

# Comparative Study of Single Dose Pre-Emptive Gabapentin vs Clonidine for Post Operative Pain Relief in Lower Limb Surgeries Under Spinal Anaesthesia

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## ABSTRACT

**Introduction:** Spinal anesthesia is a technique, which is frequently preferred in lower extremity surgery. It has been reported that preoperative administration of gabapentin, approved for neuropathic and chronic pains, also reduces post-operative pain. Clonidine also possesses anti-nociceptive properties. Purpose of the study was to evaluate and compare the duration of post-operative analgesia with premedication by oral Gabapentin or Clonidine in lower limb surgeries under spinal anaesthesia.

**Material and Methods:** The present study was done at the Department of Anesthesiology, Gandhi Medical College, Hamidia Hospital and Bhopal. Sixty patients belonging to ASA grade I and II, having age between 18 -65 years were randomly divided as: Group G (received 300 mg of Gabapentin) and Group C (received 100 mcg of Clonidine). Drugs were given orally one hour prior to administration of spinal anaesthesia. Postoperative analgesic duration, total dose of analgesic used and pain scores were analysed.

**Results:** All demographic characters, duration of surgery, total dose of analgesic, pain scores, type of surgery and side effects were similar in both the groups ( $p > 0.05$ ). Total postoperative analgesic duration was 9.02 hours in Group G whereas 14.20 hours in Group C ( $P < 0.001$ ).

**Conclusion:** In present study, clonidine was a better adjuvant compared to gabapentin when given orally 1 hour before spinal block in lower limb surgeries.

**Keywords:** gabapentin, clonidine, spinal anaesthesia

## INTRODUCTION

Pain is always unpleasant for the patients who had undergone a surgery. Pain usually develops due to tissue damage. Satisfactory relief in pain brings back the normal physiological function and prevents the development of chronic pain. Opioids are being used since long time for postoperative pain relief.<sup>1,2</sup>

Administration of opioids during post-operative period can lead to complications such as sedation, respiratory depression, pruritis and constipation.<sup>3,4</sup> Regional analgesia demand additional intervention and it also has possible risk of hypotension and bradycardia.<sup>4</sup>

Clonidine is an agonist of  $\alpha_2$  adrenergic receptor which provides dose dependent analgesia at spinal sites. There is a complete absorption of oral clonidine and peak plasma concentration is achieved after 1-3 hours of administration. It inhibits neurotransmission in both A- delta and C fibers and also escalates the inhibitory effect of local anesthetic on C-fibre.<sup>1</sup>

Gabapentin is an anticonvulsant which is a structural analogue of Gama Amino Butyric Acid (GABA). It possesses

analgesic effect for different conditions like diabetic neuropathy, neuropathic pain, neuralgia and reflex sympathetic dystrophy. Recent reports have shown a positive response on postoperative pain relief.<sup>5</sup>

The present study was done to evaluate and compare the duration of post-operative analgesic effect of oral gabapentin with clonidine as premedication in lower limb surgeries under spinal anaesthesia.

## MATERIAL AND METHODS

The present prospective study was done on 60 patients belonging to ASA grade I and II and having age between 18 -65 years in the Deptt. of Anaesthesiology, GMC and Hamidia Hospital, Bhopal.

Patients with physical status ASA Grade III and IV, having severe systemic diseases (heart diseases, hepato renal diseases, bleeding disorders, psychological problems, etc.) and patients who were allergic to any medicine were excluded from the study.

Routine monitoring such as non invasive blood pressure (NIBP), pulse oximetry and ECG was instituted on arrival in preparation room and then in operation theatre (OT) continuously.

The patients were randomly divided using envelop method into two groups of 30 each: Group G (who received 300 mg gabapentin) and Group C (who received 100 mcg clonidine). All doses of gabapentin and clonidine were given per oral one hour prior to administration of spinal anaesthesia with a small sip of water.

Visual Analogue Scale (VAS) was explained to the patient during preoperative visit and also in preparation room. No other premedication was instituted. All patients were preloaded with 10ml/kg ringer lactate solution before administering spinal anaesthesia. Spinal anaesthesia was instituted with 3 ml of hyperbaric 0.5% bupivacaine (15mg).

Fluid administration was continued intra-operatively and hypotension, if any, was treated with fluid replacement and i.v mephentermine.

Pain was assessed postoperatively by VAS; immediate postoperatively and at every two hourly thereafter. Any patient

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with VAS score of more than three were administered diclofenac 1 mg/kg intramuscularly.

Any complications like dizziness, somnolence, diplopia, vomiting, confusion, pain, and urinary retention were recorded in first 24 hours post operatively.

All statistical analysis was done using IBM SPSS ver. 20. Two sample paired t-test was used to find out significance between two samples. Data was reported as mean value  $\pm$ SD. A P-value of  $< 0.05$  was considered statistically significant.

## RESULTS

In present study, mean age of Group G and Group C was  $44.1 \pm 13.0$  years and  $39 \pm 13.4$  years respectively ( $p > 0.05$ ). Mean weight in Group G and Group C was  $67.5 \pm 9.50$  and  $61.67 \pm 9.27$  kg respectively ( $p > 0.05$ ). In group G and Group C, 23(76.66%) and 22(73.33) patients belong to ASA status I respectively ( $p > 0.05$ ).

Mean duration of surgery in Group G and Group C was  $51.17 \pm 23.66$  min and  $48.17 \pm 27.68$  min respectively ( $p > 0.05$ ).

Distribution of patients according to type of surgery revealed that out of 30 patients in Group G, surgery for fracture neck of femur, fracture tibia, fracture patella and fracture both bone leg was performed in 5 (16.66%), 20 (66.66%), 2(6.66%) and 3 (10%) patients respectively whereas, in Group C, surgery for fracture neck of femur, fracture tibia, fracture patella and fracture both bone leg was performed in 5(16.66%), 19 (63.34%), 3 (10%) and 3 (10%) respectively.

The intra operative hemodynamic values i.e. mean blood pressure, heart rate and respiratory rate were similar ( $P > 0.05$ ) in both the groups at all measured intervals.

The total postoperative analgesic duration (time from spinal analgesia to first dose of analgesic) was 9.02 hours in Group G whereas 14.20 hours in Group C ( $P < 0.001$ ).

The mean total dose of analgesic in first 24 hour was 72.5mg in Group G, whereas 62.5mg in Group C. Total dose of analgesics in first 24 hour was less in Group C ( $P > 0.05$ ).

Pain scores were similar, as patients were given analgesics immediately on reaching the VAS scale of three ( $p > 0.05$ ). Six patients (20%) in either group experienced somnolence ( $p > 0.05$ ). Dizziness was experienced in five patients (17%) in Group G as compared to four patients (14%) in Group C ( $P > 0.05$ ).

## DISCUSSION

In post operative period, the most common complain made by the patients is always pain. Pain impulse initiates the cascade of different changes in the somatosensory systems, which escalate the response to accompanying stimuli and amplify pain.<sup>6</sup>

In present study, we used 100 mcg of clonidine as reports have shown that incidence of hypotension and bradycardia was more with higher doses in patients undergoing spinal anesthesia.<sup>7,8</sup>

Marashi et al did a study on 66 patients posted for total thyroidectomy without lymph node dissection, reported significantly lower VAS pain scores in clonidine group as compared to gabapentin group ( $P < 0.001$ ).<sup>9</sup> But in present study VAS score was similar in both the group ( $p > 0.05$ ). This may be due to the demand of more rescue analgesia. A study done

by Prasad et al also confirmed the results of Marashi et al.<sup>1</sup> Marashi et al also reported less consumption of post-operative morphine in gabapentin group as compared to clonidine group ( $P = 0.02$ ).<sup>9</sup> But in present study, total dose of analgesic used in first 24 hour was similar in both the groups ( $p > 0.05$ ). In both the groups, only 20% patients experienced somnolence and 17% and 14% patients reported dizziness in gabapentin and clonidine group respectively ( $p > 0.05$ ). Other studies reported higher incidence of post operative nausea and vomiting in clonidine (40.9%) than gabapentin (9.1%).<sup>9</sup>

In present study, postoperative analgesic duration was significantly longer in clonidine group as compared to gabapentin ( $P < 0.001$ ).

Many workers have studied the duration of postoperative analgesic effect in clonidine group. A study done by Montazeri et al reported that when oral clonidine was used in spinal anesthesia, the mean duration of both sensory and motor blockage was increased with clonidine.<sup>10</sup> Various other workers have shown that when 150-200 mcg of clonidine was given preoperatively resulted in significant increase in sensory analgesia.<sup>7,8,11</sup> Prasad et al did a randomized study on 90 females of 30-60 years of age who underwent vaginal hysterectomy under spinal anesthesia reported that duration of analgesia was lower in clonidine group as compared to pregabalin ( $p < 0.001$ ).<sup>1</sup>

Partahusniutojo did a similar study and confirmed that mean duration of analgesia was significantly increased with clonidine when 150 mcg was used in spinal anesthesia.<sup>12</sup>

## CONCLUSION

In our study, patients who were premedicated with clonidine showed better pain tolerance compared to gabapentin. Although the VAS scores were almost similar, patients in clonidine group showed lesser need for rescue analgesia compared to those in the gabapentin group. Thus we conclude that clonidine was an better adjuvant compared to gabapentine when given orally 1 hour before spinal block.

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