Perioperative Administration of Gabapentin for Shoulder Arthroscopy: A Prospective, Randomized, Double-Blind, Placebo-Controlled Study

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Recent studies suggest gabapentin has opioid-sparing effects and may reduce acute postoperative pain. However, there is limited research on the efficacy of gabapentin when combined in a multimodal approach after shoulder arthroscopy under general anesthesia with an interscalene block.

We conducted prospective, double-blind study of 70 patients who were randomized to receive either 300 mg of gabapentin or placebo 1 hour before surgery, then twice a day for 2 days. The primary outcome was average pain scores. Secondary outcomes included differences in morphine equivalents, adverse effects, and sleep patterns.

No significant differences in pain scores were found on day 1 (gabapentin mean [SD], 4.23 [2.61], vs placebo, 4.61 [2.57]; P = .58) or day 2 (gabapentin, 4.26 [2.39], vs placebo, 4.03 [2.34]; P = .71). Total morphine equivalents on day 1 (gabapentin, 9.75 mg [6.58 mg], vs placebo, 9.52 mg [4.75 mg]; P = .88) and day 2 (gabapentin, 9.21 mg [6.66 mg], vs placebo, 6.93 mg [5.44 mg]; P = .17) were similar. Adverse effects and sleep patterns were similar (P > .05).

These results suggest this dosing regimen of gabapentin is not efficacious in improving outcomes in patients undergoing shoulder arthroscopy under general anesthesia with an interscalene block.

Keywords: Central sensitization, gabapentin, interscalene block, postoperative pain, shoulder arthroscopy.

In the United States, more than 73 million surgical procedures are performed annually, and up to 75% of patients experience postoperative pain.[1] Untreated surgical pain increases morbidity and mortality and negatively affects postoperative outcomes.[2] One surgical procedure that is associated with significant postoperative pain, which may last for several days after surgery, is arthroscopic shoulder surgery.[3-6] Large doses of opioids are usually administered to help decrease postoperative pain after arthroscopic shoulder surgery.[6] However, the opioid-related adverse effects can interfere with quality of life, and the effectiveness of analgesia is often inadequate. An interscalene brachial plexus block (ISB) is one nonopioid option for analgesia for arthroscopic shoulder surgery.[4,6] It may be placed preoperatively to provide extended pain relief after shoulder arthroscopy. Unfortunately, the duration of action is limited to 22 to 23 hours when using long-acting local anesthetics, such as 0.5% bupivacaine with epinephrine.[3] This leaves patients with continued postoperative discomfort during the peak pain period.[5] A practical option for improving postoperative analgesia is the addition of nonopioid oral medications that can be combined in a multimodal analgesic plan with ISB. One such medication is gabapentin.

Gabapentin is a structural analogue of γ-aminobutyric acid, which decreases activation of $\alpha 2\beta$ subunits on central voltage-activated calcium channels.[7] Although the exact mechanism of action us unknown, it is believed that gabapentin decreases the release of excitatory neurotransmitters, such as glutamate, resulting in reduced hyperexcitability of dorsal horn nociceptive neurons responsible for central sensitization.[7] Other theories suggest gabapentin activates the descending noradrenergic system and induces a spinal norepinephrine release, which produces analgesia via spinal α_2-adrenoceptor stimulation.[8]

Several recent studies, meta-analyses, and systematic reviews have demonstrated that gabapentin (300-1,200 mg) given as a single preoperative dose as well as perioperatively for up to 10 days is effective in reducing postoperative pain and opioid consumption.[9-18] Gabapentin, when administered during the perioperative period as part of a multimodal approach, decreases

opioid consumption by 20% to 62%, postoperative pain scores between 18% and 37%, and opioid-related adverse effects.[10,15] The most frequent adverse effects of gabapentin are sedation and dizziness, which are more common with higher doses, such as 1,200 mg.[10]

There are limited studies on the perioperative administration of gabapentin after arthroscopic surgery of the shoulder. Adam et al[19] investigated the administration of a single preoperative oral dose of 800 mg of gabapentin on postoperative pain and opioid requirements for 48 hours after shoulder arthroscopy surgery with an ISB using 0.5% ropivacaine. In their study, they found no difference in pain or opioid consumption at 24 hours and 48 hours when compared with placebo. It may be that multiday dosing of gabapentin is necessary,[10,18,20] because the effect of a single dose of gabapentin may be less than the duration of action of an ISB with ropivacaine, thus leaving patients with substantial pain once the block has worn off.[3-6,19]

Therefore, the purpose of this investigation was to determine if the perioperative administration of gabapentin for 48 hours is more efficacious than placebo in patients scheduled for arthroscopic shoulder surgery under general endotracheal anesthesia with preoperative placement of an ISB.

Materials and Methods

Following approval from the hospital institutional review board, an experimental, prospective, randomized, double-blind, placebo-controlled study was conducted at a large military training hospital. The study included ASA class 1 and 2 patients 18 to 60 years old scheduled for shoulder arthroscopy surgery under general anesthesia who consented to preoperative placement of an ultrasound-guided ISB. Exclusion criteria were a history of chronic pain syndromes, malignant hyperthermia, neuropathy in the surgical extremity, psychiatric disorders, diagnosed obstructive sleep apnea, or a gabapentin allergy. After informed consent was obtained, patients were randomized by a research pharmacist to an experimental group or a control group using a computer-generated random numbers table. Study medications and randomization sequence were prepared and maintained by the pharmacist. Neither the patient nor the investigators were aware of group assignment. Patients in the experimental group received 300 mg of gabapentin within 1 hour of surgery, followed by 300 mg the night after surgery if able to tolerate oral medications that evening, then 300 mg twice a day for 48 hours. Patients randomized to the control group received identically prepared placebo capsules and were instructed to take the capsules on the exact same regimen as previously described. The investigators wanted to determine the efficacy of this low-dose regimen, because at this facility gabapentin is typically started at 300 mg twice a day and titrated up to minimize adverse effects. Several previous studies[13,14,17] have found decreased pain scores with preoperative administration of 300 mg of gabapentin without significant adverse effects.[17]

Following group assignment, baseline data were obtained, which included demographic information (age, height, weight, body mass index, gender, ethnicity, ASA class, diagnosis, proposed surgical procedure, current medications, and comorbidities), vital signs, and a baseline pain score using a 0 to 10 verbal numeric rating scale (VNRS), in which 0 indicated "no pain" and 10 indicated the "worst possible pain."

All patients then had a peripheral 18-gauge or 20-gauge intravenous (IV) line inserted in the nonoperative extremity and had an infusion of lactated Ringer's solution started. Before ISB block placement, patients were administered up to 5 mg of midazolam and up to 100 µg of fentanyl. Experienced practitioners then placed an ISB under ultrasound guidance with up to 3 mg/kg (20-30 mL) of 0.5% bupivacaine with 1:400,000 epinephrine. Total local anesthetic volume administered, time to complete block, block success (evaluated as sensory blockade over the operative site before entering the operating room), and complications were recorded on the data collection sheet.

Patients were then transported to the operating room for induction of anesthesia. A standardized anesthetic protocol was used for all patients. Intraoperatively, patients received an IV induction sequence of 1 to 3 µg/kg of fentanyl, up to 1.5 mg/kg of lidocaine, 1 to 2 mg/kg of propofol, and a neuromuscular blocking agent (succinylcholine or rocuronium) at the discretion of the staff anesthesia provider. Anesthesia was maintained with sevoflurane and nitrous oxide or air, and fentanyl titrated by the anesthesia provider. Before extubation, providers administered up to 5 mg neostigmine and 1 mg glycopyrrolate to patients who received rocuronium. After extubation patients were transported to the postanesthesia care unit (PACU). In the PACU, patients could receive up to 500 µg of IV fentanyl for pain, up to 50 mg of IV meperidine for shivering, and 4 mg of odansetron for postoperative nausea and vomiting. Additional medications were ordered and administered at the discretion of the staff anesthesia provider. Data collection included pain scores using a 0 to 10 VNRS scale, vital signs, Aldrete scores, and neurological scores (level of consciousness, eye opening, best verbal response, and respiratory pattern) on admission and discharge from the PACU. Additional data collection included total opioids administered and total surgical and PACU duration in minutes.

After discharge from the PACU, patients were transported to our same-day surgery unit. When patients met discharge criteria they were discharged to home or admitted overnight and prescribed a combination analgesic (5 mg of oxycodone, and 325 mg of acetaminophen [Percocet]), 1 to 2 tablets every 4 to 6 hours as needed for

pain. Patients were instructed to take the study medication the night after surgery if possible, then before breakfast and dinner on postoperative days 1 (POD 1) and 2 (POD 2). Patients were given a data collection packet and were contacted by a study investigator on POD 1 and POD 2. Data collection included total sleep duration in hours and sleep quality using a 1 to 5 Likert scale, with 1 indicating they slept "very poorly" and 5 indicating they slept "very well."[21] On the evenings of POD 1 and POD 2, patients were asked to rate their *average* pain for the day using a 0 to 10 VNRS scale. Patients were also asked to record their *average* drowsiness and dizziness scores, using a 0 to 10 VNRS scale, with 0 indicating "no drowsiness or dizziness," to 10 indicating "severe drowsiness or dizziness." Patients were asked to record whether they took the study medication and total Percocet tablets taken.

Before initiation of the study, a power analysis was performed. Based on previous research, it was hypothesized that patients in the experimental group (gabapentin) would have a mean (SD) pain score value of approximately 45.7 (16).[16] Based on the fact that doses of gabapentin were given at 12-hour intervals, the 12-hour pain scores from the previous study were chosen to represent the most conservative estimate of sample size. This computation therefore assumed that the mean difference was –16.26, corresponding to group means of 45.7 (19.3) vs 62.0 (23.3). Given the hypothesized effect size, a sample of 56 (28/group) would provide a power level of 80% with an α of .05. Allowing for 25% attrition and/or missing data per group, the sample size was increased to 70 patients (35/group). Prior to data analysis, all opioids were converted to morphine equivalents, and frequencies of adverse effects (drowsiness and dizziness) were calculated. A per-protocol analysis was conducted; that is, only patients who took the study medication twice a day for 48 hours were included in the final analysis. Descriptive and inferential statistics were used to analyze the results. Categorical data were analyzed with a χ^2 test or Fisher exact test, when appropriate. Repeated measures of analysis of variance; Student *t* tests; or Mann-Whitney *U* tests, when appropriate, were used to compare VNRS pain scores, total morphine equivalents, and drowsiness and dizziness scores on POD 1 and POD 2. Data were displayed as number (%), median, and mean (SD), and a *P* value less than .05 was considered significant.

Results

• *Sample.* A total of 70 patients were enrolled; however, 13 were excluded from the study (experimental group, n = 9 (25.7%), vs control group, n = 4 (11.4%); *P* = .12) leaving 57 patients for the analysis. Of the 70 patients, 5 were excluded for perioperative events or protocol violation, and 8 were excluded because they did not take the study medication on one or both days. In the gabapentin group, the risk of being excluded from the study was greater (relative risk, 1.52; 95% confidence interval (CI), 0.958-2.40) compared with the control group (relative risk, 0.56; 95% CI, 0.24-1.32; Figure 1).

• *Perioperative Data.* No significant differences were noted between the 2 groups with regard to baseline demographics or vital signs (*P* > .05; Table 1). Patients in the gabapentin group did have significantly higher baseline VNRS pain scores; however, an analysis of covariance was completed that indicated baseline pain scores had no significant effect on the primary or secondary outcomes (*P* > .05). No differences were found between the groups with regard to block volume or success, intraoperative medications, ketorolac use, type of arthroscopic procedure performed, or surgical or PACU duration; PACU admission or discharge Aldrete or neurological scores, vital signs, and PACU morphine equivalents (*P* > .05; Table 2).

• *Primary Outcome.* Average pain scores were compared between the 2 groups for POD 1 and POD 2 using a Student *t* test. A Student *t* test was used rather than repeated measures analysis of variance to analyze differences in average pain or opioid consumption, because the time frames for which the data were collected on each day were slightly different. No significant differences were found in average pain scores on POD 1 (experimental group, 4.23 [2.61] vs control group, 4.61 [2.57]; *P* = .58) and POD 2 (experimental group, 4.26 [2.39], vs control group, 4.03 [2.34]; *P* = .71) between the 2 groups (Figure 2).

• *Secondary Outcomes.* Total morphine equivalents were compared between the 2 groups for POD 1 and POD 2 using a Student *t* test. Total morphine equivalents on POD 1 (experimental group, 9.75 mg [6.58 mg], vs control group, 9.52 mg [4.75 mg]; *P* = .88) and POD 2 (experimental group, 9.21 mg [6.66 mg], vs control group, 6.93 mg [5.44 mg]; *P* = .17) were similar (Figure 3).

A χ^2 test was used to test the association between group assignment of adverse effect frequency, and a Student *t* test was used to analyze differences in adverse effect severity. There were no significant differences between the groups in the frequency or severity of the 2 most common adverse effects of gabapentin, dizziness or drowsiness, on POD 1 and POD 2 (*P* > .05; Table 3). In the gabapentin group, 38.5% of patients reported feeling dizzy compared with 30% in the control group on POD 1 (*P* = .50). Likewise, the results were similar between the groups on POD 2, with 26.9% of patients in the gabapentin group reporting feeling dizzy compared with 43.3% in the control group (*P* = .20). On POD 1, 76.9% of patients in the gabapentin group reported feeling drowsy compared with 67.7% in the control group (*P* = .44). On POD 2, 53.8% of patients in the gabapentin group reported feeling drowsy as compared with 66.7% in the control group (*P* = .32).

Differences in sleep duration between the 2 groups were compared with a 2-way repeated measures analysis of variance, and in sleep quality using a Mann-Whitney

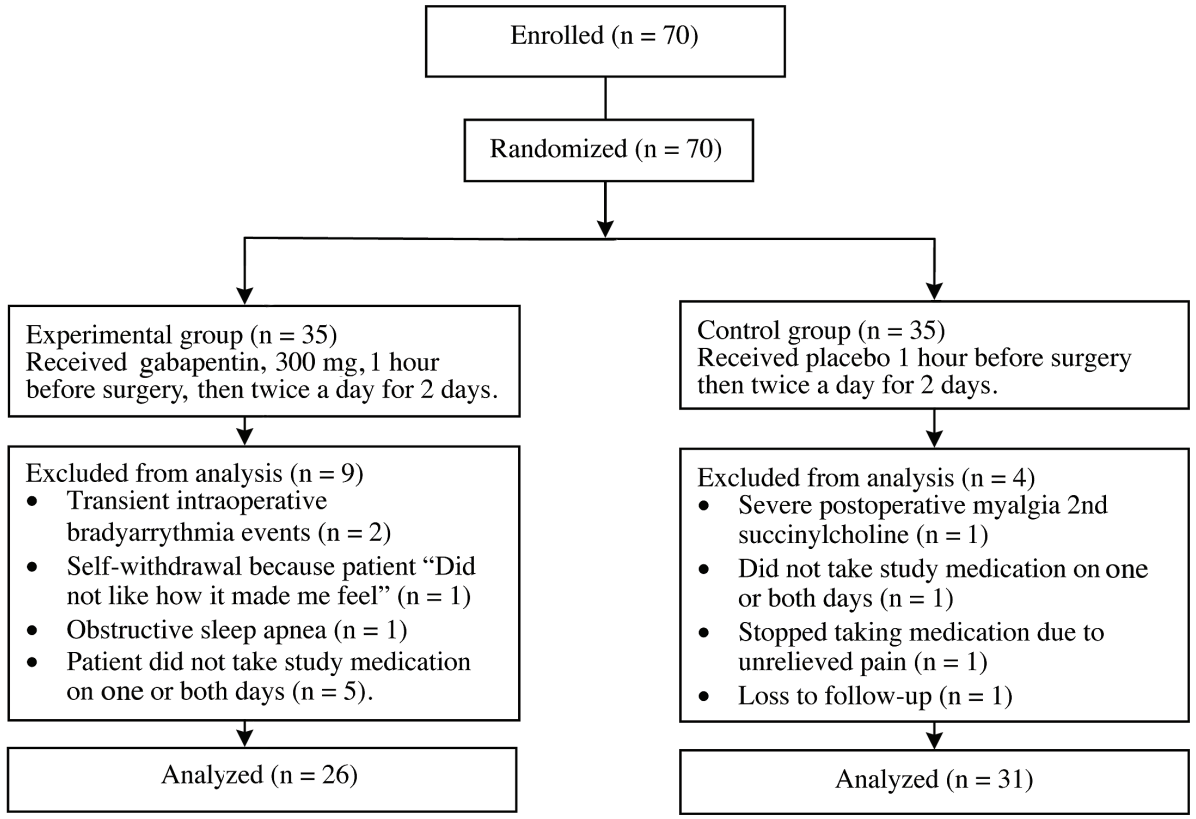

Figure 1. Consort Flow Diagram
A per-protocol analysis was conducted. Only patients who took the study medication on both days were included in the final analysis. Two subjects in the gabapentin group experienced transient intraoperative bradyarrythmia events (heart rate decreased from 70-79/min to 20-30/min) requiring treatment with atropine.

Demographic variable	Gabapentin group n = 26	Control group n = 31	*P* value
Age, mean (SD), y	31.8 (10.48)	31.51 (8.9)	.91
BMI, mean (SD), kg/m^2	28.44 (4.02)	28.49 (3.3)	.96
Gender, no. (%)			
Male	22 (84.6)	26 (83.9)	.62
Female	4 (15.4)	5 (16.1)	
Ethnicity, no. (%)			
White	14 (56)	22 (71)	.47
African American	3 (12)	5 (16.1)	
Asian	1 (4)	0 (0)	
Hispanic, nonwhite	3 (12)	2 (6.5)	
Pacific islander	4 (16)	2 (6.5)	
ASA status, no. (%)			
ASA 1	14 (53.8)	19 (61.3)	.38
ASA 2	12 (46.2)	12 (38.7)	
Baseline VNRS pain (0-10)	2.61 (2.36)*	1.16 (1.63)	.008

Table 1. Demographics and Baseline Data
*Analysis of covariance results indicated baseline pain score was not a significant covariant in any of the outcomes ($P > .05$).
Abbreviation: VNRS indicates verbal numeric rating scale.

Variable	Gabapentin group n = 26 Mean (SD)	Control group n = 31 Mean (SD)	*P* value
Surgical duration (min)	102.35 (42.21)	100.25 (31.59)	.83
Intraoperative fentanyl (μg)	181.34 (106.94)	143.54 (89.67)	.15
PACU duration (min)	50.46 (29.25)	50.19 (23.59)	.97
PACU			
Admission VNRS pain scores	0.27 (1.04)	0.55 (1.99)	.52
Discharge VNRS pain scores	0.73 (1.45)	0.81 (1.70)	.85
PACU			
Morphine equivalents (mg)	0.38 (1.35)	1.0 (2.91)	.51

Table 2. Surgical and Postanesthesia Care Unit Data
Abbreviations: PACU indicates postanesthesia care unit; VNRS, verbal numeric rating scale.

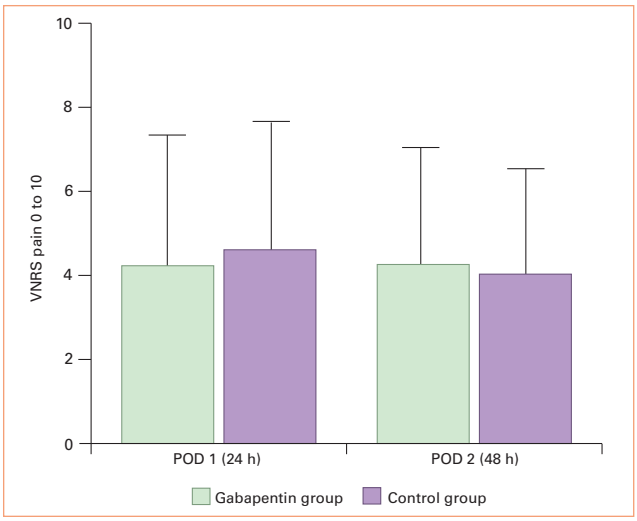

Figure 2. Group Comparison of Average Verbal Numeric Rating Scale Pain Score
Data are mean (SD). *P* > .05 for POD1 and POD2.
Abbreviations: VNRS indicates verbal numeric rating scale; POD, postoperative day.

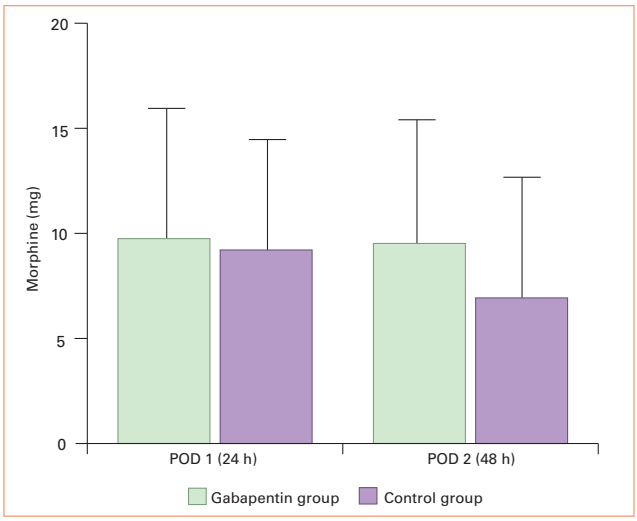

Figure 3. Group Comparison of Morphine Equivalents
Data are Mean (SD).
POD indicates postoperative day.
POD 1, *P* = .88, POD 2, *P* = .16.

U test. There were no significant differences in sleep duration between the 2 days (*P* = .46) or between the 2 groups (*P* = .051; see Table 3). Patients in the gabapentin group slept on average 52 minutes longer on both days when compared with the control group. Although sleep duration was slightly longer on both days in the gabapentin group, sleep quality was similar in both groups, with patients in both groups reporting a median score of 4 on a scale of 1 to 5 on both days (*P* > .05).

Discussion

Gabapentin has antiallodynic and antihyperalgesic properties that result in decreased central sensitization,[7,10] which may play a role in acute postoperative pain. Peripheral nerve blocks provide effective postoperative analgesia by blocking peripheral sensitization and may also have an effect on decreasing central sensitization.[22]

The pain scores reported in both groups in the PACU and on POD 1 and POD 2 are consistent with previous research on patients who received an ISB with long-acting local anesthetics.[19] However, as with the previous research study,[19] the negative findings in this study may be related to the effect the ISB had on preventing peripheral and central sensitization, thus masking any clinical effect this gabapentin dosing regimen had on postoperative outcomes. Although our study evaluated a lower preoperative and multiday dosing of gabapentin, the results are consistent with those of Adam et al,[19] who found no significant differences in pain or opioid consumption in 60 patients undergoing shoulder arthroscopy under ISB and general anesthesia randomized to receive a single preoperative dose of 800 mg of gabapentin or placebo. In contrast, Bang et al[17] found a single dose of 300 mg of gabapentin 2 hours before surgery in patients having arthroscopic rotator cuff repair under general anesthesia

Adverse effect measure	Gabapentin group n = 26	Control group n = 31	*P* value
Dizziness, mean (SD), severity (VNRS 0-10)			
Day 1	1.03 (1.88)	0.70 (1.41)	.45
Day 2	0.65 (1.26)	1.26 (1.91)	.15
Drowsiness, mean (SD), severity (VNRS 0-10)			
Day 1	3.65 (2.91)	3.09 (2.88)	.48
Day 2	1.69 (2.22)	2.90 (2.85)	.10
Sleep duration, mean (SD), h			
Day 1	7.44 (1.91)	6.48 (2.55)	.12
Day 2	7.55 (1.95)	6.76 (2.53)	.21
Sleep quality, median (minimum, maximum), (1, very poor to 5, very well)			
Day 1	4 (1, 5)	4 (2, 5)	.85
Day 2	4 (1, 5)	4 (1, 5)	.30

Table 3. Secondary Outcomes
Abbreviation: VNRS indicates verbal numeric rating scale.

without an ISB had significantly less pain during the first 12 hours after surgery, but not at 24 hours, when compared with placebo. Therefore, it is possible that low-dose gabapentin (300 mg) may have some efficacy in decreasing immediate postoperative pain in patients undergoing shoulder arthroscopy without an ISB.

This is the first study to evaluate multiday administration of gabapentin after shoulder arthroscopy surgery. Our results suggest that 300 mg of gabapentin administered 1 hour before surgery and then twice a day for 48 hours is no more efficacious than placebo on decreasing postoperative pain or opioid consumption in patients undergoing shoulder arthroscopy with ISB (with 0.5% bupivacaine and 1:400,000 epinephrine) and general endotracheal anesthesia. There were no significant differences in the frequency and severity of the most common adverse effects of gabapentin, dizziness and sedation, between the 2 groups. Likewise, sleep quality and duration were similar; however, patients in the gabapentin group slept, on average, 52 minutes longer on both days. The increased sleep duration in the gabapentin group is not surprising given that, clinically, many patients report they sleep longer when taking gabapentin, although in this study, sleep quality was no better than placebo.

There was a trend toward a larger proportion of patients being excluded for perioperative events, attrition, or not taking the study medication in the gabapentin group (25.7% vs 11.4%, $P = .12$). Although not statistically significant, these findings may be clinically relevant. One patient in the gabapentin group withdrew from the study because of medication intolerance. The patient described substantial dizziness and ataxia after taking 2 doses, which is consistent with the adverse effect profile for gabapentin.[10,15] In fact, Peng and colleagues[10] found the relative risk of dizziness to be 1.4 (95% CI, 1.06-1.84) when compared with placebo. Two patients were excluded in the gabapentin group because they experienced transient intraoperative bradyarrythmia events. In one case, odansetron was administered before the event and was suspected as contributing to the event. However, in the second case, no odansetron was administered. In both cases, anticholinergics were administered, the events quickly resolved, and the patients were later discharged without complications. Hypotensive and/or bradycardic events have been reported to occur in 29% of patients undergoing shoulder surgery in the sitting position with an ISB and are associated with epinephrine administration (ie, in local anesthetics or irrigation solution).[23] The hypotensive and/or bradycardic events have been purported to be mediated by the Bezhold-Jarisch reflex.[23] Cardiac events have not been previously associated with gabapentin, and both cases were performed in the sitting position. It is possible that these were hypotensive and/or bradycardic events mediated by the Bezhold-Jarisch reflex, although we cannot definitively conclude that the gabapentin was not a contributing factor. Sen et al[24] reported intraoperative bradycardia occurred in 2 out of 30 patients who received a single dose of 1,200 mg of gabapentin compared with 1 out of 29 patients in the placebo group undergoing inguinal hernia repair under spinal anesthesia ($P > .05$). Cardiac abnormalities, specifically, bradycardia and asystole, are rare but reported adverse events associated with 5-HT_3 antagonists, including odansetron.[25,26]

It is unclear why more patients in the gabapentin group did not take the study medication on one or both days given that reported adverse effects were similar between the 2 groups. In 1 case, the patient (gabapentin group) reported he had trouble swallowing the capsules. It could

be that asking patients who are recovering from surgery to take an additional medication, such as gabapentin twice a day for 48 hours, increases patient burden and decreases adherence to the dosing regimen. This is especially true when the patients are unsure whether the medication is going contribute to their analgesic regimen.[27] Patient withdrawal due to adverse effects of dizziness and sedation has been reported in previous studies evaluating the efficacy of multiday dosing regimens of gabapentin.[18] Given the excellent postoperative analgesia provided by the ISB and the lack of differences in efficacy, it is possible that in some patients the adverse effects and/or increased burden of taking a medication to which they are not accustomed may have contributed to decreased adherence. The patients in this investigation were a predominately young, male, active duty military population, and thus may differ from previous populations studied.[19]

Although gabapentin has demonstrated efficacy in multiple surgical populations,[10] there is still a paucity of studies on the efficacy of multiday dosing. Kong and Irwin,[28] in their systematic review and meta-analysis, reported that only 4 out of 16 perioperative randomized placebo-controlled trials of gabapentin evaluated multiday dosing, all with conflicting results. They concluded that multiday dosing of gabapentin offered no benefit over single-day dosing. As was demonstrated in this current study, adherence with multiday dosing of gabapentin is difficult. As a result, the conflicting results reported by Kong and Irwin[28] could be related to decreased adherence. Given the limited number of studies and the fact that gabapentin has shown some efficacy in decreasing postoperative pain,[29] future research should focus on multiday dosing,[30] consider objective measures for monitoring and improving adherence (eg, medication event monitors),[31] and report both the frequency and severity of adverse effects.[32]

Most of the research on gabapentin reports only the frequency of adverse effects (ie, dizziness and sedation), rather than the frequency and severity. Reporting of adverse effect severity is important to anesthesia providers because this allows them to analyze the risk-benefit profile to determine if a medication such as gabapentin will provide benefit to a patient. This study was one of the few to evaluate severity of the most common adverse effects, dizziness and sedation. Dierking et al[32] used a Likert scale to evaluate somnolence severity, but only reported the frequency of dizziness in 80 patients undergoing abdominal hysterectomy randomized to receive 1,200 mg of oral gabapentin or placebo 1 hour before surgery, followed by 600 mg of oral gabapentin or placebo 8, 16, and 24 hours after the initial dose. Similar to these findings, no significant differences were noted between the groups in the severity of somnolence and the frequency of dizziness by Dierking et al.[32] However, they did state that residual effects of anesthetic agents and surgery may have masked adverse effects from gabapentin. Investigators should consider these issues when designing future studies.

There are several limitations of this study. First, some patients may have taken their pain medications around the clock instead of as needed, which could account for the lack of group differences. In addition, the dosing strategy for gabapentin may have been too low to achieve a clinical effect.[28] Peng et al[10] reported in their meta-analysis that there was no benefit in starting a dose greater than 600 mg, whereas Kong and Irwin[28] recommended administering a single preoperative dose of less than or equal to 1,200 mg to minimize adverse effects. Rusy et al[18] found that initial dosages of 15 mg/kg followed by 5 mg/kg 3 times per day for 5 days were associated with significantly less postoperative pain and opioid consumption in the pediatric population undergoing spinal fusion surgery. Relating this information to our study, if our patients had an average weight of 70 kg, this would equilibrate to an initial gabapentin dose of 1,050 mg, which would be within the range recommended by Peng et al[10] and Irwin and Kong.[28] Perhaps the 300-mg dosage administered twice-a-day in this study was too low, especially considering the patients received an ISB. Gabapentin has a half-life of 6.5 hours, so it is possible that the patients' pain perceptions were higher in the middle of the day when plasma levels were lower. However, at our facility, gabapentin is typically started at 300 mg twice a day and titrated up to avoid excessive dizziness and sedation. We felt this was an appropriate dose to evaluate because it reflected our clinical practice. To compensate for the less frequent dosing regimen, we evaluated average pain and total opioid consumption on each day, rather than pain at specific times of the day or with activity.

Conclusion

Gabapentin has demonstrated efficacy as a single preoperative dose in multiple surgical populations.[10] Nevertheless, given the lack of efficacy, potential adverse reactions, adverse effects, and nonadherence issues in this current study, we would not recommend this dosing regimen of gabapentin for shoulder arthroscopy with general anesthesia and interscalene block with long-acting local anesthetics. Future studies are needed on the effect of single-day and multiday gabapentin regimens on postoperative pain and should incorporate measures of adverse effect severity and include objective measures of adherence.

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