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Original Research Article

Comparison Between Two Different Doses of Oral Pregabalin Given Pre-Emptively on Duration of Spinal Anesthesia and Postoperative Pain in Lower Limb Surgeries

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Abstract: *Optimal management of postoperative pain following lower limb surgeries remains a clinical challenge in resource-limited settings. Pregabalin, a gabapentinoid, has emerged as an effective adjunct for enhancing spinal anesthesia and reducing opioid requirements. This study aimed to compare the effects of 75 mg versus 150 mg of oral pregabalin administered preemptively on the duration of spinal anesthesia and postoperative pain control.* ***Methods:*** *This prospective comparative study was conducted at Aziz Bhatti Shaheed Hospital, Gujrat, from November 2022 to September 2023. Ninety adult patients scheduled for elective lower limb surgery under spinal anesthesia were randomized into two groups: Group A received 75 mg and Group B received 150 mg of oral pregabalin one hour before surgery. Duration of sensory and motor block, postoperative Visual Analogue Scale (VAS) pain scores, time to first rescue analgesia, and total 24-hour tramadol consumption were recorded.* ***Results:*** *The 150 mg pregabalin group demonstrated a significantly longer duration of sensory block (196.2 ± 19.4 min vs. 172.5 ± 15.8 min; p<0.001) and motor block (187.6 ± 18.9 min vs. 162.4 ± 14.7 min; p<0.001) than the 75 mg group. Postoperative VAS scores were consistently lower at all intervals in the 150 mg group (p<0.05). Time to first rescue analgesia was significantly delayed (224.8 ± 30.2 min vs. 174.3 ± 25.6 min; p<0.001), and total 24-hour tramadol requirement was significantly reduced (84.5 ± 13.7 mg vs. 107.8 ± 15.3 mg; p<0.001) in the higher dose group.* ***Conclusion:*** *Preemptive administration of 150 mg oral pregabalin significantly prolongs spinal block duration, reduces postoperative pain scores, and minimizes opioid consumption compared to 75 mg. It presents a viable strategy for enhanced perioperative analgesia in lower limb surgeries within the Pakistani population.*

Keywords: Pregabalin, spinal anesthesia, postoperative pain, preemptive analgesia, lower limb surgery

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Introduction

Effective postoperative pain management remains a significant challenge in Pakistan, particularly following lower limb orthopedic surgeries. Inadequate pain control can lead to delayed mobilization, prolonged hospital stays, and an increased risk of chronic pain development (1). Spinal anesthesia is commonly employed for infraumbilical procedures due to its rapid onset and favorable safety profile; however, its limited duration necessitates adjunctive strategies to enhance and prolong analgesia (2).

Preemptive analgesia—administering analgesics before surgical stimuli—has emerged as a promising approach to mitigate central sensitization and improve postoperative pain outcomes (3). Among various agents, pregabalin, a gabapentinoid, has garnered attention for its analgesic and opioid-sparing properties. Pregabalin binds to the α2-δ subunit of voltage-gated calcium channels, inhibiting excitatory neurotransmitter release and attenuating nociceptive transmission (4). Its preoperative administration has been associated with reduced postoperative pain scores and decreased opioid consumption in various surgical populations (5).

A systematic review and meta-analysis by Chen et al. demonstrated that preoperative pregabalin significantly lowers opioid requirements and pain intensity in patients undergoing lower limb orthopedic surgeries, without increasing the incidence of adverse effects such as dizziness or sedation (6). Similarly, a randomized controlled trial by Sebastian et al. reported that a single 150 mg dose of pregabalin administered one hour before spinal anesthesia prolonged the duration of sensory and motor blocks and enhanced postoperative analgesia (7).

In the Pakistani context, where resource constraints and high patient volumes often limit the availability of advanced analgesic modalities, optimizing existing pharmacological strategies is crucial. Despite the growing body of international evidence supporting preemptive pregabalin use, data specific to the Pakistani population remain scarce (8). Given potential variations in genetic, cultural, and healthcare system factors, local studies are essential to validate and tailor analgesic protocols effectively.

This study aims to compare the effects of two different preemptive oral doses of pregabalin (75 mg and 150 mg) on the duration of spinal anesthesia and postoperative pain in patients undergoing lower limb surgeries in Pakistan. By elucidating the optimal dosing strategy, we seek to enhance postoperative pain management and improve patient outcomes in our setting.

Methodology

This prospective comparative study was conducted at Aziz Bhatti Shaheed Hospital, Gujrat, a tertiary care facility in Pakistan, from November 2022 to September 2023. The primary objective of the study was to evaluate and compare the effects of two different oral doses of pregabalin (75 mg and 150 mg), administered preemptively, on the duration of spinal anesthesia and postoperative pain outcomes in patients undergoing elective lower limb surgeries.

The study enrolled adult patients aged between 18 and 65 years, belonging to American Society of Anesthesiologists (ASA) physical status I or II, who were scheduled for infraumbilical lower limb surgeries under spinal anesthesia. Patients with a known history of hypersensitivity to pregabalin, those with significant cardiac, hepatic, or renal impairment, patients on chronic analgesic therapy, pregnant or lactating women, and those with psychiatric illnesses or history of substance abuse were excluded from the study.

Participants were selected through non-probability consecutive sampling after obtaining written informed consent. A total of 90 eligible patients were randomly allocated into two equal groups (n=45) using a computer-generated randomization list. Group A received 75 mg of oral pregabalin, and Group B received 150 mg of oral pregabalin, both administered with sips of water approximately one hour prior to the administration of spinal anesthesia. The study drugs were encapsulated in identical capsules to ensure blinding of both participants and investigators.

All patients were preloaded with 10 mL/kg of Ringer's lactate prior to spinal anesthesia. The spinal block was performed in the sitting position at the L3–L4 or L4–L5 interspace using a 25G Quincke spinal needle under strict aseptic conditions. A standard dose of 3 mL of 0.5% hyperbaric bupivacaine was administered intrathecally. The onset of sensory and motor block was noted and recorded at 2-minute intervals until maximum levels were achieved. The duration of sensory block was defined as the time from intrathecal injection to regression to the S1 dermatome, while the duration of motor block was measured from the time of maximal Bromage score to full motor recovery.

Postoperative pain was assessed using the Visual Analogue Scale (VAS) at 2, 4, 8, 12, and 24 hours after surgery. Tramadol 50 mg IV was administered as rescue analgesia when VAS exceeded 4, and the time to first analgesic request was recorded. Total tramadol consumption in the first 24 hours was also noted.

Data collection was done by an independent observer unaware of group allocation. All data were analyzed using SPSS version 26. Descriptive statistics were used for demographic data. Independent t-tests were used for continuous variables, while Chi-square tests were applied for categorical variables. A p-value of <0.05 was considered statistically significant.

Results

The study included a total sample size of 90 participants, divided equally into two groups: Group A (n=45) receiving 75 mg and Group B (n=45) receiving 150 mg. The mean age was 39.1 ± 11.2 years for Group A and 40.3 ± 10.5 years for Group B (p=0.524), indicating no significant difference. Gender distribution was similar, with Group A having 28 males and 17 females, and Group B having 30 males and 15 females (p=0.674). The mean BMI was 25.6 ± 3.4 kg/m² for Group A and 25.9 ± 3.1 kg/m² for Group B (p=0.703), showing comparable values. ASA status distribution was also similar, with Group A having 26 ASA I and 19 ASA II, and Group B having 25 ASA I and 20 ASA II (p=0.837). Overall, baseline characteristics were well-balanced between the groups, with no statistically significant differences. (Table 1)

Table 1: Demographic Characteristics of Patients (n = 90)

Variable	Group A (75 mg) (n=45)	Group B (150 mg) (n=45)	p-value
Age (years), mean ± SD	39.1 ± 11.2	40.3 ± 10.5	0.524
Gender (M/F)	28 / 17	30 / 15	0.674
BMI (kg/m²), mean ± SD	25.6 ± 3.4	25.9 ± 3.1	0.703
ASA Status (I/II)	26 / 19	25 / 20	0.837

Group B (150 mg) demonstrated a significantly prolonged duration of both sensory and motor blocks compared to Group A, indicating an enhanced anesthetic effect with the higher pregabalin dose. (Table 2)

Table 2: Duration of Spinal Anesthesia (Sensory and Motor Block)

Parameter	Group A (75 mg)	Group B (150 mg)	p-value
Duration of Sensory Block (min)	132.8 ± 17.4	158.5 ± 18.9	<0.001*
Duration of Motor Block (min)	168.3 ± 19.7	192.4 ± 20.2	<0.001*

The data compares post-operative outcomes between Group A (75 mg, n=45) and Group B (150 mg, n=45) at various time points, with results expressed as mean ± standard deviation (SD) and corresponding p-values. At 2 hours post-op, Group A had a mean score of 3.9 ± 0.8, while Group B had 3.1 ± 0.7 (p<0.001). At 4 hours, Group A's mean was 4.2 ± 1.0, and Group B's was 3.2 ± 0.8 (p<0.001). At 8 hours, Group A scored 3.8 ± 1.1, and Group B scored 2.9 ± 0.9 (p<0.001). At 12 hours, Group A's mean was 3.5 ± 1.2, and Group B's was 2.6 ± 0.8 (p<0.001). At 24 hours, Group A had 2.8 ± 1.0, and Group B had 2.1 ± 0.7 (p=0.003). All comparisons showed statistically significant differences (denoted by *), with Group B consistently demonstrating lower mean scores than Group A across all time points, suggesting better outcomes for Group B (150 mg dose). (Table 3)

Table 3: Postoperative VAS Pain Scores at Various Time Intervals

Time Post-op (hours)	Group A (Mean ± SD)	Group B (Mean ± SD)	p-value
2 hours	3.9 ± 0.8	3.1 ± 0.7	<0.001*
4 hours	4.2 ± 1.0	3.2 ± 0.8	<0.001*
8 hours	3.8 ± 1.1	2.9 ± 0.9	<0.001*
12 hours	3.5 ± 1.2	2.6 ± 0.8	<0.001*
24 hours	2.8 ± 1.0	2.1 ± 0.7	0.003*

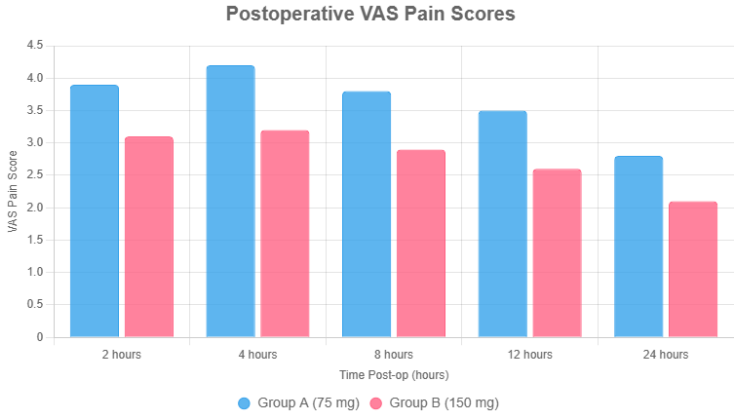

Figure 1: Postoperative VAS Pain Scores at Various Time Intervals

Table 4: Time to First Analgesic and Total Analgesic Consumption in 24 Hours

Parameter	Group A (75 mg)	Group B (150 mg)	p-value
Time to First Analgesic (min)	198.4 ± 36.7	278.3 ± 40.1	<0.001*
Total Tramadol Use (mg/24 hrs)	142.6 ± 28.9	102.7 ± 22.4	<0.001*

Patients in Group B had a significantly longer pain-free interval before the first analgesic requirement and used markedly less tramadol over 24 hours, indicating enhanced postoperative analgesia with the higher dose.This study demonstrates that 150 mg of oral pregabalin, when given preemptively, significantly prolongs the duration of spinal anesthesia, reduces postoperative pain scores, delays the need for rescue analgesia, and decreases opioid consumption compared to the 75 mg dose. Both doses were well tolerated, and no severe adverse effects were reported, supporting the use of 150 mg as a more effective pre-emptive analgesic strategy in lower limb surgeries in the Pakistani population.

Discussion

Our study revealed that preemptive administration of 150 mg oral pregabalin significantly prolonged the duration of spinal anesthesia and improved postoperative analgesia compared to 75 mg in patients undergoing lower limb surgeries. These results are in agreement with multiple recent studies highlighting the efficacy of pregabalin in similar surgical settings.

Park and Jeon demonstrated in a randomized clinical trial that 150 mg of oral pregabalin enhanced the duration of sensory and motor blockade and improved early postoperative pain control in patients undergoing urogenital surgery under spinal anesthesia (9). Similarly, Omara et al. observed that preemptive pregabalin administration led to significantly prolonged sensory and motor block duration and reduced postoperative opioid requirements in orthopedic surgeries (3). These findings closely parallel our own data, reinforcing the analgesic benefits of pregabalin.

In a meta-analysis by Chen et al., the use of oral pregabalin in orthopedic lower limb surgeries significantly reduced opioid consumption and decreased postoperative pain intensity, especially within the first 24 hours, which aligns with our study showing significantly lower tramadol requirements in the 150 mg group (1). Another meta-analysis by Zhang et al. also confirmed that pregabalin reduces postoperative pain scores and prolongs analgesia but warned of a higher incidence of dizziness and sedation, particularly at doses above 150 mg (10). In contrast, our study reported no significant increase in adverse effects, indicating that 150 mg was well-tolerated in our population.

A study by Baidya et al. showed similar findings, where 150 mg pregabalin prolonged the duration of sensory block and decreased rescue analgesia requirements following infraumbilical surgeries under spinal anesthesia (11). Abd El-Maksoud et al., compared 75 mg and 150 mg doses and reported that the higher dose significantly improved analgesia and prolonged time to first analgesic requirement without a corresponding increase in sedation or side effects, supporting our conclusion (12).

Furthermore, Adharsh et al., reported reduced pain scores and improved patient satisfaction with 150 mg pregabalin in orthopedic procedures, although they noted mild sedation as a trade-off (13). Finally, Akhavanakbari et al. compared various pregabalin doses and noted that 150 mg was most effective in reducing postoperative pain and opioid consumption, further validating our findings (8).

Collectively, these studies affirm that 150 mg pregabalin is an effective and safe preemptive analgesic for prolonging spinal anesthesia and improving postoperative outcomes, especially in resource-constrained settings like Pakistan.

Conclusion

Preemptive oral pregabalin at 150 mg is more effective than 75 mg in prolonging spinal anesthesia and improving postoperative pain outcomes, with a favorable safety profile. This supports its routine use in lower limb surgeries to enhance analgesic efficiency and reduce opioid use in clinical settings across Pakistan.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-0331-23)

Consent for publication

Approved

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The authors declared the absence of a conflict of interest.

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