Title: Prior spontaneous preterm birth: Subsequent pregnancy outcomes among women with PPROM vs spontaneous preterm labor

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Objective: Women with a history of spontaneous preterm birth (sPTB) are at an increased risk for recurrent preterm birth. Preterm premature rupture of membranes (PPROM) and spontaneous preterm labor (sPTL) have potentially varying mechanisms and etiopathogenesis. The objective of our study was to evaluate the differential impact of history of PPROM vs sPTL on subsequent pregnancy management and perinatal outcomes.

Study Design: Retrospective review of women delivering at a single hospital from July 2018-November 2019 to identify women with a history of sPTB of singleton gestations. The cohort was divided into two groups based on a history of sPTL vs PPROM. Demographic data, pregnancy management, and perinatal outcomes were abstracted through a review of electronic medical records and compared across the 2 groups using student's t test and chi squared/Fischer's exact test for continuous and categorical data respectively.

Results: Out of 2,803 women, 168 women had a history of sPTB: 125 (74%) with a history of sPTL and 43 (23%) with a history of PPROM. Demographic characteristics were similar across groups. We found no significant differences in the pregnancy interventions (Table 1) and perinatal outcomes (Table 2) among study groups. Subgroup analyses were performed evaluating the impact of vaginal vs IM progesterone. While there were no significant differences noted in women with a history of PPROM, differences were noted among women with a history of sPTL. Women who received IM progesterone had longer cervical lengths (mean ± SD) [36.3mm ± 4.4; N=21 vs 20.5 ± 12.2; N=18 $p<0.001$] and delivered at a later gestational age (mean ± SD) (37.2 ± 1.6 weeks; N=28 vs 34.7 ± 5.6 weeks; N = 23) as compared to women receiving vaginal progesterone.

Conclusions: In our cohort, similar outcomes were noted in subsequent pregnancies among women with history of PPROM and sPTL. However, subgroup analyses in women with a history of sPTL suggest a potential benefit of IM progesterone. Further research in a larger cohort is warranted to delineate the differential impact of the history of sPTB in the context of PPROM vs sPTL.

Table 1. Maternal Demographics and Pregnancy Interventions with History of PPROM (N=43) and Spontaneous PTL (N=125).

Maternal Demographics	History of PPROM (43)	History of sPTB (125)	P-value
Age	31.7 years	30.2 years	0.10
Parity	2	2	0.70
Number of prior PTBs	1	2	0.053
Smoking			0.65
Yes	30.2% (N=13)	34.7% (N=43)	
No	65.1% (N=38)	57.3% (N=71)	
Former	2.3% (N=1)	6.5% (N=8)	
Substance use			0.58
Yes	18.6% (N=8)	25.8% (N=32)	
No	76.7% (N=33)	66.1% (N=82)	
Former	2.3% (N=1)	5.7% (N=7)	
Received Vaginal Prog	18.6% (N=8)	18.4% (N=23)	0.98
Received IM Prog	20.9% (N=9)	27.2% (N=34)	0.42
Received a Cerclage	11.63% (N=5)	16.13% (N=20)	0.59
GA at cerclage (weeks)	13.4	16.5	0.10
Received a TVU-CL	62.79% (N=27)	46.40% (N=58)	0.15
# of TVU screens	3	3	0.67
GA at first TVU	18.2	18.1	0.93
Shortest CL (mm)	31.4	30.5	0.73
Received ANCS	34.88% (N=15)	33.33% (N=41)	0.83

Table 2. Pregnancy outcomes for patients with history of PPROM (N=43) and spontaneous PTL (N=125).

Outcomes	History of PPROM	History of sPTL	P value
Experienced rPTB	37.21% (N=16)	38.40% (N=48)	0.83
GA at delivery (weeks)	32.4	31.1	0.38
Mode of delivery			0.42
Vaginal	60.5% (N=26)	68.0% (N=85)	
Cesarean	34.9% (N=15)	30.4% (N=38)	
Instrumental	4.65% (N=2)	1.60% (N=20)	
NICU admission	34.88% (N=15)	33.06% (N=41)	0.94