CASE REPORT

A case of placenta percreta with massive hemorrhage during cesarean section

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Abstract : We describe a case of a 39-year-old woman diagnosed with placenta percreta complicated by massive hemorrhage during a cesarean section. At 27 weeks of gestation, she underwent an emergency cesarean section under general anesthesia for vaginal bleeding and an intrauterine infection. Soon after delivery, a massive hemorrhage was encountered while attempting to separate the placenta percreta from the bladder wall. Although total abdominal hysterectomy and partial cystectomy were performed, massive hemorrhaging persisted. Bleeding was finally controlled following bilateral internal iliac artery embolization. We used a cell salvage device and a rapid infuser for hemodynamics stabilization. Total blood loss was 47,000 mL, and anesthesia time was 12 h and 47 min. The patient was discharged on the 32nd postoperative day without major complications. Placenta accreta can be associated with life-threatening hemorrhage and it is vital to plan accordingly preoperatively. J. Med. Invest. 61 : 208-212, February, 2014

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INTRODUCTION

Placenta percreta is a subtype of placenta accreta in which the placenta invades the entire uterine wall and affects the adjacent organs. The incidence of placenta accreta ranges from one in 530 to one in 2,500 deliveries, and its incidence has been increasing due to an increase in cesarean sections (1). Cesarean sections with placenta percreta is mostly performed under general anesthesia. However, it is a condition with a high surgical risk and generally requires an obstetric hysterectomy to control massive hemorrhage. It has been reported to have a mortality rate up to 7% (2). We report a case of placenta percreta with massive hemorrhage where a cell salvage device (Cell Saver® ; Haemonetics Japan) and a rapid infuser (LEVEL 1 SYSTEM 1000® ; Smith Medical Japan Ltd.) were life saving and effective.

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CASE PRESENTATION

The patient was a 39-year-old woman who was 157 cm in height and 58 kg in weight. She had four previous children, two of which had been delivered

by cesarean section. She was diagnosed with placenta percreta by magnetic resonance imaging with a high suspicion that there was invasion into the muscularis of the bladder (Figure 1). Therefore, cesarean section was planned at 33 weeks of gestation. However, at 27 weeks of gestation, she underwent an emergency cesarean section due to vaginal bleeding and an intrauterine infection. We planned a cesarean section without exfoliating the placenta and cesarean hysterectomy. Pre-operative laboratory data are shown in Table 1. General anesthesia was induced using propofol, remifentanil, and rocuronium and anesthesia was maintained using propofol, fentanyl, and remifentanil. Figure 2 shows the anesthetic chart including hemodynamics and laboratory data. During the surgery, because the uterine surface was highly vascularized due to the placenta percreta, the decision was made to avoid surgical resection of the placenta and to directly dissect the uterine base with a vertical incision and perform a complete hysterectomy and partial cystectomy. However, hemostasis became difficult because the bladder invasion by the placenta was abundant. Bleeding was ultimately controlled following bilateral internal iliac artery embolization. Furthermore, we used catecholamines (dopamine and norepinephrine), a cell salvage device (Cell Saver® ; Haemonetics Japan) and a rapid infuser (LEVEL 1 SYSTEM 1000® ; Smith Medical Japan Ltd.) for hemodynamic stabilization. Intra-operative bleeding was 47,000 mL and total anesthesia time was 12 h and 47 min. A total of 120 units of red blood cells, 90 units of fresh frozen plasma, and 100 units of platelets were transfused. After the surgery, the patient was transferred to the intensive care unit and was extubated 9 hours later. Post-operative laboratory data are also shown in Table 1. She was discharged on the 32th post-operative day without major complications.

The baby (898 g) was born 7 min after the operation had started and was intubated immediately after birth with Apgar scores of 1 and 5 at 1 minute and 5 minutes, respectively. The baby was extubated 17 days after birth and discharged after the 95th day.

Table 1. Vital sign and laboratory data before and after operation

	Before	After			
		1hour	6hours	Day1	Day3
HR (beat/min)	111	64	85	58	60
SBP (mmHg)	82	146	113	148	115
DBP (mmHg)	34	78	69	77	65
SpO2 (%)	98	100	100	98	100
Hb (g/dL)	9.5	8.2	9.0	8.1	12.7
Plt (×1000/μL)	155	63	48	29	112
PT-INR	0.92	1.36	1.37	0.99	0.96
APTT (s)	28.2	46.9	35.9	29.0	27.4
Fibrinogen (mg/dL)	484	167	305	447	501
BUN (mg/dL)	6	11	15	31	8
Creatinine (mg/dL)	0.46	0.58	0.9	1.10	0.69
Sodium (mEq/L)	133	147	146	146	143
Potassium (mEq/L)	3.5	3.3	3.4	3.4	2.7
Chloride (mEq/L)	101	113	112	112	110

HR=Heart rate, SBP=Systolic blood pressure, DBP=Diastolic blood pressure, SPO_2=Saturation of peripheral oxygen, Hb=Hemoglobin, Plt=Platelets, PT-INR=Prothrombin time and international normalized rate, APTT=Activated partial thromboplastin time, BUN=Blood urea nitrogen.

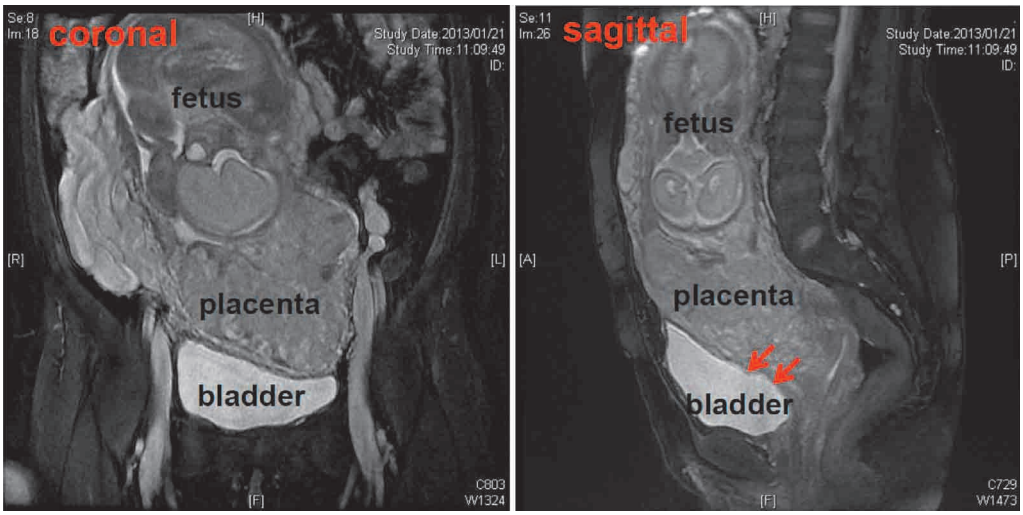

Figure 1. Magnetic resonance imaging of the plevis revealed invasion into the bladder by the placenta (red arrow).

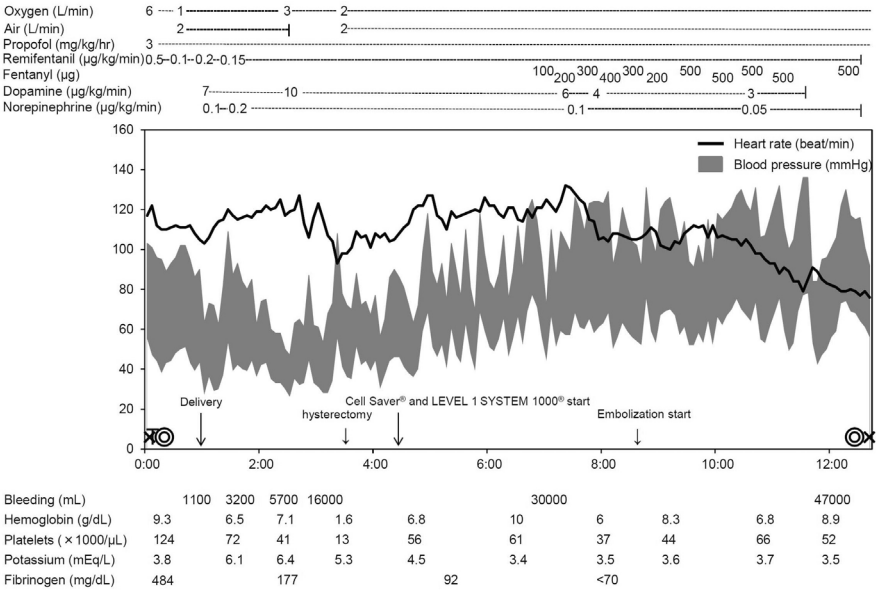

Figure 2. Anesthetic chart

DISCUSSION

Placenta percreta is a rare subtype of placenta accreta in which the placenta invades the entire uterine wall and affects the adjacent organs (Table 2). It is a condition with a high surgical risk and generally requires an obstetric hysterectomy. Placenta accreta has been reported to have up to a 7% mortality rate as well as intra-operative and post-operative morbidity associated with massive blood transfusions, infection, ureteral damage, and fistula formation (2). Prior delivery by cesarean section is a risk factor for placenta accreta. According to a report by Sumigama *et al.* (3), among 59,008 deliveries, 408 cases were diagnosed as placenta previa ; of these, 18 cases were placenta increta and 5 of placenta percreta. Mean intra-operative blood loss was 3,630 ± 2,216 mL (increta) and 12,140 ± 8,343 mL (percreta). One patient with placenta percreta died of hemorrhage (3).

Table 2. Summary of reported case of placenta percreta

Authors (Reference number)	Year	Method of diagnosis	Amount of transfusion (Red blood cells)	Treatments
Abbas *et al* (11)	2000	ultrasound	22	hysterectomy, bladder repair, bilateral internal iliac artery ligation
Abbas *et al* (11)	2000	ultrasound	15	hysterectomy, bladder repair, bilateral internal iliac artery ligation
Caliskan *et al* (12)	2003	ultrasound	13	hysterectomy, bladder repair, bilateral hypogastric artery ligation, abdominal packing
Takai *et al* (13)	2005	ultrasound MRI cystoscopy	35	hysterectomy, bladder repair, bilateral internal iliac artery ligation
Shawish *et al* (14)	2007	ultrasound MRI cystoscopy	5	hysterectomy, bladder repair
Matsubara *et al* (15)	2009	ultrasound MRI	8+2(autologous)	hysterectomy, bladder repair, bilateral internal iliac artery balloon catheters occlusion
Parva *et al* (16)	2009	ultrasound MRI	2	hysterectomy, bladder repair, bilateral internal iliac artery balloon catheters occlusion
Sijanovic *et al* (17)	2011	no diagnosis before surgery	20	hysterectomy, bladder repair, bilateral hypogastric artery ligation
Reitman *et al* (18)	2011	ultrasound	3	hysterectomy, bladder repair, uterine artery ligation
Vahdat *et al* (19)	2012	ultrasound	20	radical parametrectomy, bilateral internal iliac artery ligation, abdominal packing
Sultan *et al* (20)	2012	ultrasound	16	hysterectomy, bladder repair

In 1997, Dubois *et al.* reported that temporary balloon occlusion of the bilateral internal iliac artery is a method to control bleeding during cesarean hysterectomy for placenta percreta (4). However, in this emergency case, the patient presented with vaginal bleeding and had an intrauterine infection, preventing any pre-operatively planning. Ultimately, bilateral internal iliac artery embolization was performed intra-operatively to control hemorrhaging and achieve hemodynamic stability. Ideally, multidisciplinary pre-operative planning with the departments of obstetrics and gynecology, radiology, and anesthesiology will be optimal in future cases.

A decrease in fibrinogen is one of the leading factors involved in postpartum massive hemorrhage. Bleeding of > 2,000 mL ; can result in dilutional coagulopathy. When massive hemorrhage occurs, fibrinogen is the first coagulation factor that becomes depleted resulting in coagulopathy. This is because other coagulation factors can deplete up to 80% of normal concentrations before coagulopathy is observed, whereas fibrinogen can only lose up to 60% of normal concentrations (100 mg/dL) before coagulopathy (5). Fresh frozen plasma (FFP) is used to increase the fibrinogen concentrations. However, when massive hemorrhaging persists, administration of FFP cannot be expected to effectively supplement the fibrinogen concentrations (6). Moreover, there is a report that administration of a large quantity of FFP is associated with acute lung injury (7). In this case, although the patient did not develop acute lung injury, we should prepare a cryoprecipitate by concentrating FFP to 10 times, when massive hemorrhage was expected (8).

Cell Saver® is a cell salvage device used during surgery to avoid allogeneic transfusions and the elevation of serum potassium concentration. Cell salvage has been used in obstetrics to a limited degree because of the fear of amniotic fluid embolism although the exact mechanism is still unclear. In contrast, leukocyte depletion filtering of cell-salvaged blood obtained from cesarean section reduces amniotic fluid components to a concentration equivalent to maternal venous blood (9). This device has been reportedly used safely in > 400 cases (4, 10). In this case, the patient did not develop an amniotic fluid embolus. Moreover, Cell Saver® reduced the need for allogeneic transfusions and avoided the elevation of serum potassium concentration. During surgery the patient's serum potassium concentration increased up to 7.6 mmol/L, but returned to a normal concentrations after using this device.

We describe a difficult case of placenta percreta with massive hemorrhage, where transfusions alone were not sufficient to maintain hemodynamics. The use of a cell salvaging device and rapid infuser, which are not routinely available during these procedures were required to maintain hemodynamic stability. Ultimately, it is critical to have multidisciplinary pre-operative discussions regarding strategic planning and potential complications in difficult cases such as these. Furthermore, pre-operative preparation of a Cell Saver® and LEVEL 1 SYSTEM 1000® with appropriate staffing is essential in cases where massive blood loss is expected.

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