CASE REPORT

Management of placenta percreta in a Jehovah's Witness patient

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SUMMARY

Placenta percreta is increasing in incidence and is associated with the risk of life-threatening haemorrhage. Patients who do not accept blood products present a unique challenge to obstetrician-gynaecologists. In this case report, we present the case of a 42-year-old pregnant Jehovah's Witness with a complete placenta previa and confirmed percreta at 26 weeks' gestation. Due to her religious beliefs against the use of blood products, she was managed with a stepwise surgical approach which involved caesarean delivery with internal iliac (hypogastric) artery ligation, weekly methotrexate and delayed hysterectomy 6 weeks later. Non-traditional, alternative approaches to the management of abnormal placentation in patients declining blood products warrant exploration.

BACKGROUND

As the rate of caesarean deliveries has increased over recent decades, obstetrician-gynaecologists are increasingly encountering abnormal placentation.¹ Abnormal implantation of the placenta is described according to the level of invasion (accreta, increta, percreta), with percreta extending to extrauterine tissue and carrying the greatest risk of peripartum complications. Placenta percreta is associated with the risk of damage to local organs, neurovascular invasion, haemorrhage, amniotic fluid embolism, disseminated intravascular coagulation and operative complications, with a maternal mortality rate as high as 5.6%.² Caesarean hysterectomy is the standard of care with frequent need for transfusion of blood products due to massive haemorrhage. Among patients with placenta percreta specifically, average blood loss during caesarean hysterectomy is 4800 mL, with a mean of 9.5 units of red blood cells transfused.³ However, there is a paucity of literature on the management of morbidly adherent placenta in Jehovah's Witness patients.⁴⁻⁸ We present a case of placenta percreta managed with bilateral internal iliac artery ligation and weekly methotrexate followed by an interval hysterectomy, due to the patient's religious beliefs (Jehovah's Witness) which did not allow her to receive donor blood products.

CASE PRESENTATION

The patient was a 42-year-old woman gravida 5 para 2-0-22, admitted at 26 and 0/7 weeks' gestation for vaginal bleeding in the setting of complete placenta previa with suspicion for placenta percreta. She had been diagnosed with abnormal placentation 2 weeks

prior via ultrasound and was counselled extensively regarding the risks of haemorrhage, with a high likelihood for blood transfusion in the peripartum period. However, as a Jehovah's Witness, the patient was clear in her wishes to abstain from all blood products.

Her obstetric history was significant for two previous caesarean deliveries. The first delivery was performed emergently for an abnormal fetal heart tracing due to suspected nuchal cord. The second was an elective repeat caesarean section 16 years later without complications. She had no other medical comorbidities.

A previous ultrasound at 20 weeks showed a complete posterior previa with myometrium measuring 4.3 mm and high vascularity near the cervix, suspicious for placenta accreta. On admission, she was initiated on intravenous fluids, magnesium for fetal neuroprotection and antenatal corticosteroids with a haemoglobin of 10.2 g/dL. Speculum examination showed about 20 mL of clots and no active bleeding. The patient reported fetal movements and infrequent uterine contractions. Obstetric ultrasound showed a complete placenta previa and an estimated fetal weight of 1089 g. An MRI was obtained which suggested placenta previa and percreta with bilateral pelvic sidewall extension, concerning for iliac vessel and bladder involvement. She was given one dose of synthetic erythropoietin to raise her haemoglobin.

During her hospitalisation, the patient continued to have intermittent episodes of vaginal bleeding. A multidisciplinary team consisting of maternal fetal medicine, gynaecological oncology, radiology, paediatrics, interventional radiology, bloodless medicine and trauma surgery was convened, and recommended a planned caesarean delivery and management of the placenta at 27 weeks' gestation. At that time, her haemoglobin was 10.4 g/mL, raising concerns for catastrophic blood loss during caesarean hysterectomy in a patient not accepting of blood products. Our institution's bloodless medicine team was consulted to discuss blood product options. She agreed to the use of synthetic erythropoietin to increase haemoglobin levels, intraoperative blood salvage, fibrin sealant, dialysis, immunoglobulins, haemodilution, synthetic albumin and heart-lung equipment (non-blood primed). The bloodless medicine team did recommend the consideration of polymerised bovine haemoglobin which would have required Food and Drug Administration's approval for off-label use. However, she ultimately decided against the use of this product due to the significant toxicity profile.

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The patient was counselled by gynaecological oncology on potential scenarios for surgical management, depending on the extent of the placental vasculature. Exploration of the pelvis would be performed by the gynaecological oncology team following caesarean delivery to determine resectability of the placenta. If the placenta did not extend to the posterior pelvic sidewalls and minimal blood loss would be encountered, a caesarean hysterectomy would be performed. However, if the placenta was found to be encroaching on the pelvic vessels and/or if the risk of extensive bleeding was high, then the abdomen would be closed, leaving the uterus and placenta in situ, and the team would proceed with delayed hysterectomy 6–8 weeks later. The patient was advised to remain hospitalised for observation until interval hysterectomy, due to the risk of haemorrhage and infection with a retained placenta. She was counselled regarding the risks and benefits of methotrexate by the gynaecological oncologists, and she consented to its use because of its potential to reduce placental bulk and blood loss at the time of hysterectomy.

During surgery, internal iliac catheter balloons were placed bilaterally by interventional radiology. Cystoscopy with bilateral Pollack stent placement was performed which showed no evidence of mucosal invasion of the placenta in the bladder. A live infant was delivered through a classic caesarean section, and the hysterotomy was closed. Subsequent intraoperative assessment of the uterus and placenta was performed which demonstrated a placenta previa extending through the prior hysterotomy scar anteriorly and involving the bladder serosa. Though the posterior pelvic sidewalls and colon were not involved as originally suspected, there was significant engorgement of the vessels along the anterior lower uterine segment and bladder, and extension towards the right pelvic sidewall vessels. Due to the concern for catastrophic haemorrhage in a patient who did not accept blood products, the decision by two gynaecological oncologists was made to ligate the internal iliac arteries and delay the hysterectomy. The intrailiac artery catheter balloons were removed, and the internal iliac arteries were ligated to decrease future blood loss. Additionally, the utero-ovarian ligaments were transected bilaterally, and the patient was closed with the placenta and uterus left in situ. Estimated blood loss (EBL) was 500 mL.

Postoperatively, the patient had no signs or symptoms of anaemia, with a haemoglobin of 10.1 g/dL. She remained inhouse and was given intravenous iron sucrose every other day for 10 days and weekly synthetic erythropoietin injections for 6 weeks to increase her haemoglobin. On postoperative day (POD) 2, the patient spiked a fever of 38.5°C, but no clear aetiology could be identified on workup. Out of concern for endometritis or sepsis, she was started on piperacillin–tazobactam intravenously for 10 days. Urine culture, blood culture and chest X-ray were all negative, and she remained haemodynamically stable and afebrile thereafter. On POD 38, a second MRI of the pelvis showed an enlarged and heterogeneous uterus, containing haemorrhage, fluid and retained placenta, with minimal decrease in size of placenta and prominent pelvic vasculature.

During her postoperative care, a total of four doses of intramuscular methotrexate were administered. The first dose of methotrexate was given at a concentration of 50 mg/m², following the standard dosing and timing of the management of molar pregnancies. Due to transaminitis following the first dose (aspartate aminotransferase of 586 U/L and alanine aminotransferase of 719 U/L), it was held on week 2. The subsequent next three doses of methotrexate were given at a reduced concentration of 25 mg/m². Her beta-human chorionic gonadotropin levels were noted to trend down from 1593 mIU/mL at the

beginning of methotrexate treatment to 56.4 mIU/mL a week after the fourth dose.

Six weeks after the caesarean section, a completion hysterectomy was scheduled as planned. However, due to staffing issues, the procedure was cancelled. Five days later, the patient became symptomatic, noting dark brown vaginal bleeding with extensive cramping and pain, concerning for placental abruption versus early endometritis. She was rescheduled for the hysterectomy. Interventional radiology performed feeder vessel embolisation in preparation for a total abdominal hysterectomy and bilateral salpingectomy. Similar to the prior procedure, the patient declined the use of blood products but agreed to the use of cryoprecipitate and intraoperative cell salvage. Intraoperatively, no placental vessels were found within the bladder mucosa on cystoscopy nor were they found to extend to the pelvic sidewalls on gross examination, but necrotic placental tissue was noted on the bladder serosa. Total EBL was 1350 mL.

OUTCOME AND FOLLOW-UP

The patient's postoperative course was significant for expected postoperative anaemia. Haemoglobin was 6.1 g/dL on POD 1, and she was started on intravenous iron sucrose, intramuscular B₁₂ and ferrous sulfate with folate supplementation. She was discharged home on POD 6. There were no reported short-term or long-term postoperative (30-day and 90-day, respectively) complications.

DISCUSSION

We describe a unique case of placenta previa with percreta in a patient who would not accept blood products. Placenta percreta is associated with a high risk of life-threatening haemorrhage. Typically, caesarean hysterectomy is the treatment of choice for such patients, but when a patient declines blood products, management must be tailored to minimise catastrophic blood loss. Conservative management in morbidly adherent placentas include any approach that avoids hysterectomy.^{9–11} Given the extension of the placental vasculature, our patient's anaemia and our experience with morbidly adherent placentas, we decided to pursue three strategies to decrease intraoperative blood loss: interval hysterectomy, internal iliac artery ligation and adjuvant methotrexate.

Planned delayed hysterectomy has been associated with lower blood loss in patients with placenta percreta. Delayed hysterectomy is largely described as an unexpected complication following attempted conservative management as a fertility-sparing technique.^{13 12} However, planned delayed hysterectomy is not truly a conservative approach. In our case, it was a hybrid strategy aimed at preventing complications that may arise with immediate hysterectomy or prolonged retained placenta. In a retrospective cohort study of patients with placenta percreta, those managed with a caesarean hysterectomy had significantly higher median EBL (2800 mL) compared with those managed with a planned delayed hysterectomy (900 mL at caesarean section and 750 mL at interval hysterectomy, totalling 1650 mL).¹³ Another cohort study reported blood loss during caesarean hysterectomy to be 2615 mL vs 1506 mL in planned delayed hysterectomy, with a statistically significant difference in the volume of blood transfused (5546 mL vs 1648 mL).¹⁴ However, the exact mechanisms of reduced blood loss are unclear. The literature suggests that the spontaneous resolution of placental involution may take from 4 weeks to 9–12 months with a mean of 6 months.^{12 15 16} There is no conclusive data regarding the optimal timing of interval hysterectomy. Retained placenta is associated with risks of

haemorrhage, endomyometritis, sepsis and disseminated intra-vascular coagulation, but is also associated with overall reduced levels of haemorrhage and need for blood transfusion.^{1 14} A case report on the conservative management of a patient with placenta percreta was complicated by disseminated intravascular coagulation (DIC) 7 weeks after delivery.¹⁷ This suggests a potential similarity in the pathophysiology and timeline of DIC in patients with retained placenta percreta and those with retained products of conception after intrauterine fetal demise. In two studies reviewing conservative management of patients with placenta percreta, 60% of women required delayed hysterectomy with 40%–80% occurring emergently.^{3 12} Thus, for our patient, we planned a delayed hysterectomy at 6–8 weeks to allow for placental resorption, uterine involution and medical interventions to boost haemoglobin levels.

Endovascular interventions such as balloon catheter occlusion or embolisation of the aorta, the internal iliac artery or the uterine artery were discussed with interventional radiology. Most commonly, uterine artery occlusion with temporary intra-arterial balloon catheters or uterine artery embolisation have been described.^{18–20} During the intraoperative assessment of our patient's placental vessel engorgement and anaemia, the decision for planned delayed hysterectomy was made which made temporary intra-arterial balloon occlusion no longer an option. In considering uterine artery embolisation versus hypogastric artery ligation with planned hysterectomy in our patient, hypogastric artery ligation was chosen to further decrease the rich collateral feeding vessels in the pelvis. Internal iliac artery ligation reduces the risk of haemorrhage by reducing the pulse pressure in arteries distal to the ligation by 85%.²¹ In a case series of patients with placenta percreta who received prophylactic balloon occlusion of the internal iliac arteries, patients were successfully managed but their mean intraoperative blood loss was still high (4050 mL).¹⁸ Another study found that pre-caesarean prophylactic balloon catheter placement for suspected placenta accreta did not affect the number of packed red blood cell units transfused.²² Furthermore, reported risks of intra-arterial occlusion and/or embolisation include iliac thrombosis, inadvertent embolisation of external iliac arteries, uterine necrosis, leg ischaemia and necrosis of buttocks.^{23–25}

Methotrexate, a dihydrofolate reductase inhibitor targeting rapidly dividing cells, most commonly used as treatment for ectopic pregnancy and gestational trophoblastic disease, was used in our patient. Some data suggest that methotrexate induces placental necrosis and causes more rapid placental expulsion.^{26–28} Methotrexate is contraindicated during breastfeeding which likely contributes to high-quality data against its use in the postpartum setting of retained morbidly adherent placentas.²² One large cohort study of placenta accretas (n=167), including percretas, reported that the risks of methotrexate-related pancytopenia and nephrotoxicity outweigh the purported benefits.¹⁶ There was one death due to myelosuppression and nephrotoxicity which was suspected to be related to intraumbilical injection of methotrexate.¹⁶ However, case reports have shown that the use of methotrexate can result in complete resolution of vascular involvement of the bladder which was of concern in our patient.²⁹ Additionally, other cases have noted the decrease in the size of retained placenta.³⁰

In addition to the medical and surgical management of this case, the ethics and religious considerations of this case are unique. Delivering optimal care to this patient required extensive discussions with the patient, her husband, case management, medical staff and hospital administration to develop a treatment plan. The medical preferences of Jehovah's Witnesses vary from patient to patient, as each person will accept different products and levels of

intervention. It is important for medical providers to be familiar with the options available which do not involve donor blood products, and to individualise patient care accordingly. Our institution is fortunate to have a bloodless medicine team with expertise in alternatives to blood products. The bloodless medicine team manages a variety of blood conservation methods and techniques, such as intraoperative cell salvage, and works closely with patients and surgeons to advocate for patient's medical preferences. In hospitals without a bloodless medicine team, information is readily available online and collaboration with a centre with a bloodless medicine team should be encouraged.

In conclusion, this report describes a challenging Jehovah's Witness patient who may not have survived the blood loss of a caesarean hysterectomy. A staged surgical approach in conjunction with medical optimisation as we have described may be a reasonable option for patients who may not be able to sustain the risks of life-threatening haemorrhage secondary to caesarean hysterectomy. Further studies evaluating side effects and comorbidities in a staged surgical approach are warranted.

Learning points

- ▶ Delayed hysterectomy is an alternative when caesarean hysterectomy is not feasible or the risk of catastrophic haemorrhage is too great.
- ▶ Intraoperative assessment of the placental vasculature may clarify the need for delayed hysterectomy. Preparations should be made for close, inhouse observation of these patients if possible.
- ▶ Intravenous iron supplementation and synthetic erythropoietin are options to increase haemoglobin levels in patients who refuse donor blood products.
- ▶ A collaborative, multidisciplinary approach to the morbidly adherent placenta is necessary to deliver high-quality care.
- ▶ Non-traditional, alternative approaches to the management of abnormal placentation in patients declining blood products warrant exploration.

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