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RANDOMIZED CONTROLLED TRIAL OF GABAPENTIN VERSUS PREGABALIN AS PREEMPTIVE OPIOID FREE ANALGESIA IN SPINE SURGERY

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ABSTRACT **Introduction:** Spine surgeries are associated with excruciating postoperative neurotic pain and requires opiod analgesics perioperatively very often. Gabapentin and pregabalin has a well established role in neurotic pain. Hence we decided to compatre their utility as preemptive analgesic when compared to conventional analgesic.we also wanted to explore the possibility of this two as a part of multimodal opioid free analgesia. **Methods:** This was a randomized controlled trial carried out at our institute from NOVEMBER 2022 TO NOVEMBER 2023 on 75 patients, with 25 Patients in each group. Patients were randomly divided in three groups. Group G (gabapentin) , group P (pregabalin) and Group C (multivitamin).All the patients were given tablet according to pre assigned group 1 hour prior to surgery. **Results:** Time to requirement of first dose of rescue analgesic in P group was 183 min and in G group was 136 min. In comparison to group C group G and P had lower visual analogue scale (VAS) score, and it was statistically significant. Total no of rescue analgesic required in 24 hours was less in group G and P in comparison to group C . Mean VAS scores was lowest in pregabalin group in comparison to gabapentin. Total NUMBER of rescue analgesia required in 24 hours was highest in group C and lowest in group P. **Conclusions:** Pregabalin and gabapentine produce prolonged postoperative analgesia compared to conventional, pregabalin had better analgesic effect than gabapentin postoperative period.

KEYWORDS :

INTRODUCTION

Effective pain control after major surgical procedures not only affects patient satisfaction but also the morbidity and length of hospital stay [1,3].

Despite many techniques and drugs have been used many of the patients still experience significant postoperative pain [5]. The patient satisfaction is often low in spine surgery related to chronic pain as they develop tolerance to strong analgesics due to chronic usage [7]. Use of multimodal analgesics and blocks has reduced the side effects and doses required for adequate analgesia . Combination of different analgesics and blocks can help to reduce side effects and opioid dependence.

Pregabalin is a structural analog of gamma-aminobutyric acid (GABA) and has characteristics comparable to gabapentin. Its mechanism of action is the same as gabapentin, with superior pharmacokinetics . It has greater bioavailability, and require shorter time to achieve an optimal analgesic effect[4] . Pregabalin also appears to be more effective for the control of acute nociceptive pain after surgery and the reduction of both opioid dependence and anxiety.

A few studies have recommended the use of pregabalin as part of an analgesic regimen for spine surgery specifically but there was a limitation as pregabalin was compared to placebo. Gabapentin and pregabalin should be compared in view of analgesia and side effects as their clinical profile is similar[5]. Thus comparing them can be very useful in post operative opioid free multimodal analgesia regimen.

MATERIALS AND METHODS

This randomized controlled trial was conducted in the department of anaesthesiology, smt s m shah hospital, from december2022 to December 2023, and included 75 patients who underwent spine surgery. All necessary approvals were taken befor starting the study.Patients between 30 and 60 years of age who underwent elective spine surgery were randomized to either group G (gabapentin) , group P (pregabalin), & group C (multivitamin) To reduce confounding effects,

We Excluded Patients With

- Known allergy to GABA analogs
- Use of anticonvulsant drugs
- History of steroids or alcohol use
- Multiple comorbidities (e.g., renal failure, chronic liver disease, etc.)
- Spinal deformity
- Inability to understand and respond to the VAS

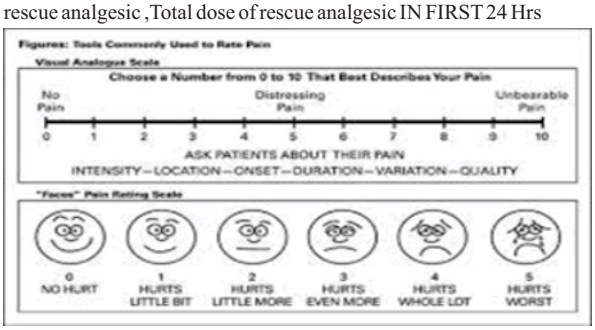
Group-G: Received two gabapentin capsules 300 mg each with a sip of water 1 hour before the expected time of induction of anesthesia.
Group P: Received two pregabalin capsules 150 mg each with a sip of water 1 hour before the expected time of induction of anesthesia.
Group-C: Received two multivitamin capsule with a sip of water 1 hour before the expected time of induction of anesthesia.

Preanesthetic check-up done & informed consent was taken from all the patients before surgery. VAS (0–10 mm) was explained to them. Study drug was given to all the patients 1 hr prior to induction according to allotted group. On shifting the patient to ot baseline heart rate, oxygen saturation, and blood pressure were recorded. After insertion of a 18-G IV cannula, inj. Glycopyrrolate 0.004 mg/kg, midazolam 0.04 mg/kg, and inj. Ondansetron 0.2mg/kg was given intravenously. Preoxygenation was done with 100% oxygen for 3 minutes prior to induction. Induction was done with inj. Propofol (1.5–2 mg/kg) and intubation was done after giving inj. Succinylcholine 2 mg/kg with appropriate sized cuffed endotracheal tube. Anesthesia was maintained with N_2O:oxygen & isoflurane along with inj. Atracurium 0.5mg/kg loading followed by 0.1mg/kg maintainance dose. Electrocardiogram, noninvasive blood pressure, spo_2, heart rate, systolic (SBP), diastolic (DBP) and mean arterial pressure (MAP), end tidal CO_2 concentration ($etco_2$) were monitored. Intravenous paracetamol 10 mg/kg IV was given to all patients in group G, P and C approximately 30 min before the end of the surgery. Amount of blood loss and urine output was recorded and replaced accordingly intraoperatively. At the end of surgery, patient was reversed with inj. Neostigmine and inj. Glycopyrrolate, and then extubated and shifted to postanesthesia care unit.

Blood pressure,heart rate, respiratory rate,VAS score, were recorded at extubation and after that every 1 hour for the first 6h and then every 3 hour till 24 hours post operatively.

Rescue analgesic in form of Inj. Diclofenac 75 mg was given to all the

patients with VAS score more than 4. We recorded the Time to first rescue analgesic ,Total dose of rescue analgesic IN FIRST 24 Hrs



RESULTS

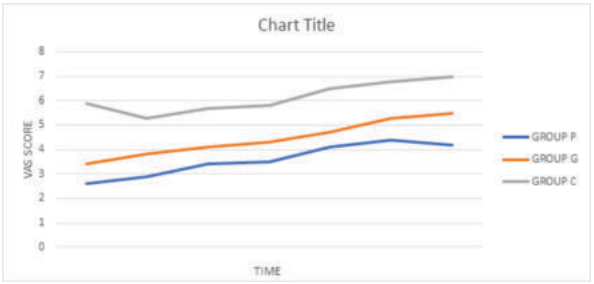
All three groups were comparable and there was no statistically significant difference amongst the three groups in view of age, sex, weight, ASA status.

Requirement of first rescue analgesia was late in group P (183 MIN) than group G(136 MIN) and group C (98 MIN). Similarly, group C required first dose of rescue analgesia earlier than other groups, which was statistically significant ($P < 0.001$).

	Group P	Group G	Group C	P Value
Time to first resque analgesic	183.4 MIN	136.7 MIN	98.1 MIN	<0.001 (SIGNIFICANT)
Total No Of Rescue Analgesi	1.68	2.34	3.89	<0.001 (SIGNIFICANT)

Total NUMBER of rescue analgesia required in 24 hours was highest in group C and lowest in group P. Number of doses of rescue analgesic were lower in pregabalin group compared with gabapentin.

Mean VAS scores was lowest in pregabalin group in comparison to gabapentin and control group. Intergroup analysis revealed that both pregabalin and gabapentin groups had significantly lesser VAS scores in comparison to the control group.in this two group comparision pregabalin had the lowerer VAS score



In terms of side effects there was no significant difference in all three groups.

DISCUSSION

This randomized controlled trial explored the opportunity for usage of pregabalin and gabapentin as analgesic as part of multimodal opioid free analgesia in spine surgery. In surgery, opioids and nonsteroidal anti-inflammatory drugs have been the preffered analgesics. The use of these drugs at high doses, however, has been associated with side effects, like drowsiness, constipation, urinary retention, etc. [1,2], which has led to The concept of multimodal opioid free pain management. The pharmacological properties of pregabalin and gabapentine are not identical as pregabalin has higher bioavailability (90% vs. 33%–66%), more rapid absorption (peak plasma level: 1 hour vs. 3–4 hours), and linear increase in plasma concentrations when its dose is increased [1,4]. Thus lower doses of pregabalin required for its analgesic effect, compared to gabapentin, resulting in better tolerance and fewer side effects[5].

Turan et al. In their study found that pain scores were significantly lower in the gabapentin (1200 mg) group compared to the placebo group in spinal surgery. They concluded reduced postoperative morphine consumption, there by decreasing morphine-related side effects. Which was similar in our study when compared with placebo.[9]

In our study we found that use of gabapentin and pregabalin help in decresing opioid requirement and dosage of the same which was similar to the Agarwal et al. Who found that single preoperative oral dose of pregabalin 150 mg was effective in reducing postoperative pain and reduced fentanyl consumption in patients undergoing laparoscopic cholecystectomy[10].

Bafna et al. Studied the effect of oral gabapentin and pregabalin with the control group for postoperative analgesia and concluded that pre-emptive use of gabapentin 600 mg and pregabalin 150 mg orally significantly help to prolong the duration of postoperative analgesia and reduced the postoperative rescue analgesic requirement which was similar to ours[11].

CONCLUSIONS

Pregabalin and gabapentin provide good postoperative analgesia following spine surgery. Thus Both gabapentin and pregabalin can be utilized as pre-emptive analgesic in spine surgeries as a part of multimodal opioid free anaesthesia. However In comparision to gabapentine Pregabalin has a better analgesic profile and delays the time for requirement of first dose of rescue analgesic spinal surgery thus making it more favourable drug.

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