

Introduction

Traditionally, mothers diagnosed with PPROM (preterm premature rupture of membranes) between 34w0d to 36w6d had immediate delivery. However, newly developed research has shown potential benefit to expectant management through delaying delivery until 37 weeks to reduce adverse neonatal outcomes. Our research showing a lower percentage of respiratory distress, mechanical ventilation, and/or length of NICU stay in expectant management can greatly impact neonatal care. Additionally, this can form a new standard in guidelines on how to manage mothers diagnosed with PPROM between 34w0d to 36w6d.

Aims and Objectives

This research project seeks to determine if there is a higher percentage of adverse neonatal outcomes in neonates born to mothers diagnosed with Preterm Prelabor Rupture of Membranes (PPROM) between 34w0d to 36w6d in immediate delivery vs delayed delivery up to 37 weeks. We anticipate that there will be a higher percentage of adverse neonatal outcomes in neonates born to mothers who had a diagnosis of PPROM and immediate delivery between 34-37 weeks vs. delayed delivery until 37 weeks at our institution. Based on the issuing of a practice bulletin proposed in March 2020 by the American College of Obstetrics (ACOG), we want to determine if the adjustment from immediate delivery of neonates born to mothers with PPROM at 34 weeks gestation to offering expectant management between 34-37 weeks gestation decreases the percentage of adverse neonatal outcomes at our institution. (7)

The specific aim for this project is as follows:

To perform a retrospective medical chart review comparing percentage of adverse neonatal outcomes of neonates born to mothers who had a diagnosis of PPROM and immediate delivery between 34-37 weeks gestation at our institution vs. delayed delivery until 37 weeks gestation.

Based on the practice bulletin proposed in March 2020 by ACOG (7), we will be comparing the following variables between immediate delivery and expectant management related to adverse neonatal outcomes: rates of respiratory distress, rates of mechanical ventilation, and length of NICU stay.

The results of this study will contribute to evidence that affects health outcomes of neonates born to mothers diagnosed with PPROM between 34w0d to 36w6d. Additionally, this study will either confirm or deny if the new guideline to offer expectant management to mothers diagnosed with PPROM between 34w0d to 36w6d results in lower neonatal adverse outcomes when compared to immediate delivery, specifically at our institution.

Methods

The study was a retrospective chart review design using a sample of neonates born to mothers diagnosed with PPROM between 34w0d to 36w6d comparing the following variables of outcomes between neonates born to mothers who had immediate delivery vs expectant management: rates of respiratory distress, rates of mechanical ventilation, and length of NICU stay. We decided to perform a retrospective study rather than a prospective study due to time feasibility. Additionally, the time selected was after the publication of the ACOG practice bulletin in March 2020 and we feel it is a reasonable timeframe to be able to provide adequate results.

We enrolled participants from a sample of neonates born to mothers diagnosed with PPROM between 34w0d to 36w6d from January 1 2020 to November 13, 2023 at Corewell Health William Beaumont University Hospital. We chose this institution as it is a provider of both neonatal and OBGYN care with high volume of patients to adequately cover our sample population.

We then compared the following variables of adverse neonatal outcomes between neonates born to mothers who had immediate delivery vs expectant management: rates of respiratory distress, rates of mechanical ventilation, and length of NICU stay.

SharePoint folder was created and a variable list was sent to Corewell Programmer, Shirley Qu, who pulled data from EPIC and uploaded to SharePoint folder. Additionally, the database was only accessed on computers that were username and password-protected. OWUB statistician, Jacob Keeley created a separate folder within the SharePoint containing a Master List linking MRN/Study ID. We worked with Jacob Keeley to provide descriptive statistics, specifically comparing the percentages of the described variables between the immediate delivery vs expectant management group.

Results

Our data collection revealed a higher rate of respiratory distress in expectant management (36.0%) vs immediate delivery (15.9%), longer length of NICU stay in expectant management (1 day) vs immediate delivery (0.38 day), and higher rate of mechanical ventilation in expectant management (31.8%) vs immediate delivery (18.5%).

	Expectant Management		Total (N=490)	P-value
	NO (N=465)	YES (N=25)		
ANY RESPIRATORY DISTRESS, n (%)				0.0233 ¹
0	391 (84.1%)	16 (64.0%)	407 (83.1%)	
1	74 (15.9%)	9 (36.0%)	83 (16.9%)	
MECHANICAL VENTILATION, n (%)				0.1584 ¹
Absent	265 (81.5%)	15 (68.2%)	280 (80.7%)	
Present	60 (18.5%)	7 (31.8%)	67 (19.3%)	
Missing	140	3	143	
NICU Stay, n (%)				<.0001 ²
0	299 (64.3%)	0 (0.0%)	299 (61.0%)	
1	166 (35.7%)	25 (100.0%)	191 (39.0%)	
Days in NICU				0.0022 ³
N	166	25	191	
Missing	299	0	299	
Median (IQR)	5.8 (1.3, 10.5)	9.2 (6.7, 14.2)	6.3 (1.9, 10.9)	
Mean (SD)	7.9 (9.59)	10.8 (5.85)	8.3 (9.23)	
Range	0.0, 60.7	0.5, 24.1	0.0, 60.7	

Conclusions

It is important to note that there were only 25/490 mothers diagnosed with PPROM between 34w0d and 36w6d that elected to have expectant management. This indicates that there was not a great comparison of neonatal adverse outcomes born to mothers with diagnosis of PPROM between 34w0d and 36w6d expectant management (25) vs. immediate delivery (465). Our data collection revealed a higher rate of respiratory distress in expectant management (36%) vs immediate delivery (16%) p value 0.0233, longer length of NICU stay in expectant management (1 day) vs (0.38 day) p value <0.001, and higher rate of mechanical ventilation in expectant management (31.8%) vs immediate delivery (18.5%) p value 0.1584. These findings go against our initial hypothesis of a lower percentage of respiratory distress, mechanical ventilation, and/or length of NICU stay in expectant management. All data was deemed to be statistically significant with the exception of higher rate of mechanical ventilation in the expectant management group considering p value was >0.05. One limitation of this study was the uneven distribution of the expectant management vs. immediate delivery group. It is also worth considering immediate delivery is indicated if there is evidence of intraamniotic infection, abnormal fetal testing, and/or vaginal bleeding suggesting abruptio placentae (8), further contributing to the increased amount of women in the immediate delivery group.

Additionally, at least ½ of patients deliver within 1 week of membrane rupture regardless of obstetrics management. This is important to note because depending on timing of PPROM diagnosis, and if the neonate was born prior to 37 weeks, there is an increased risk of higher rates of respiratory distress, mechanical ventilation, and longer NICU stay. This could be contributing to the increased rates of respiratory distress, mechanical ventilation, and longer NICU stay in the expectant management group compared to the immediate delivery group.

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Acknowledgements

Thank you to my embark mentor Dr. Kaur, biostatistician Dr. Jacob Keeley, Dr. Shirley Qu, Dr. Tracy Wunderlich-Barillas, and Dr. Dwayne Baxa.