
Urologic Complications of Placenta Percreta Invading the Urinary Bladder: A case report and review of the literature

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Abstract

Introduction

Placenta percreta invading the urinary bladder may cause hemorrhagic shock, hematuria and urologic complications at parturition. This retrospective survey of 54 patients reviews maternal characteristics, presentations, urologic complications, and management.

Methods

The first reported case of placenta percreta with urinary bladder invasion in Hawaii is presented. Medline search and literature review identified an additional 53 patients. A meta-analysis of all 54 cases was performed.

Results

Hematuria was present initially in 31% (17/54) patients. Of these, 9 of 17 required transfusion support. A preoperative diagnosis was established by ultrasound or MRI in 33% of patients. Cystoscopy was performed in 12 patients and did not make a preoperative diagnosis in any patient. 39 urologic complications included bladder laceration 26%, urinary fistula 13%, gross hematuria 9%, ureteral transection 6%, and small capacity bladder 4%.

Partial cystectomy was performed in 44% (24/54). Three maternal deaths and 14 fetal deaths occurred. Only 1 patient subsequently had a delivery.

Conclusion

Readily identifiable risk factors by history are important to suggest placenta percreta in pregnant patients with gross hematuria. Ultrasound and/or MRI can establish a preoperative diagnosis. Cystoscopy did not identify any patient preoperatively. Partial cystectomy is commonly required for extensive or deep bladder invasion.

Introduction

The placenta is a pelvic organ of uncommon urologic concern. Yet, abnormal placentation with urinary bladder involvement may cause exsanguinating hemorrhage, hematuria and urologic complications. Placenta percreta or accreta is an adherent placenta that develops beyond the myometrium due to a deficient Nitabuch's membrane or absence of local decidua basalis. It may invade the urinary bladder or contiguous organs. The reported incidence of placenta percreta varies from 1:3,333 to 1:400,000 births.¹ Cesarean section, placenta previa, multiple pregnancies and uterine trauma are risk factors for placenta percreta.² We present a new patient and review 53 addi-

tional reported cases with bladder invasion.³⁻⁶ Due to the rarity of placenta percreta no single institution will accumulate a series, we therefore present a meta-analysis to discuss maternal characteristics, surgical management, urologic complications, and outcomes of this challenging clinical problem.

Case Report

A 38 year old woman G5, P3 with a history of 3 previous cesarean sections presented with vaginal bleeding at 28 weeks. Evaluation by ultrasound revealed placenta previa. The patient was treated with bed-rest. At 34 weeks vaginal bleeding increased. Cesarean section and hysterectomy were performed. The bladder was densely adherent to the lower uterine segment. Severe hemorrhage ensued with placental dissection. A bladder laceration occurred and severe hematuria and clot retention developed. A cystotomy tube was inserted. An intraoperative diagnosis of placenta percreta with bladder invasion was made. The patient was unstable despite 36 units of PRBCs, 24 units of platelets, 6FFP, and 10 cryoprecipitate for an estimated blood loss of 25 liters. The patient's wound was packed and then closed 2 days later. 46 units of PRBCs, 20 units FFP, 20 units cryoprecipitate, and 43 units of platelets were given in total. Subsequently, both the mother and child were discharged from the hospital.

Literature Review

Mean age at presentation was 31 years (range 19 - 42 years). The mean gestational age was 30 weeks (range 14-39). Ninety-four percent had had a previous cesarean section. Sixty-six percent were at least gravida 4 (range 4-14). Only 3 of 54 patients were primigravidae.

Bleeding was the most common presenting complaint. Vaginal bleeding occurred in 26 of 54 (48%). Hematuria was found in 17 of 54 (31%); three patients had only microscopic hematuria. Due to bladder hemorrhage 9 of 17 (53%) required transfusion support (range 2-11 UPRBC). One preoperative diagnosis was made based only on clinical presentation. Of the 17 patients with hematuria, 9 had a preoperative diagnosis established by sonogram or MRI. Ultimately 8 of 17 patients with hematuria had a partial cystectomy and cesarean hysterectomy. Table 1 enumerates all presentations.

Forty-six patients had preoperative sonograms while 5 had MRI. Placenta previa was identified in 38 patients. Two had placenta previa plus hemorrhage and 1 had placenta previa plus a macerated fetus. Eighteen percretae were identified preoperatively. Blood clots in the bladder were seen in 6 patients by sonography.

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Table 1.— Clinical Presentation

Clinical Presentation	# of Patients	% of Patients
Vaginal Bleeding	26	48%
Hematuria	17	31%
Abdominal Pain	7	13%
Elevated AFP	2	4%
Preeclampsia	2	4%
Premature Rupture of Membranes]	2	4%
Hyperemesis gravidarum	1	2%
Retroplacental Bleeding	1	2%
Premature Labor	1	2%

Table 2.— Surgical Management

Procedure	# of Patients	% of Patients
Cesarean Section	39	72%
Partial Cystectomy + C-Hysterectomy*	21	39%
Hypogastric Ligation	19	35%
Bladder Repair+ C- Hysterectomy*	14	26%
Cesarean Hysterectomy	12	22%
Cystotomy	12	22%
SP Tube	9	17%
Hypogastric Catheterization	3	6%
Reimplant Ureter	2	4%
Packing	7	13%
Bladder Repair	1	2%
Bladder/Uterus Repair	1	2%
JJ Stent	1	2%
Ureterolithomy	1	2%
Cesarean Hysterectomy + Abortion	1	2%
Hysterectomy	1	2%
Splenectomy	1	2%
Median Sternotomy	1	2%
Tracheostomy	1	2%
Hysterotomy	1	2%

*C-hysterectomy = cesarean hysterectomy

Table 3.— Urologic Complications

Urologic Complications	# of Patients	% of Patients
Bladder Laceration	14	26%
Gross Hematuria	5	9%
UTI	5	9%
Vesicovaginal Fistula	5	9%
Ureteral Transection	3	6%
Small Capacity Bladder	2	4%
Vesicouterine Fistula	2	4%
Hydronephrosis	1	2%
Renal Vein Laceration	1	2%
Bladder Calculus	1	2%

Cystoscopy was performed in 12 patients. Two patients had cystoscopy plus irrigation. One patient had 3 cystoscopies plus bladder biopsy which resulted in exsanguinating hemorrhage and emergency hysterectomy. One patient underwent 2 cystoscopic clot evacuations and fulguration and developed uncontrollable hemorrhage at the second fulguration. Another patient had 2 cystoscopic clot evacuations. The initial examination was normal, however, the second clot evacuation released bladder tamponade and attempted fulguration was unsuccessful. Endoscopy revealed active bleeding (4 patients), marked vascularity (2 patient), exophytic growth (1 patient), erosive lesion (2 patients), granular lesion (1 patient), and a normal examination (3 patients). Surgical management is listed in Table 2. Significantly, 21 (39%) patients had partial cystectomy and cesarean hysterectomy. Fourteen had bladder repair plus cesarean hysterectomy. Cystotomy was performed in 12 (22%) and ureteral reimplantation in 3 patients. Hypogastric ligation in 19 (35%) and packing in 7 (13%) were adjuncts to control hemorrhage. Ancillary urologic interventions included exploratory laparotomy plus partial cystectomy (2), ileal cystoplasty (1), nephrostomy and JJ stent (1), delayed hysterectomy, partial cystectomy and bilateral ureteral reimplantation (1).

Hemorrhage is a conspicuous feature of placenta percreta due to hematuria and attempts to resect an invasive placenta. The mean blood loss was 5,570 ml (range 1,500 - 17,000 ml) in 7 patients and mean replacement was 24 units (2-115 UPRBC) in 30 patients.

Urologic complications are enumerated in Table 3. Bladder laceration was the most common problem occurring in 14 (26%), followed by gross hematuria in 5 (9%), vesicovaginal fistula in 5 (9%), and vesicouterine fistula in 2 (4%). Ureteral transection occurred in 3 patients, 1 unilaterally and 2 bilaterally.

Three maternal deaths and 14 fetal deaths occurred. Maternal deaths occurred at 20, 35, and 38 weeks secondary to hemorrhagic shock. Two died during surgery and one expired four hours postoperatively. All 3 had had subtotal hysterectomy. Fetal deaths occurred at 11, 14, 16, 16, 20, 20, 20, 22, 22, 24, 26,26, 27 and 27 weeks of gestation.

In 4 patients with retained placenta, significant urologic complications developed. Two developed gross hematuria and shock requiring partial cystectomy at postoperative day 1 and 2 months postpartum. One developed multiple pelvic abscesses. One patient had urinary ascites due to a vesicouterine fistula. Only six patients had their uterus conserved. Two developed vesicouterine fistulas. Two underwent delayed hysterectomy at 2 and 8 weeks postpartum. One patient had methotrexate and suction curettage postpartum. Severe hemorrhage ensued, necessitating hysterectomy, partial cystectomy and ureteral reimplantation seven weeks after delivery. Only one patient subsequently had a delivery.

Discussion

Placenta percreta with urinary bladder invasion is a critical urologic obstetric emergency with a maternal and fetal mortality of 6% and 19% respectively. Prompt recognition and treatment are paramount to minimize maternal mortality and morbidity. This retrospective series confirmed multiparity, multiple cesarean sections, placenta previa, and uterine trauma as risk factors for the development of placenta percreta with bladder invasion.

A preoperative diagnosis was established in 35% (19/54) of

patients almost invariably by sonography or MRI. Ultrasound is the preferred modality for evaluation of third trimester bleeding. On ultrasound, criteria for an invasive placenta include: 1) absence of the normally visible retroplacental sonolucent space, 2) presence of unusually large dilated vessels extending from the placenta through the myometrium, 3) thinning or disruption of the linear hyperechoic boundary echo representing the uterine serosa and its' interface with the posterior wall of the bladder and, 4) focal nodular projections beyond the expected plane of the bladder.⁴⁰ Neither ultrasound nor MRI predicts the degree of bladder invasion found at surgery.⁴⁰

Although 31% of patients had hematuria, cystoscopy was performed in only 12. However, endoscopy did not establish a preoperative diagnosis in any patient. Bladder biopsy can lead to severe hemorrhage and should be avoided. Clot evacuation may release bladder tamponade and cause exsanguinating hemorrhage from the dilated sinusoids of the invasive placenta.

Urologic management had been predicated by the extent, depth, and location of the invasive placenta. Twenty-one of 54 patients had immediate partial cystectomy and cesarean hysterectomy. An additional 3 patients had a delayed partial cystectomy at postoperative day 1 and 2 months postpartum for severe hematuria. The third patient required partial cystectomy after failed conservative management with methotrexate and attempted suction curettage 7 weeks postpartum. Of the patients treated with partial cystectomy subsequent complications include 3 vesicovaginal fistulas and 1 small capacity bladder requiring ileal cystoplasty. Bladder repair was needed in 16 patients to treat 14 lacerations and minimal or small volume placenta percreta. Of these patients, one patient developed a bladder calculus from vesical sutures. Gross hematuria occurred in 5 patients, 2 of whom required partial cystectomy. Two vesicovaginal fistulas developed in the bladder repair group.

Thirty-nine urologic complications developed in 54 patients with bladder involvement by placenta percreta. Late complications included small capacity bladder (2), gross exsanguinating hematuria (1), vesical calculus (1), and bilateral ureteral transections (1). Ileal augmentation cystoplasty, partial cystectomy, partial cystectomy plus bilateral ureteral reimplantation, and stone removal were performed in 1 patient each. No maternal deaths, but 6 fetal deaths occurred in patients with an established preoperative diagnosis. Of this group urologic complications included ureteral transection, UTL, and hematuria (1 patient each).

The surgical management of placenta percreta requires an exploratory laparotomy through a vertical midline incision under a general anesthetic. Disappearance of the cul de sac between the uterus and bladder and presence of overdeveloped blood vessels running on the serosa of the bladder and uterus provides visual confirmation.³⁰ Cesarean section should be performed as far from placental insertion as possible. Initial dissection of the placenta should be avoided. Severe hemorrhage often requires hysterectomy. With anterior placenta percreta subtotal hysterectomy should be avoided since most arteries (that is cervical, vaginal, and vesical) remain uncontrolled and reoperation rates approach 90% in these patients.^{47, 48} Moreover, in three maternal mortalities all had a subtotal hysterectomy and died of hemorrhagic shock. A posterior approach mobilizing the uterus by dividing the uterosacral ligaments and entering the vagina posteriorly is recommended.²¹ By retracting the ureters laterally and the uterus medially, uterine vessels and parametria

medial to the ureter are ligated from cephalad to caudad direction. Early cystotomy is a useful adjunct to identify tissue planes. With minor bladder invasion, simple bladder repair was performed in nearly 25% of patients. With extensive invasion extirpation of all tissues involved is important to avoid delayed complications. Partial cystectomy with hysterectomy was ultimately necessary in 44% (24/54) of the patients. Isolation of the posterior bladder suture line from the vaginal cuff by omental interposition will minimize fistula formation.

In obstetrics the optimal management of placenta percreta is controversial. In a survey of 335 members of The Society of Perinatal Obstetricians 69% opted for conservative management with the placenta left in situ after delivery of the fetus when the bladder was involved.³⁹ Yet in a review of 109 recent cases of placenta percreta surgical removal of the uterus and involved tissue was performed in 93% (101 cases) and conservative treatment with the placenta left in situ after delivery was performed in only 7% (8 cases).³⁹ Moreover the single greatest factor affecting outcome was the antepartum identification of abnormal placentation. That is possible by ultrasound in 50% of patients.

Conclusion

Readily identifiable risk factors by history can suggest placenta percreta in pregnant patients with gross hematuria. A preoperative diagnosis can be achieved by ultrasound in 50% of patients and can decrease morbidity. Partial cystectomy for extensive or deep bladder invasion is commonly required and decreases urologic complications. The clinical presentation, location, extent and depth of the bladder invasion will dictate the degree of urologic reconstructive surgery. In the retrospective series cystoscopy had minimal diagnostic and therapeutic value.

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