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Original Research Article

# Outcomes of Immediate Vs Delayed Induction in Term PROM without Maternal Risk Factors: A Prospective Observational Study

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**Abstract:**

**Background:** Premature rupture of membranes at term (term PROM) is a common obstetric event. Management remains debated between immediate induction of labour and expectant/delayed induction, especially in women without maternal risk factors.

**Objective:** To compare maternal and neonatal outcomes of immediate versus delayed induction in term PROM without maternal risk factors.

**Methods:** Over the course of nine months, a prospective observational study was carried out in a tertiary care facility. One hundred women were enrolled who had singleton term pregnancies, PROM, and no maternal risk factors. Fifty women got delayed induction (after observation for up to 24 hours if spontaneous labor did not start), and fifty underwent prompt induction (within 6 hours after PROM). PROM-to-delivery time, method of delivery, maternal infection, postpartum hemorrhage, newborn Apgar score, and NICU hospitalization were among the outcomes evaluated. Student's t-test and the chi-square test were employed in the statistical analysis.

**Results:** The immediate induction group had a substantially shorter mean PROM-to-delivery interval (14.2 ± 4.6 h vs. 18.6 ± 5.1 h, $p<0.001$). Immediate induction resulted with a decreased rate of cesarean sections (36% vs. 60%, $p=0.018$). In the immediate group, chorioamnionitis was less common (12% vs. 28%, $p=0.041$). 16% and 34% of patients were admitted to the NICU, respectively ($p=0.032$). Apgar scores at five minutes and postpartum hemorrhage did not differ significantly.

**Conclusion:** Immediate induction in low-risk term PROM is associated with shorter delivery interval and lower maternal infection and NICU admission rates, with no increase in operative delivery complications.

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## Introduction

The term "premature rupture of membranes" (PROM) describes the spontaneous rupture of fetal membranes before to the start of labor. PROM is defined as occurring at or after 37 full weeks of gestation. Approximately 8–10% of term pregnancies are complicated by this syndrome, which is a major cause of obstetric hospitalization globally. A considerable percentage of women do not go into spontaneous labor within 24 hours of membrane rupture, which raises questions about the best course of action. Ascending infection due to the removal of the protective amniotic sac barrier is the main risk after PROM. Maternal chorioamnionitis, postpartum endometritis, neonatal sepsis, and the need for neonatal critical care are all become more likely by prolonged membrane rupture [1].

In certain situations, however, routine prompt induction of labor may result in higher rates of intervention, uterine hyperstimulation, mother discomfort, and surgical delivery. Therefore, a key component of management decisions continues to be weighing the risks of intervention against the risks of infection. Immediate induction typically entails starting labor as soon as PROM is confirmed. Depending on cervical favorability, oxytocin or prostaglandins are typically used. A time of observation for the commencement of spontaneous labor while keeping an eye on the health of the mother and fetus is made possible by delayed induction or expectant management. In certain situations, delayed induction may be deemed safe for women who do not have a fever, meconium-stained alcohol, fetal compromise, or other maternal risk factors. However, women and newborns may still be at risk for preventable infectious morbidity due to extended latency [2].

The timing of induction in term PROM is subject to different guidelines, and local practice frequently

varies on hospital resources, patient preferences, cervical state, and professional experience. Both approaches are used in numerous Indian tertiary institutions. Prospective real-world comparisons in low-risk Indian populations are still scarce, nonetheless. Comprehending the results of these individuals is therapeutically significant because it is important to minimize avoidable maternal and newborn morbidity while avoiding needless intervention [3].

In women with term PROM who did not have maternal risk factors, the results of prompt versus delayed induction were compared in this prospective observational trial. Maternal infectious morbidity, cesarean section rate, and PROM-to-delivery time were the main outcomes. Postpartum hemorrhage, Apgar ratings, and admission to the neonatal critical care unit were secondary outcomes [4].

**Methods**

**Study Design:** Prospective observational study.

**Study Duration:** 9 months.

**Setting:** Department of Obstetrics and Gynecology, tertiary care teaching hospital.

**Sample Size:** 100 pregnant women with term PROM.

**Inclusion Criteria**

- Singleton pregnancy
- Cephalic presentation
- Gestational age ≥37 weeks
- Confirmed PROM
- No maternal risk factors

**Exclusion Criteria**

- Fever or suspected infection on admission
- Previous cesarean scar
- Fetal distress
- Hypertensive disorders
- Diabetes mellitus
- Multiple gestation

**Study Groups**

- **Immediate induction:** labour induced within 6 hours of PROM (n=50)
- **Delayed induction:** observation up to 24 hours, then induction if no labour (n=50)

**Outcomes**

- PROM-to-delivery interval
- Mode of delivery
- Chorioamnionitis
- Postpartum hemorrhage
- Apgar score
- NICU admission

**Statistical Analysis:** $p<0.05p<0.05p<0.05$

Chi-square test for categorical variables and Student's t-test for continuous variables.

**Results**

**Table 1: Baseline Characteristics**

| Variable | Immediate (n=50) | Delayed (n=50) | p-value |
|---|---|---|---|
| Mean age (years) | 25.8 ± 3.9 | 26.2 ± 4.1 | 0.62 |
| Primigravida | 28 (56%) | 30 (60%) | 0.68 |
| Mean gestational age (weeks) | 38.6 ± 0.8 | 38.7 ± 0.9 | 0.57 |
| Bishop score <6 | 29 (58%) | 31 (62%) | 0.69 |

**Table 2: Labour and Delivery Outcomes**

| Outcome | Immediate | Delayed | p-value |
|---|---|---|---|
| Vaginal delivery | 32 (64%) | 20 (40%) | 0.018 |
| Cesarean section | 18 (36%) | 30 (60%) | 0.018 |
| PROM-to-delivery interval (h) | 14.2 ± 4.6 | 18.6 ± 5.1 | <0.001 |

**Table 3: Maternal Outcomes**

| Outcome | Immediate | Delayed | p-value |
|---|---|---|---|
| Chorioamnionitis | 6 (12%) | 14 (28%) | 0.041 |
| Postpartum hemorrhage | 3 (6%) | 5 (10%) | 0.46 |
| Fever postpartum | 4 (8%) | 10 (20%) | 0.082 |

**Table 4: Neonatal Outcomes**

| Outcome | Immediate | Delayed | p-value |
|---|---|---|---|
| NICU admission | 8 (16%) | 17 (34%) | 0.032 |
| Apgar <7 at 5 min | 3 (6%) | 6 (12%) | 0.29 |
| Suspected neonatal sepsis | 4 (8%) | 11 (22%) | 0.047 |

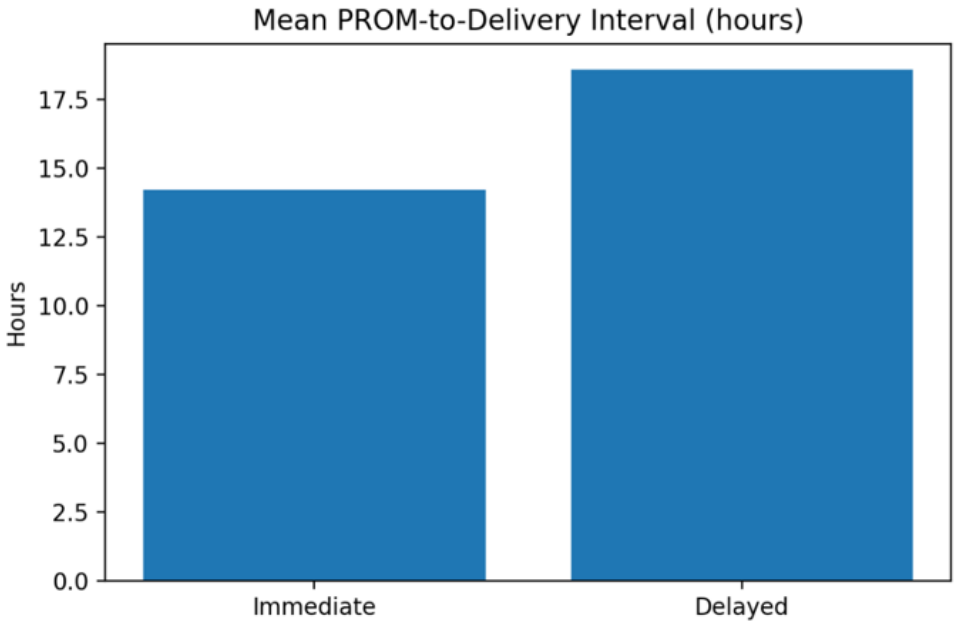


**Figure 1: Mean PROM-to-delivery interval**

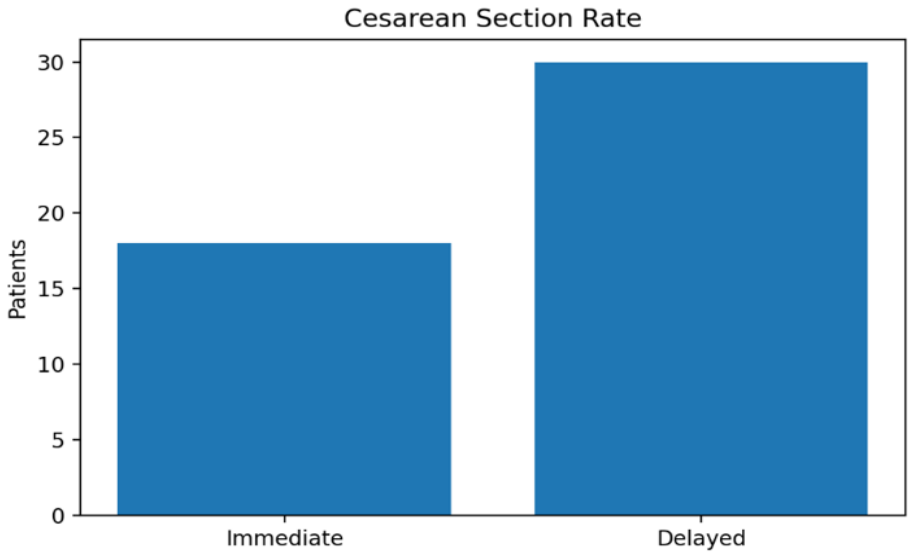


**Figure 2: Caesarean section rate**

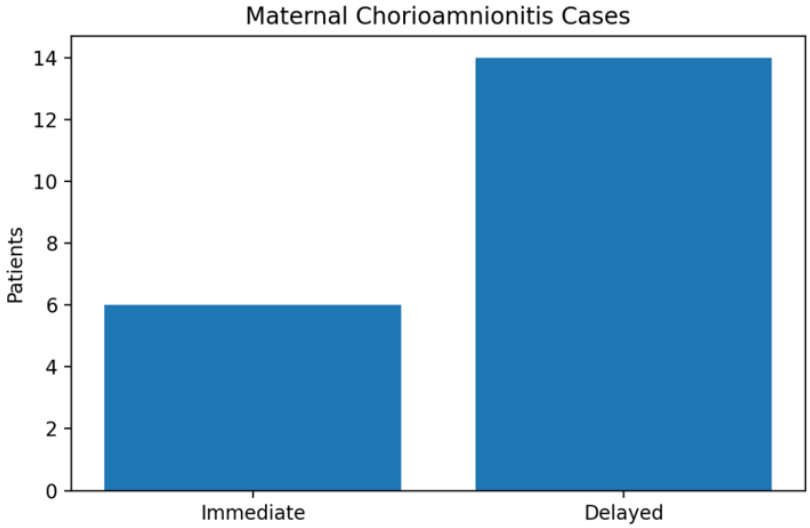


**Figure 3: Maternal chorioamnionitis cases**

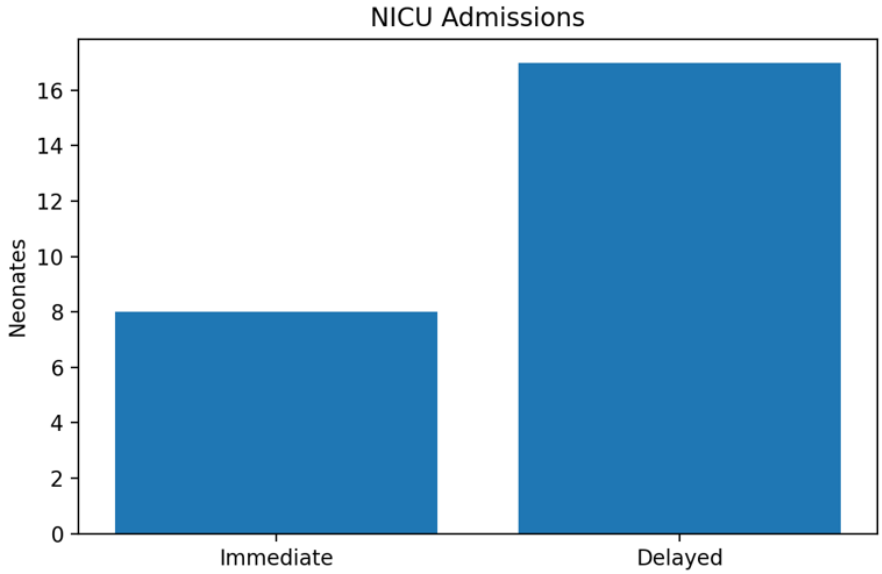


**Figure 4: NICU admissions**

## Discussion

In this prospective observational trial, women with term PROM without maternal risk factors were compared for the effects of prompt and delayed induction. According to the results, rapid induction was linked to a decreased rate of cesarean sections, a considerably shorter PROM-to-delivery period, a decrease in maternal infectious morbidity, and fewer NICU admissions. In carefully chosen low-risk women, our findings recommend prompt active management.

The decrease in the PROM-to-delivery period with quick induction was one of the most noteworthy results. This is anticipated since the latent phase following membrane rupture is shortened by active labor stimulation. Because it increases the uterine cavity's and the fetus's exposure to ascending bacterial colonization, a longer time between rupture and delivery is clinically significant [5].

Thus, a number of positive maternal and newborn outcomes seen in the immediate induction group may be explained by decreasing latency. The prompt induction group had a far reduced rate of cesarean sections. In the past, some medical professionals were concerned that early PROM induction, particularly in cases when the cervix was unfavorable, would result in a higher rate of surgical deliveries. Our findings, however, point to the contrary. Delays in induction can result in non-reassuring fetal condition, infection-related fetal impairment, dysfunctional labor, or maternal tiredness, all of which can raise the risk of cesarean delivery. Before problems develop, effective labor

progression may be established by early induction under close observation [6].

In the immediate induction group, maternal chorioamnionitis was less common. This is consistent with research showing a high correlation between intrauterine infection and the length of membrane breach. Vaginal flora may eventually rise into the uterine cavity when membranes burst. If labor is postponed, infection can occur even in women who do not have a fever or other risk factors. This pattern is further supported by lower rates of postpartum fever in the immediate group, albeit not statistically significant. Additionally, timely induction improved infant outcomes, especially in terms of NICU admission and suspected neonatal sepsis. Prolonged membrane rupture increases the risk of early-onset infection, respiratory morbidity from labor stress, and observation hospitalizations for sepsis screening in newborns.

Because it reduces healthcare expenses, parental worry, and mother-child separation, fewer NICU admissions are practically relevant [7].

Low Apgar scores and postpartum hemorrhage did not differ significantly. This implies that intrapartum safety was not jeopardized by prompt induction. Induction drugs, including oxytocin, can be administered safely in circumstances that are appropriately managed, along with routine fetal screening and labor progress assessment [8].

The results have significant ramifications for obstetric care, particularly in crowded tertiary facilities. By reducing labor time and infection-related problems, prompt induction following term PROM confirmation may lower bed occupancy. By reducing NICU admissions, it might also maximize the utilization of available resources. Patient-centered care is still crucial, though. After counseling, some women might prefer expectant management, especially if labor seems likely and there is easy access to monitoring. There are a few restrictions to be aware of. Selection bias may have been introduced by doctor preference, cervical status, or patient choice, given the study was observational rather than randomized. Even if the sample size is sufficient for typical outcomes, it might not be enough to identify uncommon adverse events.

Not every patient had microbiological proof of infection. Neonatal long-term outcomes were not evaluated [9].

Despite these drawbacks, the study offers helpful prospective data in a low-risk cohort in the real world. Immediate induction is preferred since it consistently results in shorter delivery intervals, lower infection rates, and fewer NICU admissions. The significance of cervical state, induction technique, patient satisfaction, and cost-effectiveness in identifying the best therapy approaches for term PROM may be further clarified by future randomized multicenter trials with bigger sample sizes [10].

## Conclusion

This prospective observational study shows that, when compared to delayed induction, prompt labor induction is linked to better outcomes for both the mother and the newborn in women with term PROM who do not have maternal risk factors. In addition to lowering the incidence of cesarean section, maternal chorioamnionitis, NICU admission, and suspected neonatal sepsis, immediate induction dramatically shortened the time between membrane rupture and delivery. These advantages were attained without a notable rise in unfavorable Apgar scores or postpartum hemorrhage.

The findings suggest that extended latency following PROM may raise the chance of ascending infection and secondary obstetric intervention, even in women who appear to be at low risk. Therefore, prompt induction may promote effective labor progression while preventing needless problems. This is especially pertinent in tertiary care settings, where limiting neonatal intensive care utilization, maximizing bed turnover, and lowering the burden of infections are crucial practical considerations.

However, management should continue to be customized. Decision-making should be guided by cervical favorability, patient preference, fetal welfare, and local monitoring capability. Women who opt for expectant management must be closely watched for indications of fetal deterioration, infection, or the commencement of labor. In conclusion, for the majority of women with simple term PROM, rapid induction seems to be a safe and successful approach. Implementing standardized procedures that prioritize early evaluation and prompt induction could lead to better results. To validate these results and improve treatment based on parity and cervical status, larger randomized investigations are necessary.

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