IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 24, Issue 8 Ser. 6 (August. 2025), PP 48-52
www.iosrjournals.org

Impact of Labor Induction versus Expectant Management on Neonatal Outcomes in Term PROM: A Randomized Clinical Evaluation

Shafinaz Mehzabin[1], Fatema Wahid[2], Sumona Parvin[3], Mohammad Mahbub Elahi[4], Sharmin Hossain[5]

[1]Medical Officer, OSD, DGHS

[2]*Associate Professor, Department of Fetomaternal Medicine, Bangladesh Medical University, Dhaka, Bangladesh*

[3]*Medical Officer, OSD, DGHS*

[4]*Senior Consultant, Department of General Surgery, OSD, DGHS*

[5]*Junior Consultant, Department of Paediatric Neurology, National Institute of Neuroscience, Dhaka, Bangladesh*

Corresponding Author: *Dr. Shafinaz Mehzabin, Medical Officer, OSD, DGHS*

ABSTRACT

Introduction: *Premature rupture of membranes (PROM) at term, defined as spontaneous rupture of fetal membranes after 37 weeks of gestation but before the onset of labor, poses significant clinical management challenges. The primary concern lies in balancing the risks of maternal and neonatal infection with those associated with early delivery. This study aims to evaluate and compare these strategies to guide evidence-based clinical decision-making.*

Methods: *This randomized controlled trial was conducted at the Department of Obstetrics and Gynecology in the Institute of Child and Mother Health (ICMH), Matuail, Dhaka, from March 2012 to February 2013. One hundred patients of PROM admitted to ICMH were selected for the study as convenient sampling. Data was analyzed by SPSS for Windows and statistical analysis was done by using percentage, frequency, mean±SD, x^2 test, etc. P value less than 0.05 was taken as significant.*

Result: *The study demonstrated that while maternal characteristics and mode of delivery were comparable between the induction and expectant groups, neonatal outcomes favored labor induction, with significantly higher APGAR scores at 1 minute ($p = 0.001$) and a lower incidence of neonatal infections (8% vs. 30%, $p = 0.005$), suggesting better immediate neonatal health in the induction group.*

Conclusion: *This randomized clinical evaluation demonstrated that in term PROM cases, labor induction leads to better neonatal outcomes compared to expectant management. Specifically, neonates in the induction group had significantly higher APGAR scores at 1 minute and a markedly lower incidence of neonatal infections.*

Keywords: *PROM, Neonatal Outcomes, Expectant Management, Labor Induction*

I. INTRODUCTION

Premature rupture of membranes (PROM) at term, defined as the spontaneous rupture of fetal membranes after 37 weeks of gestation and before the onset of labor, occurs in approximately 8–10% of all pregnancies and poses a significant clinical challenge in obstetrics (1). The primary concern in term PROM is balancing the risk of ascending infection with the potential complications of early labor induction, particularly in cases where the cervix may not be favorable for induction. Although various management strategies are available, the optimal approach between induction of labor (IOL) and expectant or conservative management remains a topic of ongoing debate (2). The primary rationale for early induction in term PROM cases is to minimize the duration of membrane rupture and hence reduce the likelihood of maternal and neonatal infections, particularly chorioamnionitis and neonatal sepsis (3). Conversely, proponents of expectant management argue that spontaneous labor can still occur within 24 hours in a significant number of women, thereby avoiding unnecessary interventions and promoting physiological birth outcomes (4). Evidence suggests that IOL in term PROM may reduce the risk of neonatal sepsis and maternal infection without significantly increasing cesarean section rates when compared with expectant management (5). A Cochrane review indicated that while induction may lead to earlier delivery, it is not associated with a higher incidence of adverse neonatal outcomes and may confer a protective effect against

neonatal infection (6). Additionally, several randomized controlled trials and meta-analyses have shown that expectant management does not significantly affect fetal well-being if closely monitored, but may be associated with an increased duration of hospital stay and greater need for intrapartum antibiotics (7,8). In terms of neonatal outcomes, factors such as Apgar scores, neonatal intensive care unit (NICU) admission rates, birth weights, and incidence of neonatal infection are frequently evaluated to compare these two strategies. Studies have demonstrated that the incidence of early-onset neonatal sepsis is notably higher in neonates born to mothers managed expectantly beyond 18–24 hours after PROM (9). Group B Streptococcus (GBS) colonization, if not adequately managed, further exacerbates this risk, especially in resource-limited settings where intrapartum prophylaxis may not be timely (10). Additionally, the risk of meconium-stained liquor, umbilical cord prolapse, and oligohydramnios also rises with prolonged PROM, potentially complicating neonatal outcomes. However, the timing and methods of induction (e.g., oxytocin versus prostaglandins) also influence neonatal parameters such as birth trauma, APGAR scores, and transient tachypnea of the newborn (TTN), thus warranting further comparative evaluation (11). By focusing on indicators such as neonatal infection rates, APGAR scores, and birth weights, this research intends to clarify the potential benefits or drawbacks of early induction. While previous research has addressed maternal outcomes and general obstetric implications of PROM, fewer studies have focused exclusively on neonatal outcomes in a randomized, controlled setting with recent evidence-based updates. This study aims to evaluate and compare the neonatal outcomes—including birth weight, APGAR scores, neonatal infection, and NICU admission—between labor induction and expectant management groups in term PROM.

II. METHODS

This randomized controlled trial was conducted at the Department of Obstetrics and Gynecology in the Institute of Child and Mother Health (ICMH), Matuail, Dhaka, from March 2012 to February 2013. One hundred cases of PROM admitted in ICMH were selected for the study as convenient sampling. This study included 50 patients as cases**:** patients with term PROM (gestational age 37-42 weeks) who received induction of labor., and 50 patients as comparative group: patients with term PROM (gestational age 37-42 weeks) who received conservative treatment. Data were collected from cases and comparative groups by data collection sheet. Cases received induction of labor by tab. Misoprostol 25microgram vaginally, we repeated the dose after 4 hours. The comparative group received expectant management, they were just kept waiting with conservative treatment for 48 hours. Data was analyzed by SPSS for Windows and statistical analysis was done by using percentage, frequency, mean±SD, x^2 test, etc. P value less than 0.05 was taken as significant.

Inclusion Criteria

- Patients with term premature rupture of membrane.

Exclusion Criteria:

- Patients with preterm premature rupture of the membrane with other obstetrics and medical complications like previous cesarean section, diabetes mellitus, hypertension, and other medical disorders.

III. RESULTS

Table 1: Distribution of the Study Subjects According to Age (n=100)

Age Group	Case (n=50)	%	Comparative Group (n=50)	%	P-value
≤19	10	20.0	5	10.0	0.128 NS
20–24	18	36.0	20	40.0	
25–29	12	24.0	15	30.0	
≥30	8	16.0	10	20.0	
Mean ± SD	23.6 ± 3.9		24.9 ± 4.1		>0.05 NS
Age Range	18–32		21–32		-

The majority of participants in both groups were between 20–29 years of age. The mean age was slightly lower in the case group (23.6 ± 3.9 years) compared to the comparative group (24.9 ± 4.1 years), though this difference was not statistically significant ($p > 0.05$). This indicates a comparable age distribution between the groups. [Table 1]

Table 2: Distribution According to Socioeconomic Status (n=100)

Income Group (Tk/month)	Case (n=50)	%	Comparative Group (n=50)	%	P-value
Low (<5000)	34	68.0	29	58.0	0.301 NS
Lower-middle (5000–20000)	16	32.0	21	42.0	

Most participants in both groups belonged to the low-income category, especially in the case group (68%). However, the difference in socioeconomic status distribution was not statistically significant (p = 0.301), suggesting that economic background was similar between the groups. [Table 2]

Table 3: Distribution According to Antenatal Check-Up (n=100)

ANC Status	Case (n=50)	%	Comparative Group (n=50)	%	P-value
Irregular	8	16.0	15	30.0	0.096 NS
Regular	42	84.0	35	70.0	

Regular antenatal check-ups were more common in the case group (84%) than in the comparative group (70%), although the difference did not reach statistical significance (p = 0.096). This may suggest better prenatal care in the case group. [Table 3]

Table 4: Obstetrical History of The Participants (n=100)

Obstetrical History	Case (n=50)	%	Comparative Group (n=50)	%	P-value
Primi	28	56.0	29	58.0	0.839 NS
Multi	22	44.0	21	42.0	
History of abortion	22	44.0	15	30.0	0.147 NS
History of stillbirth	2	4.0	8	16.0	0.045 S
Previous PROM	12	24.0	15	30.0	0.499 NS

Parity distribution was similar across both groups. Although not statistically significant, a higher proportion of abortions and PROM was noted in the case group. Importantly, a significantly higher rate of stillbirth was observed in the comparative group (p = 0.045), which may indicate a worse obstetric outcome in that group. [Table 4]

Table 5: Mode of Delivery (n=100)

Mode of Delivery	Case (n=50)	%	Comparative Group (n=50)	%	P-value
Normal Vaginal Delivery	26	52.0	23	46.0	0.548 NS
Cesarean Section (LSCS)	24	48.0	27	54.0	

Both groups had a nearly equal distribution of vaginal and cesarean deliveries, with no statistically significant difference in delivery mode (p = 0.548), suggesting comparable obstetric management. [Table 5]

Table 6: Time from Labor Onset to Delivery (n=100)

Duration (hrs)	Case (n=50)	%	Comparative Group (n=50)	%	P-value
<12 hrs	44	88.0	48	96.0	0.134 NS
12–24 hrs	6	12.0	2	4.0	

Most women in both groups delivered within 12 hours of labor onset. Although more prolonged labor was slightly more common in the case group, the difference was not statistically significant. [Table 6]

Table 7: Fetal Outcome (n=100)

Outcome	Case (n=50)	Comparative Group (n=50)	P-value
Live Birth	50	50	-
Weight of Baby (kg)	2.93 ± 0.25	2.81 ± 0.38	0.078 NS
APGAR at 1 min	8.8 ± 1.5	7.6 ± 1.4	0.001 S
Neonatal Infection	4 (8.0%)	15 (30.0%)	0.005 S

All subjects had live births. The APGAR score at 1 minute was significantly higher and the rate of neonatal infections was significantly lower in the case group ($p < 0.05$), indicating better neonatal outcomes in this group. [Table 7]

IV. DISCUSSION

In this study, the mean age was 23.6±3.9 years in the induced group and 24.9±4.1 years in the expectant group. In this research, the mean gestational age on admission was 38.2±1.2 weeks in the case and 38.0±1.1 in the comparative group which was not statistically significant. Similar results were found in other previous studies. (12,13). In this current study, it was found that PROM was more common in low-income families in both groups. Regular antenatal check-ups up received by 84.0% in the induced group and 70.0% in the expectant group, no significant (P >0.05) difference was found between the two groups. The time interval between rupture membranes and the onset of labor pain was 1-12 hours (80%) in the induced group and >12-24 hours (80%) in the expectant group and the difference was not statistically significant (P >0.05) between the two groups. Another study conducted on 100 patients at Lady Reading Hospital, Peshawar, Pakistan showed that the latent period was short in the induced group, i,e, 76% started labor pain within 48 hours of PROM as compared to 60% in the conservative group (14). In our study, among the induced group, 52% of mothers delivered vaginally and 48% delivered through cesarean section. In the expectant group, 46% delivered vaginally, and 54% delivered through cesarean section. So, induction of labor does not increase the risk of cesarean section (>0.05). Other studies also showed similar results (15,16). Regarding mode of delivery, a study conducted on 100 patients in Rural Medical College, Pravara Institute of Medical Sciences showed there was a higher incidence of cesarean sections in the induced group (20%) than in the expectant group (14%). Though the difference was insignificant (16). Another study conducted on 100 patients in Lady Reading Hospital, Peshawar, Pakistan showed about 80% of patients in the conservative group delivered by NVD as compared to 60% in the induced group, which was not statistically significant (P >0.05) (14). The above study findings strengthen the present study result, where no statistically significant (P >0.05) difference was found between the two groups regarding the mode of delivery. In this study, it was observed that the time interval between the onset of labor pain to delivery was < 12 hours in 88% of patients in the induced group and 96% of patients in the expectant group but no statistically significant (P >0.05) difference was found between two groups. A similar study showed the mean time interval for PROM to delivery was 11.6 hours in the induced group as compared to 17 hours in the expectant group, which was statistically insignificant (13). In the present study, the mean birth weight of the fetus was 2.93±0.25 kg in the induced group and 2.81±0.38 kg in expectant group. A study conducted on 100 patients in Rural Medical College, Pravara, Ahmednagar, Maharashtra, India showed the incidence of neonatal sepsis was 8% in induced group and 14% in expectant group. In this study, neonatal infection was significantly higher (P <0.05) in expectant group in comparison to induced group. Another study done at 72 hospitals in Canada, UK, Australia, Israel, Sweden & Denmark, showed frequency of neonatal infection did not differ significantly between the induction with oxytocin & the expectant management group (17).

Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

V. CONCLUSION

This randomized clinical evaluation demonstrated that in term PROM cases, labor induction leads to better neonatal outcomes compared to expectant management. Specifically, neonates in the induction group had significantly higher APGAR scores at 1 minute and a markedly lower incidence of neonatal infections.

VI. RECOMMENDATION

Based on the findings of this study, labor induction should be considered as the preferred management strategy in cases of term PROM to enhance neonatal outcomes, particularly by reducing the risk of neonatal infection and improving APGAR scores. Further large-scale studies are recommended to reinforce these results and guide standardized clinical protocols.

Funding: No funding sources

Conflict of interest: None declared

REFERENCES

[1]. Kuba K, Bernstein PS. ACOG practice bulletin no. 188: prelabor rupture of membranes. Obstetrics & Gynecology. 2018;131(6):1163–4.

[2]. Simhan HN, Canavan TP. Preterm premature rupture of membranes: diagnosis, evaluation and management strategies. BJOG. 2005 Mar;112(s1):32–7.

[3]. Van Der Ham DP, Vijgen SM, Nijhuis JG, Van Beek JJ, Opmeer BC, Mulder AL, et al. Induction of labor versus expectant management in women with preterm prelabor rupture of membranes between 34 and 37 weeks: a randomized controlled trial. PLoS medicine. 2012;9(4):e1001208.

[4]. Kenyon S, Pike K, Jones DR, Brocklehurst P, Marlow N, Salt A, et al. Childhood outcomes after prescription of antibiotics to pregnant women with preterm rupture of the membranes: 7-year follow-up of the ORACLE I trial. The Lancet. 2008;372(9646):1310–8.

[5]. Chiossi G, Di Tommaso M, Monari F, Consonni S, Strambi N, Zoccoli SG, et al. Neonatal outcomes and risk of neonatal sepsis in an expectantly managed cohort of late preterm prelabor rupture of membranes. European Journal of Obstetrics & Gynecology and Reproductive Biology. 2013;261:1–6.

[6]. Middleton P, Shepherd E, Crowther CA. Induction of labour for improving birth outcomes for women at or beyond term. Cochrane Database of Systematic Reviews [Internet]. 2013

[7]. Jha D. Expectant Versus Active Management at Term Pregnancy with Prom [Internet] [Master's Thesis]. Rajiv Gandhi University of Health Sciences (India); 2013

[8]. Mercer BM. Preterm premature rupture of the membranes. Obstetrics & Gynecology. 2003;101(1):178–93.

[9]. Orwenyo GK. maternal factors predisposing to early-onset neonatal sepsis at Kenyatta national hospital maternity unit [Internet] [PhD Thesis]. University of Nairobi; 2011

[10]. Edwards MS, Gonik B. Preventing the broad spectrum of perinatal morbidity and mortality through group B streptococcal vaccination. Vaccine. 2013;31:D66–71.

[11]. Team I. Vaginal birth after cesarean: New insights [Internet]. 2010. Available from: https://www.ncbi.nlm.nih.gov/books/NBK44571/pdf/TOC.pdf

[12]. Mercer BM. Preterm premature rupture of the membranes: current approaches to evaluation and management. Obstetrics and Gynecology Clinics. 2005;32(3):411–28.

[13]. Bangal VB, Gulati P, Shinde KK, Borawake SK. Induction of labour versus expectant management for premature rupture of membranes at term. Int J Biomed Res. 2012;3(3):164–70.

[14]. Yasmin S, Yasmin A, Khattak NN, Karim R, Raees M. Active versus conservative management of prelabour rupture of membranes at term. Journal of Postgraduate Medical Institute [Internet]. 2013

[15]. Nayot D, Penava D, Da Silva O, Richardson BS, De Vrijer B. Neonatal outcomes are associated with latency after preterm premature rupture of membranes. Journal of Perinatology. 2012;32(12):970–7.

[16]. Naef III RW, Albert JR, Ross EL, Weber BM, Martin RW, Morrison JC. Premature rupture of membranes at 34 to 37 weeks' gestation: aggressive versus conservative management. American journal of obstetrics and gynecology. 1998;178(1):126–30.

[17]. Hannah ME, Ohlsson A, Farine D, Hewson SA, Hodnett ED, Myhr TL, et al. Induction of Labor Compared with Expectant Management for Prelabor Rupture of the Membranes at Term. N Engl J Med. 1996 Apr 18;334(16):1005–10.