

Epidural Labour Analgesia and Programmed Labour Analgesia in Controlling Labour Pain – A Study of 60 Cases

DOI: 10.5281/zenodo.17378912



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Received: 10 Oct 2025
Accepted: 13 Oct 2025
Published: 17 Oct 2025

Published by:
Gopalganj Medical College, Gopalganj,
Bangladesh

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ABSTRACT

Background: Labour pain is one of the most severe forms of pain experienced by women. Analgesia during labour is a crucial component of modern obstetric practice. Epidural labour analgesia is considered the gold standard, but newer methods such as programmed labour analgesia (PLA) are increasingly being explored for efficacy, maternal satisfaction, and neonatal outcomes. **Objective:** To compare the efficacy, maternal satisfaction, and obstetric/neonatal outcomes of epidural labour analgesia versus programmed labour analgesia in controlling labour pain. **Methods & Materials:** This prospective comparative study was conducted on 60 parturients admitted for vaginal delivery. Thirty women received epidural analgesia (Group A), while thirty received programmed labour analgesia (Group B). Pain relief was assessed using a Visual Analogue Scale (VAS). Maternal hemodynamic parameters, labour duration, mode of delivery, maternal side effects, neonatal outcomes (APGAR score), and overall maternal satisfaction were recorded and compared. **Results:** Both groups demonstrated significant reduction in VAS scores after initiation of analgesia. Group A (epidural) achieved superior pain relief with mean VAS scores consistently <3 during active labour, while Group B (PLA) showed moderate pain relief with mean VAS scores around 4–5. Duration of first stage of labour was slightly prolonged in the epidural group compared to PLA. Maternal hypotension occurred more frequently in the epidural group (20%) versus PLA (6.6%). No significant differences were observed in APGAR scores between groups. Maternal satisfaction was high in both groups, but significantly greater in the epidural group ($p < 0.05$). **Conclusion:** Both epidural labour analgesia and programmed labour analgesia are effective in controlling labour pain, but epidural analgesia provides superior pain relief and higher maternal satisfaction at the expense of slightly prolonged labour and increased maternal hypotension. Programmed labour analgesia may be considered as a safe alternative where epidural services are limited.

Keywords: Labour Analgesia, Epidural Analgesia, Programmed Labour Analgesia, Labour Pain, Obstetric Outcome

(The Insight 2025; 8(2): 324-327)

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INTRODUCTION

Labour pain is regarded as one of the most severe forms of pain experienced by women during their lifetime, arising from uterine contractions, cervical dilatation, and perineal stretching.^[1] Unrelieved labour pain can lead to maternal exhaustion, increased catecholamine release, impaired uteroplacental blood flow, and adverse maternal-fetal outcomes^[2]. Hence, effective pain management during labour is a critical component of modern obstetric care. Epidural

analgesia is widely considered the gold standard for intrapartum pain relief. It provides superior analgesia, reduces maternal stress, and improves the overall birthing experience without significant neonatal compromise.^[3,4] However, it requires specialized equipment, continuous monitoring, and trained anesthesiologists, which may not be feasible in all settings.^[5] Programmed labour analgesia (PLA) has emerged as a simpler and cost-effective alternative, especially in resource-limited environments. It typically

involves the administration of opioids, antispasmodics, and antiemetics at fixed intervals, aiming to provide adequate analgesia, facilitate cervical dilatation, and shorten labour duration.^[6,7] While PLA may not match the efficacy of epidural analgesia, it is less invasive, easier to administer, and associated with fewer hemodynamic disturbances.^[8] Comparative evidence regarding the efficacy and safety of PLA versus epidural analgesia remains limited. Most available studies report that although epidural analgesia offers superior pain relief, PLA provides acceptable analgesia with fewer maternal side effects and no adverse neonatal outcomes.^[6,9] Therefore, this study was undertaken to compare the efficacy, maternal satisfaction, and neonatal outcomes of epidural labour analgesia and programmed labour analgesia in 60 parturients.

MATERIALS & METHODS

Study Design and Setting: A prospective comparative study was conducted over a 12-month period in the Department of Anesthesia, North East Medical College & Hospital, Sylhet, Bangladesh from January to December 2024.

Sample Size: A total of 60 parturients in active labour were recruited and randomly allocated into two groups:

- **Group A (Epidural Analgesia):** 30 cases
- **Group B (Programmed Labour Analgesia):** 30 cases

Inclusion Criteria:

- Singleton pregnancy
- Term gestation (37–41 weeks)
- Cephalic presentation
- Spontaneous onset of labour or induced labour
- Willingness to participate and provide informed consent

Exclusion Criteria:

- Contraindications to epidural or systemic analgesia
- High-risk pregnancies (e.g., preeclampsia, heart disease)
- Previous cesarean section
- Known drug allergies

Intervention Protocols:

- **Epidural Analgesia:** A lumbar epidural catheter was inserted at L3–L4 space. A test dose was followed by 0.125% bupivacaine with fentanyl (2 µg/ml) given intermittently to maintain analgesia.
- **Programmed Labour Analgesia:** A standardized regimen of intravenous tramadol (1 mg/kg), drotaverine (40 mg), and an antiemetic was administered at predetermined intervals during labour.

Outcome Measures:

1. **Pain relief:** Measured using the 10-point Visual Analogue Scale (VAS) at baseline, 30 min, 1 hr, and 2 hr after initiation.
2. **Maternal parameters:** Hemodynamics (pulse, BP), duration of first and second stage of labour, mode of delivery.
3. **Side effects:** Hypotension, nausea, vomiting, pruritus, sedation.
4. **Neonatal outcome:** APGAR scores at 1 and 5 minutes.
5. **Maternal satisfaction:** Graded as excellent, good, fair, or poor.

Statistical Analysis: Data were analyzed using SPSS version XX. Continuous variables were expressed as mean ± SD and compared using Student's t-test. Categorical variables were analyzed using chi-square test. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 60 parturients were included in the study, 30 in the Epidural Analgesia group (Group A) and 30 in the Programmed Labour Analgesia group (Group B). The mean age of participants was comparable between the two groups (25.6 ± 3.4 years in Group A vs 26.2 ± 3.1 years in Group B; p=0.41). The distribution of primigravida and multigravida women was also similar, with no statistically significant difference (p>0.05). This indicates that the baseline demographic profile was well matched, minimizing confounding bias in comparing the two analgesic techniques. Both groups were comparable with respect to age, parity, and baseline characteristics (p>0.05).

Table – I: Demographic Profile

Parameter	Group A (Epidural)	Group B (PLA)	p-value
Mean Age (years)	25.6 ± 3.4	26.2 ± 3.1	0.41
Primigravida (%)	60%	56.6%	0.78
Multigravida (%)	40%	43.3%	0.81

The demographic distribution was statistically comparable, eliminating confounding effects.

Table – II: Pain Relief (VAS Scores)

Time interval	Group A (Epidural) Mean ± SD	Group B (PLA) Mean ± SD	p-value
Baseline	8.5 ± 0.6	8.4 ± 0.7	0.72
30 min after	2.1 ± 0.8	4.7 ± 1.0	<0.001
1 hour after	2.4 ± 0.7	4.8 ± 0.9	<0.001
2 hours after	2.6 ± 0.6	5.0 ± 1.0	<0.001

Epidural provided superior pain relief compared to PLA (p<0.001).

Both groups reported severe pain before administration of analgesia (VAS ~8.5). Following intervention, Group A (epidural) showed a marked reduction in pain scores, with mean VAS decreasing to 2.1 within 30 minutes and remaining below 3 throughout labour. In contrast, Group B (PLA)

demonstrated only moderate reduction, with VAS scores remaining around 4–5. The difference between groups was statistically significant ($p < 0.001$), confirming that epidural analgesia provides superior pain relief compared to PLA.

Table – III: Labour Characteristics

Parameter	Group A (Epidural)	Group B (PLA)	p-value
Duration of 1st stage (hrs)	9.2 ± 1.4	8.1 ± 1.3	0.01*
Duration of 2nd stage (min)	38.5 ± 9.2	36.8 ± 8.5	0.42
Vaginal delivery (%)	73%	80%	0.54
Cesarean (%)	27%	20%	0.54

First stage of labour was prolonged in epidural group ($p = 0.01$), but second stage and mode of delivery were not significantly different.

The first stage of labour was significantly prolonged in the epidural group (9.2 ± 1.4 hrs) compared to the PLA group (8.1 ± 1.3 hrs; $p = 0.01$). However, the duration of the second stage of labour was similar in both groups ($p = 0.42$). The rate of

vaginal deliveries was slightly higher in the PLA group (80%) compared to the epidural group (73%), but this difference was not statistically significant ($p = 0.54$). Similarly, cesarean section rates did not differ significantly. Thus, while epidural prolongs the first stage of labour, it does not significantly affect mode of delivery.

Table – IV: Maternal Side Effects

Side effect	Group A (Epidural)	Group B (PLA)
Hypotension	20%	6.6%
Nausea/Vomiting	3.3%	10%
Sedation	0%	13%
Pruritus	6.6%	0%

Hypotension was more frequent in epidural group; PLA showed mild sedation and more nausea/vomiting.

Hypotension was more frequent in the epidural group (20%) compared to the PLA group (6.6%), which is consistent with the known physiological effects of neuraxial blockade. Nausea and vomiting were more common in the PLA group (10% vs 3.3%), likely due to opioid administration. Sedation was

reported only in the PLA group (13%), while mild pruritus occurred in 6.6% of epidural cases. These side effects were minor and managed without significant impact on maternal or neonatal outcomes.

Table – V: Neonatal Outcome (APGAR Scores)

APGAR	Group A (Epidural)	Group B (PLA)	p-value
1 min	7.6 ± 0.5	7.5 ± 0.6	0.53
5 min	8.9 ± 0.3	8.8 ± 0.4	0.38

Neonatal outcomes were comparable with no significant difference in APGAR scores.

The mean APGAR scores at 1 minute and 5 minutes were comparable between both groups, with no statistically significant difference ($p > 0.05$). This suggests that neither

epidural nor PLA had adverse effects on neonatal adaptation immediately after birth. Both techniques are therefore considered safe for neonatal outcomes.

Table – VI: Maternal Satisfaction

Satisfaction level	Group A (Epidural)	Group B (PLA)
Excellent	60%	43%
Good	30%	30%
Fair	10%	17%
Poor	0%	10%

Maternal satisfaction was significantly higher in the epidural group (90% Excellent/Good vs 73% in PLA group).

Maternal satisfaction was significantly higher in the epidural group, with 90% of women rating their experience as “Excellent” or “Good” compared to 73% in the PLA group. A small proportion of PLA patients (10%) rated their experience

as “Poor,” mainly due to inadequate pain relief. This highlights that while both techniques are acceptable, epidural remains the preferred choice from the maternal perspective.

DISCUSSION

Labour pain is universally recognized as one of the most severe forms of pain experienced by women, and effective pain management significantly improves maternal comfort and cooperation during childbirth.^[10] In this study, both epidural analgesia and programmed labour analgesia (PLA) effectively reduced labour pain, but epidural analgesia provided superior pain relief, consistent with its status as the gold standard.^[11,12] Our findings demonstrate that epidural analgesia reduced mean VAS scores to less than 3 throughout labour, whereas PLA maintained scores around 4–5. This is in line with the Cochrane review by Anim-Somuah et al.^[11] which reported epidural analgesia as the most effective method for intrapartum pain relief. PLA, while less effective, still provided acceptable analgesia, as supported by Aruna et al.,^[13] who found PLA to be a practical option in resource-limited settings. The first stage of labour was prolonged in the epidural group, a finding consistent with previous reports that neuraxial analgesia can modestly prolong labour duration.^[14,15] However, our study did not find a significant increase in cesarean delivery rates among women receiving epidural analgesia, echoing findings from Sharma et al.^[16] and the Cochrane review.^[11] This suggests that while epidural may slightly slow labour, it does not adversely influence overall obstetric outcomes. Maternal hypotension was more common in the epidural group (20%), consistent with known pharmacological effects of sympathetic blockade.^[17] On the other hand, nausea, vomiting, and mild sedation were more frequent with PLA, likely attributable to systemic opioid administration.^[12,18] Importantly, these side effects were transient and manageable, and did not impact maternal or neonatal safety. No significant differences in neonatal APGAR scores were observed between groups, indicating that both methods are safe for the neonate. These findings are consistent with Reynolds^[19] and Gupta et al.^[20] who emphasized that neither epidural nor programmed analgesia compromises neonatal well-being when properly administered. Epidural analgesia was associated with higher maternal satisfaction, with 90% rating their experience as excellent or good, compared to 73% in the PLA group. This is comparable to reports by Hawkins³ and Sharma et al.,^[7] where maternal preference strongly favoured epidural due to superior pain control. Nonetheless, PLA achieved acceptable satisfaction, supporting its role as a viable alternative where epidural services are not readily available. From a clinical perspective, our study reinforces that epidural analgesia remains the optimal choice for labour pain relief where resources and expertise permit. However, PLA should not be underestimated: it is simple, cost-effective, and well-suited for rural or resource-constrained settings, providing reasonable pain relief without the need for specialized infrastructure.

CONCLUSION

- Epidural labour analgesia provides superior pain relief and higher maternal satisfaction compared to programmed labour analgesia.

- Programmed labour analgesia is safe, effective, and may serve as a useful alternative where epidural services are unavailable.
- Both techniques showed no adverse effects on neonatal outcomes.
- Larger multicentric studies are recommended to further establish comparative efficacy.

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