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Impact of a Multidisciplinary Program on Pregnancy Outcomes in the Setting of Placenta Accreta Spectrum

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HYPOTHESIS

Women requiring a peripartum hysterectomy have risk factors and outcomes that differ based on the circumstances of care and management (unplanned hysterectomy, planned without a multidisciplinary approach and planned with a multidisciplinary approach).

OBJECTIVES

- To determine the impact of a formalized, multidisciplinary Placenta Accreta Spectrum Program (PASP) on maternal and neonatal outcomes for pregnancies complicated by placenta accreta spectrum.
- To identify whether having a multidisciplinary approach for the antepartum, intraoperative, and postpartum management of women undergoing cesarean hysterectomy affects maternal and fetal outcomes.

STUDY DESIGN

- A registered database of all women who underwent a peripartum hysterectomy at a Level IV Regional Perinatal Health Care Center from December 1, 2007 to June 30, 2019 was created.
- In 2012, a monthly meeting to create a multidisciplinary management plan for all patients with suspected placenta accreta was implemented (PASP).
- We conducted a retrospective cohort study of all women from our database who underwent a cesarean hysterectomy and compared maternal and neonatal outcomes of women discussed at PASP compared with those that were not discussed in the program.
- Primary outcomes were maternal transfusion and NICU admission.
- Secondary outcomes included EBL, planned (vs unplanned) procedure, prenatal diagnosis of accreta spectrum, maternal and neonatal outcomes, and surgical complications.
- Data were analyzed using univariate and multivariable techniques

RESULTS

71 women had peripartum hysterectomy, of which 41 were discussed in PASP. 15 women who delivered after implementation of PASP did not participate, due to unplanned preterm delivery, transport from another hospital, or undiagnosed accreta. The figure demonstrates an example of the template used for women discussed in PASP. Table 1 details the baseline characteristics of women who underwent peripartum hysterectomy for placenta accreta spectrum. Table 2 describes the select maternal and neonatal outcomes in pregnancies with placenta accreta spectrum

The PASP group was more likely to have the following characteristics and outcomes:

prenatal diagnosis of previa or accreta spectrum	46.7% no PASP vs. 100% PASP, p<0.001
lower rates of transfusion	86.7% no PASP vs. 39.0% PASP, p<0.001
lower maternal ICU admission	60% no PASP vs. 34.2% PASP, p=0.03
higher NICU admission rate	53.6% no PASP vs. 85.4% PASP, p=0.004
lower median blood loss	2450 ml no PASP vs. 800 ml PASP, p=0.003
longer median surgical time	181.5 minutes no PASP vs. 289 minutes PASP, p<0.001

Surgical time was likely increased due to more frequent use of routine embolization and ureteral stents in the PASP group. After adjustment of potential confounders - planned (vs. unplanned) delivery and delivery after implementation of PASP in 2012, which may have influenced management of all women regardless of PASP status, PASP participation was still associated with a reduction in transfusion rate [AOR 0.14 (0.03,0.74), p=0.02].

A formalized, multidisciplinary approach for patients with placenta accreta spectrum may decrease the risk of maternal morbidity, including blood loss, transfusion, and ICU admission.

Table 1. Baseline characteristics of women with peripartum hysterectomy for placenta accreta spectrum

	No PASP N = 30	PASP N = 41	p value
Maternal age at delivery (years)[a]	35 (31, 38)	34 (30, 38)	0.62
Caucasian, n (%)	17 (56.7)	24 (58.5)	0.84
Multiparity, n (%)	29 (96.7)	40 (97.6)	0.82
Government insurance, n (%)	9 (30.0)	20 (48.8)	0.20
Body mass index (kg/m2)[a]	29.1 (23.4, 36.8)	29.1 (25, 32.7)	0.85
BMI ≥ 40, n (%)	2 (6.7)	5 (12.2)	0.44
Smoking, n (%)	4 (13.3)	6 (14.6)	0.75
Number of previous cesareans, n (%)			
0	11 (36.7)	5 (12.2)	
1	9 (30.0)	7 (17.1)	
2	6 (20.0)	12 (29.3)	0.02
3	3 (10.0)	11 (26.8)	
≥ 4	1 (3.3)	6 (14.6)	
Previous D&C, n (%)	9 (30.0)	17 (41.5)	0.32
Other previous uterine surgery, n (%)	23 (76.7)	41 (100.0)	0.001
Previous hemorrhage, n (%)	7 (23.3)	3 (7.3)	0.05
Assisted reproductive conception, n (%)	6 (20.0)	3 (7.3)	0.11
Pregestational diabetes, n (%)	2 (6.7)	0 (0)	0.09
Gestational diabetes, n (%)	4 (13.3)	4 (9.8)	0.64
Chronic hypertension, n (%)	0 (0)	1 (2.4)	0.39
Prenatal diagnosis of placenta accreta spectrum, n (%)	14 (46.7)	41 (100.0)	<0.001
Gestational age at diagnosis (weeks)[a]	27.7 (21.3, 34.4)	23.5 (20.0, 29.3)	0.08
Placenta previa, n (%)	14 (46.7)	34 (82.9)	0.001
Prenatal magnetic resonance imaging, n (%)	3 (10.0)	34 (82.9)	<0.001

[a]Data expressed as median (interquartile range)

Table 2. Select maternal and neonatal outcomes in pregnancies with placenta accreta spectrum

	No PASP N = 30	PASP N = 41	p value
Gestational age at delivery (weeks)[a]	36.2 (31.3, 38.5)	34.4 (34.0, 35.0)	0.02
Antenatal corticosteroids, n (%)	13 (43.3)	34 (82.9)	<0.001
Circumstances of peripartum hysterectomy, n (%)			
Planned*	6 (20.0)	24 (58.5)	0.001
Unplanned#	24 (80.0)	17 (41.5)	
Preoperative prophylactic procedures, n (%)			
Pelvic vasculature occlusion catheters	5 (16.7)	35 (85.4)	<0.001
Ureteric stent placement	8 (26.7)	37 (90.2)	<0.001
Articulating mechanical stapler for hysterotomy	1 (3.3)	8 (19.5)	0.04
Uterine incision, n (%)			
Low transverse	10 (33.3)	0 (0)	
Vertical/classical	12 (40.0)	34 (82.9)	<0.001
Other	1 (3.3)	7 (17.1)	
Not specified	7 (23.3)	0 (0)	
Total operative time (minutes)[a]	181.5 (156.0, 232.0)	289.0 (242.0, 340.0)	<0.001
Estimated blood loss (milliliters)[a]	2450 (1200, 4000)	800 (600, 1500)	0.003
Transfusion of any blood products, n (%)	26 (86.7)	16 (39.0)	<0.001
Surgical injury, n (%)			
Ureteral injury	1 (3.3)	1 (2.4)	0.96
Bladder injury	6 (20.0)	8 (19.5)	0.96
Maternal intensive care admission, n (%)	18 (60.0)	14 (34.1)	0.03
Number of days in ICU[a]	1 (1, 2)	1 (1, 1)	0.02
Neonatal birthweight (grams)[a]	2787.5 (2130, 3235)	2342.5 (2095, 2642.5)	0.03
Neonatal intensive care admission, n (%)	15 (50.0)	35 (85.4)	0.004

[a]Data expressed as median (interquartile range)
*Planned procedures took place as scheduled due to diagnosis of placenta accreta spectrum
#Unplanned procedures were performed earlier than originally scheduled due to bleeding/labor or due to undiagnosed placenta accreta spectrum

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TEMPLATE USED FOR MULTIDISCIPLINARY PLAN FOR PASP

Abnormal Placentation Template (plan meeting for around 28 weeks)
Plan of Care for
MRN:
EDC:

ISSUES
- Placenta accreta

CARE TEAM
- Obstetrics
- High Risk
- GYN oncology
- Interventional Radiology

ANTENATAL
- Admission for symptoms
- BMZ around 32 weeks (pending MFM recommendations)
- Consults
  - GYN oncology –
  - Interventional radiology –
  - Anesthesia -
  - NICU -
- MRI of pelvis WITHOUT gadolinium
- Optimize Hemoglobin (>11)
- Type and cross for 4 units
- Delivery in the Main OR at 34-35 weeks

SURGICAL PLAN
- To be scheduled in the Main OR on (date)
- Anesthesia – epidural to general anesthesia for hysterectomy – T4 level with anesthesia – to keep catheter for post-op pain control
- Patient position – Low lithotomy in Allen stirrups
- Urology – Cystoscopy with placement of ureteral catheters – 3-way foley to be placed following ureteral catheter placement
- Equipment
  - 5F open-ended ureteral catheters x 2
  - Sensor wire
  - 18F and 20F 3-way foley catheter
  - Rigid cystoscopy tray
- IR – to place femoral catheters
  - Equipment – IR will bring cart
- C-section (Primary surgeon – (name); assisted by (name and specialty)

- Midline vertical incision
- Anterior-fundal incision with goal of staying away from the placenta
- Baby passed to NICU – FOB to go with NICU to nursery
- Designated person to communicate with the family – Peri-op RN
- IR – Embolization
  - Equipment – IR will bring cart
- C-hysterectomy (Primary surgeon – GYN oncology with 1st assistant (name) and 2nd assist by (name)
  - Equipment
  - GYN oncology tray/Code crimson tray
  - Glassman clamps
  - Bookwalter retractor/Omni retractor
  - LigaSure Impact
- MICU/SICU for post-op care
  - Epidural catheter to be kept in place for post-op pain control

CONCLUSION

- A formalized, multidisciplinary approach for patients with placenta accreta spectrum may decrease the risk of maternal morbidity, including blood loss, transfusion, and ICU admission. In our study population, the discussion of women under the PASP program was associated with a reduction in transfusion rate [AOR 0.14 (0.03,0.74), p=0.02] after controlling for planned (vs. unplanned) delivery and whether the delivery took place after implementation of PASP in 2012.
- Surgical time was longer for women managed under the PASP program. This finding is likely explained by the more frequent use of prophylactic pelvic vasculature occlusion and ureteric stent placement in the PASP group.
- The creation of the program has led to the standardization in the management of patients with placenta accreta spectrum when prenatally diagnosed and has likely led to an increased awareness of the need for prenatal imaging, high index of suspicion while imaging women with known risk factors for placental invasion, and increased use of interdisciplinary services when managing women with risk factors. Additional data regarding the benefit of prenatal magnetic resonance imaging, prophylactic pelvic vasculature occlusion and ureteric stent placement are needed.
- The care of women with placenta accreta spectrum must take place using a multidisciplinary approach in a center capable of managing surgically complicated cases.

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