the myometrium and beyond the serosa
Magnetic resonance imaging (MRI) sign:
i. Uterine bulging
ii. Heterogeneous signal intensity within the placenta
iii. Dark intraplacental bands and bladder bulging in nodular or "tent" shape on T2-weighted imaging

Table 2
Details of Patient characteristics.

Total number of cases	62
Age (y)	29.9 (21–39)
Gravidity	2.9 (2–8)
Parity	2.4 (2–5)
Gestational age (wk)	36.0 (28^{+5}–40^{+1})
Number of previous cesarean sections	2.3 (2–4)

blood-soaked gauze pads, gauzes, and surgical dressings minus their preoperative weight, and corresponding conversion according to the proportion of 1.05 g in weight to 1 mL in volume; and (3) postoperative clearance of the vaginal blood volume.

The amount of blood loss within 24 h after surgery was measured by the weight of blood-soaked disposable hip pads minus its own weight, and corresponding conversion according to the proportion of 1.05 g in weight to 1 mL in volume.

Data collection

The EBL during surgery, the EBL within 24 h after surgery, the operation time, whether a hysterectomy was performed, bladder repair, intensive care unit (ICU) admission, postoperative hospital stay, and complications associated with PABO were recorded. Patients were followed up by telephone and outpatient visits. The follow-up time was up to May 31, 2016.

Results

Basic data

Sixty-two cases of MAP were identified and included in this report. Patient characteristic details are shown in Table 2.

All patients had a morbidly adherent placenta: myometrium penetrated (n = 10); posterior bladder wall involved (n = 46); and posterior bladder wall penetrated (n = 6). The details are shown in Table 3.

Intraoperative and postoperative EBL

For all cases, the mean EBL during surgery was 1377.3 ± 605.2 mL (range 300–2500 mL), the mean EBL in the initial postoperative 24 h was 140.6 ± 66.3 mL (range 50–350 mL), the mean operation time was 72.3 ± 24.5 min (range 49–142 min), and the mean postoperative hospital stay was 5.8 ± 1.6 days (range 4–15 d). Sixty-one cases had preserved uterus, and only 1 patient required a hysterectomy due to AFE. Four cases had intrauterine packing with gauze. All 62 cases recovered and were discharged from the hospital. The details are shown in Table 4.

Complications

One patient in our study had complication of AFE and coagulation dysfunction, and therefore required a hysterectomy. Six patients underwent bladder repair, whereas no patient had bowel or ureteral injury. One patient had complication of lower extremity arterial thrombosis. None of the patients required further surgical procedures, and none had puerperal infection, uterine necrosis, or death.

Follow-up

Up to May 31, 2016, 59 patients were available for follow-up. Of these, 6/59 cases were still in the puerperium, 43/59 patients had resumed normal menstruation, and 10/59 were in the lactation period. The patient who had a lower extremity arterial thrombosis had fully recovered. No uterine abnormalities were detected by transvaginal sonography, except for scar diverticulum in two patients (<1 cm).

Discussion

MAP is a life-threatening condition characterized by placental villi being abnormally adherent, resulting in myometrium defect or absence. They are commonly classified into three distinct grades according to the degree of the placental villi invasion into the myometrium: placenta accreta, placenta increta, and placenta percreta. Placenta percreta is a severe condition in which the placenta penetrates through the entire thickness of the uterine myometrium and even comes out of the uterine serosa. Sumigama et al. [4] reported an average EBL was 3630 mL in placenta accreta, and up to 12,140 mL in a case of placenta percreta that they reported. Kassem and Alzahrani [5] reported that the average EBL in placenta accreta was 3000 mL, and more than 5000 mL in 20% of patients.

The incidence of cesarean section surgery has been increasing in recent years, accompanying the increased complication of placenta previa and abnormally invasive placenta. Cesarean section is often complicated by intraoperative and postoperative intractable hemorrhage, which has become the leading cause of postpartum hemorrhage [6], peripartum emergency hysterectomy [7], and maternal death [8]. Cesarean-hysterectomy is considered to be the gold standard treatment for placenta accreta. Although it reduces intraoperative and postoperative bleeding and related complications, hysterectomy causes great physical trauma and psychological burden to women. Therefore, obstetricians need to solve the deeper issues of how to guarantee maternal safety and preserve the uterus.

Clinical effects and safety of abdominal aortic balloon occlusion

In placenta accreta, lower uterine segment atony makes hemostasis difficult, and it is especially complicated by MAP. Separation of the placenta from its highly vascular bed is likely to cause massive hemorrhage. The conventional suture technique, uterine contraction drug administration, and gauze packing in the uterine cavity could solve the problem limitedly. In recent years, more reports of the use of interventional radiology to control obstetric hemorrhage have emerged [9]. Studies have reported [10,11] that PABO can prevent hysterectomy in many cases and improves perioperative outcomes. Our previous study [3] showed that PABO is safe and effective to control intraoperative blood loss, and it greatly decreases the risk of hysterectomy in patients with placenta accreta. Inflating the abdominal aortic balloon temporarily blocks the abdominal aortic blood flow, mitigating intraoperative bleeding and enhancing surgical visibility, which provides sufficient time for the

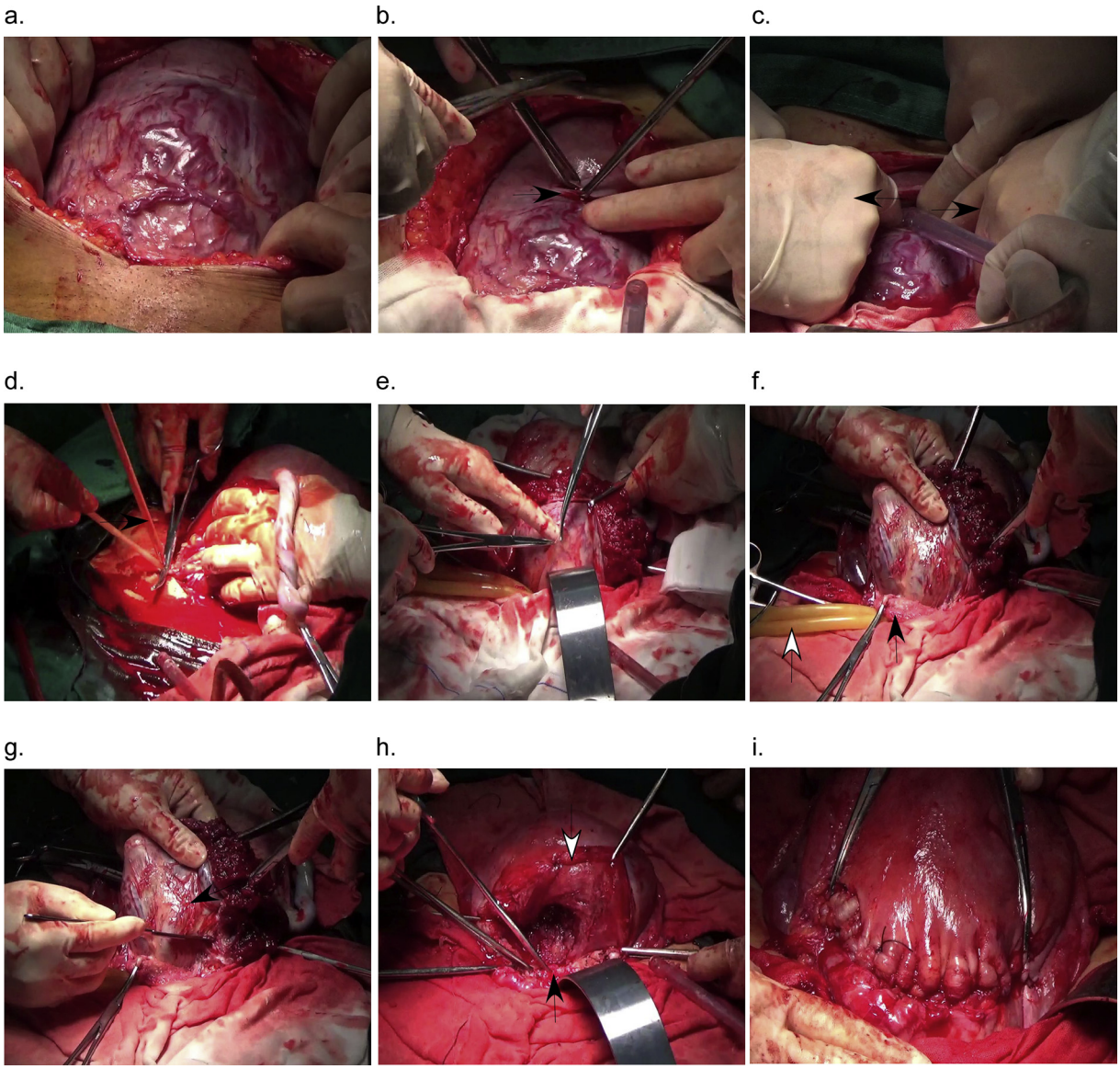

Fig. 3. (A) The abdomen is opened for a full operative exposure. (B) A "higher" myometrium incision above the upper border of the placenta (the black arrow denotes the upper border of the placenta) trying to avoid the placenta wholly or partly. (C) The uterine margin is pressed to reduce active bleeding. After the rapid rupture of the amniotic membrane, the surgeon and assistant press at the uterine margin (as indicated by the arrows) while absorbing amniotic fluid. (D) The lower uterine segment is bound with a tourniquet around the circumference to obstruct the blood supply (as indicated by the arrow). (E) Blunt dissection downward to the intersection of the bladder and uterus, where the placenta lies. (F) The uterus after the bladder had been separated (the black arrow denotes the bladder; the white arrow denotes the tourniquet). (G) Excision of the myometrium. The partial anterior wall of the uterine myometrium where the placenta was deeply adherent was resected, together with the placenta (as indicated by the arrow). (H) The uterus after myometrium excision. The white arrow denotes the superior lip of the uterine incision. The black arrow denotes the inferior lip of the myometrium incision. (I) The uterus after closure.

Table 3
Position of placenta previa observed during surgery.

	Myometrium Penetrated	Posterior bladder wall involved	Posterior bladder wall penetrated	Total
Number	10	46	6	62
Ratio (%)	16.13	74.19	9.68	100

Myometrium penetrated implies that the placenta penetrated through full-thickness myometrium and reached the uterine serosa layer.
Posterior bladder wall involved implies that the placenta penetrated through full-thickness myometrium and the uterine serosa layer, reaching the seromuscular layers of the bladder wall, without involving the bladder mucosa layer.
Posterior bladder wall penetrated implies that the placenta tissue reached or penetrated through the bladder mucosa layer.

surgeon to check the placenta attachment site carefully and remove the placental tissue as much as possible. In this study, the intraoperative EBL of all 62 placenta percreta cases was significantly lower than that reported in the literature [4,5]. Only one patient had a hysterectomy because of AFE, and the hysterectomy rate is 1.61%.

The advantages of uterine wall local resection and reconstruction on the basis of abdominal aortic balloon occlusion

Blocking the abdominal aortic blood flow immediately minimized blood loss and made it possible to excise the portion of the

Table 4
Intraoperative and postoperative data.

Case	EBL (mL)	EBL-24 h (mL)	Operation time (min)	Hospital stay (d)	ICU admission (%)	Hysterectomy (%)
62	1377.3 ± 605.2	140.6 ± 66.3	72.3 ± 24.5	5.8 ± 1.6	1.61 (1/62)	1.61 (1/62)

EBL: estimated blood loss in the operation.
EBL-24 h: estimated blood loss in postoperative 24 h.
Data are mean range or number (%).

anterior uterine myometrium wall overlying the placental bed, together with the adherent placenta as described previously. It could also avoid secondary injury to adjacent organs due to rough and violent surgery under the circumstance of difficult placental detachment and torrential bleeding. As we have removed a partially implanted placenta and a myometrium defected uterus, the subsequent hemostasis would be reduced because of area reduction and reduced bleeding volume, reducing the time needed for hemostasis correspondingly. If the placenta initially had been stripped and detached, we also recommend excising the myometrium-defected uterine wall because of its limited functionality and contraction atony. Maternal morbidity is minimized because there is no extensive surgery involving urinary bladder resection, ureteric stenting, or re-implantation. In addition, the potential complications associated with peripartum hysterectomy are avoided.

Prof. Palacios Jaraquemada JM [12] published a large series of cases of uterine wall resection and reconstruction for anterior wall placenta accrete. He preferred selective vascular ligature or surgical myometrial compression to hemostasis.

British researchers put forward the “triple-P procedure” and improved it for morbidly adherent placenta cesarean section [1,2,13]. Triple-P involves perioperative placental localization, pelvic devascularization, placental nonseparation, and myometrial excision with reconstruction of the uterine wall, which can effectively preserve the uterus. The procedure we reported is similar to triple-P procedure. In the triple-P procedure, the occlusion balloon catheters are placed with their tips in the bilateral internal iliac artery, and were required to puncture both sides of the femoral artery for adequate placement. The balloons are inflated one after another, which is time consuming, allowing an extended period of massive bleeding. Whereas in our study, the occlusion balloon catheter was placed preoperatively in the abdominal aorta, and it only needed to puncture one side of the femoral artery, reducing the morbidity of lower extremity arterial thrombosis. Inflating the balloon intraoperatively could block bilateral iliac and external iliac artery blood flow simultaneously, and block pelvic blood supply effectively in a short time. In these cesarean sections, we dissociate the adhesive bladder from the uterus without separation of the morbidly adherent placenta from the underlying myometrium bed, which could avoid secondary surgical injury. Yang Huixia [14] put forward the “butterfly compression suture” method, which uses a traditional tourniquet to tie all pelvic blood vessels into a compact bundle to block blood circulation, and suturing of the anterior uterine wall in an overlapping compression manner, trying to close arteriovenous sinus for hemostasis. Uterine artery ligation, uterine tamponade, or hysterectomy would be applied if suturing failed to arrest the bleeding. However, in a perforating placenta, in which trophoblasts invade adjacent organs (e.g., anteriorly into the urinary bladder, posteriorly into the colon, and downward into the cervical canal), additional blood supplies from the blood vessels supplying these organs, and from the internal pudendal artery, may supply the lower partial placenta. Thus, traditional uterine artery ligation is generally insufficient to arrest the ongoing massive obstetric hemorrhage due to the multiple blood supplies. In addition, a severe pelvic adhesion zone formed in many cases due to previous cesarean section. In such cases, tourniquets cannot be placed into the pelvic cavity nor can they be ideally placed to fully block the pelvic blood circulation, and ongoing bleeding below the tourniquet may not be found in time. Moreover, the operative field cannot be adequately viewed for hemostasis. Therefore, this “butterfly compression suture” method would be economical and effective for cases in which the placenta did not invade the lower segment of the cervical canal and those without serious pelvic adhesion. However, our procedure is applicable for a wider number of cases compared with the “butterfly compression suture” method. Clinicians can choose individualized hemostasis and surgical models based on hospital facility conditions and the patient's particular medical conditions.

The importance of uterus preservation

Studies have shown that hysterectomy could affect ovarian blood circulation and endocrine function, leading to premature ovarian failure. The uterus itself is an important endocrine organ and also has endocrine function. Lacking a uterus in childbearing-age women is equivalent to losing an important endocrine regulating organ, which could accelerate ovarian aging and failure. Moreover, hysterectomy may also result in damage to adjacent organs and may have a long-term negative effect on pelvic floor function [15]. Childbearing-age women who have a hysterectomy often undergo great psychological issues, including fear of rapid aging and losing femininity, and others resulting from endocrine imbalance. The long-term effects of hysterectomy affect psychological as well as physical health. Some studies reported that hysterectomy could lead to sexual dysfunction and depression [16].

In summary, combined with PABO, uterine wall local resection and reconstruction is highly effective to reduce the intraoperative blood loss and hysterectomy in patients with anterior placenta percreta. It is a safe and effective surgical alternative to peripartum hysterectomy or conservative management.

Conflicts of interest

None.

Sources of funding

None.

References

[1] Chandraharan E. Should the Triple-P procedure be used as an alternative to peripartum hysterectomy in the surgical treatment of placenta percreta. Womens Health Lond 2012;8(4):351–3.
[2] Chandraharan E, Rao S, Belli AM, Arulkumaran S. The Triple-P procedure as a conservative surgical alternative to peripartum hysterectomy for placenta percreta. Int J Gynaecol Obstet 2012;117(2):191–4.
[3] Wu Q, Liu Z, Zhao X, Liu C, Wang Y, Chu Q, et al. Outcome of pregnancies after balloon occlusion of the infrarenal abdominal aorta during caesarean in 230 patients with placenta praevia accreta. Cardiovasc Intervent Radiol 2016;39(11):1573–9.
[4] Sumigama S, Itakura A, Ota T, Okada M, Kotani T, Hayakawa H, et al. Placenta previa increta/percreta in Japan: a retrospective study of ultrasound findings, management and clinical course. J Obstet Gynaecol Res 2007;33(5):606–11.

[5] Kassem GA, Alzahrani AK. Maternal and neonatal outcomes of placenta previa and placenta accreta: three years of experience with a two-consultant approach. Int J Womens Health 2013:5803–10.
[6] Rossi AC, Lee RH, Chmait RH. Emergency postpartum hysterectomy for uncontrolled postpartum bleeding: a systematic review. Obstet Gynecol 2010;115(3):637–44.
[7] Awan N, Bennett MJ, Walters WA. Emergency peripartum hysterectomy: a 10-year review at the Royal Hospital for Women, Sydney. Aust N Z J Obstet Gynaecol 2011;51(3):210–5.
[8] Eller AG, Bennett MA, Sharshiner M, Masheter C, Soisson AP, Dodson M, et al. Maternal morbidity in cases of placenta accreta managed by a multidisciplinary care team compared with standard obstetric care. Obstet Gynecol 2011;117(2 Pt 1):331–7.
[9] Ballas J, Hull AD, Saenz C, Warshak CR, Roberts AC, Resnik RR, et al. Preoperative intravascular balloon catheters and surgical outcomes in pregnancies complicated by placenta accreta: a management paradox. Am J Obstet Gynecol 2012;207(3):216. e1-5.
[10] Wei X, Zhang J, Chu Q, Du Y, Xing N, Xu X, et al. Prophylactic abdominal aorta balloon occlusion during caesarean section: a retrospective case series. Int J Obstet Anesth 2016:273–8.
[11] Panici PB, Anceschi M, Borgia ML, Bresadola L, Masselli G, Parasassi T, et al. Intraoperative aorta balloon occlusion: fertility preservation in patients with placenta previa accreta/increta. J Matern Fetal Neonatal Med 2012;25(12):2512–6.
[12] Palacios JJM, Pesaresi M, Nassif JC, Hermosid S. Anterior placenta percreta: surgical approach, hemostasis and uterine repair. Acta Obstet Gynecol Scand 2004;83:738–44.
[13] Teixidor VM, Belli AM, Arulkumaran S, Chandraharan E. Prevention of postpartum hemorrhage and hysterectomy in patients with morbidly adherent placenta: a cohort study comparing outcomes before and after introduction of the Triple-P procedure. Ultrasound Obstet Gynecol 2015;46(3):350–5.
[14] Yang Huixia YL, Shi Chunyan SW, Wei Y. Efficiency of ring butterfly sewing in lower uterine segment aided with tourniquet in treating pernicious. Chin J Perinat Med 2015;7:497–501. https://doi.org/10.3760/cma.j.issn.1007-9408.2015.07.005.
[15] Selcuk S, Cam C, Asoglu MR, Kucukbas M, Arinkan A, Cikman MS, et al. Effect of simple and radical hysterectomy on quality of life - analysis of all aspects of pelvic floor dysfunction. Eur J Obstet Gynecol Reprod Biol 2016:19884–8.
[16] Goktas SB, Gun I, Yildiz T, Sakar MN, Caglayan S. The effect of total hysterectomy on sexual function and depression. Pak J Med Sci 2015;31(3):700–5.