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*Research Article*

# A single preoperative dose of Gabapentin decreases postoperative pain in ambulatory anal surgeries

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## Abstract

**Background:** Anal surgeries are painful procedures despite advancements in postoperative pain management. Efficient post-surgical pain control is essential to patients' recovery, it may contribute to fastening healing, patient mobilization, and reducing hospital stays. We aimed to evaluate the effect of single-dose gabapentin on postoperative pain in patients who underwent ambulatory anal surgeries. **Methods:** Prospective, randomized, double-blind controlled study; 50 patients were divided into two equal groups. All patients underwent ambulatory anal surgeries under spinal anesthesia with a plan to be discharged on the same day. Group G received 600 mg of oral gabapentin one hour before surgery, while group C received an oral placebo tablet one hour before surgery. The primary outcome was the severity of postoperative pain (visual analog scale 0 to 10 cm) was conducted at 0, 6, and 12h. The time for the first analgesic request, frequency of rescue analgesia in the first 12 hours, and postoperative sedation (Ramsay sedation score) at 0, 6, and 12h were monitored as secondary outcomes. **Results**: The gabapentin group (G) showed significantly lower visual analog scale scores at 6, and 12 in comparison to the control group (C), and group G also showed a longer duration of analgesia and delayed analgesic rescue when compared with the control group. Ramsay sedation score showed insignificant differences between the two groups at 0, 6, and 12h postoperatively. **Conclusions**: A single preoperative gabapentin dose was effective in decreasing postoperative pain, prolonging the duration of analgesia, and decreasing the total opioid consumption, with no significant complications.

**Keywords:** Ambulatory, anal surgery, gabapentin, preoperative, single dose

## Introduction

Ambulatory surgery is appropriate for most anorectal pathology. It can be performed at a reduced cost compared with inpatient procedures with excellent safety, improved efficiency, and high levels of patient satisfaction. Several perioperative strategies are employed to control pain and avoid urinary retention, including the use of a multimodal pain regimen and restriction of intravenous fluids [(1)]. Ambulatory anorectal surgery often utilizes standardized order sets and discharge instructions. Multimodality pain management, including preemptive use of regional anesthesia and postoperative use of NSAIDs

and acetaminophen, has improved pain control and decreased opioid requirements in different types of surgery[(2)]. Gabapentin, a structural analog of gamma-aminobutyric acid, has been used as an anticonvulsant drug since the early nineties. Gabapentin is effective in neuropathic pain, such as diabetic neuropathy, postherpetic neuralgia, and reflex sympathetic dystrophy; it has been added to acute, chronic, and postoperative pain regimens with success and low morbidity [(3)]. The exact mechanism of the action of gabapentin remains speculative, but experimental and clinical studies have demonstrated the anti-hyperalgesic effects of gabapentin in models involving central neuronal sensitization [(4)].

## Patients and Methods

### Eligibility of the study

After obtaining approval from the ethics committee of the Faculty of Medicine, Minia University (Approval No: 343-2022) and written consent from the patients, Clinical Trials Registry number (NCT05533684). This prospective, randomized, double-blind procedure was conducted on 50 patients, aged from 18 to 65 years, with ASA physical status I or II, and scheduled for ambulatory anal surgeries at Minia University Hospital's general surgery department within the period from September 2022 to November 2022.

**Exclusion criteria**

Presence of contraindications to neuraxial anesthesia, a history of central nervous system or mental disorders, epilepsy, chronic pain, drug abuse, or use of neuropathic analgesic or antiepileptic drugs.

**Study design, randomization, and blinding**

It was a prospective randomized controlled, double-blind procedure where the patients were grouped into two equal groups of twenty-five each based on a randomization computer-generated table using Microsoft Excel by a statistician who was blind to the patient's management.

Two tablets were placed in sequentially numbered envelopes to cover the allocation. For blinding, the study tablets were given to the patients by another anesthesiologist other than the investigator an hour before surgery. After the study ended, it was revealed that C stood for the control group who received a placebo tablet (Limitless man max, *Eva Pharma*, Egypt) and group D received gabapentin 600mg (Neurontin 600mg, *Pfizer*, USA).

**Technique**

An hour before the anticipated time of surgery the patients were given the study medication by mouth with a sip of water gabapentin 600mg was given to group G patients, while group C patients received the multivitamin placebo tablet by an anesthesiologist other than the investigator. In the operating room (OR), All patients received a preload of 10 mL/kg of Ringer's lactate solution before induction of spinal anesthesia (saddle block), along with antibiotic prophylaxis. Spinal anesthesia consisted of 2.5ml 0.75% hyperbaric bupivacaine, the patients were kept in the sitting position for 5 minutes. Standard monitors were applied as non-invasive blood pressure, pulse oximetry ($SPO_2$), and electrocardiograph (ECG). Blood pressure, pulse rate, and oxygen saturation were recorded as baseline values then every 15 min until the end of the operation. After the end of the operation, patients were transferred to the post--anesthesia care unit (PACU) where they were observed for approximately 2 hours. In the PACU, postoperative pain was treated with 2 mg IV nalbuphine at the patient's request. Patients were transferred to the general surgery ward where they were observed for another 10 hours, and the severity of postoperative pain (measured by visual analog scale 0 to 10 cm)[(5)], was conducted at 0, 6, and 12h as a primary outcome. The time for the first analgesic request, frequency of doses of rescue analgesia in the first 12 hours, and postoperative sedation (Ramsay sedation score) table 1 at 0, 6, and 12h were monitored as well (secondary outcomes).

**Table (1): Ramsay Sedation Scale [(6)]**

| Score | Description |
|---|---|
| **1** | The patient is anxious and agitated or restless or both |
| **2** | The patient is cooperative, oriented, and tranquil |
| **3** | The patient responds to commands only |
| **4** | The patient exhibits a brisk response to a light glabellar tap or loud auditory stimulus |
| **5** | The Patient exhibits a sluggish response to a light glabellar tap or loud auditory stimulus |
| **6** | The Patient exhibits no response |

**Sample size calculation**

The number of patients required in each group was calculated after data was collected from a previous study[(7)]. The study's primary outcome was the postoperative pain score with a power of 90% and type I error of 0.05. To detect a 20% difference between the 2 groups. The sample size was calculated as 21 patients in each group; it had been increased to 25 patients for better accuracy. The sample size was calculated by using the PASS program (Power Analysis and Sample Size Calculation) by NCSS, LLC, USA.

### Statistical analysis

The collected data were coded, tabulated, and statistically analyzed using the SPSS program (Statistical Package for Social Sciences) software version 24. Descriptive statistics were done for parametric quantitative data by mean, and standard deviation while they were done for categorical data by number and percentage. Analyses were done for parametric quantitative data between the two groups using the independent T-test. Analyses were done for qualitative data using the chi-squared test. The level of significance was taken at (P value < 0.05).

## Results

This study included 50 patients randomly allocated into two equal groups of 25 patients each as shown in the Consort flow diagram. Three patients in the study were excluded because of failure to follow up figure (1).

The patients' characteristics are shown in Table 2. The two groups were statistically similar in age, sex, weight, type, and duration of surgery (P > 0.05). Mean BP, HR, and $SpO_2$ were comparable between the study groups at all the measurement points. When compared with the placebo group, the gabapentin group displayed significantly lower VAS scores at 6 and 12 h postoperative (P < 0.05), while at 0 h there were no significant differences as shown in table (3).

Time to first analgesic request was significantly prolonged in group G compared to the control group, and the frequency of rescue analgesia doses was significantly less in the gabapentin group (P < 0.05) table (4). Sedation scores on Ramsay sedation scale were similar between the groups at all the measured time intervals (0, 6, and 12) as all patients were fully conscious and not sedated (P > 0.05).

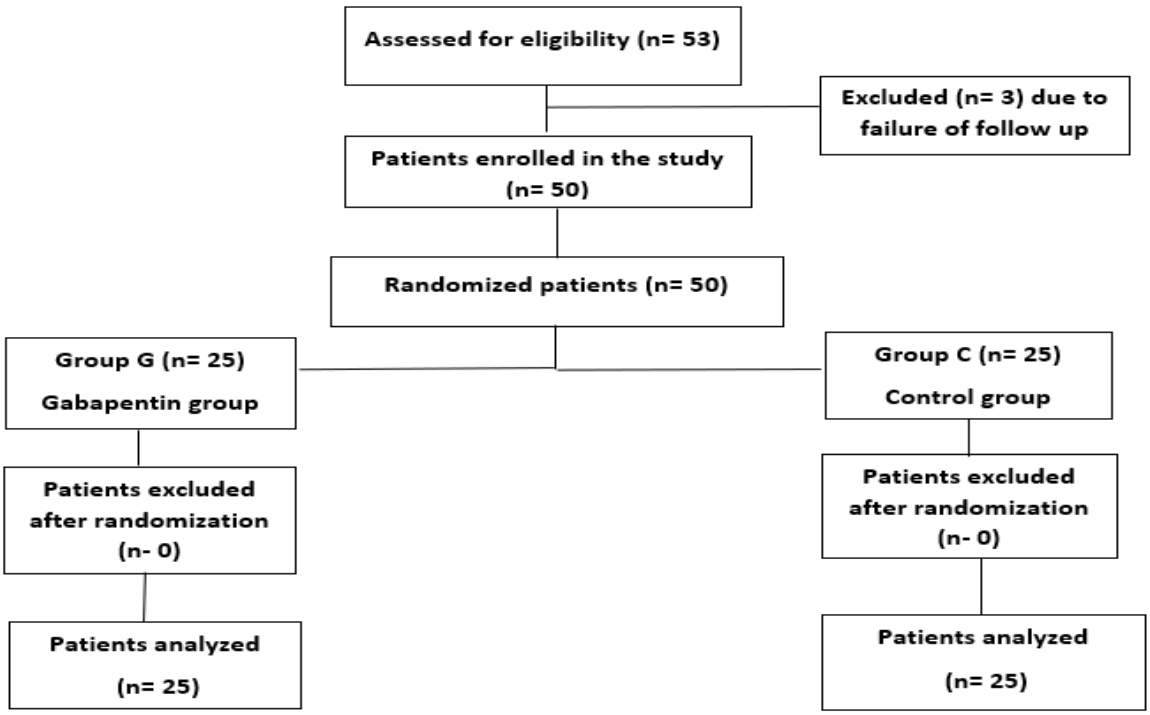


**Figure (1): Consort flow diagram**

**Table (2): Patients' Characteristics**

| | Group G (n= 25) | Group C (n= 25) | P value |
|---|---|---|---|
| **Age (years)** | 38± 16 | 40±16 | 0.7 |
| **Sex**<br>**Males**<br>**Females** | <br>15 (60%)<br>10 (40%) | <br>16 (64%)<br>9 (36%) | <br>0.6 |
| **ASA (I/ II)**<br>**I**<br>**II** | <br>22<br>3 | <br>24<br>1 | <br>0.9 |
| **Weight (kg)** | 83±11 | 79± 13 | 0.55 |
| **Types of Surgery**<br>Hemorrhoidectomy<br>Anal fissure<br>Anal fistula | <br>12 (48%)<br>8 (32%)<br>5 (20%) | <br>14 (56%)<br>7 (28%)<br>4 (16%) | <br>0.7<br>0.8<br>0.8 |
| **Duration of surgery (min)** | 35± 13 | 37± 8 | 0.5 |

Data are expressed as mean ± SD using independent samples t-test or numbers, and number percent.

**Table (3): Pain scores using the visual analog scale**

| Time | Group G (n= 25) | Group C (n= 25) | P value |
|---|---|---|---|
| **0 h** | 3 (2-3) | 2 (2-3) | 0.8 |
| **6 h** | 2 (2-3) | 7 (6-8) | 0.01* |
| **12 h** | 3 (2-4) | 6 (6-7) | 0.04* |

Data expressed as median (minimum-maximum) using Mann–Whitney U test.
*P value≤ 0.05 is significant

**Table (4): Time to first analgesic request and the frequency of rescue analgesia doses**

| | Group G (n= 25) | Group C (n= 25) | P value |
|---|---|---|---|
| **Time to first analgesic request (hours)** | 10± 1.9 | 5± 2.1 | 0.005* |
| **Frequency of rescue analgesia doses (n. %)** | 2 (4%) | 23 (96%) | 0.001* |

Data are expressed as mean ± SD using independent samples t-test or number percent.
*P value≤ 0.05 is significant

## Discussion

Although postoperative pain management has been greatly advanced lately, anal surgeries remain painful procedures with prolonged recovery that negatively affect the patient's life. A single preoperative dose of gabapentin significantly decreases postoperative pain after anal surgeries. In this study, the Gabapentin group displayed significantly lower VAS scores at 6 and 12 h postoperative, but at 0 h there were no significant differences as the patients at this point of measurement were still under the effect of spinal anesthesia. Decreasing postoperative pain was also achieved by Menda et al., in their study on 60 patients who underwent cardiac surgery, they were randomly allocated into 2 groups preoperatively either to receive 600 mg of oral gabapentin (GABA) or placebo (PLA) 2 hours before the operation, also the total morphine consumption was lower in the GABA group compared to the control group as in the present study [(8)].

Polylin et al., also reported postoperative analgesia achieved by the daily use of gabapentin for 9 days perioperatively for patients undergoing hemorrhoidectomy (1,000 mg of gabapentin was taken daily starting a day just before surgery and continuing for 9

days after, 9 pills total). Opioid use was slightly lower in the gabapentin group, there were no gabapentin-related complications in this study [7].

Time to first analgesic request was significantly prolonged in group G compared to the control group, and the frequency of rescue analgesia doses was significantly less in the gabapentin group.

The same results were recorded in previous studies, as gabapentin was effective in acute postoperative pain via decreasing opioid requirements, these results were also obtained in the study performed by Samira et al., which included sixty adult patients listed for laparoscopic cholecystectomy allocated to two groups of 30 each to receive gabapentin 600 mg orally or a matching placebo 2 hours before surgery[4].

There were no gabapentin-related complications in this as no patient in this study suffered from sedation as in previous studies[7, 8]. All of the present study's results correlate with a meta-analysis that included 12 randomized controlled trials of 896 patients undergoing a variety of surgical procedures that investigated the impact of perioperative administration of gabapentin on the postoperative outcome[9].

## Limitations

The study did not compare different doses of gabapentin to detect the exact amount that gives the maximum beneficial effects with the most negligible side effects. However, this may be a point for further investigation.

## Conclusion

Preoperative oral gabapentin decreases postoperative pain, prolongs analgesia duration, and decreases total opioid consumption in patients undergoing anorectal surgeries.

## References

1. Peterson KJ, Dyrud P, Johnson C, Blank JJ, Eastwood DC, Butterfield GE, Stekiel TA, Peterson CY, Ludwig KA, Ridolfi TJ. Saddle block anesthetic technique for benign outpatient anorectal surgery. Surgery. 2022;171(3):615-620.
2. Kent J. Peterson, Paul Dyrud, Colin Johnson, Jacqueline J. Blank, Daniel C. Eastwood, Gail E. Butterfield, Thomas A. Stekiel, Carrie Y. Peterson, Kirk A. Ludwig, Timothy J. Ridolfi, Saddle block anesthetic technique for benign outpatient anorectal surgery, Surgery. 2022; 171(3): 615-620.
3. Evan D. Kharasch, J. David Clark, Sachin Kheterpal; Perioperative Gabapentinoids: Deflating the Bubble. Anesthesiology 2020; 133:251–254
4. Semira S, Abbas Z, Bashir A. Effects of Gabapentin on Postoperative Pain and Total Analgesic Requirement After Laparoscopic Cholecystectomy. Biomed Pharmacol J 2019;12(2).
5. Sybilski A. Visual analog scale. A simple tool for daily treatment monitoring in allergic rhinitis. Pediatria i Medycyna Rodzinna, 2018; 14:277-281. 10.15557/ PiMR.2018.0030.
6. Dawson R., Von Fintel N., Nairn S. Sedation assessment using the Ramsay scale. Emergency nurse: the journal of the RCN Accident and Emergency Nursing Association, 2010; 18(3), 18–20. https://doi.org/10.7748/en2010.06.18.3.18. c7825
7. Poylin V, Quinn J, Messer K, Nagle D. Gabapentin significantly decreases post hemorrhoidectomy pain: a prospective study. Int J Colorectal Dis. 2014;29 (12):1565-9.
8. Menda F., Köner Ö, Sayın M., Ergenoğlu M., Kaku S., Aykaç B. Effects of Single-Dose Gabapentin on Post-operative Pain and Morphine Consu-mption After Cardiac Surgery. Journal of Cardiothoracic and Vascular Anesthesia 2010;24:808-813
9. Hurley RW, Cohen SP, Williams KA, et al., The analgesic effects of perioperative gabapentin on postoperative pain: a meta-analysis. Reg Anesth Pain Med 2006; 31:237–247. 20 Ho K-Y, Gan TJ, Habib AS. Gabapentin and postoperative pain-a systematic review of randomized controlled trials. Pain 2006; 126:91–101.