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ORIGINAL ARTICLE

A comparative study effects of gabapentin and alprazolam on post-operative analgesia

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ABSTRACT:

Background: Gabapentin, a structural analogue of gamma amino butyric acid, is used as an analgesic adjunct to reduce the post-operative pain and post-operative morphine consumption. The present study was conducted to compare effects of gabapentin and alprazolam on post-operative analgesia. **Materials & Methods:** fifty- one patients with age ranged 30–65 years of both genders scheduled for elective abdominal hysterectomy were divided into three groups of 17 each. Group I received gabapentin – oral gabapentin 600 mg, group II received 0.5 mg alprazolam oral and group III placebo – oral B-complex forte with Vitamin C 1 capsule. Visual analogue scale (VAS) was used to measure the anxiety and post-operative pain. **Results:** The mean duration of surgery in group I was 157.2 minutes, in group II was 161.6 minutes and in group III was 155.7 minutes. Anxiety score before pre- medication was 21 in group I, 33 in group II and 35 in group III and after pre-medication was 20 in group I, 20 in group II and 27 in group II. VAS score at 1 hour was 50.4, 70.3 and 70.8, at 2 hours was 48.2, 60.4 and 62.4, at 6 hours was 35.7, 32.8 and 40.6 and at 24 hours was 20.6, 10.4 and 15.8. Ramsay sedation score (h) at 1 hour was 2, 3 and 2, at 2 hours was 2, 2 and 2, at 6 hours was 2, 2 and 2 and at 24 hours was 2, 2 and 2 in group I, II and III respectively. The difference was significant (P< 0.05). **Conclusion:** Alprazolam as premedication was found to be an effective anxiolytic in the pre-operative period as compared to gabapentin.

Key words: Alprazolam, Anxiety, Gabapentin

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INTRODUCTION

Anxiety leads to a surge of catecholamines associated with the stress response leading to tachycardia, hypertension and haemodynamic instability. The relationship between anxiety and pain has previously been identified.[1] Psychological stress, measured over several post-operative days, revealed that anxiety and pain are well correlated. Thus, alleviation of pre-operative anxiety as an adjunct to post-operative pain management seems a promising approach.[2]

Despite intensive investigation, the molecular mechanism of action of gabapentin remains unsettled. Experimental studies have demonstrated anti-hyperalgesic effects of gabapentin in models involving central neuronal sensitization, without affecting acute pain transmission.[3] In healthy volunteers, gabapentin enhanced the effect of morphine in the cold pressor test, reduced primary mechanical allodynia in acute inflammation following a thermal injury, and reduced secondary hyperalgesia following sensitization with combined heat and capsaicin, without affecting acute nociceptive thresholds.[4]

Gabapentin, a structural analogue of gamma amino butyric acid, is used as an analgesic adjunct to reduce the post-operative pain and post-operative morphine consumption.[5]Initially introduced as an antiepileptic, it soon found use in treating neuropathic pain associated with post-herpetic neuralgia, post-poliomyelitis neuropathy and reflex sympathetic dystrophy. It has been suggested that central neuronal sensitization may amplify postoperative pain, although the relative contribution of various pain mechanisms to post-operative pain has not been established.[6] Alprazolam, a triazolo-analog of the 1,4 benzodiazepine is a widely used pre-operative anxiolytic drug in anaesthetic practice.[7] The present study was conducted to compare effects of gabapentin and alprazolam on post-operative analgesia.

MATERIALS & METHODS

The present study comprised of fifty- one patients with American Society of Anesthesiologists Physical status 1 or 2 with age ranged 30–65 years of both genders scheduled for elective abdominal hysterectomy. All patients gave their written consent for participation.

Demographic data was recorded. Patients were divided into three groups of 17 each. Group I received gabapentin – oral gabapentin 600 mg, group II received 0.5 mg alprazolam oral and group III placebo – oral B-complex forte with Vitamin C 1 capsule. Patients received above premedication with sips of water, on the night prior to surgery and 2 hours prior to surgery. Visual analogue scale (VAS) was used to measure the anxiety and post-operative pain. All patients received patient-controlled analgesia. Results

thus obtained were assessed statistically. P value <0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II	Group III
Agent	600 mg Gabapentin	0.5 mg Alprazolam	B-complex forte with Vitamin C 1
M:F	10:7	8:9	9:8

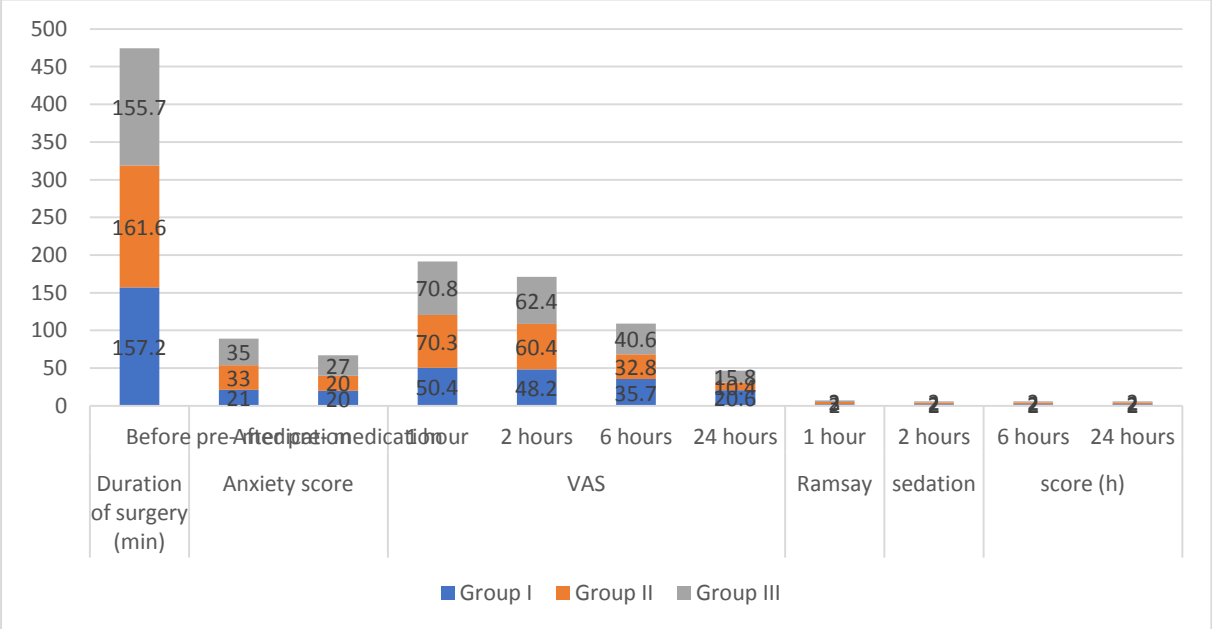
Table I shows that group I had 10 males and 7 females, group II had 8 males and 9 females and group III had 9 males and 8 females.

Table II Patients characteristics

Characteristics	Variables	Group I	Group II	Group III	P value
Duration of surgery (min)		157.2	161.6	155.7	0.97
Anxiety score	Before pre- medication	21	33	35	0.01
	After pre- medication	20	20	27	0.90
VAS	1 hour	50.4	70.3	70.8	0.12
	2 hours	48.2	60.4	62.4	0.17
	6 hours	35.7	32.8	40.6	0.15
	24 hours	20.6	10.4	15.8	0.18
Ramsay sedation score (h)	1 hour	2	3	2	0.91
	2 hours	2	2	2	
	6 hours	2	2	2	
	24 hours	2	2	2	

Table II, graph I shows that mean duration of surgery in group I was 157.2 minutes, in group II was 161.6 minutes and in group III was 155.7 minutes. Anxiety score before pre- medication was 21 in group I, 33 in group II and 35 in group III and after pre- medication was 20 in group I, 20 in group II and 27 in group II. VAS score at 1 hour was 50.4, 70.3 and 70.8, at 2 hours was 48.2, 60.4 and 62.4, at 6 hours was 35.7, 32.8 and 40.6 and at 24 hours was 20.6, 10.4 and 15.8. Ramsay sedation score (h) at 1 hour was 2, 3 and 2, at 2 hours was 2, 2 and 2, at 6 hours was 2, 2 and 2 and at 24 hours was 2, 2 and 2 in group I, II and III respectively. The difference was significant (P< 0.05).

Graph I Patients characteristics



DISCUSSION

Gabapentin has demonstrated potent anti-hyperalgesic properties in preclinical and clinical studies, without affecting acute nociception.[8] In experimental studies, gabapentin suppressed experimentally induced hyperalgesia. Intrathecal administration reduced tactile allodynia after incision enhanced pain behavior in rats after formalin induced pain, and reduced mechanical hyperalgesia in a rat model of postoperative pain.[9] Ménigaux et al[10] suggested the anxiolytic effect of gabapentin. A single drug providing pain relief as well as anxiolysis is desirable

favouring better perioperative results. There are no studies comparing gabapentin and alprazolam with regard to their anxiolytic properties. The present study was conducted to compare effects of gabapentin and alprazolam on post-operative analgesia.

In present study, group I had 10 males and 7 females, group II had 8 males and 9 females and group III had 9 males and 8 females. Joseph et al[11] compared seventy- five patients scheduled for abdominal hysterectomy under general anaesthesia. Groups gabapentin, alprazolam and placebo, received oral gabapentin 600 mg, alprazolam 0.5 mg and one capsule of oral B-complex forte with Vitamin C respectively, on the night prior to surgery and 2 hours prior to surgery. Visual analogue scale (VAS) was used to measure the anxiety and post-operative pain. All patients received patient-controlled analgesia. Alprazolam provided significant anxiolysis (median [interquartile range] baseline VAS score 35 [15.5, 52] to 20 [6.5, 34.5] after drug administration; P = 0.007). Gabapentin did not provide significant decrease in anxiety (median [interquartile range] VAS score 21 [7.5, 41] to 20 [6.5, 34.5]; P = 0.782). First analgesic request time (median [interquartile range in minutes]) was longer in group gabapentin (17.5) compared to group placebo (P = 0.019) but comparable to that in group alprazolam. Cumulative morphine consumption at different time periods and total morphine consumption (mean [standard deviation]) at the end of study period (38.65 [18.04], 39.91 [15.73], 44.29 [16.02] mg in group gabapentin, alprazolam and placebo respectively) were comparable.

We observed that mean duration of surgery in group I was 157.2 minutes, in group II was 161.6 minutes and in group III was 155.7 minutes. Anxiety score before pre- medication was 21 in group I, 33 in group II and 35 in group III and after pre- medication was 20 in group I, 20 in group II and 27 in group II. VAS score at 1 hour was 50.4, 70.3 and 70.8, at 2 hours was 48.2, 60.4 and 62.4, at 6 hours was 35.7, 32.8 and 40.6 and at 24 hours was 20.6, 10.4 and 15.8. Ramsay sedation score (h) at 1 hour was 2, 3 and 2, at 2 hours was 2, 2 and 2, at 6 hours was 2, 2 and 2 and at 24 hours was 2, 2 and 2 in group I, II and III respectively. Dirks et al[12] in their study 70 patients received a single dose of oral gabapentin (1,200 mg) or placebo 1 hour before surgery. Patients received patient-controlled analgesia with morphine at doses of 2.5 mg with a lock-out time of 10 min for 4 hours postoperatively. Pain was assessed on a visual analog scale at rest and during movement, and side effects were assessed on a four-point verbal scale 2 and 4 h postoperatively. Results: Thirty-one patients in the gabapentin group and 34 patients in the placebo group completed the study. Gabapentin reduced total morphine consumption from a median of 29 to 15 (10–19) mg (P < 0.0001). Pain during movement was reduced from 41 (31–59) to 22 (10– 38) mm at 2 h postoperatively (P < 0.0001) and from 31 (12–40) to 9 (3–34) mm at 4 h postoperatively (P<0.018). No significant differences between groups were observed with regard to pain at rest or side effects.

Clarke et al[13] found that gabapentin 600 mg did not reduce the pre-operative anxiety compared to a placebo. In a randomized, double-blind, placebo-controlled, parallel-group trial, 300 mg pregabalin was compared to placebo and 400 mg ibuprofen using a dental pain model.[14]

CONCLUSION

Authors found that alprazolam as premedication was found to be an effective anxiolytic in the pre-operative period as compared to gabapentin.

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