

Multidisciplinary Team Management of a Patient with Placenta Percreta for Elective Cesarean Section

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ABSTRACT

The incidence of placenta previa/percreta are increasing in numbers and accounts for high maternal morbidity and mortality. This is a case of placenta previa/percreta successfully managed by a multidisciplinary team. This case demonstrates that adequate knowledge, effective communication, and the availability and utilization of resources all play significant roles. The team includes an obstetrician, gynecologic oncologist, urologist, vascular surgeon, anesthesiologist, neonatologist, and blood bank and nursing personnel. Prenatal identification of risk factors and diagnosis aid in the implementation of treatment strategies by team. Team effort and elective delivery in a tertiary hospital is essential to improve both maternal and neonatal outcome.

Key Words: placenta previa, placenta percreta, multidisciplinary team, cesarean delivery, hysterectomy, hemorrhage

Introduction

Placenta accreta is a potential life-threatening obstetric condition that requires a multidisciplinary approach. Placenta accreta was an unknown obstetric occurrence in the past but in the last few years it has increased significantly. This increase was noted to be in parallel with the increasing trend of the cesarean section (CS) rates and is now becoming a worldwide epidemic. The rising trend of CS rates was noted in both developed countries and developing countries. It has increased beyond the recommended level of WHO, which is 10-15%. The U.S. CS rate has increased steeply and reached a record high of 32.9 percent of all births in 2009.¹ In Southeast Asian countries, the CS rate varied from 12 to 39 per cent. The Philippine General Hospital, a premier university hospital, has a 22.7 percent CS rate.² In one study covering the period of 1982-2000, it was noted that there was an increase in the incidence of placenta accreta, i.e. 1 in 533 births.³ This steady increase in the incidence of accreta is expected to occur with the expanding indications for

cesarean section, including maternal request. The most important risk factor for placenta accreta is a combination of prior cesarean section and placenta previa. The pathogenesis is still not known but the common theory is that there is a defective decidualization related to previous surgery or to anatomical factors that allow the placenta to attach directly to the myometrium.

Placenta accreta is associated with increased bleeding at the time of attempted placental delivery requiring hysterectomy. Maternal death may occur despite optimal planning, transfusion management, and surgical care. Maternal mortality with placenta accreta has been reported to be as high as 7%.⁴

Case Report

This is a case of a 36-year-old woman who was admitted at 35 4/7 weeks gestation for an elective cesarean section. She was not in labor, status post 2 cesarean sections, G4P2 (2-0-1-2). She had a blood pressure of 140/90, heart rate of 90 per minute, respiratory rate of 16 per minute, weight of 98 kg, height of 165 centimeters, and BMI of 36. Laboratory findings were within normal limits. Her ultrasound report indicated placenta previa marginalis located anteriorly on the right side and placenta increta/percreta. The operative plan was cystoscopy, bilateral ureteral stenting, and repeat cesarean section with hysterectomy. Counseling was done with the members of the family. A multidisciplinary meeting was attended by the members of the surgical team. The individual plans of the different specialists were presented and discussed thoroughly.

She was received at the operating room with a 16-gauge peripheral line inserted into her right arm. A 16-gauge peripheral line was inserted into the left arm. Blood sample was extracted and sent to the laboratory for complete blood count, typing and crossmatching of the previously reserved 4 units of packed RBC and 6 units of fresh frozen plasma. The patient was connected to monitors. She appeared alert, oriented, and in no apparent distress. Review of systems revealed controlled gestational diabetes. Her vital signs were essentially normal. A cell salvage machine, rapid infuser, infusion bags, colloids, crystalloids, drugs, neonatal resuscitation equipment, and cautery machine were prepared for the procedure. Fetal heart tones were

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monitored prior to induction of anesthesia. A combined spinal–epidural anesthesia was initiated. Cystoscopy was done and bilateral ureteral stents were inserted. Cystoscopy showed no signs of mucosal invasion of the placenta. Exposure of the uterus after a midline skin excision showed a prominent isthmic portion with abnormal vascularities on the surface (Figure 1). Fundal and posterior hysterotomy was done on the uterus to avoid injury to the low lying placenta. A live baby boy was delivered with an Apgar score of 9-9. Upon the delivery of the baby, an infusion of 20 units of oxytocin was started. The placenta was noted to be adherent to the lower uterine segment and implanted on the right anterolateral area of the uterus covering the cervical os. Hysterectomy was started after the closure of the uterus with the placenta left behind. It was during this time that the uterus was noted to be not well contracted and there was profuse vaginal bleeding. Vital signs were normal but the patient became very apprehensive. The anesthesiologist decided to shift to general anesthesia. The gyne-oncologist and obstetrician carefully dissected the adherent anterior lower uterine segment from the posterior wall of the urinary bladder. During the dissection, the vascular surgeon was requested to do temporary cross-clamping of the infra-renal aorta in order to minimize the blood loss. The entire procedure lasted 4 hours. Total blood loss was 1,200 ml and urine output was 500 cc. She was admitted at the post-anesthesia care unit alert, oriented, and with stable vital signs. Histopathological diagnosis of the postpartum uterus was singleton placenta percreta. Her postoperative course was uneventful.

Case Discussion

Abnormally invasive placenta implantation may occur in a uterus with defective decidua basalis resulting in morbidly adherent placenta. Placenta accreta is a collective term for abnormal placentation adherence. Further classification is based on the degree to which the chorionic villi penetrate the myometrium. Placenta accreta indicates trophoblastic invasion beyond the Nitabuch fibrinoid layer but not into the myometrium. Placenta increta indicates invasion into the myometrium while placenta percreta indicates invasion beyond the uterine serosa, which may involve adjacent organs such as the bladder, ureters, bowel, omentum or vessels.

Early diagnosis of abnormal implantation is very important in the management of this condition. Prenatal diagnosis tends to improve the maternal outcome.^{5,6} It allows patient counseling and planning of management, including the choice and timing of elective delivery, the decision to do hysterectomy, or prophylactic/alternative strategies. Diagnosis can be suspected prenatally in patients with risk factors for placenta accreta. The most important risk factor for placenta accreta is placenta previa after a prior cesarean delivery. The frequency of placenta accreta increases with an

increasing number of cesarean deliveries, reaching 50% to 67% with four or more previous cesarean deliveries.⁷ Additional risk factors include advanced maternal age, smoking, multiparity, previous curettage or myomectomy, Asherman syndrome, and submucosal fibroids.

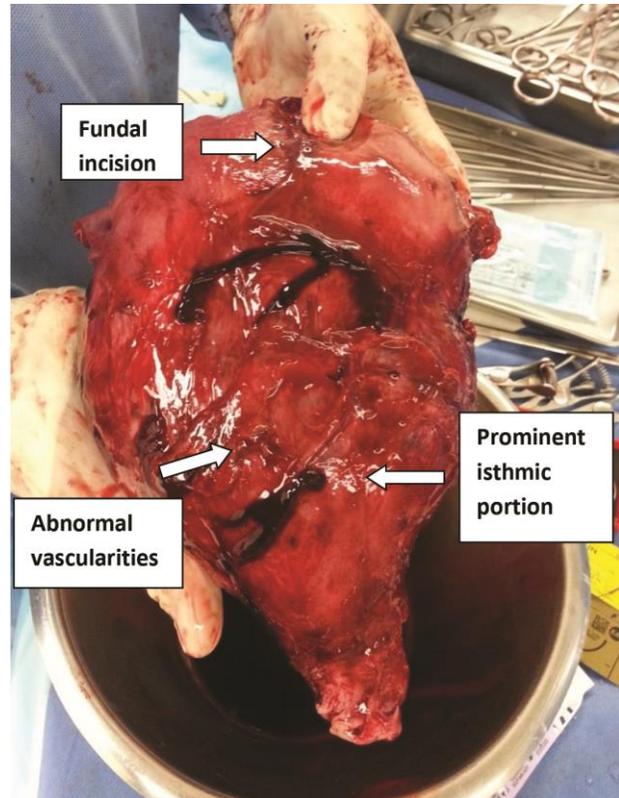


Figure 1. Placenta percreta. The surgical uterus showing a fundal incision with prominent isthmic portion. Abnormal vascularities seen on the surface. Placenta extended through uterine wall covered with thin serosa.

Our patient was at high risk for placenta accreta because of the presence of placenta previa and previous history of two cesarean sections. She was informed of this risk by her attending obstetrician during her prenatal visit. Transabdominal ultrasound was used to establish the diagnosis and served as a guide in the clinical management of the case. The test has a high accuracy for prenatal diagnosis of disorders of invasive placentation in high-risk women.⁸ The ultrasound of the patient revealed a placenta previa marginalis anterior, grade 2, with possible accreta/increta and suspicious focal percreta. The findings were evaluated further by a transvaginal scan and color Doppler which showed a “moth-eaten” or “Swiss cheese” appearance of the placenta. Ultrasound can be used from 15 weeks gestation, although it is more sensitive at gestational ages of 20 weeks or more. Magnetic resonance imaging is an adjunctive diagnostic tool used to accurately clarify the diagnosis in addition to accurate localization of the placenta

in relation to the cervix. However, this procedure is very costly and was not used in this patient.

In this case, a multidisciplinary team was organized by the attending obstetrician which consisted of obstetricians, a gynecologist, a vascular surgeon, a urologist, anesthesiologists, a neonatologist, operating room nurses, and blood bank personnel. The team met to discuss the potential problems of each specialty in order to ensure proper coordination and excellent communication among members of the team.

The most common indication for hysterectomy in patients with placenta previa/accreta is poorly controlled hemorrhage. An elective cesarean delivery performed under controlled circumstances significantly decreases morbidity.^{9,10} Combined maternal and neonatal outcomes are optimized in stable patients of planned delivery at 34 weeks age of gestation. It is associated with shorter operative time and a lower frequency of transfusions, complications, and intensive care unit admissions.¹¹ Well-planned delivery in a tertiary hospital by a multidisciplinary management team has been demonstrated to significantly improve maternal and fetal outcomes significantly.^{12,13,14} In a retrospective cohort study on pregnancies with placenta accreta, delivery at a medical center with a multidisciplinary care team resulted in a more than 50% risk reduction for composite early morbidity among all cases of accreta and a nearly 80% risk reduction among those cases wherein accreta was suspected before delivery.¹² The patient was scheduled for surgery at 35-36 weeks after her completion of antenatal corticosteroid injections.

Before the start of the surgery, all drugs, equipment, instruments, and monitors were checked. The patient had two large-bore intravenous accesses for fluid resuscitation and blood transfusion. An ECG monitor, pulse oximeter, and blood pressure monitor were connected. A pneumatic compression device was placed on her lower extremities to prevent venous thromboembolism. A suction apparatus and a cell-saver were prepared in case of massive bleeding. The anesthesiologist coordinated with blood bank personnel with regards the availability of properly crossmatched and typed blood and blood products. Crystalloids and colloids were prepared for fluid resuscitation.

Anesthesiologists play a key role in the management of the cesarean hysterectomy. During the prenatal visit of the patient, the anesthesiologist discussed the anesthetic plan thoroughly. Strategic management of possible worst-case scenarios was discussed with the other members of the team preoperatively. There is insufficient evidence as to the choice of anesthesia technique for cesarean hysterectomy for placenta accreta. It becomes more difficult if the patient is not adequately prepared for the surgery. The American Society of Anesthesiologists task force on obstetric anesthesia suggested that general anesthesia may be the most appropriate choice in some circumstances, including

cases where severe hemorrhage is anticipated.¹⁵ The use of regional anesthesia is controversial. It can cause hypotension due to sympathectomy and may be difficult to manage in cases of hemodynamic instability. However, with the increasing experience in managing this group of patients, some anesthesiologists use regional anesthesia in a select group of hemodynamically stable women. A multi-institutional study on anesthetic management of obstetric hysterectomy showed that epidural anesthesia might be an appropriate choice for some patients. There was no evidence in the study that epidural anesthesia significantly affected blood loss, crystalloid replacement or requirement for transfusion.¹⁰ Another large retrospective study comparing the use of general anesthesia and regional anesthesia showed that there was more blood loss, more transfusion requirements and more major morbidity in the general anesthesia group. In the study, general anesthetics were more commonly used in emergency situations and consultants were more likely to give regional anesthesia than their junior colleagues.¹⁶ A combined spinal-epidural anesthesia was used in this case to avoid the effects of volatile anesthetics on the baby and to allow the mother to remain awake. Other advantages of regional anesthesia are avoidance of complications with maternal airway and reduction of deep venous thrombosis. Spinal anesthesia was initially used with the intention of using the epidural catheter in case spinal anesthesia is inadequate since cystoscopy and bilateral ureteral stenting may take some time to accomplish. The epidural catheter was to be maintained for postoperative pain management. However, the patient became very apprehensive after the delivery of the baby and upon the appraisal of the profuse vaginal bleeding, the anesthesiologists decided to convert to general anesthesia. General anesthesia enabled the anesthesiologists to secure the airway, maintained the vital functions, and controlled the hemodynamic parameters especially during the periods of bleeding. Pharmacologic management and fluid replacement were done to maintain hemodynamic stability. The anesthesiologists were aware that maintaining good communication and teamwork at all times are the keys to a successful outcome in the management of obstetric hemorrhage.¹⁷

Urologic consultation before the scheduled procedure has been associated with a decreased incidence of urologic complications.¹⁴ Urologists are needed in case there is a need to perform resection and repair of the bladder or the ureters. Cystoscopy is often done to determine bladder involvement. It may show posterior bladder wall abnormalities and biopsy and fulguration should be avoided as it may cause bleeding.¹⁸ Injury to the ureters may also occur during ligation of the uterine vessels and transection of the cardinal ligaments during hysterectomy. It is the most frequently encountered intraoperative complication of placenta accreta and surgeons need to be aware of this risk and should

maintain a high level of vigilance. One approach recommended to reduce ureteral injury is to insert a preoperative ureteral stent.^{9,19} Cystoscopy done on the patient revealed intact mucosal layer and absence of pulsating submucosal placental vessels which means that there was no extensive involvement of the bladder. Bilateral ureteral stents were inserted after the cystoscopy in order to avoid injury to the ureters during the hysterectomy.

Most obstetricians have limited experience with cesarean section and hysterectomy on patients with placenta previa/percreta. The recommended management is planned preterm cesarean hysterectomy with the placenta left in situ because removal of the placenta is associated with significant hemorrhagic morbidity. This, however, may not apply to patients who are desirous of future fertility. A midline vertical incision of the skin was done to provide better exposure for the hysterectomy. It is further recommended that the uterus be opened from a site distant from the placenta leaving it attached while hysterectomy is performed.²⁰ The uterine incision done in this case was at the fundus extending posteriorly in order to avoid the placenta that was implanted anteriorly. Conservative management was not considered because fertility preservation was not a concern for the patient. The potential for massive hemorrhage or urinary tract injury with cesarean hysterectomy usually calls for the presence of two obstetricians in the operating room, and a gynecologist. The gynecologist was requested to participate in the hysterectomy since she has had extensive training and experience in performing complex pelvic surgeries. Her expertise was indeed needed during the hysterectomy in order to avoid complications.

There are limited reports on the use of infrarenal aortic clamping in obstetrics. Temporary compression and clamping of the infrarenal abdominal aorta can decrease blood flow to the pelvis and allow time for resuscitation with blood products.^{21,22} It is a relatively simple technique and can be done by trained obstetrician-gynecologists. However, serious complications such as large vessel injuries may occur and should be done in cooperation with a vascular surgeon.²³ This technique was very essential in the control of bleeding during hysterectomy. The compression and clamping of the infrarenal abdominal aorta by the vascular surgeon immediately controlled the bleeding. Clamping of the aorta provided optimum exposure of the surgical field while the obstetricians and gynecologist proceeded with the ligation of uterine arteries and hysterectomy. The anesthesiologist was able to control the hemodynamic status of the patient with the controlled bleeding.

Neonatologists also play an important role. Elective cesarean hysterectomy allows the neonatologist to address the issues of prematurity, hemorrhage, and effects of general anesthetics. The decision to give antenatal corticosteroids

and the timing of administration should be individualized. Antenatal corticosteroids should be given to all women at high risk of preterm delivery between 24⁺⁰ and 34⁺⁶ weeks of gestation to prevent the development of respiratory distress syndrome (RDS).²⁴ One study showed that antenatal corticosteroid is still effective after 37 weeks gestation in infants born by elective cesarean section, with reduction in RDS and transient tachypnea.²⁵ Corticosteroid was given to this patient at 35 weeks gestation by the attending obstetrician. Planned cesarean hysterectomy also allowed the neonatologist to prepare neonatal drugs and resuscitation equipment prior to the surgery. It was also decided during the multidisciplinary meeting that regional anesthesia will be used before the delivery of the baby to avoid the effects of volatile anesthetics. In one study, 20% of babies born by cesarean section under general anesthesia were depressed, so greater use of epidural block for elective cesarean section was recommended.²⁶ The Apgar score of the baby was 9-9 at 1 minute and 5 minutes, respectively.

Transfusion support is a challenging task because of sudden onset of massive hemorrhage. It is important for the blood bank to be aware of the scheduled day and time of the procedure to prevent delays in obtaining the products required for the case. Clear communication between personnel, especially the obstetrician, anesthesiologist, and nursing staff regarding ongoing blood loss and the continued need for blood products is important. Before the start of the surgery, the blood bank was notified and the number of units of blood previously discussed with the obstetricians and anesthesiologists was rechecked. There is no consensus as to the number of blood components to be prepared because of limited experiences on massive transfusion. Current recommendations for blood replacement are a 1:1 ratio of packed cells to fresh frozen plasma based on trauma studies.²⁷ In this case, a total of 4 units of packed red blood cells and 6 units of fresh frozen plasma were prepared. However, the patient did not receive any blood transfusion since the blood loss was only 1,200 ml. Crystalloids and colloids were used instead to maintain the intravascular volume of the patient. A retrospective medical record review on patients with placenta accreta who presented for delivery recommended that hospitals should have a massive transfusion protocol for managing these cases that addresses preoperative blood component preparation and intraoperative management.²⁸ Most hospitals in the country do not have a massive transfusion protocol that should be activated in the event of massive bleeding. A cell salvage machine was on standby during the procedure for possible autotransfusion. It was not used because of the adequate control of bleeders by the temporary infrarenal aortic clamp. Cell saver technology is not widely used in obstetrics because of the theoretical concern that fetal cellular debris and amniotic fluid may result in amniotic fluid embolism syndrome. Currently available filtering

technology addresses this problem but is still reserved for emergent use during massive bleeding. In the event that banked blood is unavailable in elective surgeries, one can resort to autologous blood donation or normovolemic hemodilution. Recombinant factor VIIa is a new adjunct for the treatment of massive hemorrhage and should be considered in a situation when no other treatment is available. However, it should be used with caution since it can cause vascular thrombosis and thromboembolic events like cardiac and cerebral ischemia.

Recommendation and Conclusion

Patients with placenta previa and percreta are at risk of catastrophic maternal hemorrhage. The alarming increase in the cesarean section rate has led to the escalation of this abnormally invasive placentation. This obstetric condition is significant because it has increased the maternal and neonatal morbidity and mortality especially in developing countries. The optimal management of patients with placenta previa/percreta requires meticulous evaluation and planning to ensure success in the management of its complications. Risk factors assessment and diagnostic imaging significantly improves the safety of these patients. The formation of a multidisciplinary team that will take care of the antepartum and intrapartum management of this potentially life-threatening event was proposed. The multidisciplinary team will be composed of obstetricians, gynecologists, urologists, vascular surgeons, anesthesiologists, neonatologists, and blood bank and nursing personnel. The team will develop practice guidelines and checklists to guide them so they can respond quickly and effectively when the situation occurs. It is further recommended that delivery should be elective, preferably in a tertiary hospital that is equipped with the necessary personnel and adequate resources. The case presented showed a favorable outcome that resulted from this team approach.

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