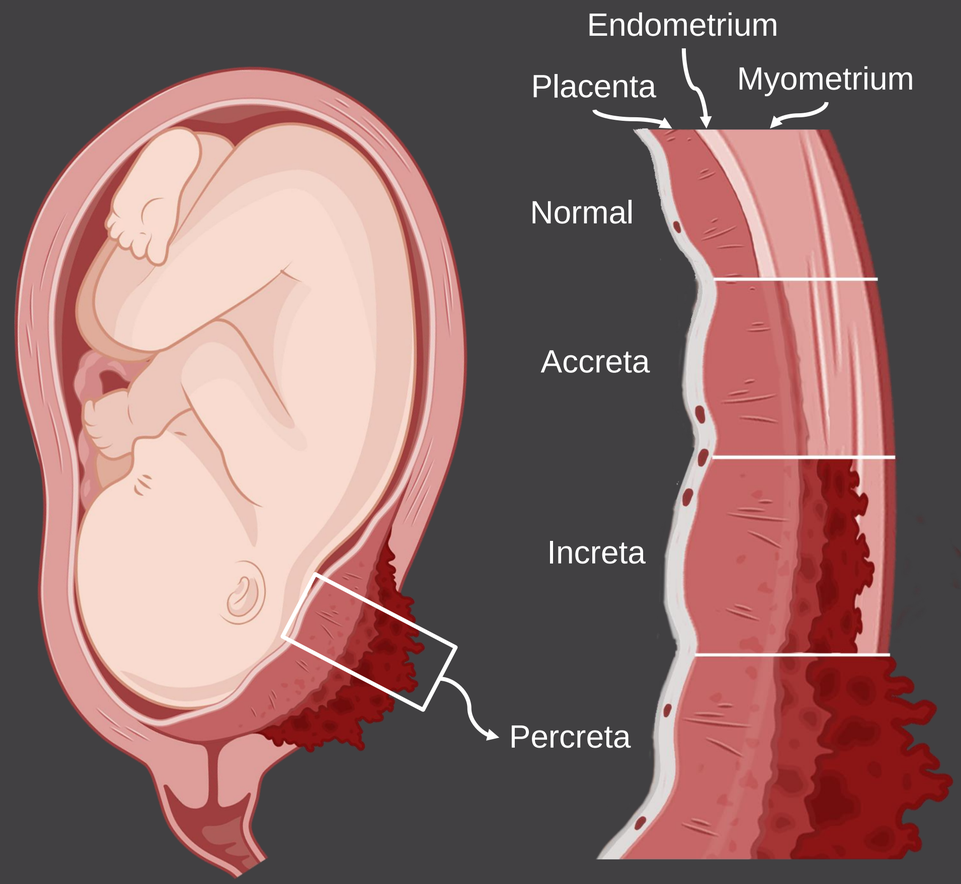
Perioperative and anesthetic management of placenta accreta spectrum at an academic center: a 11-year retrospective cohort study

Nicolas Muller MD; Anuja Mandavkar MBBS; Juan Pablo Ghiringhelli MD; Javiera Vargas MD; Mrinalini Balki MD
Department of Anesthesiology and Pain Medicine, Mount Sinai Hospital, University of Toronto

Sinai Health | Mount Sinai Hospital
Joseph & Wolf Lebovic Health Complex

Background

- Placenta Acreta Spectrum (PAS) disorder represents a significant global threat due its association with severe postpartum hemorrhage.
- The incidence of PAS disorder has been increasing over time from 1:2,510 in 1970s to 1:272 in 2000s.
- Multidisciplinary care with OB anesthesiologists, obstetricians, radiologists and neonatologists has shown to improve clinical outcomes.
- Prior studies at **Mount Sinai Hospital (MSH): 2000-2008 (n=23)[1] and 2009-2012 (n=50),[2]** predominantly employed neuraxial anesthesia and prophylactic balloons for hemostasis, with less perioperative complications and no difference in blood loss when compared to general anesthesia (GA).
- The obstetric and anesthesia practices at our hospital have evolved over time to further minimize blood loss and reduce complications. The changes include: abandonment of prophylactic IIA balloon occlusion, increased rates of C-hysterectomy, and routine use of cell saver.



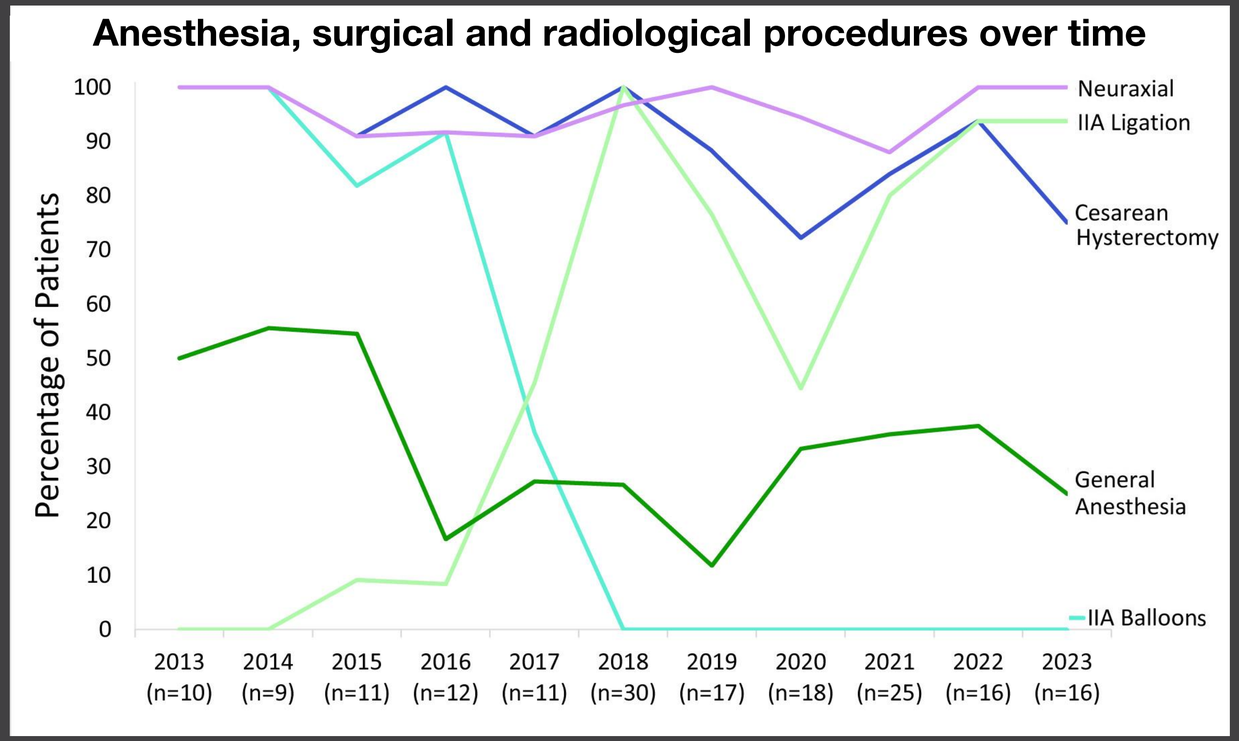
Objective: to determine the impact of surgical and anesthetic practice change over time on maternal outcomes.

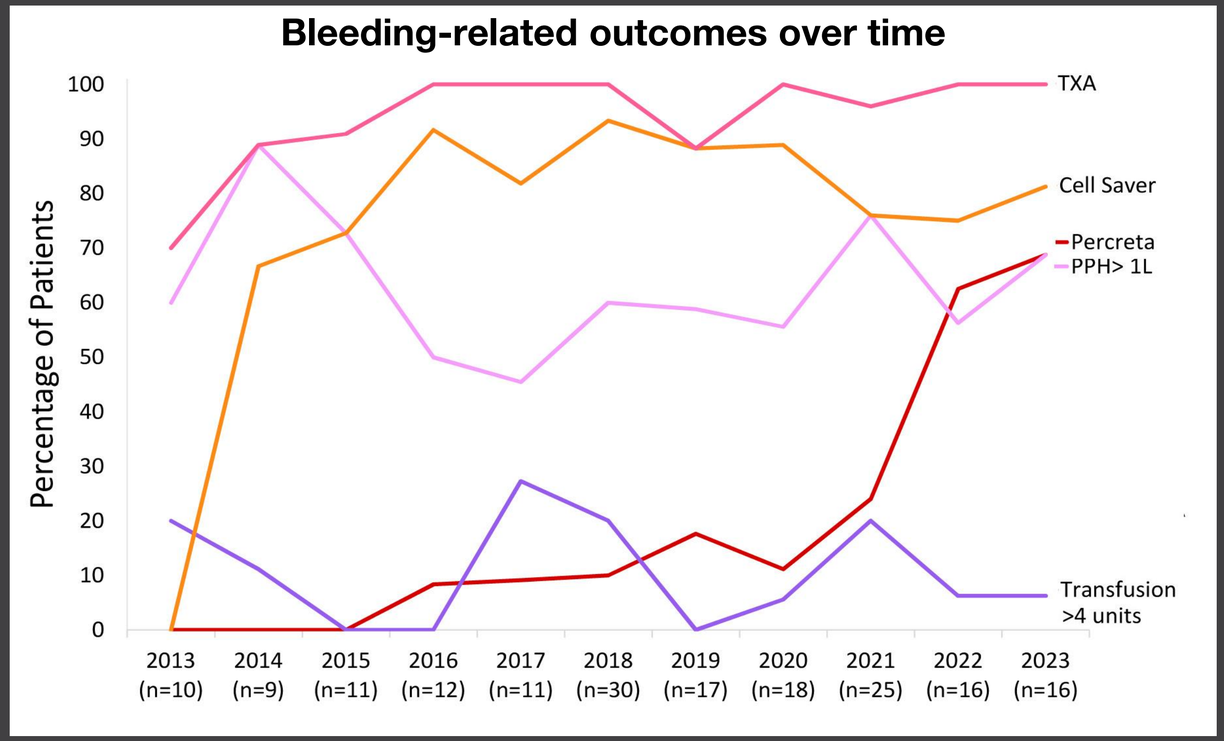
1. Lilker SJ et al. Int J Obstet Anesth 2011
2. Nguyen N et al. CJA 2016

using STATA 14.0

Methods

- Retrospective cohort study in patients with diagnosed PAS disorder at MSH from Jan 1, 2013 to Dec 31, 2023.
- Cases were identified through obstetric database. Data collected from Health Records: patient characteristics, mode of anesthesia, surgical approach, radiological strategy, blood loss, transfusion, postoperative pain management and complications.
- Continuous variables were summarized using mean (SD) or median (IQR) and categorical variables were expressed as frequencies (%). Statistical analysis included Fisher's exact test and logistic regression. Analyses performed using STATA 14.0.





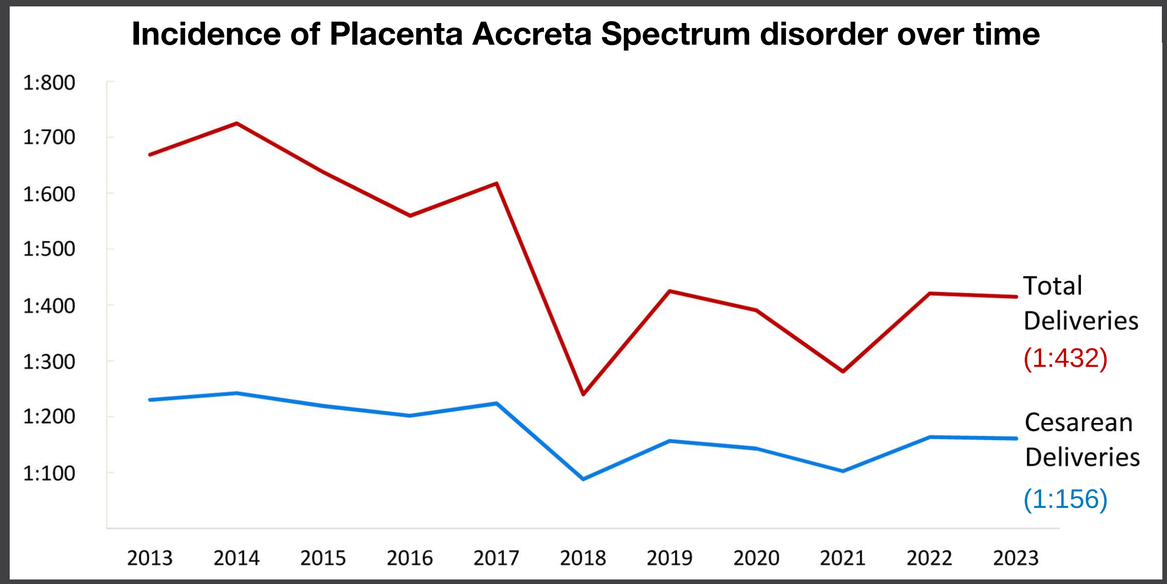
Sinai Health | Mount Sinai Hospital
Joseph & Wolf Lebovic Health Complex
Anesthesiology & Pain Medicine
UNIVERSITY OF TORONTO

N= number of patients with PAS

Results

- 175 patients with PAS ➡ 21% had percreta and 92% had associated placenta previa
- Age: Mean (SD) 36 (5) years, BMI (median IQR]: 27 [23-31] kg/m^2 , gestational age 35 [34-36] weeks
- Considering the change in surgical technique after 2017, data were stratified in two time periods.

Surgical and anesthetic management	2013-2017 (n=53)	2018-2023 (n=122)	P value*
Unscheduled surgery, n (%)	7/53 (13)	97/121 (19)	0.39
Cesarean Hysterectomy, n (%)	51/53 (96)	106/121 (88)	0.09
Internal iliac artery balloon, n (%)	43/53 (81)	0/122 (0)	<0.01
Internal iliac artery ligation, n (%)	7/50 (14)	100/121 (83)	<0.01
Neuraxial anesthesia, n (%)	49/52 (94)	116/121 (95)	0.70
Low-thoracic Epidural, n (%)	5/48 (9.6)	63/114 (54)	<0.01
General anesthesia, n (%)	21/52 (40)	35/110 (32)	0.29
Conversion to GA, n (%)	15/53 (28)	35/122 (29)	0.55
PCEA (hours)	18 [15-19.5]	19 [17-21]	0.03
Resuscitation			
Estimated blood loss (ml)	1400 [835-2000]	1400 [800-2500]	0.91
Cell saver used, n (%)	34/53 (64)	103/119 (86)	<0.01
Crystalloids (ml)	3450 [3000-4000]	3500 [2993-4750]	0.43
Colloids, n (%)	10/53 (19)	5/122 (4.1)	<0.01
Intraoperative Packed RBC, n (%)	22/53 (42)	46/122 (38)	0.73
Intraoperative Packed RBC (units)	2 [0-3]	0 [0-2]	<0.01
Fresh Frozen plasma, n (%)	13/53 (25)	5/122 (4.1)	0.82
Platelets, n (%)	4/53 (7.5)	9/122 (7.4)	0.95
Cryoprecipitate, n (%)	5/53 (9.4)	4/122 (3.3)	0.13
Fibrinogen, n (%)	0/53 (0)	9/122 (7.4)	0.06



Complications	2013-2017 (n=53)	2018-2023 (n=122)	p-value*
Bladder injury, n (%)	9/53 (17)	15/122 (12)	0.47
Vascular/hematological, n (%)	2/53 (4)	5/120 (4)	0.63
Thromboembolic, n (%)	0/53 (0)	1/120 (0.8)	0.69
Fever, n (%)	4/53 (8)	5/93 (5)	0.42
Reoperation, n (%)	4/53 (8)	0/91 (0)	0.02
ICU admission, n (%)	4/51 (7.8)	6/122 (4.9)	0.59

Discussion

Surgical Considerations

- The rate of C-hysterectomy was high (90%) in our cohort. After 2017, none of the patients had prophylactic IIA balloons placed, however, IIA ligation was done in all cases.
- Median EBL was 3500 ml, with 39% requiring blood transfusion. The use of cell saver was high in post-2017 period. Quantity of RBC transfusion decreased in the second period, likely due to cell saver availability.
- The change in surgical techniques did not affect patient outcomes including transfusion or complication rates. None of the patients required re-operation post-2017.
- Advanced strategies can be safely employed even with increasing complexity in patients with PAS.

Anesthetic Considerations

- Neuraxial anesthesia continues to be increasingly used as the primary modality in patients with PAS (95%), with a conversion rate to GA being 29% (mainly due to intraoperative bleeding or pain).
- GA was associated with a higher rate of blood transfusion than no GA [OR 7, 95% CI 3-16; $p<0.01$].
- About 67% patients required opioids for up to 48 hrs post-delivery. PCEA use was higher post-2017.
- Our findings support previous studies with the safety of neuraxial, and the use of GA limited to critical cases or intraoperative bleeding.