

Original Research Article

Single dose oral gabapentin as a pre-emptive analgesic for post-operative pain relief in patients undergoing tonsillectomy

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Abstract

Introduction: Post-operative pain and swallowing difficulty following tonsillectomy remain one of the most difficult pain states to manage in Otolaryngology. Many therapeutic modalities - ranging from non-steroidal anti-inflammatory drugs (NSAIDs) to systemic opioids, acetaminophen, and tramadol - have been used for posttonsillectomy pain control in patients. Gabapentin has been recently found to be useful for reducing acute post-operative pain when administered preoperatively. Although various dose regimens have been tried in different surgical settings, the minimum effective dose is not established.

The aim of the study: To study the analgesic property of a single of dose oral Gabapentin for postoperative pain relief, to study the hemodynamic variables in patients receiving oral Gabapentin

Materials and methods: A total number of, 60 patients were included in the study group between 6 to 16 years. P group (Placebo group) 30 ASA I patients for tonsillectomy receiving oral placebo, G group 30 ASA I patients for tonsillectomy receiving oral gabapentin during a 24-hour post-operative period, the outcomes of interest being postoperative pain intensity; rescue analgesic consumption; or adverse effects such as sedation, nausea and vomiting, dizziness, and headache.

Results: The pain score reported by the physician during the first 8 hours, as well as the need for analgesics during 24 hours postoperatively, were significantly decreased in the gabapentinoids group versus the control group. Additionally, there was no significant difference between gabapentinoids and control groups for adverse effect during 24 hours postoperatively. Statistically, significant

sedation was observed up to 4 hours in the postoperative period. After 5 hours there was no statistically significant difference in both groups.

Conclusion: Oral Gabapentin is effective for postoperative pain relief, reduces the requirement of supplementary analgesics in the postoperative period. Oral Gabapentin has a better hemodynamic profile. Gabapentin is safe for use in pediatric patients.

Key words

Gabapentin, Pain Sensation, Ramsay Sedation Score, Hemodynamic Profile.

Introduction

Tonsillectomy is the most commonly performed surgical procedure in ENT practice. Post-operative pain remains the major problem following tonsillectomy, if not treated. Different methods and many drugs have been used to control the postoperative pain. In this study, we evaluate the role of gabapentin premedication vs paracetamol in the management of postoperative pain following adenotonsillectomy in children [1]. Tonsillectomy is one of the most commonly performed surgeries in the pediatric age group producing a consistent pattern and intensity of pain in the recovery period. These features make this surgery ideal for the investigation of pain-relieving medications [2]. Post-operative pain following tonsillectomy is often severe and aggravated by swallowing and can, therefore, lead to impaired food intake, possible dehydration, sleep disturbances and increased risk of secondary haemorrhage [3]. Moreover, adequate analgesia for tonsillectomy in the postoperative period presents a challenge to the anesthetist because the use of opioid analgesics that have been traditionally used to provide postoperative analgesia is associated with a variety of postoperative side effects like respiratory depression, sedation postoperative nausea and vomiting pruritus, and constipation. Opioids increase the risk of nausea and vomiting, as well as the ominous risk of respiratory depression in patients with sleep-disordered breathing. Acetaminophen alone provides less pain relief than opioids and requires more rescue analgesia [5]. Therefore, it is necessary to develop an effective approach to control post tonsillectomy pain by combining treatment

modalities that can block different pain mechanisms [4].

Materials and methods

A total number of, 60 patients were included in the study group between 6 to 16 years. P group (Placebo group) 30 ASA I patients for tonsillectomy receiving oral placebo, G group 30 ASA I patients for tonsillectomy receiving oral gabapentin during a 24-hour postoperative period, the outcomes of interest being postoperative pain intensity; rescue analgesic consumption; or adverse effects such as sedation, nausea and vomiting, dizziness, and headache.

Exclusion criteria

- Known Hypersensitivity to gabapentin.
- Anemia.
- Upper respiratory tract infection.
- Lower respiratory tract infections.
- Cardiac valvular abnormalities.
- Abnormal bleeding and clotting time.
- Obstructive sleep apnea.8.Pts having any renal disease.
- Patients taking any other analgesic or antiepileptic medications.

G group - Oral Gabapentin 10 mg/kg given 2 hours before surgery, P group-oral placebo capsules given 2 hours before surgery. Induction – inj. Thiopentone 5 mg/kg i.v. Intubation inj. Succinylcholine 1.5mg/kg i.v. appropriate size cuffed endotracheal tube nasally. Maintenance - 66% N₂O in oxygen and halothane Extubation after adequate regain of reflexes.

Results

No statistical difference between both groups intraoperatively as per **Graph – 1**. Hemodynamic variables comparison of postoperative pulse rate was as per **Table – 1**.

Adverse drug effect in both the groups was as per **Table – 2**. The MAP in the G group is significantly lower than the P group ($P < 0.01$) as per **Graph – 2**.

Graph – 1: Hemodynamic variables.

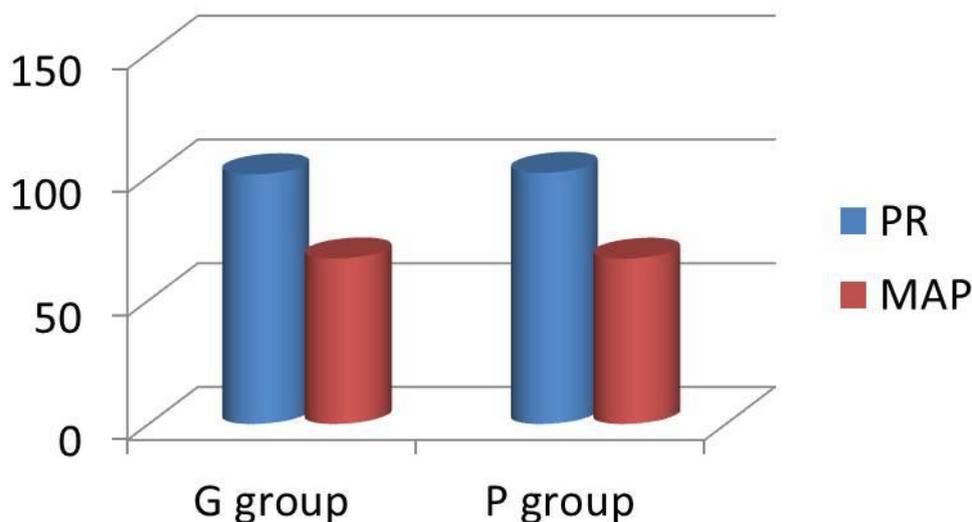


Table – 1: Hemodynamic variables comparison of postoperative pulse rate.

Time	Group G		Group P		Significance (p)
	mean	SD	mean	SD	
EOS	100.6	4.7	101.3	5.5	$P > 0.05$
2 hrs	98.6	4.3	103.1	5.6	$P < 0.01$
4 hrs	97.5	3.4	104.3	5.8	$P < 0.01$
6 hrs	96.5	3.4	105.4	5.6	$P < 0.01$
8 hrs	98.0	3.1	106.8	5.3	$P < 0.01$
12 hrs	99.6	3.1	108.6	4.9	$P < 0.01$

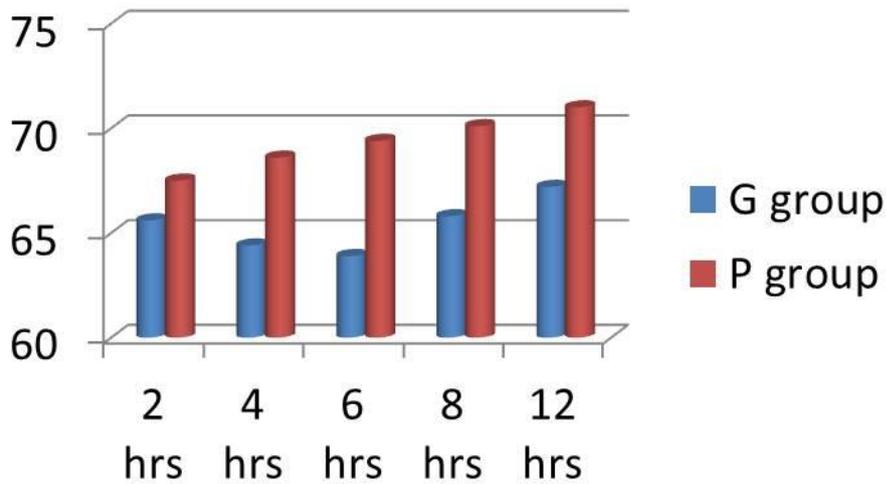
Table – 2: Adverse drug effect in both the groups.

	Group G n = 30	Group P n = 30
Dizziness	0	0
Confusion	0	0
Headache	0	0
PONV	0	0

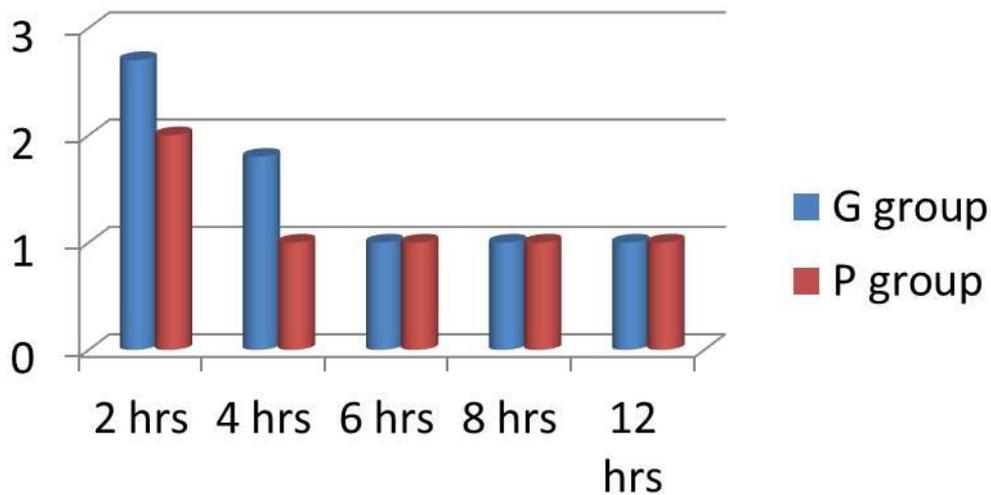
Statistically significant sedation in G group was observed up to 4 hours in the postoperative period. After 5 hours there was no statistically significant difference in both groups (**Graph – 3**). VAPS score was 0 for about 4 hours in the post-op while a VAPS score of 4 was reached only after 8 hours duration in the G group

(**Graph – 4**). A VAPS score of 4 was reached at the end of the 4th hour in the majority of patients belonging to the placebo group (**Graph – 5**). Statistically significant postoperative pain relief was observed in the patients receiving Gabapentin - lasting for about 11 hours (**Graph – 6**).

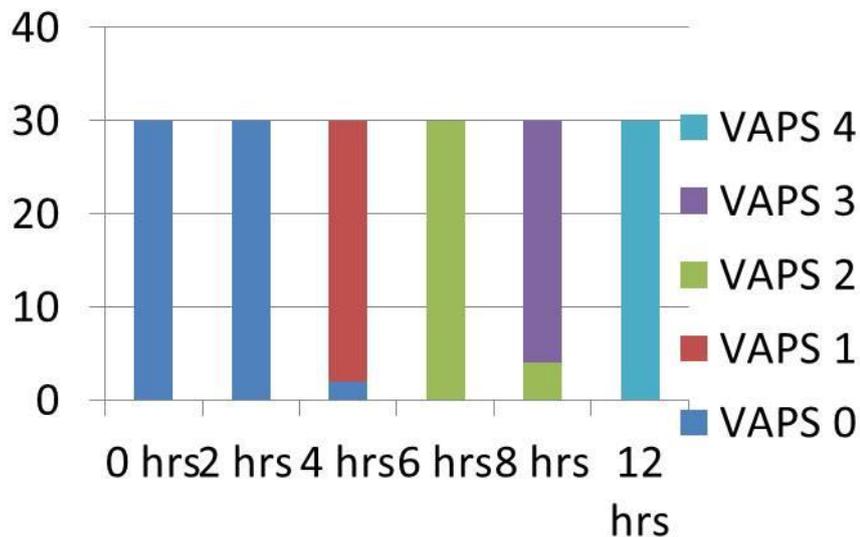
Graph – 2: Comparison of postoperative MAP.



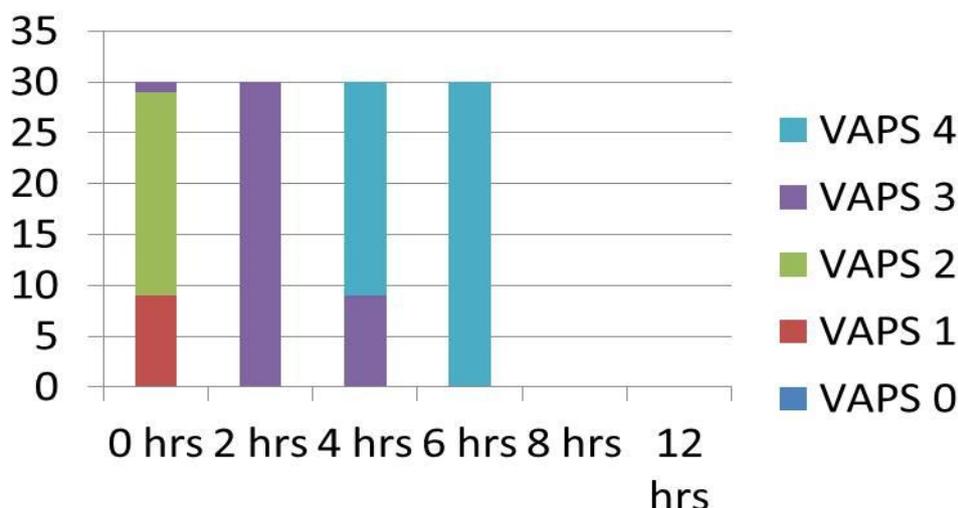
Graph – 3: Post-operative sedation score using Ramsay sedation score.



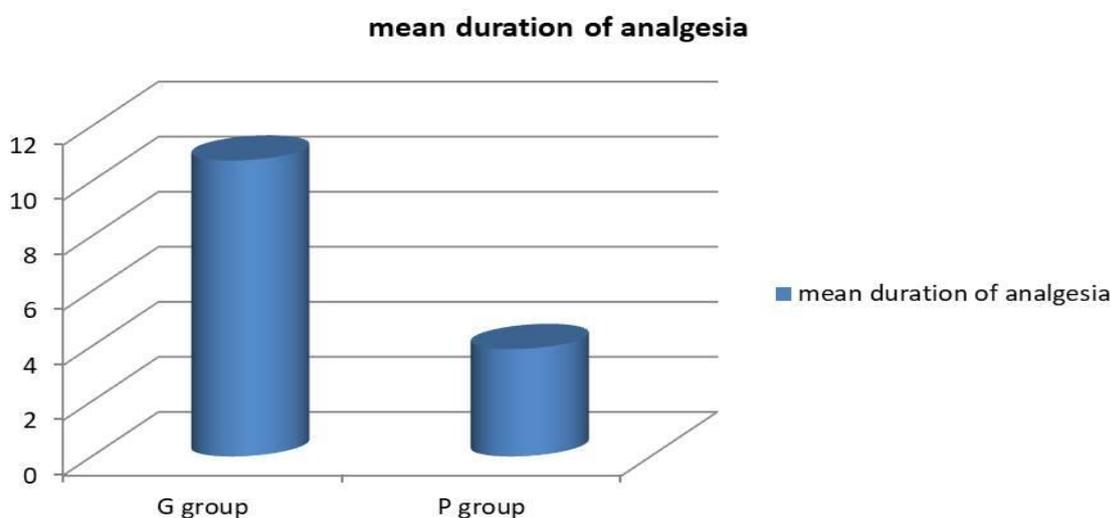
Graph – 4: G-group post-operative pain relief VAPS score.



Graph – 5: P- group postoperative pain relief VAPS score.



Graph – 6: Total duration of postoperative pain relief.



Discussion

Post-operative pain is one of the most troublesome aspects patients undergoing tonsillectomy. Postoperative pain is not purely nociceptive in nature and may consist of inflammatory, neurogenic and visceral components; therefore multimodal analgesic techniques utilizing a number of drugs acting on different analgesic mechanisms are becoming increasingly popular [5]. The concept of pre-emptive analgesia to reduce the magnitude and duration of postoperative pain were paved in 1983 by Woolf. Subsequently an overwhelming amount of experimental data demonstrated that various anti-nociceptive techniques applied before injury were more effective in reducing the

post-injury sensitization phenomena as compared with administration after injury. Gabapentin is an anti-epileptic drug that has been used in adults to treat pain after surgery [6]. It has an extensive safety record in the treatment of children with seizures and chronic pain syndromes. A number of mechanisms may be involved in the action of Gabapentin. Possible pharmacologic targets of Gabapentin are selective activation of the heterodimeric GABAB receptors which consist of GABAB1a and GABAB2 subunits. The effects of perioperative gabapentin on postoperative pain control have been evaluated in 27 studies [7]. The influence of perioperative gabapentin on postoperative analysis as measured by pain scores and opioid consumption is mostly

favorable. Hence, Gabapentin was chosen for pre-emptive analgesia as a single oral dose pre-operatively, for this study. The effectiveness of an oral dose of 600 mg of gabapentin on postoperative pain control in patients undergoing tonsillectomy. They concluded that premedication with gabapentin decreased post-tonsillectomy pain and the addition of gabapentin prior tonsillectomy may have an adjunctive role in pain control [8].

In our study, only randomized controlled trials were also included for improving the quality of the underlying studies in the meta-analysis, despite several trials (case series or case-controlled trials) presenting the various results related to the effect of gabapentinoid [9]. Although the results of this study offer evidence for the use of preoperative gabapentinoid at a single dose of 1,200 mg or less in ameliorating patient's morbidity, larger trials, duration of treatment, and standardized dosing represent some areas in which further study is needed. However, the short-term dosing, limited side effect risk, and lack of drug interactions make this an easy adjunctive pain control option with effectiveness in both movement-evoked pain and pain at rest, while decreasing opioid usage and possible side effects related to their use [10].

Conclusion

This meta-analysis showed that the systemic administration of gabapentin before tonsillectomy could decrease post tonsillectomy pain efficiently without adverse effects. It can also decrease analgesic consumption and the time to the beginning of analgesic intake. However, the duration of the treatment and standardized dosing require further investigation, and larger trials need to be included.

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