ORIGINAL ARTICLE

Journal of MedVerse Research & Practice

ISSN: 3107-4278

Fetomaternal Outcomes in Low-Risk Primigravida Women: Expectant Management Versus Elective Induction at 39 Weeks in a Tertiary Hospital

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Submission Date: 20.11.2025	Accepted Date: 22.12.2025	Published Date: 31.12.2025

Abstract

Background: The optimal timing of delivery in low-risk primigravida women remains a subject of ongoing debate. While expectant management allows for the spontaneous onset of labour, advancing gestational age may increase maternal and neonatal risks. Elective induction of labour at 39 completed weeks has been proposed as a strategy to reduce perinatal morbidity without increasing operative delivery rates.

Methods: This comparative cross-sectional study was conducted over one year in the Department of Obstetrics and Gynaecology at Pushpagiri Institute of Medical Science, Kerala. A total of 200 low-risk primigravida women at 39 completed weeks of gestation were included and divided into two groups: the elective induction group (n = 100) and the expectant management group (n = 100). Maternal outcomes assessed included mode of delivery, intrapartum and postpartum complications, and duration of labour, while neonatal outcomes included birth weight, APGAR score at one minute, NICU admission, and neonatal morbidity. Data were analyzed using appropriate statistical methods, with a p-value of less than 0.05 considered statistically significant.

Results: Maternal baseline characteristics were comparable between the two groups. The caesarean section rate did not differ significantly between the elective induction and expectant management groups. The incidence of meconium-stained amniotic fluid, low APGAR scores at one minute, and NICU admissions was higher in the expectant management group. Neonates in the expectant management group also had a higher mean birth weight.

Conclusion: Elective induction of labour at 39 completed weeks in low-risk primigravida women is a safe approach that does not increase caesarean section rates and may improve selected neonatal outcomes when compared with expectant management.

Keywords: Elective induction of labour; Expectant management; Low-risk primigravida; Fetomaternal outcome; 39 weeks gestation; Caesarean section

Introduction

The timing of childbirth plays a critical role in determining both maternal and neonatal outcomes. Deliveries occurring at either extreme of gestational age are associated with increased morbidity and mortality. While preterm birth is a major contributor to neonatal complications, prolongation of pregnancy beyond term is linked with a progressive rise in maternal, fetal, and perinatal risks. As gestational age advances, placental efficiency gradually declines, increasing the likelihood of fetal compromise, oligohydramnios, meconium passage, and adverse obstetric events [1]. In low-risk pregnancies, particularly among primigravida women, expectant management until the spontaneous onset of labour has traditionally been considered safe and appropriate [2]. However, continuation of pregnancy beyond 39 weeks may be associated with a higher incidence of obstetric interventions, operative vaginal

delivery, caesarean section, hypertensive disorders, meconium-stained amniotic fluid, and neonatal morbidity [3]. Maternal anxiety also tends to increase with advancing gestation, often influencing clinical decision-making and intervention rates. Elective induction of labour at 39 completed weeks has gained increasing attention as a strategy to mitigate risks associated with prolonged gestation without adversely affecting delivery outcomes. Emerging evidence suggests that planned induction at this gestational age in low-risk nulliparous women may reduce perinatal complications and maternal morbidity while not increasing, and in some studies reducing, the rate of caesarean delivery [4]. Induction at 39 weeks may also limit fetal overgrowth, thereby decreasing the risk of macrosomia, shoulder dystocia, birth trauma, and related neonatal complications. Additionally, elective induction may reduce the risk of stillbirth and complications related to placental ageing and meconium aspiration [5].

Despite these potential benefits, induction of labour continues to raise concerns regarding failed induction, prolonged labour, increased requirement for augmentation, uterine tachysystole, abnormal fetal heart rate patterns, and maternal discomfort [6]. These concerns are particularly relevant in nulliparous women with an unfavourable cervix, where induction has historically been associated with higher operative delivery rates, although recent studies have challenged this perception [7]. In tertiary care settings, especially within resource-conscious healthcare systems, decisions regarding elective induction versus expectant management must be guided by robust evidence tailored to local populations. Low-risk primigravida women represent a distinct group in whom balancing maternal preferences, fetal well-being, and obstetric safety is essential. Expectant management up to 41 weeks allows for spontaneous onset of labour but may eventually necessitate induction or operative delivery due to emerging obstetric indications [8]. Kerala, with its high institutional delivery rates and well-established maternal healthcare infrastructure, provides an ideal setting to evaluate this clinical question. Generating region-specific evidence is essential to guide obstetric practice, support informed patient counselling, and optimize fetomaternal outcomes.

Materials and Methods

Study Design

This hospital-based diagnostic accuracy study was conducted to evaluate the role of C-reactive protein (CRP) in identifying serious bacterial infections among children presenting with fever without an identifiable focus.

Study Setting and Duration

The study was carried out in the Department of Pediatrics at Dr. D.Y. Patil Vidyapeeth, Pune, over a period of 18 months. Both the Pediatric Outpatient Department and Pediatric Wards were included in the study following approval from the Institutional Ethics Committee.

Study Population

The study population comprised children aged 1 to 36 months presenting with fever without focus. A total of 100 eligible children attending the outpatient department or admitted to the pediatric wards during the study period were enrolled consecutively.

Sample Size

A total of 100 children were included in the study. The sample size was calculated based on diagnostic accuracy parameters considering the expected sensitivity and specificity of C-reactive protein, with a 95% confidence level and an allowable error of 15%.

Inclusion Criteria

Children aged between 1 and 36 months presenting with fever lasting more than 12 hours and up to seven days, with a documented body temperature greater than 39°C and no identifiable source of infection following detailed clinical examination, were included in the study.

Exclusion Criteria

Children who had received antibiotics or vaccinations prior to presentation, those with known immunological disorders or immunodeficiency states, and children whose parents or legal guardians declined consent were excluded from the study.

Data Collection Tool

After obtaining written informed consent from parents or legal guardians, demographic details, clinical history, physical examination findings, and laboratory investigations were recorded using a structured case record proforma. Venous blood samples were collected under strict aseptic precautions for complete blood count, total white blood cell count, absolute neutrophil count, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and blood culture. Blood culture was considered the reference standard for confirming serious bacterial infection. C-reactive protein estimation was performed using the slide agglutination method. Initially, qualitative testing was carried out to identify elevated CRP levels, followed by semi-quantitative estimation using serial serum dilutions. The highest dilution demonstrating visible agglutination was recorded as the CRP concentration in mg/dL. All clinical and laboratory findings were documented systematically in the study proforma.

Ethical Considerations

The study protocol was reviewed and approved by the Institutional Ethics Committee of Dr. D.Y. Patil Vidyapeeth before commencement of the study. Written informed consent was obtained from the parents or legal guardians of all participating children prior to enrolment. Participant confidentiality was maintained by assigning unique identification numbers, and all collected information was used solely for research purposes.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using the Statistical Package for the Social Sciences (SPSS) software version 26.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation, whereas categorical variables were presented as frequencies and percentages. Diagnostic performance of C-reactive protein was evaluated by calculating sensitivity, specificity, positive predictive value, negative predictive value, and overall diagnostic accuracy, considering blood culture as the reference standard. Receiver Operating Characteristic (ROC) curve analysis was performed to determine the optimal CRP cut-off value for predicting serious bacterial infection. Agreement between CRP results and blood culture findings was assessed using appropriate statistical tests. A *p*-value of less than 0.05 was considered statistically significant.

Results

Table 1. Baseline Maternal Characteristics of Study Participants (n=200)

Variable	Elective Induction (n=100)	Expectant Management (n=100)	p value
Mean maternal age (years)	25.8 ± 3.2	26.1 ± 3.4	0.54
Mean BMI (kg/m²)	22.4 ± 1.8	22.6 ± 1.9	0.47
Mean Bishop score at admission	5.6 ± 1.2	5.4 ± 1.3	0.29

The two groups were comparable with respect to maternal age, body mass index, and cervical status at admission. No statistically significant difference was observed between the elective induction and expectant management groups, indicating baseline homogeneity.

Table 2. Mode of Delivery in the Two Study Groups (n=200)

Mode of delivery	Elective Induction (n=100)	Expectant Management (n=100)	p value
Vaginal delivery	72 (72%)	65 (65%)	0.28
Instrumental delivery	10 (10%)	12 (12%)	0.65
Caesarean section	18 (18%)	23 (23%)	0.37

Vaginal delivery was the most common mode of delivery in both groups. Although the caesarean section rate was lower in the elective induction group compared to the expectant management group, the difference was not statistically significant.

Table 3. Intrapartum and Maternal Outcomes(n=200)

Maternal outcome	Elective Induction (n=100)	Expectant Management (n=100)	p value
Meconium-stained liquor	14 (14%)	26 (26%)	0.03
Non-reassuring CTG	12 (12%)	20 (20%)	0.12
Postpartum hemorrhage	6 (6%)	8 (8%)	0.58
Prolonged labour	15 (15%)	22 (22%)	0.19

Meconium-stained amniotic fluid was significantly more frequent in the expectant management group. Other maternal complications, including non-reassuring cardiotocography, postpartum hemorrhage, and prolonged labour, were more common in the expectant group but did not reach statistical significance.

Table 4. Neonatal Outcomes (n=200)

Neonatal outcome	Elective Induction (n=100)	Expectant Management (n=100)	p value
Mean birth weight (kg)	3.05 ± 0.38	3.24 ± 0.42	0.01
APGAR <7 at 1 min	6 (6%)	14 (14%)	0.04
NICU admission	10 (10%)	22 (22%)	0.02

Neonates in the expectant management group had a significantly higher mean birth weight. Lower APGAR scores at one minute and NICU admissions were significantly more frequent among neonates born to women managed expectantly.

Table 5. Indications for NICU Admission

Indication	Elective Induction (n=10)	Expectant Management (n=22)
Respiratory distress	4 (40%)	9 (41%)
Meconium aspiration	2 (20%)	6 (27%)
Hypoglycemia	2 (20%)	4 (18%)
Sepsis	1 (10%)	2 (9%)
Birth asphyxia	1 (10%)	1 (5%)

Respiratory distress was the most common indication for NICU admission in both groups. Meconium aspiration syndrome was more frequently observed among neonates in the expectant management group, reflecting the higher incidence of meconium-stained liquor with advancing gestation.

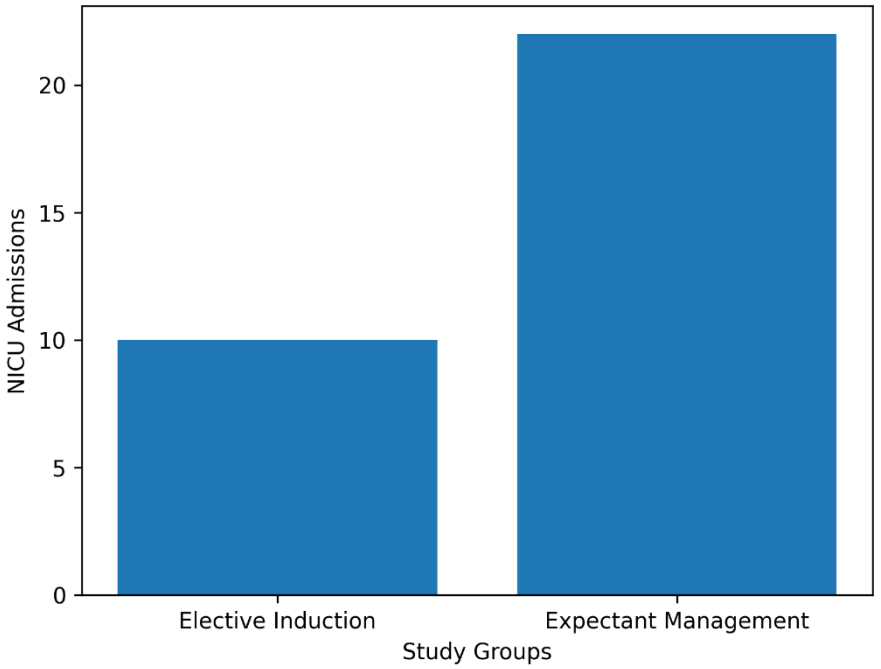

Figure 1: Comparison of NICU admissions between study groups

The chart demonstrates a higher proportion of NICU admissions among neonates born to women managed expectantly compared to those who underwent elective induction at 39 completed weeks. This visual representation supports the observed trend of increased neonatal morbidity with expectant management in the study population.

Discussion

In the present study, fetomaternal outcomes were compared between low-risk primigravida women who underwent elective induction of labour at 39 completed weeks and those managed expectantly. The findings suggest that elective induction at 39 weeks is not associated with an increase in adverse maternal outcomes and may confer benefits in terms of neonatal morbidity. The baseline maternal characteristics, including maternal age, body mass index, and cervical status at admission, were comparable between the two groups, ensuring uniformity and reducing confounding. Similar baseline comparability was reported in the ARRIVE trial conducted by Grobman et al., which evaluated elective induction of labour at 39 weeks in low-risk nulliparous women and established the safety of this approach [9]. In the present study, vaginal delivery was the predominant mode of delivery in both groups, with a lower caesarean section rate observed among women who underwent elective induction. Although this difference was not statistically significant, the trend aligns with findings reported by Grobman et al., who demonstrated a significantly lower caesarean section rate in the induction group [9]. Walker et al. also reported that elective induction at 39 weeks did not increase operative delivery rates and was associated with favourable maternal outcomes [10]. Indian studies by Yogindra M. Kabadi et al. and Ghosh et al. similarly observed no increase in caesarean section rates with elective induction in low-risk primigravida women [11,12].

A significantly higher incidence of meconium-stained amniotic fluid was observed in the expectant management group in the present study. Darney et al. demonstrated that the risk of meconium passage increases with advancing gestational age beyond 39 weeks [13]. Caughey et al. also reported a progressive rise in intrapartum complications, including meconium-stained liquor, with prolonged pregnancy [14]. These findings support the role of elective induction in reducing meconium-related neonatal complications. Neonatal outcomes in the present study favoured elective induction, with lower rates of low APGAR scores at one minute and reduced NICU admissions. Stock et al. reported a reduction in perinatal morbidity when delivery occurred at 39 weeks compared to ongoing pregnancy

[15]. Similarly, Kabadi et al. observed higher NICU admission rates among neonates born to expectantly managed mothers, primarily due to respiratory distress and meconium aspiration [11].
The mean birth weight was higher in the expectant management group, reflecting the effect of advancing gestation on fetal growth. Cheng et al. reported an increased risk of fetal macrosomia and associated birth complications with continuation of pregnancy beyond 39 weeks [16]. Increased birth weight has been linked to higher rates of shoulder dystocia and birth trauma, as highlighted by Rouse et al. [17]. Respiratory distress was the most common indication for NICU admission in both groups, with a higher frequency in the expectant management group. Tita et al. reported that prolonged gestation is associated with increased neonatal respiratory morbidity and perinatal complications [18]. Wood et al. further emphasized that early-term delivery at 39 weeks may reduce neonatal morbidity without increasing maternal risk [19]. The findings of this study are consistent with existing literature suggesting that elective induction of labour at 39 completed weeks in low-risk primigravida women is a safe and effective strategy. In tertiary care settings, elective induction may reduce neonatal morbidity while maintaining acceptable maternal outcomes. These findings support the incorporation of individualized counselling and evidence-based decision-making when managing low-risk pregnancies approaching term.

Conclusion

The present study demonstrates that elective induction of labour at 39 completed weeks in low-risk primigravida women is a safe and effective alternative to expectant management. Elective induction was not associated with an increased rate of primary caesarean section or adverse maternal outcomes, while neonatal outcomes showed improvement in terms of reduced meconium-stained amniotic fluid, fewer low APGAR scores at one minute, and lower NICU admission rates compared to expectant management. These findings suggest that planned delivery at 39 weeks may help minimize perinatal risks related to advancing gestation without increasing maternal morbidity. In well-equipped tertiary care settings, elective induction at 39 weeks can be considered a reasonable and evidence-based option for low-risk primigravida women, supporting informed decision-making and individualized obstetric care.

Conflict of interest: Nil
Source Of Fund: Nil

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