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Comparative Study of Oral Pregabalin Vs Gabapentin for Post Operative Analgesia in Lower Limb Surgeries under Spinal Anaesthesia

Sukriti Bhardwaj[1], S. P. Chittora[2], Aksha Khan[3]

[1]Post Graduate (3rd year resident), Department of Anaesthesiology, Jhalawar Medical College, Jhalawar, Rajasthan
E mail ID: *bhardwajsuku1494[at]gmail.com*

[2]Sr. Prof. Department of Anaesthesiology, Jhalawar Medical College, Jhalawar, Rajasthan
E mail ID: *drspchittora[at]rediffmail.com*

[3]Post Graduate (3rd year resident), Department of Anaesthesiology, Jhalawar Medical College, Jhalawar, Rajasthan
E mail ID: *akshakhan03[at]gmail.com*

Abstract: ***Background and aim: Pre - emptive analgesia is an anti – nociceptive treatment that prevents establishment of altered processing of afferent input which amplifies post operative pain. The aim of the study is to evaluate and compare the pre - emptive analgesic efficacy of oral pregabalin vs oral gabapentin for postoperative analgesia in patients undergoing elective orthopaedic lower limb surgeries under spinal anaesthesia. Methodology: This study included 90 patients, who were divided into 3 groups of 30 each. Group P received Tablet pregabalin 300 mg, Group G received Tablet gabapentin 900 mg and Group C received placebo tablets (multi vitamin) preoperatively 2 hrs before surgery. Parameters like duration of analgesia, visual analogue score (VAS), Ramsay sedation score were recorded. Result: The mean duration of analgesia was 535.6, 305.03 and 156.53 minutes in Group P, Group G and Group C respectively. These differences were statistically significant. Conclusion: This study shows that Pre - emptive Pregabalin and Gabapentin provides good post operative analgesia compared to placebo and Pregabalin (300mg) provides prolonged pain relief compared to Gabapentin (900mg) in the post operative period. Pregabalin and Gabapentin reduce post operative opioid requirement in the first 24 hours post - surgery with very less adverse events.***

Keywords: Pregabalin, Gabapentin, Pre - emptive analgesia

1. Introduction

Postoperative pain is not purely nociceptive in nature and may consist of inflammatory, neurogenic and visceral components [(1).] Inadequately treated post operative pain may have various systemic implications on the patient such as tachycardia, hypertension, increased blood glucose, delayed wound healing and anxiety. Anxiety leads to a surge of catecholamines due to the stress response leading to tachycardia, hypertension and hemodynamic instability. Therefore, the relationship between anxiety and pain is well established. Post operative pain could be attributed to inflammation resulting from tissue trauma due to the surgical incision, tissue injury due to cauterization or direct nerve injury as a result of nerve transection, stretching or compression. Pro - inflammatory mediators released as a result of tissue injury such as prostaglandins, interleukins, cytokines and neurotrophins contribute to nociceptor sensitization. Also, a decrease in tissue pH and oxygen tension, and increased lactate concentration which may be persistent at the surgical site for several days play an important role in peripheral sensitization and spontaneous pain behaviour following an incision [(2).]

Pre - emptive analgesia, an evolving clinical concept, involves the introduction of an analgesic regimen before the onset of noxious stimuli, with the goal of preventing sensitization of the nervous system to subsequent stimuli that could amplify pain. Surgery offers the most promising setting for pre - emptive analgesia because the timing of noxious stimuli is known. This can be achieved by multimodal approach to pain management. Multimodal analgesia therefore takes into account the exact mechanisms, new pharmaceutical products and other routes and modes of delivery of analgesics. Acute postoperative pain associated with surgical wounds is commonly encountered in most patients after a surgical procedure.

Postoperative pain prevention and treatment continues to be a major challenge in postoperative care and plays an important role in allowing the patient to move and feel better. Major goal of postoperative pain management is to minimize the dose of medication, to lessen the side effects and provide adequate analgesia.

Additionally, improper postoperative pain management is significantly related to higher risk of occurrence of severe complications to patients, such as delayed trauma recovery, pulmonary embolism, as well as myocardial ischemia [(3).] It may produce clinical and psychological changes which in turn will increase morbidity and mortality [(4).] Although opioid drugs are commonly used in postoperative pain management, they are accompanied by side effects such as nausea, vomiting, drowsiness, itching, and urinary retention, leading to restriction of their use [(5).] Other methods such as epidural analgesia are effective, but require extra effort and are associated with serious complications. Nonsteroidal anti - inflammatory drugs (NSAIDs) are also used for postoperative analgesia, but may be accompanied by damage to gastrointestinal mucosa, bleeding, renal toxicity, allergic reactions, and heart failure. Selective cyclooxygenase - 2

NSAIDs have pro - thrombotic properties and increase the risk of stroke and myocardial ischemia [6].

Considering that surgical stimulation is associated with peripheral and central sensitization, anti - hyperalgesic drugs can treat postoperative pain by preventing central nervous system pain hypersensitivity. Examples of these drugs are gabapentin and pregabalin, which are anti - seizure, anti - hyperalgesic, and anti - anxiety drugs. These drugs bind to the α2 - δ1 subunit of voltage - dependent calcium channels found in the central nervous system. Pregabalin is structurally similar to gabapentin and induces a greater analgesic effect than gabapentin in the case of neuropathic pain, diabetic peripheral neuropathy [7] and postherpetic neuralgia in animal models. Pregabalin is preferred over gabapentin because of the increased bioavailability (90%). However, these drugs have side effects such as somnolence, dizziness, nausea, and vomiting.

Based on the knowledge available regarding the management of post operative pain, this study was designed to compare the pre - emptive analgesic efficacy of oral pregabalin versus oral gabapentin for post operative analgesia in patients undergoing lower limb orthopaedic surgeries under spinal anaesthesia.

Aim:
Aim of this study is to evaluate and compare the pre - emptive analgesic efficacy of oral gabapentin vs oral pregabalin for postoperative analgesia in patients undergoing elective orthopaedic lower limb surgeries under spinal anaesthesia.

Objectives

Primary Objective:
To determine the difference in the duration of analgesia in patients receiving oral gabapentin and oral pregabalin preoperatively, posted for elective orthopaedic lower limb surgeries.

Secondary Objectives:
1) To determine the side effects of oral gabapentin and oral pregabalin in these two groups of patients and
2) To access the difference in the need for the rescue analgesics in these two groups.

2. Review of Literature

- **Elhameed GAA et al 2019** [8] compared the Benefit of Pre - Emptive Pregabalin 300 mg and Gabapentin 900 mg on Acute Postoperative Pain for Elective Gynaecological Surgery. A total number of 75 patients were randomized, into three groups (group A, B and C), each group including 25 patients with total 75 patients. Pregabalin, gabapentin or placebo, the pain was assessed on a visual analogue scale (VAS) at 0, 6, 12, 18 & 24 hours postoperatively. Duration of effective analgesia was documented, and administration of extra analgesic doses of meperidine required in the first 24 hours. Patients in the gabapentin or pregabalin had significantly lower VAS scores at 6, 12, 18 and 24 hours, than those in the placebo group. As for rescue analgesia with meperidine consumed in the gabapentin, and pregabalin were significantly less than in the placebo. As for the complications, both drugs had increased incidence of nausea, vomiting and dizziness postoperatively, while no significance was found between all groups as regard hypotension, bradycardia and shivering. They concluded Preoperative use of pregabalin or gabapentin provides comparable but significant prolonged postoperative analgesia, less nausea and vomiting compared to placebo after gynaecological surgeries. However, it was associated with increased incidence of postoperative dizziness.

- **Dhurve PK et al 2021** [9] studied preoperative oral pregabalin and gabapentin with respect to postoperative pain relief and postoperative analgesic requirement in patients undergoing laparoscopic cholecystectomy. They conducted in patients 18 - 70 years, of either sex, with ASA grade I - II and 60 patients were randomly divided into Gabapentin group (Gabapentin 600 mg orally with sips of water, two hours prior to surgery) and Pregabalin group (Pregabalin 150 mg orally with sips of water, one hour prior to surgery) in double blinded manner. In this study, there was no substantial difference among the two groups with regard to age, weight, sex and ASA grade. In present study, the number of patients receiving Pregabalin (14.7 ± 4.1) had a statistically significant lower mean first hour post operative visual analogue scale score as compared to patients receiving Gabapentin (32.8 ± 9.6). The mean time of rescue analgesia in the pregabalin group was 4.33 hours and that in the gabapentin group was 1.75 hours and difference was statistically significant. Pain was lower in the Pregabalin group when compared with the Gabapentin group, during the entire observation period. Mean Ramsay sedation score was higher in gabapentin group during the first 8 hours post operatively as compared to pregabalin group and difference was statistically significant. They concluded Pregabalin is superior to gabapentin as: it decreases post operative pain for the first 24 hours, reduces the requirement of rescue analgesia and is associated with low incidence of side effects.

- **Kalu EBE et al 2022 ([10])** compared the analgesic effect of gabapentin and pregabalin in postoperative pain management of major lower limb orthopaedic surgeries. A total of 90 patients between the ages of 18 – 65 years, ASA I and II physical status, were randomized into three groups to receive either 300mg gabapentin in group G (n = 30), 150mg of pregabalin in group P (n=30), or placebo in group C (n=30). The pain scores, duration of analgesia, total opioid consumption, and side effects of the study drugs were assessed and documented. A p - value of < 0.05 was considered statistically significant. The mean VAS score at 1st hour was significantly lower in Group P (1.33 ± 0.48), compared with Group G (2.17 ± 0.83) and Group C (3.67 ± 1.61), ($p < 0.01$). Moreover, the mean duration of analgesia was significantly prolonged in Group P (422.00 ± 39.934 min), compared with Group G (272.07 ± 55.08 min) and Group C (194.27 ± 23.22 min), $p<0.01$. Nevertheless, the mean total analgesic consumption was significantly higher in Group C (180.23 ± 34.07 mg), compared to Group G (126.10±41.88 mg) and Group P (102.13 ± 32.78 mg), $p<0.001$. However, the incidence of hypotension was more in Group C (20%), compared with Group P (13.3%) and Group G (10%). They concluded that preoperative oral

pregabalin 150mg provided prolonged duration of analgesia, reduced pain score, and reduced postoperative pethidine consumption, compared with preoperative oral gabapentin in patients that received spinal anaesthesia for lower limb orthopaedic surgery.

3. Methodology

This is a prospective interventional study done in the department of Anaesthesiology and Critical Care. Jhalawar (Rajasthan). This included patients undergoing elective lower limb orthopaedic surgery, who were more than 18 years and less than 60 years of age, in ASA GRADE 1, 2.

Exclusion Criteria:
Patients belonging to ASA grade 3, 4, 5 and emergency cases, those who were refusing for the intake of the study drugs, Pregnancy and lactating mothers, History of chronic pain and daily intake of analgesics, Patients who had been prescribed pregabalin or gabapentin for other indications, patients with cardiopulmonary dysfunction, neurological and psychological illnesses, metabolic disorders, renal and hepatic disorders. Patients with hypersensitivity to the study drugs, patients with BMI >35.

First group (group P) received Tablet pregabalin 300 mg with sips of water preoperatively 2 hours before surgery. Second group (group G) received Tablet gabapentin 900 mg preoperatively 2 hours before surgery. Third group (group C) received placebo tablets (multi vitamin) preoperatively. The anaesthesiologist administering the drug and the patient were not aware of which group they were allotted to.

4. Procedure

Each patient after pre anaesthetic check - up (PAC) was kept overnight fasting after midnight for surgery. Patient's written informed consent and PAC was checked. All patients were pre - medicated with Tab. Ranitidine 150mg and Tab. Ondansetron 8mg orally on the night before surgery. Patients were divided into three groups with 30 patients in each group as mentioned earlier. Group P (Pregabalin group, n=30), Group G (gabapentin group, n=30) and Group C (placebo group, n=30). They were informed preoperatively about the visual analogue scale. Patients in Group P received 300 mg of Pregabalin orally, Group G received Gabapentin 900 mg orally and Group C patients received placebo capsules with sips of water two hours before surgery. Intravenous access with 18 - gauge iv cannula was secured at forearm level. Baseline vital parameter like BP, pulse rate, SpO_2, respiratory rate were documented. Patient were preloaded with lactated Ringer's solution as a bolus of 10 ml/kg before subarachnoid block to all patients. Under strict aseptic precautions, 3ml of hyperbaric solution of 0.5% bupivacaine with 25 mcg of Inj Fentanyl was given in lumbar subarachnoid space using 25 Gauge Quincke needle. At the end of surgery, patients were shifted to ward. VAS scores were assessed in the immediate postoperative period (0hr) and at 1, 2, 3, 5, 7, 9, 12 and 24 hours post operatively. At the end of surgery, patients were shifted to ward. Ramsay sedation scores were assessed in the immediate postoperative period (0hr) and at 1, 2, 3, 5, 7, 9, 12 and 24 hours post operatively. Patients were given inj. tramadol 2mg/kg intramuscularly when the VAS score was 4 or greater. Dosage did not exceed 250 mg at one time and 600 mg per day. Time since spinal anaesthesia to first requirement of analgesic (T1), total analgesic requirement in first 24 hours, VAS scores, Ramsay sedation score, side effects of the drug like dizziness, headache, nausea, vomiting, hypotension were recorded in first 24 hours postoperatively.

5. Statistical Tests

To determine the significance in the difference in the mean of the three groups with respect to hemodynamic parameters, Duration of analgesia were done by ANOVA test. To determine the significance in the difference of side effects in the three groups were done by chi square test.

6. Result

In this prospective randomized controlled trial, 90 patients were studied, divided into 3 groups of 30 each. The focus of this study was on the duration of analgesia, total dose of rescue analgesic used and on the complications associated with the study drugs. The results of this study are described in the below tables and graphs.

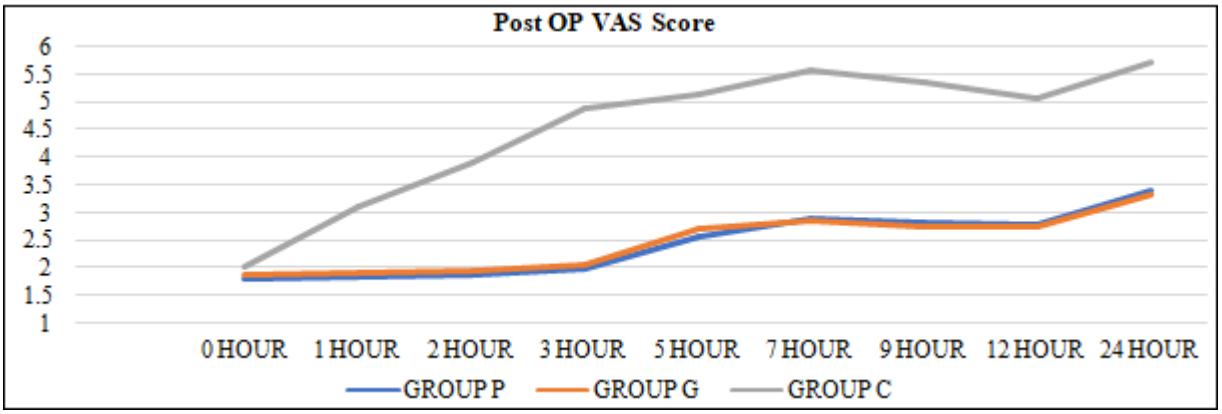
Table 1: Demographic data and preoperative parameters

Parameters	Group P (Mean ± SD)	Group G (Mean ± SD)	Group C (Mean ± SD)	p - Value
Age (years)	38.16 ± 11.82	42.76 ± 13.16	41.65 ± 12.11	0.11
Sex Ratio (M/F)	16/14	16/14	16/14	1.0
ASA Grade (I/II)	19/11	20/10	20/10	0.95
Weight (Kgs)	64.3 ± 6.19	62.9 ± 5.8	63.31 ± 7.7	0.72
PREOP Heart Rate (beats/min)	77 ± 6.00	75.5 ± 6.3	78.82 ± 9.09	0.29
PREOP Mean Blood Pressure (mm of hg)	79.56 ± 7.35	80.06 ± 5.36	79.86 ± 5.10	0.94
Duration of Surgery (mins)	109.6 ± 8.19	108.17 ± 7.65	106.43 ± 6.77	0.28

The patient baseline characteristics variables of patients are show in the above table. There were no significant differences between groups in patient characteristics and the duration of surgery between the groups.

Table 2: VAS Score of Group P VS Group G VS Group C

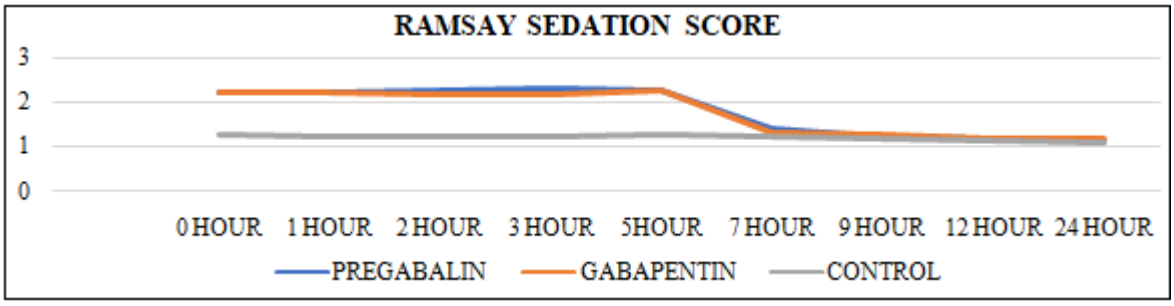
Post OP Time	Group P (Mean ± SD)	Group G (Mean ± SD)	Group C (Mean ± SD)	p – Value
0 Hour	1.82 ± 0.50	1.89 ± 0.25	2.03 ± 0.34	>0.05
1 Hour	1.84 ± 0.34	1.93 ± 0.18	3.10 ± 0.89	<0.001
2 Hour	1.89 ± 0.25	1.94 ± 0.18	3.93 ± 0.89	<0.001
3 Hour	1.99 ± 0.26	2.06 ± 0.46	4.90 ± 0.96	<0.001
5 Hour	2.56 ± 0.77	2.73 ± 1.10	5.14 ± 0.25	<0.001
7 Hour	2.90 ± 0.26	2.86 ± 0.93	5.58 ± 0.49	<0.001
9 Hour	2.84 ± 0.92	2.77 ± 1.02	5.36 ± 1.09	<0.001
12 Hour	2.79 ± 0.91	2.75 ± 0.89	5.09 ± 0.99	<0.001
24 Hour	3.39 ± 1.07	3.34 ± 0.98	5.74 ± 0.62	<0.001



All patients were monitored for VAS score in the immediate postoperative period at 0, 1, 2, 3, 5, 7, 9, 12, and 24 hours. The mean VAS SCORE was comparable between all three groups at 0 hr post operatively, (p - value >0.05). This may be due to the effect of spinal anaesthesia. The mean VAS score was significantly higher in control group from 1st hr upto 24hrs post operatively compared to Group P and Group G (p - value < 0.001).

Table 3: Ramsay Sedation Score Group P VS Group G VS Group C

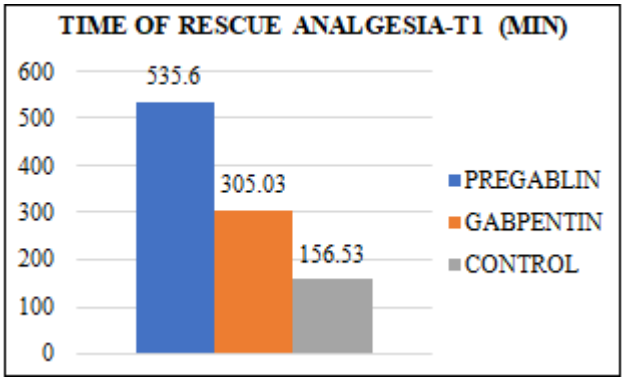
Post OP Time	Group P (Mean ± SD)	Group G (Mean ± SD)	Group C (Mean ± SD)	p – Value
0 Hour	2.23 ± 0.42	2.24 ± 0.41	1.24 ± 0.42	0.001
1 Hour	2.22 ± 0.43	2.23 ± 0.42	1.22 ± 0.41	0.001
2 Hour	2.26 ± 0.44	2.20 ± 0.42	1.23 ± 0.43	0.001
3 Hour	2.30 ± 0.46	2.17 ± 0.40	1.23 ± 0.42	0.001
5 Hour	2.24 ± 0.42	2.27 ± 0.44	1.26 ± 0.44	0.001
7 Hour	1.4 ± 0.48	1.31 ± 0.47	1.23 ± 0.42	0.38
9 Hour	1.20 ± 0.40	1.24 ± 0.42	1.16 ± 0.37	0.81
12 Hour	1.16 ± 0.37	1.17 ± 0.37	1.13 ± 0.33	0.92
24 Hour	1.13 ± 0.33	1.17 ± 0.37	1.10 ± 0.30	0.75



The mean Ramsay sedation score was significantly higher in the pregabalin and gabapentin group as compared to the control group upto 5 hrs postoperatively (p - value <0.05), beyond which it was not statistically significant (p - value >0.05). This shows that the sedation effect of pregabalin and gabapentin is significant only upto 5 hrs postoperatively.

Table 4: Time of first rescue analgesic (T1) and total dose of tramadol used in 24 hrs post surgery in 3 groups

Parameters	Group P	Group G	Group C	P - Value
Time of Rescue Analgesia (min)	535.6 ± 7.30	305.03 ± 7.78	156.53 ± 4.71	<0.001
Total Dose of Tramadol Used (mg)	128.6 ± 12.1	125.93 ± 11.40	254.13 ± 30.31	<0.001



T1 is the time interval between providing spinal anaesthesia and administration of first dose of tramadol (TIME OF RESCUE ANALGESIA). Initial dose of tramadol is 2 mg/kg ntramuscularly for postoperative pain, when patient's VAS score is 4 or more. T1 was found to be significantly earlier in Group C compared to Group P and Group G and the total dose of tramadol used was significantly higher in the Group C compared to Group P and Group G. Hence, pregabalin and gabapentin provides more prolonged pain relief than the control group and also reduced the requirement of opioid consumption in the post operative period.

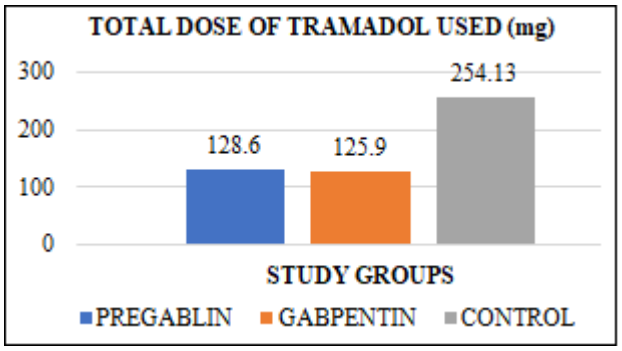
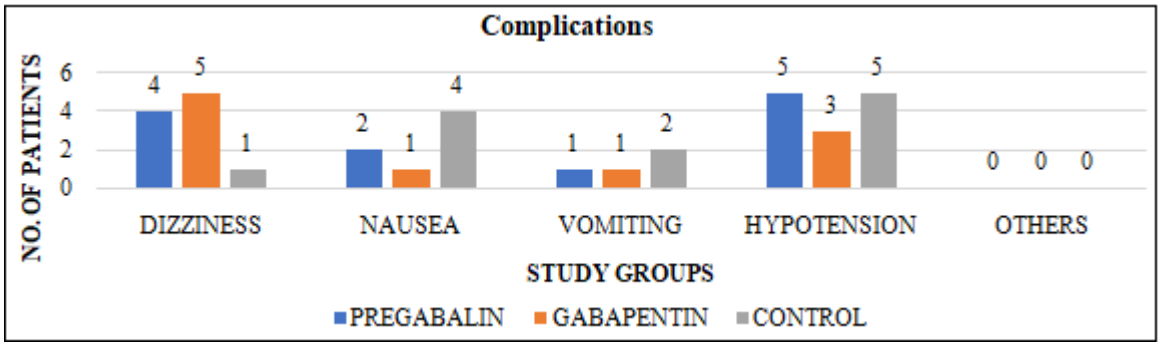


Table 5: Complications

Complications	Group P (n=30)	Group G (n=30)	Group C (n=30)	p - value
Dizziness (n)	4 (13.3%)	5 (16.6%)	1 (3.33%)	0.23
Nausea (n)	2 (6.66%)	1 (3.33%)	4 (13.33%)	0.33
Vomiting (n)	1 (3.33%)	1 (3.33%)	2 (6.66%)	0.76
Hypotension (n)	5 (16.6%)	3 (10%)	5 (16.6%)	0.69
Others (n)	0 (0%)	0 (0%)	0 (0%)	-



This graph shows that the minor complications like dizziness, nausea, vomiting, hypotension were present in all the 3 groups with no statistical difference among the 3 groups (p - value >0.05). No major complications were noted.

7. Discussion

In this prospective randomized controlled study, 90 patients were studied, the baseline parameters like age, sex, weight, ASA grading and preoperative heart rate, mean blood pressure and duration of surgery were comparable between the three groups and were not statistically significant (p>0.05) which coincides with the study of **Elhameed et al (2019)** [8] where all the demographic parameters were comparable between the three groups and were not statistically significant (p>0.05). **Kalu et al (2022)** [10] compared the analgesic effect of gabapentin and pregabalin in postoperative pain management of major lower limb orthopaedic surgeries and found that the baseline parameters like age, weight sex, ASA grading and preoperative vitals and duration of surgery were comparable between the three groups and were not statistically significant (p>0.05).

Hemodynamic Parameters:

In our study, hemodynamic parameters like heart rate, mean arterial blood pressure, oxygen saturation were recorded at regular intervals throughout the period of the surgery and 24 hours post - operatively. There was no significant difference in the heart rate, mean blood pressure, respiratory rate, and oxygen saturation during intra - operative and postoperative period (p - value>0.05). Our study was in comparison with studies by **Khetarpal R et al (2016)** [11] who compared 1200 mg Gabapentin and 300 mg pregabalin as a premedication and found that the haemodynamic parameters were comparable between the groups and were not statistically significant. **Kalu et al (2022)** [10] compared the analgesic effect of 300 mg gabapentin and 150 mg pregabalin for postoperative pain management and noticed that the haemodynamic parameters were comparable and statistically insignificant (p - value >0.05).

Onset of Sensory and Motor Block

This study showed that the mean onset time of sensory and motor block was comparable between the three groups and was statistically insignificant (p value >0.05). Thus, this shows that the pregabalin and gabapentin does not affect the onset of sensory and motor block. This was consistent with the previous study conducted by **Kalu et al (2022)** [10] whocompared the analgesic effect of 300mg gabapentin and

150 mg pregabalin in postoperative pain management and found that the onset of sensory and motor block was comparable between the groups and was statistically insignificant (p - value >0.05).

VAS Scores

In this study, the patients were educated about the Visual Analogue scoring. VAS scores were measured at 0 hrs, 1 hr, 2hrs, 3hrs, 5hrs, 7 hrs, 9 hrs, 12hrs and 24 hrs after surgery. In the immediate postoperative period (0 hr) VAS score showed no statistically significant difference between the three groups. This may be due to the effect of spinal anaesthesia. The mean VAS scores during postoperative period of 1, 2, 3, 5, 7, 9, 12 and 24 hours in group P patients were 1.84, 1.89, 1.99, 2.56, 2.90, 2.84, 2.79, 3.39 respectively. In Group G patients, the mean VAS scores were 1.93, 1.94, 2.06, 2.73, 2.86, 2.77, 2.75, 3.34 respectively. In Group C patients, the mean VAS scores were 3.10, 3.93, 4.90, 5.14, 5.58, 5.36, 5.09, 5.74 respectively. Thus, the VAS scores were significantly less in both Groups P and G compared to Group C upto 24hrs after surgery beyond which VAS scores were higher. This is similar to the study conducted by **Sharma A et al (2020) ([12])** who compared the effect of Oral Gabapentin vs. Pregabalin as Pre - emptive analgesic for postoperative pain and noticed that the VAS score was significantly lower in the Pregabalin and Gabapentin group upto 24 hours after surgery. **Madhanagopal R et al (2021) [(1)]** Compared post - operative analgesic effect between 150 mg Pregabalin and 900 mg Gabapentin given as premedication and found that the pain score was less in the pregabalin group at all intervals compared to gabapentin and placebo group and the difference was found to be statistically significant (p - value <0.05) which coincides with our study results where pregabalin have better and prolonged analgesia.

Sedation

Postoperatively all patients were assessed for the level of sedation using Ramsay sedation score periodically at 0, 1, 2, 3, 5, 7, 9, 12 and 24 hours. The level of sedation was higher in Group P and Group G patients compared to Group Cup to 5 hours in the postoperative period. The mean Ramsay sedation scores during postoperative period of 0, 1, 2, 3, 5 hours in Group P patients were 2.23, 2.22, 2.26, 2.30, 2.24 respectively. In Group G patients the mean Ramsay sedation scores were 2.24, 2.23, 2.20, 2.17, 2.27 respectively. In Group C, patients the mean Ramsay sedation scores were 1.24, 1.22, 1.23, 1.23, 1.26 respectively. **Acharya U et al (2019) [(14)]** studied Pre - emptive use of oral 300 mg gabapentin or 150 mg pregabalin for acute postoperative pain. The sedation score was significantly higher with pregabalin in the first hour (p - value=0.001). Our study results are consistent with the study of **Rose et al (2002) [(15)]** where they also found that sedation of gabapentin is upto 4.8 to 8.7 hours based on its elimination halflife. Similar results of post operative sedation with pregabalin and gabapentin has been noticed by **Pandey et al (2004) [(16)]** and **Ghaietal (2011) [(17)]** but **Dhurve PK (2021) [(9)]** noticed higher sedation score with gabapentin as compared to pregabalin and the difference was statistically significant (p - value <0.05).

Time of First Rescue Analgesic (Duration of Analgesia)

Postoperatively all patients were monitored for VAS scores periodically. When the VAS score was 4 or greater, patients were given Tramadol 2mg/kg intramuscularly as initial dose. In this study, it was found that the mean time interval for first dose of rescue analgesic was 535.6 minutes in Pregabalin group, and 305.03 minutes in Gabapentin group which was found to be statistically significant (p - value <0.001). This shows that pregabalin and gabapentin provides prolonged pain relief compared to control and Pregabalin gives significantly longer pain relief compared to gabapentin (p - value<0.05). Our findings correlate with the findings of **Acharya U et al (2019) [(14)]** who studied Pre - emptive use of oral 300mg gabapentin or 150mg pregabalin for acute postoperative pain. The mean duration of postoperative analgesia was significantly higher with pregabalin (282 minutes versus 234 minutes), p=0.009. Similar results of prolonged duration of postoperative analgesia were found in various studies conducted on pregabalin and gabapentin. **Kalu et al (2022) [(10)]** found significant prolonged duration of analgesia in pregabalin group (422.0 min), compared to Gabapentin group (272.0 min) and Control group (194.2 min), similarly **Bafna U et al (2014) [(18)]** observed prolonged duration of analgesia in pregabalin group (535.16 ± 32.86 min) as compared to gabapentin (302.00 ± 24.26 min) and control group (151.83 ± 16.21 min). In contrast to our and other studies **Sharma A et al (2020) [(12)]** found little short duration of analgesia with as early as 76 minutes in placebo group, 93 minutes in Gabapentin group followed by 136.5 minutes in Pregabalin group which may be due to the strong analgesic requirement in lumbar spine surgeries but still pregabalin provided longer duration of analgesia (136.5 min) compared to other groups.

Dosage of Tramadol Administered in 24 Hours Post Surgery

In our study, the mean dosage of rescue analgesic (tramadol) administered in 24 hours was 128.6 mg in Group P, 125.93 in Group G and 254.13mg in Group C. The P value was found to be <0.001 which is highly significant. Hence, it was found that total tramadol consumption was significantly lower in group P and group G patients compared to group C and there was no significant difference between gabapentin and pregabalin group (p - value >0.05). Our results coincide with the study conducted by **Kalu et al (2022) ([10])** where they used pregabalin 150mg and gabapentin 300mg and the mean total rescue analgesic consumption was 102.13 ± 32.78 mg in Group P, 126.10 ± 41.88 mg in Group G and highest in Group C 180.23 ± 34.07 mg. Thus, pregabalin required less rescue analgesic dose and provided longer duration of analgesia. Similar results of rescue analgesic requirements have also been observed by **Routray SS et al (2018) [(19)]** and **Madhanagopal R et al (2021) [(13)]** where pregabalin and gabapentin group required less rescue analgesic as compared to control group and was statistically significant (p - value < 0.001).

Incidence of side effects

In our study, the minorcomplications like dizziness, nausea, vomiting, hypotension were present in all the 3 groups with no statistical difference between the three groups (p - value >0.05). Pregabalin and Gabapentin group had dizziness in (4 vs 5), nausea in (2 vs 1), vomiting in (1 vs 1), and

hypotension in (5 vs 3) patients. Similar findings of side effects have also been observed in various studies conducted by **Acharya U et al (2019)** [14], **Pandey CK et al (2004)** [16] and **Bafna U et al (2014)** [18] with pregabalin and gabapentin drugs and the incidence of side effects were less and similar with both the drugs. Their results also coincide with our study results.

8. Summary

This was a Prospective randomized controlled double blinded study conducted by the Department of Anaesthesiology, Jhalawar Medical College. 90 patients undergoing lower limb orthopaedic surgeries under spinal anaesthesia were randomized and divided into 3 groups, Group P, Group G and Group C. Group P patients received 300mg tablets of Pregabalin orally, Group G received 900mg tablets of Gabapentin and Group C patients received placebo tablets two hour before surgery. Standard anaesthetic technique was followed in all patients. Patients were observed at 0 hr, 1, 2, 3, 5, 7, 9, 12 and 24 hrs post surgery. They were hemodynamically similar in three groups intraoperatively. There was no difference in the onset of sensory and motor blockade time in three groups. Post operative pain scores (VAS Score) were significantly less in Group P and Group G patients compared to Group C patients from 1st hr upto 24hrspost operatively. Group P and Group G patients had higher sedation scores compared to Group C patients upto 5 hours post surgery. There was no significant difference between the sedation scores in Group P and Group G patients. Time of first rescue analgesic was significantly prolonged in Group P patients (535.6 min) compared to Group G (305.03 min) and Group C (156.53min). The total dose of tramadol given in 24 hours as rescue analgesic was significantly less in Group P (128.6mg) and Group G (125.93mg) patients compared to Group C patients (254.13mg).4 patients in Group P had dizziness, 2 had nausea, 1 had vomiting and 5had hypotension as side effect while in Group G 5 patients had dizziness, 1 had nausea and 1 had vomiting and 3 had hypotension. In Group C patients, 1 patient had dizziness, 4 had nausea, 2 had vomiting and 5 had hypotension.

9. Conclusion

We conclude by this study that Pre - emptive Pregabalin and Gabapentin provides good post operative analgesia compared to placebo in patients undergoing elective lower limb orthopaedic surgeries under spinal anaesthesia. Pregabalin (300mg) provides prolonged pain relief compared to Gabapentin (900mg) in the post operative period. Pregabalin and Gabapentin reduce post operative opioid requirement in the first 24 hours post surgery. Both drugs have very less adverse events.

10. Future Scope

Pre emptive analgesia is upcoming future for reducing the need of intravenous analgesic like opioids which further have more side effects, which can also be reduced with the use of gabapentinoids. Gabapentinoids like pregabalin and gabapentine should be studied in various doses for pre emptive analgesia to minimize the dose of opioids, to lessen the side effects and hospital stay and also to provide adequate analgesia with minimal dose.

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Author Profile

Dr. Sukriti Bhardwaj, 28 years old from Bawani khera, Bhiwani, Haryana, She is doing her third year residentship in the department of Anaesthesiology, Jhalawar Medical College, Rajasthan. She did U. G. from NEIGRIMHS, Shillong. She has passion for critical care and would like to work for the same further. E mail ID: bhardwajsuku1494[at]gmail.com

Dr. S. P. Chittora, 69 years old from Kota, Rajasthan, he has done his undergraduation and postgraduation in Anaesthesia and Critical Care from RNT Medical College Udaipur. He is senior professor in Jhalawar Medical College (Dept of Anaesthesiology). E mail ID: drspchittora[at]rediffmail.com

Dr. Aksha Khan is 34 years old from Nagour, Rajasthan, doing her third year residentship in the department of Anaesthesiology, Jhalawar medical college, Rajasthan. She completed her U. G. from KBN Medical College, Karnataka. She is passionate about joining obstetric anaesthesia. E mail ID: akshakhan03gmail.com.