

Original research article**Effect of peri-tonsillar infiltration of ropivacaine and adrenaline on intra operative bleeding**¹Nikethan G, ²Abhishek MP, ³Nikesh Kumar Singh, ⁴Vinay S Bhat¹Consultant, Department of ENT, Taluk hospital, Kollegal, Karnataka, India²Senior Resident, Department of ENT, CIMS, Chamarajanagar, Karnataka, India³Senior Resident, Department of ENT, Patna Medical College and Hospital, Patna, India⁴Professor, Department of ENT & HNS, Adichunchanagiri Institute of Medical Sciences, Belluru, Karnataka, India**Corresponding Author:**

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Abstract

Hemorrhage after tonsillectomy occurs most commonly till 10 days after surgery. Hemorrhage occurs when scabs begin sloughing off from the surgical sites. The risk of hemorrhage is approximately 1-2%. It is higher in adults, especially males and in 75% of the cases the hemorrhage occurs on the day of surgery. 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 Peritonsillar region before the surgery and in the Tonsillar fossa after the surgery. The left side was considered as the control side. Intra-operative blood loss was estimated by weighing the swabs used before and after surgery (1gm=1ml) and adding it to the total volume of blood collected in respective suction bottles separately on both the sides 17(56.7%) females and 13(43.3%) males participated in the study. Majority of the cases belonged to <10 years of age group. Mean blood loss was 75.73ml on the Right side and 88.6ml on the left side (p value <0.0001). The peri-tonsillar infiltration of Ropivacaine (0.75%) with Adrenaline (1:200000) is effective and significant in reducing intra-operative bleeding during the surgery.

Keywords: Tonsillectomy, peri-tonsillar infiltration, ropivacaine, adrenaline, intra-operative bleeding, post-operative pain

Introduction

The most basic early complication is haemorrhage. If hemorrhage occurs within 24 hours, it is called as primary hemorrhage. If the hemorrhage occurs after 24 hours and till the healing of the tonsillar bed it is called as secondary hemorrhage. It occurs due to the infection of the healing granulation tissue. The term reactionary is very confusing and its use should be avoided. Antibiotic treatment with penicillin is adequate ^[1].

Analgesics like ketorolac tromethamine is associated with increased bleeding and should be avoided. The blood supply of the tonsillar bed consists of a system of anastomosing arteries principally emerging from the ipsilateral external carotid, supply from the branches of the internal carotid and vertebral artery also exist and contralateral vessels circle through the circle of Willis ^[2]. In this way, broad intraoperative or postoperative bleed may not generally stop after ligation of the external carotid. In serious cases, ligation of different branches (e.g. maxillary, facial, lingual, or superior thyroid arteries) is essential. Intra-operative bleed can be controlled by suction cautery, ligation or packing the tonsillar fossa and over suturing the tonsillar pillars to give steady pressure on the fossa. Post-operative bleeding usually occurs between the fifth and seventh postoperative days. Blood clots in the fossa should be cleared as these prevent coagulation by fibrinolytic action ^[3].

Hemorrhage after tonsillectomy occurs most commonly till 10 days after surgery. Hemorrhage occurs when scabs begin sloughing off from the surgical sites. The risk of hemorrhage is approximately 1-2%. It is higher in adults, especially males and in 75% of the cases the hemorrhage occurs on the day of surgery. Approximately 3% of the patients develop significant hemorrhage which requires surgical intervention ^[4].

Ropivacaine is a aminoamide. It is the monohydrate of the hydrochloride salt of 1-propyl-2',6'-pipecoloxylidide and is prepared as the pure S-enantiomer. It belongs to the local anaesthetic group of pipecoloxylidides. Mepivacaine and bupivacaine also belong to the same group. On the piperidine nitrogen atom of the molecule, Mepivacaine has a methyl group, ropivacaine a propyl group and bupivacaine a butyl group ^[5].

Mepivacaine and bupivacaine are currently produced for clinical use as racemic mixtures of the enantiomers containing equal proportions of the "S" and "R" forms but ropivacaine is the single "S"

enantiomer. It has an enantiomeric purity of 99.5% and is prepared by the alkylation of the S-enantiomer of dibenzoyl-L-tartaric acid [6].

Methodology

- Data was collected from patients, satisfying the inclusion criteria, presenting to the Otorhinolaryngology outpatient department.
- All patients underwent routine and special investigations.
- Written informed consent was taken from all patients undergoing Tonsillectomy and Adeno-tonsillectomy.
- 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.
- Intraoperative blood loss was estimated by weighing the swabs used before and after surgery (1gm=1ml) and adding it to the total volume of blood collected in respective suction bottles separately on both the sides
- Patients were followed up on 1st and 7th post-operative days.
- Occurrence of post-operative bleeding and pain was noted and recorded for analysis.
- For patients undergoing Adenoidectomy with Tonsillectomy, swabs and suctioning bottles were collected separately before Tonsillectomy.

Inclusion criteria

- Patients of all age groups and sexes.
- Patients undergoing tonsillectomy for:
 - Chronic tonsillitis and chronic adenotonsillitis.
 - Recurrent episodes of acute tonsillitis.
 - Hypertrophic obstructive tonsils with apnea, snoring or Odynophagic symptoms.

Exclusion criteria

- Patients undergoing tonsillectomy for:-
 - Unilateral styloid process removal.
 - Unilateral Glossopharyngeal neurectomy.

Patients allergic to Ropivacaine and other local anaesthetics.

Results

In our study, 30 cases were analysed, all the cases were given peri-tonsillar infiltration of Ropivacaine with adrenaline on the right side. It was found that >100ml blood loss on the right side was found in 6 patients constituting about 20% of the total cases.

Table 1: Amount of Right Sided Blood Loss

Intraop Right side blood loss	Frequency	Percent
<50ml	6	20.0
50-75ml	9	30.0
76-100ml	9	30.0
>100ml	6	20.0
Total	30	100.0

In our study, for all the 30 cases, left side was considered as the control side and on this side peri-tonsillar infiltration was not given. It was found that, >100ml blood loss was seen in 10 patients constituting 33.3% of the total cases.

Table 2: Amount of Left Sided Blood Loss

Intraop Left side blood loss	Frequency	Percent
<50ml	2	6.7
50-75ml	7	23.3
76-100ml	11	36.7
>100ml	10	33.3
Total	30	100.0

Table 3: Comparison of Mean Blood Loss between Right and Left Sides

	Mean	N	Std. Deviation	95% Confidence Interval of the Difference		t	df	P value
				Lower	Upper			
R Blood Loss	75.73	30	31.055	- 16.395	-9.338	-7.458	29	.000
L Blood Loss	88.60	30	26.282					

By analysing the above tabulated data, blood loss was found to be higher on the left side (control side) compared to the right side on which peri-tonsillar infiltration of Ropivacaine with Adrenaline was given. The association between the blood loss on the right side and the left side (control side) was found to be significant (P value <0.0001).

Discussion:

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 was 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 significant reduction of pain with use of ropivacaine [7].

Ashank Mishra *et al.*, in 2016 conducted a study with ropivacaine in periodontal surgery and found that the effect of ropivacaine infiltration is significant in reducing post-operative pain [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 [9].

Ahmed El Daly *et al.*, in 2019 conducted a study "Effect on postoperative pain after topical application of local anesthetics in the tonsillar fossa after tonsillectomy" and found out that, Topical application of the tonsillar bed with a local anesthetic after tonsillectomy results in significant reduction of postoperative throat pain and referred otalgia and should be used during tonsillectomy [10].

The above mentioned studies also supports 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.

Conclusion

From our study it can be derived that the peri-tonsillar infiltration of Ropivacaine (0.75%) with Adrenaline (1:200000) is:-

- Effective in reducing intra-operative bleeding and at the same time providing a better bloodless field during surgery.

References

1. Stichartz GR, Berde CB. Local Anesthetics. In: Miller RD, Eriksson LI, Fleisher LA, Wiener-Kronish JP, Young WL. Miller's Anesthesia. 6th ed. New York: Churchill Livingstone, 2004, 573-99.
2. Rang HP, Dale MM, Ritter JM, Moor PK. Pharmacology. 5th ed. Edinburg: Churchill Livingstone, 2003, 612-6.
3. McClure JH. Ropivacaine. Br J Anaesth. 1995;76:300-7.
4. Nan Ying JU, Guang Xiao Cui, Wei Gao. Ropivacaine plus dexamethasone infiltration reduces postoperative pain after tonsillectomy and adenoidectomy. International Journal of Pediatric Otorhinolaryngology. 2013;77:1881-5.
5. Pirbudak Cocelli L, Kaya Ugur B, Durucu C, Kul S, Arik H, Mumbuc S. Comparison of Pre-emptive Tonsillar Lodge Infiltration with Ropivacaine Versus Intravenous Tramadol in Pediatric Tonsillectomies: A randomized placebo controlled study. International Journal of Pediatric Otorhinolaryngology. 2012;76:653-7.
6. Jiehao Sun, Xiuying Wu, Xiyue Zhao, Feifei Chen, Weijian Wang. Pre-emptive Peritonsillar Infiltration of Magnesium Sulphate and Ropivacaine vs. Ropivacaine or Magnesium alone for relief of Post-Adenotonsillectomy pain in children. International Journal of Pediatric Otorhinolaryngology. 2015;79:499-503.
7. Giannoni C, White S, Enneking FK, Morey T. Ropivacaine with or without clonidine improves pediatric tonsillectomy pain. Arch Otolaryngol Head Neck Surg. 2001 Oct;127(10):1265-70.
8. Ashank Mishra, Zohra Lalani, Butchibabu Kalakonda, Preeti Krishnan, Ruchi Pandey, Krishnajaneya Reddy. Comparative evaluation of hemodynamic, vasoconstrictive and SpO₂ variability during different stages of periodontal surgery performed using 0.5% ropivacaine or 2% lignocaine HCl (1:80,000 adrenaline) local anesthesia: A randomized, double-blind, split-mouth pilot study. Journal of Indian Society of Periodontology. 2018;22(3):243-248.
9. Grainger J, Saravanappa N. Local anaesthetic for post-tonsillectomy pain: a systematic review and

- meta-analysis. *Clinical Otolaryngology*. 2008;33(5):411-419.
11. El-Daly A, El-Naby MA, Emad P. Effect on postoperative pain after topical application of local anesthetics in the tonsillar fossa after tonsillectomy. *Egypt J Otolaryngol*. 2019;35:173-81.