Resolved but not forgotten: Does a diagnosis of resolved placenta previa affect labor management?

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Background

- Placenta previa (PP) is diagnosed in 1 to 15% of pregnancies
- It persists in only 0.5% of pregnancies at term
- Resolved placenta previa (RPP) diagnosed if the placental edge is >2cm from the internal cervical os
- Risk factors for PP include previous cesarean delivery, AMA, multiparity, smoking and infertility treatments
- PP can lead to life threatening hemorrhage and adverse neonatal outcomes including fetal growth restriction
- Paucity of literature studying the outcomes of pregnancies of RPP

Objective

- We aim to examine patients with RPP to determine if abnormal placentation at any time during pregnancy is associated with adverse events during labor.

Study Design

- Retrospective cohort study between March 2018 to Jul 2020
- Inclusion criteria: diagnosis of RPP
- Exclusion criteria: persistent PP, multifetal gestation, prior cesarean delivery, placenta accreta spectrum disorder.
- Time matched controls randomly identified among patients with normal placentation.
- **Primary outcome**: fetal distress requiring cesarean delivery or operative vaginal delivery
- **Secondary outcomes**: antepartum admission, post-partum hemorrhage, use of uterotonics, composite of neonatal adverse outcomes
- Analysis: Student t-test, Wilcoxon rank-sum test, Chi-square, Fisher exact test, Univariable and Multivariable logistic regression as appropriate

Results

Table 1. Maternal Characteristics

	Resolved Placenta Previa (n=275)			Normal Placentation (n=280)			P-Value
	N	Mean ±SD	Range	N	Mean ±SD	Range	
Maternal age (years)	275	34.3 ± 4.8	20-54	280	32.8 ± 5.2	19-48	<0.01
Pre-pregnancy BMI (kg/m2)	247	24.1 ±4.6	16.1-50	203	25.2 ± 5.9	17.5-70	0.02
	N	Median (IQR)	Range	N	Median (IQR)	Range	
Gravidity	275	2 (1-3)	1-13	280	2 (1-3)	1-7	0.43
Term Births*	112	1 (1-2)	1-3	97	1 (1-2)	1-5	0.66
Preterm Births*	16	1 (1-1)	1-2	9	1 (1-1)	1-2	0.96
Abortions*	109	1 (1-2)	1-8	107	1 (1-2)	1-4	0.06
Living Births*	122	1 (1-2)	1-4	97	1 (1-2)	1-6	0.69
	No. (%)			No. (%)			
Race/Ethnicity**							0.60
Asian	35 (12.7)			42 (15.0)			
Native Hawaiian/Pacific Islander	0 (0)			1 (0.4)			
Black or African American	23 (8.4)			30 (10.7)			
White	150 (54.6)			144 (51.4)			
Current Smoker	5 (1.8)			0 (0)			0.03
Use of ART	29 (10.6)			13 (4.6)			<0.01
History of Placenta Previa	3 (1.1)			2 (0.7)			0.68
Previous Uterine Surgery							
Any	88 (32)			55 (19.6)			<0.01
Myomectomy	6 (2.2)			1 (0.4)			0.07
D&C	66 (24)			43 (15.4)			0.01
Hysteroscopy	11 (4)			5 (1.8)			0.12
Laparoscopy	13 (4.7)			4 (1.4)			0.02
Other	9 (3.3)			5 (1.8)			0.26

**23.4% of race/ethnicity data is missing

Table 2. Primary and Secondary Outcomes

	Resolved Placenta Previa (n=275)	Normal Placentation (n=280)	Resolved PP vs. Normal Placentation			
	No. (%)	No. (%)	Crude OR (95% CI)	P-Value	Adjusted OR (95% CI)*	P-Value
Operative Delivery for Fetal Distress	40 (14.6)	35 (12.5)	1.2 (0.7-1.9)	0.48	1.3 (0.8-2.1)	0.32
Antepartum Admission	14 (5.1)	11 (3.9)	1.3 (0.6-2.9)	0.51	1.5 (0.7-3.2)	0.35
Postpartum Hemorrhage	28 (10.2)	6 (2.1)	5.2 (2.1-12.7)	<0.01	5.1 (2.1-12.0)	<0.01
Use of Uterotonics	47 (17.1)	16 (5.7)	3.4 (1.9-6.2)	<0.01	3.5 (1.9-6.4)	<0.01
Fetal Heart Rate Tracing Category**						
Category I	171 (64)	172 (62.3)	Ref.	Ref.	Ref.	Ref.
Category II/III	96 (36)	104 (37.7)	0.9 (0.7-1.3)	0.68	1.0 (0.7-1.4)	0.92
Neonatal Adverse Outcomes						
Neonatal RDS/TTN	15 (5.5)	15 (5.4)	1.0 (0.5-2.1)	0.96	1.0 (0.5-2.0)	0.92
Neonatal HIE	0 (0)	0 (0)	-	-	-	-
Neonatal Hypoglycemia	20 (7.3)	18 (6.4)	1.1 (0.6-2.2)	0.69	1.1 (0.5-2.1)	0.83
Neonatal mortality	2 (0.7)	0 (0)	-	-	-	-

*Adjusted for advanced maternal age, nulliparity, smoking, previous uterine surgeries, history of placenta previa, and history of ART.

**2.2% of fetal heart rate tracing category data are missing

Results

- A total of 8,881 US were performed, 560 with PP, 275 identified as RPP, 285 excluded.
- RPP patients were significantly older with lower pre pregnancy BMI.
- Patients with RPP were significantly more likely to be a current smoker, have used assisted reproductive technology, have had previous uterine surgeries
- Patients with RPP were 5.2 times more likely to have a PPH (OR 5.2, 95% CI 2.1-12.7; p<0.01) and 3.4 times more likely to require extra uterotonic medications (OR 3.4, 95% CI 1.9-6.2; p<0.01)
- As the placental edge gets farther away from the os at resolution, the risk of PPH decreases (OR 0.9, 95% CI 0.9-1.0; p=0.03).
- There is no difference with regards to rates of operative delivery or cesarean delivery for fetal distress (OR 1.2, 95% CI 0.7-1.9; p=0.48), or Cat II/III fetal heart tracing around the time of delivery.

Conclusions

- Patients with RPP had a higher rate of PPH and use of uterotonic agents.
- They were also more likely to have similar underlying risk factors of patients with persistent PP.
- This information might have important clinical implications and could be incorporated into the hemorrhage risk assessment during labor.