Section: Obstetrics and Gynecology

Original Research Article

ACTIVE VERSUS EXPECTANT MANAGEMENT OF TERM PROM: A COMPARATIVE STUDY OF FETOMATERNAL OUTCOMES

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ABSTRACT

Background: Premature rupture of membranes (PROM) at term is a common obstetric complication that requires careful management to optimize fetomaternal outcomes. This study aims to compare active and expectant management strategies in term PROM cases and their impact on maternal and neonatal health.

Materials and Methods: A prospective comparative observational study was conducted in the Department of Obstetrics and Gynaecology at General Hospital, Jayanagar, Bengaluru, from September 2019 to February 2021. A total of 190 pregnant women with term PROM were randomized into two groups: Group A (expectant management) and Group B (active management). Data were analyzed for maternal and neonatal outcomes, including delivery mode, PROM-to-delivery interval, APGAR scores, NICU admissions, and infection rates.

Results: The mean age of participants was comparable between groups. Group A had a higher proportion of full-term vaginal deliveries (81.1%) compared to Group B (70.5%), though not statistically significant. The PROM-to-delivery interval was significantly shorter in Group B (p=0.02). Neonatal sepsis and maternal pyrexia rates were slightly higher in the expectant group but did not reach statistical significance. Active management showed a trend toward reducing prolonged PROM-related complications.

Conclusion: Both active and expectant management strategies have merits in term PROM. Active management reduces the PROM-to-delivery interval and may lower the risk of infection, while expectant management does not significantly increase adverse outcomes. Individualized care based on maternal and fetal conditions is essential.

Keywords: Premature rupture of membranes (PROM), APGAR scores, NICU admissions, PROM-to-delivery.

INTRODUCTION

PROM is defined as membrane rupture at any time prior to the onset of regular uterine contractions occurring at least every 10mins and unaccompanied by cervical dilatation and effacement.[1]

Kilbride (2001) defined Prolonged rupture of membrane (PROM) as rupture of membrane lasting more than 18 hours before labor, is found in approximately 8%-10% of all pregnancies.[2]

Fujimoto (1995) used the term high leak to describe loss of amniotic fluid caused by a tear in the membranes located above the lower uterine segment

ACOG (2018) PROM is defined as rupture of membranes before the onset of labour at or after 37 weeks of gestation.

PROM refers to the loss of membrane integrity, which results in the leakage of amniotic fluid before the labor onset. It creates a communication between amniotic cavity and endocervical canal and vagina [3]. This happens when the intrauterine pressure overcomes resistance of membranes. This weakens

the membranes resulting due to various factors below:

- Congenital or Acquired (Smoking and Vitamin C deficiency)
- Mechanical factor (Amniocentesis or amnioscopy)
- Physical factor– Chemical damage (Trichomonas, Group B Streptococci, Bacterial vaginosis)
- Etiological Factors (Overdistended uterus, Big baby, Polyhydramnios and multiple pregnancy).[4]

Premature rupture of membranes may occur due to several complications of pregnancy. It may be due to gestational hypertension, malformation of uterus, blunt trauma of uterus and some other external factors like drop in barometric pressure or sexual inter course. Lack of mechanical support like cervical dilatation also leads to PROM which causes bacterial contamination also. The interesting fact is that PROM can be a physiological variation rather than a pathological event.

Gunn, mishell.et.al (1970) have revealed that labour begins with presence of fetal membrane in most of the pregnancies. Until 8cm of cervical dilatation the membranes remain intact without intervention in most of the cases. The pressure required for the rupture of fetal membrane is generally more than the pressure generated by normal labour. But the clinical entity for membrane rupture even with undilated cervix and absence of uterine contractions at bed rest is not perfectly explained. Hence a number of theory have been suggested to explain its cause.[5] Risk factors of neonatal sepsis includes histologic evidence of inflammation of chorionic plate, APGAR score of <6 in 5 mins and clinical amnionitis. The first manifestation of impending fetal infection is non-reactive NST and absence of fetal breathing movements.

Volume of amniotic fluid which remains after PROM into the amniotic cavity possess antibacterial activity. Hannah.et.al have stated that usually the neonatal sepsis presents with apnea, poor vigorous sucking, temperature instability, respiratory distress, diarrhea, vomiting, abdominal distension, seizures, jaundice, septicemia, meningitis, pneumonia, pyoderma, umbilical sepsis, conjunctivitis.[6]

One of the risk factor for early-onset neonatal sepsis is PROM. A retrospective study of neonates more than 34 weeks were taken into study by Al-Lawama, M. et al. (2019).[7]

Most of the patients(80-90%) will set into labor within 24hours of rupture. Though the expectant management will not increase perinatal mortality rate it may also be the choice of management. To prevent infection repeated vaginal examination is to be avoided and sterile speculum examination is to be done. Munson.et.al said that the vaginal examination is completely avoided in latent period and minimized during active phase, A delivery of atleast 12 hrs can be allowed for a women with PROM to reach active labor spontaneously and their progress of labor can be enhanced.[8]

MATERIALS AND METHODS

Study Area and Duration: The study was conducted in the Department of Obstetrics and Gynaecology at General Hospital, Jayanagar, Bengaluru, Karnataka, from September 2019 to February 2021.

Study Design: Prospective comparative observational study.

Sample Size: A total of 190 pregnant women with term PROM were included.

Inclusion Criteria

- Singleton pregnancy with cephalic presentation
- Gestational age between 37 and 41 completed weeks
- Spontaneous PROM confirmed clinically
- Admission to labor room within 6 hours of PROM
- No previous cesarean section

Exclusion Criteria

- PROM before 37 weeks
- Chorioamnionitis or meconium-stained liquor
- Obstetric or medical complications (e.g., diabetes, heart disease)

Study Groups:

- **Group A (Expectant Management):** Observed for spontaneous labor for 24 hours.
- **Group B (Active Management):** Induction of labor within 6 hours using intracervical PGE2 gel.

Methodology: Women were randomized using a computer-generated table. All participants received prophylactic antibiotics (Cefotaxime and Metronidazole). Labor was monitored with a partogram, and maternal and neonatal outcomes were recorded. Data analysis was performed using SPSS version 20.

RESULTS

Table 1: Mean age of study participants

		Mean	Std. Deviation
Groups	**Group A**	26.11	3.838
	Group B	24.01	3.187

Table 1: The mean age group in expectant group is 26.11±3.838 and in active management group it is 24.01±3.187. [Table 1]

Table 2: Mode of delivery of study groups

Mode of Delivery			FTVD	LSCS	Instrument delivery	Total
Groups	Group A	N	77	16	2	**95**
		%	81.1%	16.8%	2.2%	**100.0%**
	Group B	N	67	23	5	**95**
		%	70.5%	24.2%	5.3%	**100.0%**

P value=0.29 (based on chi-square test)

Table 2: shows the mode of management of participant in my study. The proportion of the participants in my study were randomly selected and 50% were managed by expectant and 50% by active management. The proportion of the participant who underwent FTVD were 81.1%, LSCS were 16.8% and instrumental delivery were 2.2% in expectant group. In active group 70.5% delivered through FTVD, 24.2% by LSCS and 5.3% were through instrumental delivery. There is no significant difference between the groups. [Table 2]

Table 3: PROM to Delivery Interval (Hrs)

			PROM TO DELIVERY INTERVAL (Hrs)				Total
			<6	7-12	13-24	>24	
Groups	Group A	N	13	62	13	7	95
		%	13.7%	65.3%	13.7%	7.4%	100.0%
	Group B	N	28	55	10	2	95
		%	29.5%	57.9%	10.5%	2.1%	100.0%
Total		N	41	117	23	9	190
		%	21.6%	61.6%	12.1%	4.7%	100.0%

P value=0.02

Table 3: shows data on PROM to delivery interval calculated in hours. Patients who delivered in <6 hours of PROM were found to be 13.7% in expectant management and 29.5% in active management of labor. Whereas 65.3% and 57.9% where delivered in 7 to 12 hours interval in expectant and active management respectively. While few who delivered in 13-24 hours were 13.7% and 10.5% in expectant and active management of labor respectively. Whilst Expectant mothers recorded highest with 7.4% with a duration of more than 24 hours. There is statistically significant difference between the groups. (P value=0.02 <0.05).

Table 4: Distribution according to mean APGAR score

		Mean	Std. Dev	Minimum	Maximum	P value
1 min	Group A	7.65	0.943	5	9	0.28
	Group B	7.51	0.955	5	9	
5 min	Group A	8.55	0.561	7	9	0.1
	Group B	8.40	0.675	6	9	

Table 4: Mean APGAR score at 1 and 5 min among expectantly and actively managed patients in this study. Mean APGAR score at 1 minute among expectantly and actively managed cases were 7.65±0.943 and 7.51±0.955 with p value of 0.06 and APGAR score at 5minute among expectantly and managed patients were 8.55±0.561 and 8.40±0.675 with p value of 0.1. There is no significant difference between the groups.

Table 5: NICU Admission

			NAD	Yes-Asphyxia	Yes-Meconium	Yes-RDS	Total
Groups	Group A	N	89	1	4	1	95
		%	93.7%	1.1%	4.2%	1.1%	100.0%
	Group B	N	84	2	6	3	95
		%	88.4%	2.2%	6.3%	3.2%	100.0%

P value=0.63 (based on chi-square test)

Table 5: The indication for NICU admission are Asphyxia is 1.1%, meconium is 4.2% and RDS is 1.1% in expectant group whereas in actively managed group is 2.2% Asphyxia, 6.3% of meconium and 3.2% of RDS in actively managed group. There is no statistically significant difference between in the groups. (p>0.05).

Table 6: Neonatal SEPSIS

			NEONATAL SEPSIS		Total
			No	Yes	
Groups	Group A	N	86	9	95
		%	90.5%	9.5%	100.0%
	Group B	N	90	5	95
		%	94.7%	5.3%	100.0%
Total		N	176	14	190
		%	92.6%	7.4%	100.0%

P value=0.26 (chi-square test)

Table 6: Shows association between neonatal sepsis of the study participants and labor management. Out of total case the incidence of neonatal sepsis 9.5% where from expectant group and 5.3% were from active management group. There is no statistically significant difference between the groups(p>0.05)

Table 7: Maternal Pyrexia

			PYREXIA		Total
			No	Yes	
Groups	Group A	N	86	9	95
		%	90.5%	9.5%	100.0%
	Group B	N	91	4	95
		%	95.8%	4.2%	100.0%
Total		N	177	13	190
		%	93.2%	6.8%	100.0%

P value=0.51 (based on chi-square test)

Table 7: Shows association between maternal pyrexia of the study participants and labor management. Out of total case the incidence of maternal pyrexia 9.5% and 4.2% were from expectant group and actively managed group respectively. There is no statistically significant difference between the groups (p>0.05).

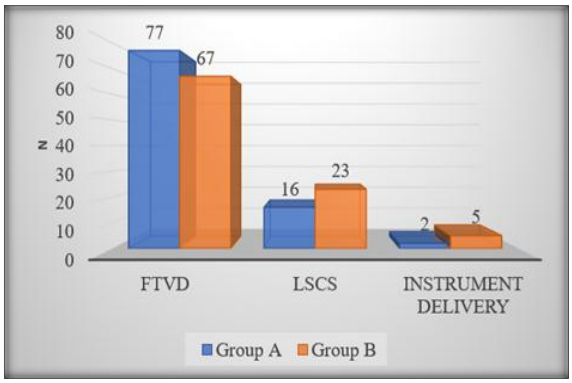

Figure 1: Mode of delivery of study groups

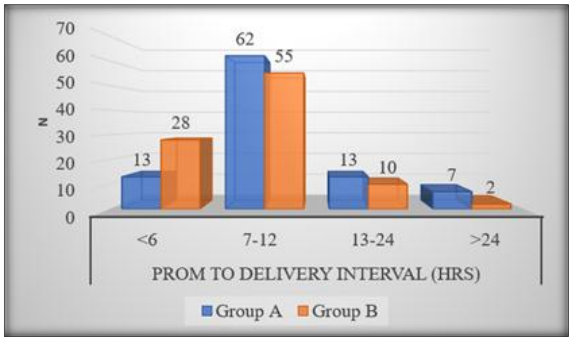

Figure 2: PROM to delivery interval (HRS)

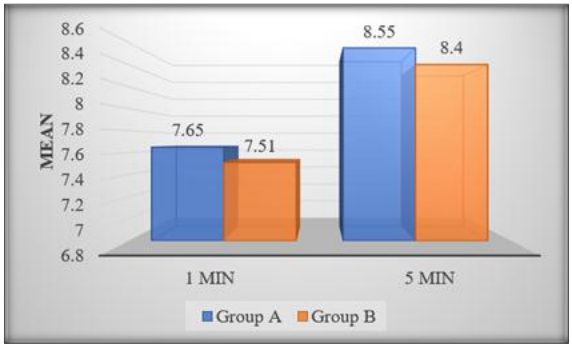

Figure 3: APGAR score at 1 minute and 5 minute

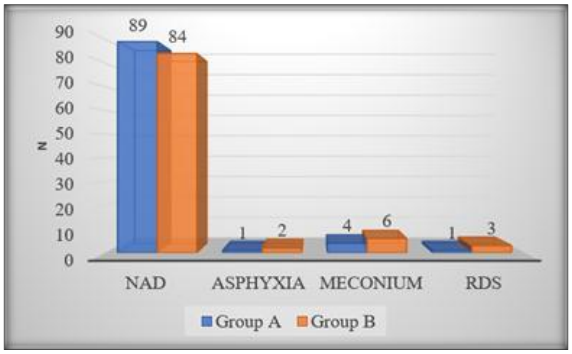

Figure 4: NICU Admission

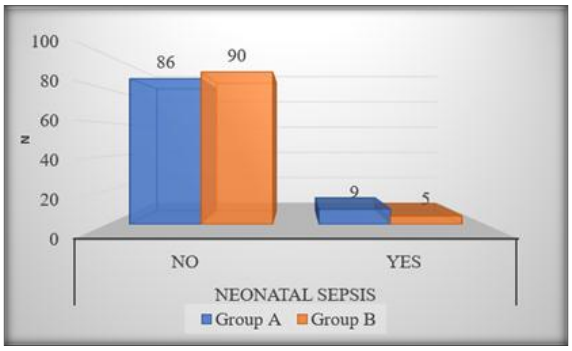

Figure 5: Neonatal SEPSIS

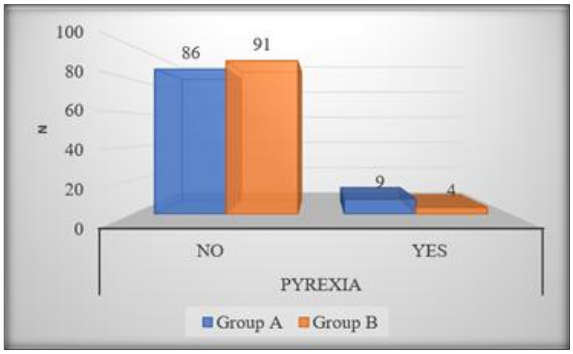

Figure 6: Maternal Pyrexia

DISCUSSION

Prelabor rupture of membranes (PROM) at term presents a clinical dilemma regarding the optimal management strategy. Active management is often advocated to reduce the risk of ascending infection, while expectant management allows for the natural

progression of labor and potentially reduces unnecessary interventions.

In the present study, expectant management did not result in significantly higher rates of cesarean delivery, maternal pyrexia, or neonatal sepsis, aligning with the findings of Hannah et al. (1996).[6] However, active management significantly shortened the PROM-to-delivery interval, which may help reduce the duration of hospital stay and alleviate maternal anxiety regarding the prolonged latency period.

In our cohort, the mean age of participants in the expectant group (Group A) was 26.11 ± 3.83 years, compared to 24.01 ± 3.1 years in the active management group (Group B). This difference was not statistically significant ($p = 0.07$), indicating that age distribution between the two groups was comparable. Patil et al. (2014) reported similar findings, with the majority of patients belonging to the 21–25 years age group and mean ages of 23.0 ± 3.5 years and 23.4 ± 2.9 years in PROM and control groups, respectively, without a statistically significant difference.[9]

In terms of mode of delivery, our study found that among vaginal deliveries, 81.1% of patients in the expectant group had spontaneous labor, while 70.5% were induced. Cesarean section (LSCS) rates were 16.8% in the expectant group and 24.2% in the active management group, while instrumental deliveries accounted for 2.2% and 5.3% in the respective groups. These differences were not statistically significant ($p = 0.09$). Patil et al. (2014) similarly reported that 82.19% of vaginal deliveries in PROM cases followed spontaneous labor, and 17.8% required induction.[9]

The PROM-to-delivery interval was significantly shorter in the active management group ($p = 0.02$). In our study, 29.5% of women in the active management group delivered within six hours compared to 13.7% in the expectant group. A higher proportion of women (7.4%) in the expectant group delivered after more than 24 hours. Rajani Rawat et al. (2018) also demonstrated shorter delivery intervals with active management, reporting delivery within six hours in 7% of actively managed cases versus 5% in the expectant group, and their findings were highly significant ($p = 0.0001$).[4]

Neonatal outcomes were comparable between the groups. In our study, an Apgar score ≥7 at 1 minute was observed in 91% and 85% of neonates in the expectant and active groups, respectively. At 5 minutes, the proportion was 100% in the expectant group and 98% in the active management group. Rajani Rawat et al. (2018) reported similar Apgar scores, with >7 in 92% and 90% of neonates at 1 minute, and 94% at 5 minutes in both groups.[4]

Regarding NICU admissions, asphyxia, meconium-stained liquor, and respiratory distress syndrome (RDS) were the common indications. In our study, NICU admissions for asphyxia were 1.1% in the expectant group and 2.2% in the active group. Meconium aspiration accounted for 4.2% and 6.3%, and RDS for 1.1% and 3.2% in the expectant and active groups, respectively. These differences were not statistically significant ($p > 0.05$). Shalini Agrawal et al. (2019) reported NICU admissions of 16.66% in the expectant group and 19.04% in the active group, with meconium aspiration and RDS being major indications.[10]

The incidence of neonatal sepsis in our study was 9.5% in the expectant group and 5.3% in the active group ($p > 0.05$), consistent with the findings of Rajani Rawat et al. (2018), who reported 4% incidence of neonatal sepsis in the expectant management group.[4]

Maternal pyrexia was observed in 9.5% and 4.2% of participants in the expectant and active groups, respectively, without statistical significance. Similar trends were reported by Anuprita Burande et al. (2018), who found maternal pyrexia rates of 5.55% in the expectant group and 2.77% in the active group.[11]

Our findings suggest that while active management can reduce the latency period between PROM and delivery, it does not significantly impact the rates of cesarean section, maternal or neonatal infections, or adverse neonatal outcomes when compared to expectant management. These results highlight the importance of individualized care that considers patient preferences, Bishop scores, and institutional resources to optimize maternal and neonatal outcomes.

CONCLUSION

Premature rupture of membranes is an important cause of maternal and perinatal morbidity and mortality. Thus this comparative study of Premature Rupture of Membrane in term pregnancy was conducted in 190 patients in labor room in order to conclude the potential benefits of expectant and active management of PROM

- The duration of labor from PROM to delivery between the two groups was higher in expectant group than active management group which was statistically significant.
- There was no significant difference in rate of cesarean section and instrumental delivery in both the groups.
- There was no significant difference in the maternal and perinatal morbidity and mortality between both the groups.

Hence both the methods can be used in premature rupture of membranes at term. However active management reduces the latency period, Prom to delivery interval, and total maternal hospital stay than increasing the anxiety of the mother due to increased duration of labor in expectant management

Limitations of the study

- Pregnant women with **preterm premature rupture of membranes (PPROM)** were excluded from this study, limiting the

generalizability of the findings to only term PROM cases.

- The fetomaternal outcomes could not be fully assessed, as **empirical antibiotics were administered to all PROM cases irrespective of culture sensitivity**, in accordance with the hospital protocol.
- The study did not evaluate the impact of **labor analgesia on PROM outcomes**, which could have provided additional insights into maternal and neonatal parameters.

Recommendation

Proper diagnosis of PROM with clinical examination should be done and active management of PROM is recommended because it reduces the PROM to delivery interval thereby decreasing the anxiety of patient due to increase in duration of labor.

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