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Original Research Article

A Comparative Study of Adjuvant Rectal Diclofenac for Postoperative Analgesia after Caesarean Section

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Abstract:

Background: Effective postoperative pain control after cesarean section is crucial to ensure early recovery, successful breastfeeding, and optimal maternal-infant bonding. Rectal diclofenac, a non-steroidal anti-inflammatory drug (NSAID), offers potential advantages as an adjuvant for postoperative analgesia due to its rapid absorption and sustained effect.

Objectives: To evaluate the efficacy of rectal diclofenac as an adjuvant for postoperative analgesia in women undergoing cesarean section under spinal anesthesia.

Methods: This prospective, randomized comparative study was conducted over a period March 2018 to February 2019 at the Department of Anesthesia, Government Medical College, Bettiah, Bihar, India. A total of 120 ASA I and II pregnant women scheduled for elective lower segment cesarean section under spinal anesthesia were enrolled. They were randomly divided into two equal groups (n=60 each). Group D received a single dose of 100 mg rectal diclofenac suppository immediately after surgery in addition to standard analgesia, while Group C received only standard postoperative analgesia without diclofenac. Pain was assessed using the Visual Analog Scale (VAS) at 2, 4, 6, 12, and 24 hours postoperatively. Additional parameters evaluated included time to first rescue analgesia, total number of analgesic doses required within 24 hours, and maternal satisfaction scores.

Results: Group D demonstrated significantly lower VAS scores at all postoperative time points compared to Group C ($p<0.001$). The mean duration before the first requirement of rescue analgesia was significantly longer in Group D (7.2 ± 1.1 hours) than in Group C (3.6 ± 0.8 hours). Additionally, total analgesic consumption was significantly reduced, and maternal satisfaction scores were higher in the diclofenac group.

Conclusion: Rectal diclofenac as an adjuvant provides superior postoperative analgesia following cesarean section, prolongs the analgesia duration, reduces the need for rescue medication, and enhances maternal satisfaction. It represents a simple, effective, and well-tolerated strategy for improving postoperative recovery.

Keywords: Rectal diclofenac, cesarean section, postoperative analgesia, spinal anesthesia, maternal satisfaction, NSAIDs

Introduction

Cesarean section (CS) is one of the most commonly performed surgical procedures worldwide, and its frequency has risen steadily due to various obstetric and fetal indications. While spinal anesthesia remains the preferred technique for elective cesarean deliveries owing to its rapid onset, ease of administration, and favorable maternal-fetal safety profile, postoperative pain management remains a significant challenge [1]. Adequate analgesia is crucial in the postpartum period, not only to improve maternal comfort but also to facilitate early ambulation, timely breastfeeding, and mother-infant bonding, thereby enhancing the overall postnatal recovery process [2].

Traditionally, systemic opioids and paracetamol have been employed for postoperative pain relief following cesarean sections. However, the use of opioids is associated with several undesirable side effects such as nausea, vomiting, sedation, pruritus, and potential for respiratory depression, especially in breastfeeding mothers [3]. Therefore, multimodal analgesic approaches that minimize opioid consumption and enhance pain control are being actively explored. Among these, non-steroidal anti-inflammatory drugs (NSAIDs) have proven to be effective adjuvants owing to their peripheral and central analgesic actions mediated by cyclooxygenase (COX) inhibition and reduced prostaglandin synthesis [4].

Diclofenac, a widely used NSAID, is known for its potent analgesic and anti-inflammatory effects. Administering diclofenac via the rectal route offers

several advantages including rapid absorption, avoidance of first-pass hepatic metabolism, improved patient compliance, and convenience in the immediate postoperative period when oral intake is restricted [5]. Multiple studies have indicated that rectal diclofenac can effectively reduce pain scores and decrease the need for opioid analgesics after various surgical procedures.

Despite these benefits, limited data are available on the use of rectal diclofenac specifically in the context of cesarean section under spinal anesthesia in the Indian population [6]. This study was thus designed to evaluate the efficacy of rectal diclofenac as an adjuvant to standard postoperative pain management following cesarean section [7]. The aim was to compare postoperative pain scores, time to first rescue analgesia, total analgesic requirement, and maternal satisfaction between patients receiving rectal diclofenac and those receiving standard care alone.

Methods

This prospective, randomized comparative study was carried out in the Department of Anesthesia, Government Medical College, Bettiah, Bihar, India from March 2018 to February 2019. A total of 120 pregnant women scheduled for elective lower segment cesarean section (LSCS) under spinal anesthesia were enrolled in the study. All patients belonged to American Society of Anesthesiologists (ASA) physical status I or II and were between 20 and 35 years of age with singleton term pregnancies. Patients with a history of allergy to NSAIDs, gastrointestinal ulcers, bleeding disorders, renal or hepatic dysfunction, or chronic analgesic use were excluded.

Participants were randomly allocated into two equal groups using computer-generated random numbers. Group D (Diclofenac group, n=60) received a 100 mg rectal diclofenac suppository immediately after surgery, in addition to standard postoperative analgesia (intravenous paracetamol 1 g every 8 hours). Group C (Control group, n=60) received standard postoperative analgesia only. All surgeries were performed under subarachnoid block with 0.5% hyperbaric bupivacaine administered in the L3-L4 or L4-L5 interspace using a 25G Quincke spinal needle in the sitting position. No intrathecal opioid or adjuvant was added to the spinal anesthetic.

Postoperative monitoring included heart rate, blood pressure, oxygen saturation, and pain assessment using the Visual Analog Scale (VAS) at predetermined intervals: 2, 4, 6, 12, and 24 hours after surgery. The time to first rescue analgesic dose was recorded, defined as the time from the end of surgery to the patient requesting additional analgesia (VAS $\geq$ 4). Rescue analgesia, when required, was provided using intravenous tramadol 50 mg. The total number of rescue doses administered in the first 24 hours was documented. Maternal satisfaction regarding pain relief was assessed using a 4-point Likert scale (1 = Not satisfied, 2 = Somewhat satisfied, 3 = Satisfied, 4 = Very satisfied) at the end of 24 hours postoperatively. Adverse events such as nausea, vomiting, rectal discomfort, or gastrointestinal irritation were also noted.

Data were compiled and statistically analyzed using appropriate software. Continuous variables such as VAS scores, time to first analgesia, and total rescue analgesic consumption were expressed as mean ± standard deviation and analyzed using the student's t-test. Categorical data such as maternal satisfaction scores and side effects were compared using the Chi-square test or Fisher's exact test as applicable. A p-value of less than 0.05 was considered statistically significant.

Results

A total of 120 patients were analyzed, with 60 in each group. Both groups were comparable in terms of demographic and baseline clinical parameters. Patients who received rectal diclofenac (Group D) demonstrated significantly better pain control, longer duration before needing rescue analgesia, and reduced total analgesic consumption over 24 hours compared to the control group (Group C). Maternal satisfaction was also significantly higher in Group D.

Table 1: Demographic and Baseline Clinical Characteristics

Parameter	Group D (n=60)	Group C (n=60)	p-value
Age (years)	27.6 ± 3.4	27.2 ± 3.6	0.512
Weight (kg)	61.8 ± 4.9	62.1 ± 5.1	0.735
Height (cm)	158.7 ± 5.2	159.2 ± 4.7	0.623
Duration of surgery (min)	43.5 ± 6.8	44.1 ± 7.2	0.528

Table 2: Mean VAS Scores at Different Postoperative Intervals

Time (hours)	Group D (n=60)	Group C (n=60)	p-value
2	2.1 ± 0.6	3.4 ± 0.7	<0.001
4	2.5 ± 0.7	4.2 ± 0.9	<0.001
6	2.9 ± 0.8	4.5 ± 0.9	<0.001
12	3.2 ± 0.6	4.3 ± 0.8	<0.001
24	2.6 ± 0.5	3.7 ± 0.7	<0.001

Table 3: Time to First Rescue Analgesia (in Hours)

Group	Time to First Rescue Analgesia (Mean ± SD)	p-value
Group D	7.2 ± 1.1	
Group C	3.6 ± 0.8	<0.001

Table 4: Total Rescue Analgesic Requirement (No. of Doses in 24 Hours)

Group	Mean Number of Doses ± SD	p-value
Group D	1.1 ± 0.5	
Group C	2.8 ± 0.6	<0.001

Table 5: Maternal Satisfaction Score Distribution

Score (1–4)	Group D (n=60)	Group C (n=60)	p-value
1 (Not satisfied)	0	8	
2 (Somewhat satisfied)	5	18	
3 (Satisfied)	21	28	
4 (Very satisfied)	34	6	<0.001

Table 6: Incidence of Adverse Effects

Side Effect	Group D (n=60)	Group C (n=60)	p-value
Nausea	6	7	0.764
Vomiting	2	3	0.643
Rectal discomfort	1	0	0.317
Gastric irritation	2	1	0.561

Table 7: Mean Heart Rate (beats/min) at Different Intervals

Time (hrs)	Group D	Group C	p-value
0	84.1 ± 6.2	83.4 ± 5.9	0.556
2	85.3 ± 5.8	84.9 ± 6.1	0.728
6	83.7 ± 6.0	84.2 ± 6.3	0.624
12	82.9 ± 5.4	83.1 ± 5.7	0.793
24	81.5 ± 5.1	81.7 ± 5.6	0.851

Table 8: Mean Arterial Pressure (MAP) (mmHg) Over Time

Time (hrs)	Group D	Group C	p-value
0	94.6 ± 6.3	95.2 ± 6.7	0.639
2	92.3 ± 5.9	91.8 ± 6.0	0.686
6	90.9 ± 5.8	91.4 ± 5.5	0.593
12	89.7 ± 5.6	90.2 ± 5.9	0.643
24	88.5 ± 5.4	89.0 ± 5.2	0.671

Table 9: Incidence of Major Complications

Complication	Group D (n=60)	Group C (n=60)	p-value
Postdural puncture headache	0	1	0.317
Wound infection	0	0	—
Readmission for pain	0	0	—

Table 10: Acceptance of Rectal Administration Route

Response	Group D (n=60)	Percentage (%)
Acceptable	52	86.7
Neutral	6	10.0
Unacceptable	2	3.3

Discussion

Effective postoperative pain management is essential for enhanced recovery and maternal comfort following cesarean section. This study demonstrates that the use of rectal diclofenac as an adjuvant significantly improves postoperative analgesia outcomes when compared to standard analgesic therapy alone [8]. Rectal diclofenac, a non-steroidal anti-inflammatory drug (NSAID), acts by inhibiting prostaglandin synthesis, thereby attenuating the inflammatory pain cascade and reducing peripheral sensitization.

The baseline characteristics such as age, weight, height, and duration of surgery were statistically comparable between the two groups, which eliminates confounding variables and lends credibility to the observed differences in analgesic outcomes [9]. The significantly lower VAS scores observed at all measured intervals in the diclofenac group suggest that the addition of NSAID therapy provides enhanced pain relief. This is consistent with multiple earlier studies that have highlighted the efficacy of diclofenac in multimodal analgesia strategies [10].

The extended time to first request for rescue analgesia in Group D indicates a prolonged duration of effective pain control. This is clinically important, as early postoperative hours are particularly distressing for post-cesarean patients who need to initiate breastfeeding, mobilize, and bond with their newborns [11]. Furthermore, the reduced need for rescue analgesics in the diclofenac group not only indicates superior analgesic efficacy but also potentially minimizes opioid-related side effects such as nausea, vomiting, and sedation.

Maternal satisfaction, a subjective yet crucial component in pain management studies, was markedly higher in patients who received rectal diclofenac [12]. A greater proportion of these patients rated their pain relief as “very satisfactory,” reflecting the practical benefits of improved analgesia. Importantly, the acceptability of the rectal route of administration was also high, indicating its feasibility in clinical settings despite potential cultural hesitations [13].

Side effects were minimal and comparable across both groups, and no serious adverse events were observed. This underscores the safety profile of diclofenac, particularly when used in a single rectal dose postoperatively [14]. Additionally, hemodynamic stability in both groups reinforces that rectal NSAID use does not interfere with cardiovascular parameters, which is essential in postpartum women.

Our findings are consistent with those of previous studies demonstrating the efficacy of rectal NSAIDs as part of multimodal analgesia protocols [15]. The results support integrating rectal diclofenac into standard postoperative care after cesarean section, particularly in settings where opioid-sparing techniques are prioritized. However, the study has some limitations, including the single-center design and the inability to blind participants to rectal administration, which could introduce a subjective bias in satisfaction reporting.

In conclusion, rectal diclofenac appears to be a safe, effective, and well-tolerated adjuvant that significantly enhances postoperative analgesia following cesarean section, reduces the need for rescue analgesics, and improves maternal satisfaction. Its incorporation into analgesic protocols can contribute to faster recovery and greater patient comfort in the early postpartum period.

Conclusion

The results of this comparative study clearly demonstrate that rectal diclofenac is a highly effective adjuvant for postoperative analgesia following cesarean section. Patients receiving rectal diclofenac experienced significantly lower pain scores at all measured intervals, a longer duration before requiring rescue analgesia, and a reduced need for additional analgesic doses within the first 24 hours postoperatively. Additionally, maternal satisfaction was notably higher in the diclofenac group, with minimal side effects and high acceptance of the rectal route.

Given its efficacy, safety profile, ease of administration, and favorable patient feedback, rectal diclofenac represents a valuable component of multimodal analgesia for cesarean section. Its routine use in postoperative pain protocols may enhance recovery, reduce reliance on systemic opioids, and improve the overall quality of maternal care in obstetric anesthesia practice.

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