Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

ENT

Effect on Post-Tonsillectomy Pain after Peri-Tonsillar Infiltration of 0.75% Ropivacaine: A Prospective Study

Dr. Ravi K S[1*], Dr. Kiran M Naik[2], Dr. Nikethan[3]

[1]Associate Professor, Department of ENT, AIMS, B G Nagar, Karnataka, India
[2]Professor and HOD, Department of ENT, AIMS, B G Nagar, Karnataka India
[3]Junior Resident, Department of ENT, AIMS, B G Nagar, Karnataka India

DOI: 10.36347/sjams.2021.v09i07.019 | **Received:** 19.06.2021 | **Accepted:** 22.07.2021 | **Published:** 30.07.2021

***Corresponding author:** Dr. Ravi K S

Abstract **Original Research Article**

Background and objectives: To study the efficacy of peri-tonsillar infiltration of 0.75%ropivacaine with adrenaline in the management of post-tonsillectomy pain. ***Materials and methods:*** This prospective study was conducted in the department of Otorhinolaryngology and Head and Neck Surgery, Adichunchanagiri Institute of Medical Sciences, B.G. Nagara, Mandya district. The study period was from November 2017 to July 2019. A sample size of 30 patients which satisfied the inclusion criteria was included in the study. Ropivacaine (0.75%) with Adrenaline (1:200000) was locally infiltrated on the right side (R-side) in the peri-tonsillar region before the surgery and in the tonsillar fossa after the surgery. The left side was considered as the control side. Patients were followed up on 1st and 7th post-operative days for the measurement of post-operative pain. For the assessment of post-operative pain, Visual Analogue Scale was used (VAS). ***Results*:** 17(56.7%) females and 13(43.3%) males participated in the study. Majority of the cases belonged to <10 years of age group. On 1st post-operative day, pain on the right side was significantly lower compared to the left side (p value <0.0001), however the reduction of pain scores on right side compared with that of the left side was not significant (p value=0.536) on the 7th post-operative day. ***Interpretation and conclusion:*** The peri-tonsillar infiltration of ropivacaine(0.75%) with adrenaline (1:200000) is effective and significant in reducing post-operative pain on the 1st post-operative day, but not so significant on the 7th post-operative day .Hence we recommend the use of peri-tonsillar infiltration of ropivacaine (0.75%) with adrenaline in view of better management of post-operative pain.

Keywords: Tonsillectomy; Peri-tonsillar infiltration; Ropivacaine; Adrenaline; Post-operative pain.

INTRODUCTION

Tonsillectomy is considered to be the most common surgery in ENT practice. There are various techniques of tonsillectomy which have been followed but the most common being the dissection and ligation method [1].

The post-tonsillectomy morbidities still continue to be a significant clinical concern, despite significant advancement in anaesthetic and surgical techniques [2, 3]. Pain is the most common postoperative morbidity after tonsillectomy.

Pain is an unpleasant emotional experience which has a negative impact on the patient's well-being and sometimes severe pain also may impair swallowing leading to an increased risk of secondary infection, bleeding, and dehydration [4]. Pain following the procedure is significant and requires continued hospital stay. Pain will usually persist approximately two weeks following surgery. Post-operative pain seems to be more in adults compared to children [8].

Thus the relief of pain after tonsillectomy is a major concern for the well-being of patient after tonsillectomy. Various theories have been proposed to explain the reduction of the post tonsillectomy pain. Blockade of peripheral nerve pain impulses to the CNS during surgery can prevent the formation of hyper excitable state in the CNS and subsequently results in reduction of postoperative pain [5].

Researchers have tried different options for pain reduction after tonsillectomy like use of topical lignocaine, ropivacaine, pethidine, dexamethasone, and bupivacaine [6-10].

Ropivacaine is a new synthetic long acting amide type local anaesthetic with intrinsic

vasoconstritive properties. When compared to other local anaesthesia drugs, Ropivacaine has equivalent anaesthetic properties with less potential to cause serious cardiotoxic reactions. Its duration of action is 6 to 8 hours in peripheral block [11]. Further, the addition of vasoconstrictors and certain other agents to local anaesthetic injections improves the onset, intensity and duration of anaesthesia and preemtive analgesia [12].

The aim of this study is to assess the efficacy of peri-tonsillar infiltration of Ropivacaine with adrenaline in the management of post tonsillectomy pain in patients undergoing tonsillectomy at our hospital. The study also emphasizes on investigating the relationship between the uses of Ropivacaine with adrenaline and the pain symptom after tonsillectomy.

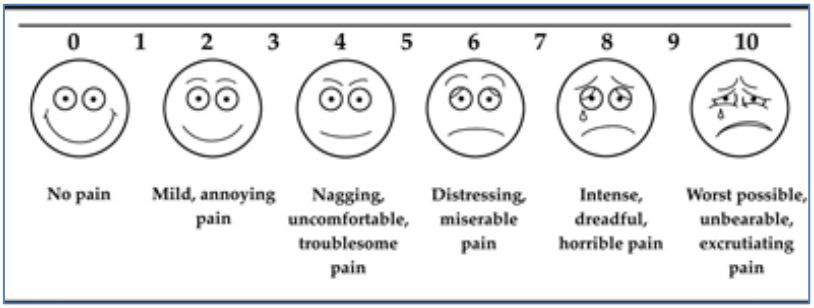
MATERIALS AND METHODS

This is a prospective study conducted in the Department of Otorhinolaryngology and Head and Neck Surgery, Adichunchanagiri Institute of Medical Sciences, B.G.Nagara, Mandya district. The study period was from November 2017 to July 2019.

A sample size of 30 patients with history of recurrent or chronic tonsillitis undergoing tonsillectomy with or without adenoidectomy was included in the study. The exclusion criteria was patients with acute infections, hypersensitivity to ropivacaine, patients with history of bleeding disorders, liver, kidney and cardiovascular dysfunction and patients who are inability to understand a visual analogue scale (VAS). The study was approved by Institutional Ethics Committee. Written informed consent was taken from all patients undergoing Tonsillectomy and Adeno-tonsillectomy. Dissection tonsillectomy was done in all the cases.

Ropivacaine (0.75%) with Adrenaline (1:200000) was locally infiltrated on the right side (R-side) in the peri-tonsillar region before the surgery and in the tonsillar fossa after the surgery. The left side was considered as the control side.

Patients were followed up on 1st and 7th post-operative days for the measurement of post-operative pain. For the assessment of post-operative pain, Visual Analogue Scale was used (VAS). The follow-up data was collected by the nursing parent using a printed out questionnaire using 10mm visual analog scale 0–10 assessing pain.



The study includes data from intra-operative and post-operative period which will be analysed using Chi square test and Student t test technique as found appropriate and comparison of each technique used for severity of pain will be determined.

The sample size of the study was calculated by statistical power analysis with a 90% power and a 95% confidence interval, taking into account the results of previous studies and was taken as 30 cases [13].

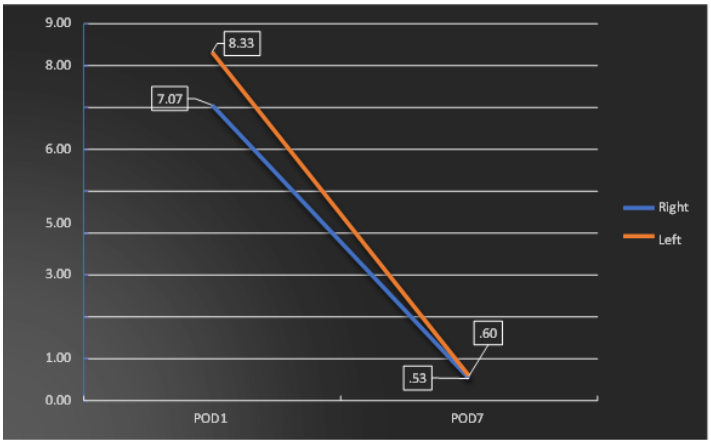
RESULTS

In our study, a total of 30 patients participated out of which 17 were females and 13 were males. Females constituted 56.7% of the total number of patients and males constituted 43.3% of the total cases. Majority of the cases belonged to <10 years of age group.

Pain was evaluated using a visual analogue scale with scores ranging from 1 to 10. On post-operative day 1, pain on the right side averaged around 7.07 and on the left side, it averaged around 8.33. On the 7th post-operative day, pain on the right side averaged around 0.53 and pain on the left side averaged around 0.60.

Table-1:-Comparison of Mean post-operative pain scores between Right and Left

	POD1		POD7	
	Mean	**Std. Deviation**	**Mean**	**Std. Deviation**
Right	7.07	.868	.53	.507
Left	8.33	.711	.60	.563



Graph-1:-Post-Operative Pain Analogue Scale Score

Table-2:-Comparison of Mean post-operative pain scores between the two sides on 1st and 7th post-operative days separately

	Mean	N	Std. Deviation	95% Confidence Interval of the Difference		t	Df	Sig. (2-tailed)
				Lower	Upper			
RPOD 1	7.07	30	.868	-1.646	-.888	-6.836	29	.000
LPOD 1	8.33	30	.711					
RPOD 7	.53	30	.507	-.284	.151	-.626	29	.536
LPOD 7	.60	30	.563					

From the above analysis, it can be said that, there is a significant decrease in pain on the right side compared to the left side ($p<0.0001$) on 1st post-operative day. On the 7th post-operative day the decrease in pain on the right side compared with that of the left side is not significant ($p=0.536$).

DISCUSSION

Tonsillectomy has a high incidence of postoperative pain. There is still debate on the optimal analgesia for this common surgical procedure. Different mechanisms have been described to reduce the post tonsillectomy pain and it includes improved intraoperative anaesthetic pain regimens, use of corticosteroids, adjustment of surgical technique, and intraoperative LA injection [14].

Among the above options, the local anaesthetic administered to the peri tonsillar space which provides analgesia and minimal adverse effects is an attractive solution to the problem of post tonsillectomy pain [15]. Local anaesthetics when applied to the tonsillar fossae can block the transmission of the electrical impulses to the CNS and reduces the post tonsillectomy pain

Though the peritonsillar infiltration with local anaesthetics has been proposed for postoperative analgesia and intraoperative bleeding control, the results are conflicting [16]. However, the agents which have been used for the analgesia includes lidocaine, bupivacaine, and ropivacaine with or without vasoconstriction.

Ropivacaine is 2–3 times less lipid soluble and has a smaller volume of distribution, greater clearance, and shorter elimination half-life than bupivacaine in humans [11]. Low concentrations of ropivaciane may produce clinically significant vasoconstriction, which is not increased further by the addition of epinephrine [17]. Ropivacaine was reported to produce fewer cardiotoxic effects than bupivacaine [18].

In our study, we used Visual Analogue Scale (VAS) for the measurement of post-operative pain, pain was evaluated on both right and the left side on 1st and 7th post-operative day. The mean pain score on 1st post-operative day on the right side is significantly less ($p<0.0001$) compared to the left (control) side. However the difference in the reduction of pain between the two sides on 7th post-operative day is not significant ($p=0.536$).

Giannoni C *et al*., in 2001 conducted a similar study on the use of ropivacaine in post-tonsillectomy pain and found a preemptive analgesic effect and decreases pain, opioid use, and the time to return to normal activity.

Apostolopoulos *et al*. found that ropivacaine in local tonsillectomy was safe, had a longer onset-time, but was more efficient concerning post-operative pain than lidocaine [8].

J. Grainger N. *et al*., in 2008 conducted a study "Local anaesthetic for post- tonsillectomy pain: a systematic review and meta- analysis". They found that, local infiltration of local anaesthetics like

ropivacaine or lignocaine is effective in reducing post-tonsillectomy pain [19].

Ahmed El Daly *et al*., in 2019 conducted a study "Effect on postoperative pain after topical application of local anaesthetics in the tonsillar fossa after tonsillectomy" and found out that, topical application of the tonsillar bed with a local anaesthetic after tonsillectomy results in significant reduction of postoperative throat pain and referred otalgia and should be used during tonsillectomy [20].

The above mentioned studies also support our results that ropivacaine is effective in reducing post-operative pain on 1st post-operative day but the same cannot be said for 7th post-operative day.

In contrast, Park *et al*. reported no reduction in postoperative pain when they injected ropivacaine with epinephrine immediately after adenotonsillectomy [21].

Gemma *et al*. claimed that peritonsillar infiltration with 0.75% ropivacaine did not provide any major postoperative analgesic effect in 3- to 7-year-old children after adenotonsillectomy [22].

Infiltration of local anaesthetic into the peritonsillar tissue may have some risks. Reported complications are bilateral vocal cord paralysis lasting 5 h, severe upper airway obstruction with pulmonary oedema due to vagal or hypoglossal block, life-threatening deep cervical abscess, and brain stem stroke due to cardiac asystole intra-operatively necessitating tracheotomy and gastrostomy tube. These are seen especially after infiltration of a deeper and higher volume of local anaesthetics with vasoconstrictors into the tonsil and adenoid beds [23-28].

The infiltration technique also carries the risk of accidental intravascular injection which can lead to cardiac arrest and convulsion [29].

From our study it can be derived that the peri-tonsillar infiltration of Ropivacaine (0.75%) with Adrenaline (1:200000) is effective in the management of post-tonsillectomy pain in the initial days after surgery although same cannot be said on the 7th post-operative day.

Hence we recommend the use of peri-tonsillar infiltration of Ropivacaine (0.75%) with adrenaline irrespective of the age of the patient in view of better management of post-operative pain.

CONCLUSION

With our study, we conclude that pre-incisional infiltration of 0.5 % ropivacaine is an effective method to reduce post-operative pain in patients undergoing tonsillectomy under GA. It is also effective for early start of postoperative oral feed and also reduces the cost of postoperative hospital stay. There were no additional complication raised because of ropivacaine use and we recommend routine use of 0.5% ropivacaine as pre-incisional infiltration in patients undergoing tonsillectomy.

REFERENCES

1. Lipman, D.S. (2005). Tonsillectomy techniques. Arch Otolaryngol Head Neck Surg, 131; 279.
2. Tay, H.L. (1995). Post-operative morbidity in electrodissection tonsillectomy. J Laryngol Otol, 109; 209–11.
3. Ashbach, M.N., Ostrower, S.T., Parikh, S.R. (2007). Tonsillectomy techniques and pain: a review of randomized controlled trials and call for standardization. ORL J Otorhinolaryngol Relat Spec, 69; 364–70.
4. Kaygusuz, İ., & Susaman, N. (2003). The effects of dexamethasone, bupivacaine and topical lidocaine spray on pain after tonsillectomy. International journal of pediatric otorhinolaryngology, 67(7), 737-742.
5. Iodice, F. G., & Testa, G. (2013). Pain relief in patients undergoing tonsillectomy.
6. Amani, S., & Abedinzadeh, M. R. (2015). Effects of oral gabapentin, local bupivacaine and intravenous pethidine on post tonsillectomy pain. Iranian journal of otorhinolaryngology, 27(82), 343.
7. Akoglu, E., Akkurt, B. C. O., Inanoglu, K., Okuyucu, S., & Daglı, S. (2006). Ropivacaine compared to bupivacaine for post-tonsillectomy pain relief in children: a randomized controlled study. International journal of pediatric otorhinolaryngology, 70(7), 1169-1173.
8. Afman, C. E., Welge, J. A., & Steward, D. L. (2006). Steroids for post-tonsillectomy pain reduction: meta-analysis of randomized controlled trials. Otolaryngology—Head and Neck Surgery, 134(2), 181-186.
9. Ju, N. Y., Cui, G. X., & Gao, W. (2013). Ropivacaine plus dexamethasone infiltration reduces postoperative pain after tonsillectomy and adenoidectomy. International journal of pediatric otorhinolaryngology, 77(11), 1881-1885.
10. Kedek, A., Derbent, A. B. D. U. R. R. A. H. İ. M., Uyar, M., Bilgen, C., Uyar, M., Kirazli, T., & Certug, A. (2005). Pre-emptive effects of ibuprofen syrup and lidocaine infiltration on postoperative analgesia in children undergoing adenotonsillectomy. Journal of international medical research, 33(2), 188-195.
11. Giannoni, C., White, S., Enneking, F. K., & Morey, T. (2001). Ropivacaine with or without clonidine improves pediatric tonsillectomy pain. Archives of Otolaryngology–Head & Neck Surgery, 127(10), 1265-1270.

12. Miller, R. D., Eriksson, L. I., Fleisher, L. A., Wiener-Kronish, J. P., & Young, W. L. (2009). Anesthesia E-Book. Elsevier Health Sciences.
13. Apostolopoulos, K., Labropoulou, E., Samaan, R., & Bogris, K. (2003). Ropivacaine compared to lidocaine for tonsillectomy under local anaesthesia. European archives of oto-rhino-laryngology, 260(7), 355-357.
14. O'Leary, S., & Vorrath, J. (2005). Postoperative bleeding after diathermy and dissection tonsillectomy. The Laryngoscope, 115(4), 591-594.
15. Ohlms, L. A. (2001). Injection of local anesthetic in tonsillectomy. Archives of Otolaryngology–Head & Neck Surgery, 127(10), 1276-1278.
16. Özmen, Ö. A., & Özmen, S. (2011). Topical bupivacaine compared to lidocaine with epinephrine for post-tonsillectomy pain relief in children: a randomized controlled study. International journal of pediatric otorhinolaryngology, 75(1), 77-80.
17. Mio, Y., Fukuda, N., Kusakari, Y., Amaki, Y., Tanifuji, Y., & Kurihara, S. (2004). Comparative effects of bupivacaine and ropivacaine on intracellular calcium transients and tension in ferret ventricular muscle. The Journal of the American Society of Anesthesiologists, 101(4), 888-894.
18. Akoglu, E., Akkurt, B. C. O., Inanoglu, K., Okuyucu, S., & Daglı, S. (2006). Ropivacaine compared to bupivacaine for post-tonsillectomy pain relief in children: a randomized controlled study. International journal of pediatric otorhinolaryngology, 70(7), 1169-1173.
19. Grainger, J., & Saravanappa, N. (2008). Local anaesthetic for post- tonsillectomy pain: a systematic review and meta- analysis. Clinical Otolaryngology, 33(5), 411-419.
20. El Daly, A., Abd El Naby, M., & Emad, P. (2019). Effect on postoperative pain after topical application of local anesthetics in the tonsillar fossa after tonsillectomy. The Egyptian Journal of Otolaryngology, 35(2), 173-181.
21. Park, A. H., Pappas, A. L., Fluder, E., Creech, S., Lugo, R. A., & Hotaling, A. (2004). Effect of perioperative administration of ropivacaine with epinephrine on postoperative pediatric adenotonsillectomy recovery. Archives of Otolaryngology–Head & Neck Surgery, 130(4), 459-464.
22. Gemma, M., Piccioni, L. O., Gioia, L., Beretta, L., & Bussi, M. (2009). Ropivacaine peritonsillar infiltration for analgesia after adenotonsillectomy in children: a randomized, double-blind, placebo-controlled study. Annals of Otology, Rhinology & Laryngology, 118(3), 227-231.
23. Elhakim, M., Ali, N. M., Rashed, I., Riad, M. K., & Refat, M. (2003). Dexamethasone reduces postoperative vomiting and pain after pediatric tonsillectomy. Canadian Journal of Anesthesia, 50(4), 392-397.
24. Bean-Lijewski, J. D. (1997). Glossopharyngeal nerve block for pain relief after pediatric tonsillectomy: retrospective analysis and two cases of life-threatening upper airway obstruction from an interrupted trial. Anesthesia & Analgesia, 84(6), 1232-1238.
25. Tajima, K., Sato, S., & Miyabe, M. (1997). A case of acute pulmonary edema and bulbar paralysis after local epinephrine infiltration. Journal of clinical anesthesia, 9(3), 236-238.
26. Fradis, M., Goldsher, M., David, J. B., & Podoshin, L. (1998). Life-threatening deep cervical abscess after infiltration of the tonsillar bed for tonsillectomy. Ear, nose & throat journal, 77(5), 418-421.
27. Bumpous, J. M., Alsarraf, R., & Sie, K. C. (2000). Brain stem stroke associated with bupivacaine injection for adenotonsillectomy. Otolaryngology—Head and Neck Surgery, 122(4), 572-573.
28. Weksler, N., Nash, M., Rozentsveig, V., Schwartz, J. A., Schily, M., & Gurman, G. M. (2001). Vocal cord paralysis as a consequence of peritonsillar infiltration with bupivacaine. Acta anaesthesiologica scandinavica, 45(8), 1042-1044.
29. Gunter, J. B. (2002). Benefit and risks of local anesthetics in infants and children. Pediatric Drugs, 4(10), 649-672.