EFFECT OF PERIOPERATIVE INFILTRATION OF STEROIDS IN TONSILLAR BED FOLLOWING TONSILLECTOMY ON POST TONSILLECTOMY PAIN

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ABSTRACT

Objective:

To observe the effect of perioperative infiltration of steroids in tonsillar bed following tonsillectomy on post tonsillectomy pain

Material and Methods:

Prospective, longitudinal, comparative, double blinded randomized study was done between 1 October 2009 and 31 March 2011. In the study side, triamcinolone acetonide 60 mg was locally infiltrated in tonsillar bed following tonsillectomy. In control side, no further procedure was done after tonsillectomy. The patients were assessed for pain using visual analogue scale (VAS) and on the basis of demand of analgesia demanded by patient during first five post operative days.

Results: Fifty patients were included in the study. VAS score in the study side was less than control side on all five post operative days and in average. (P-value on 1st and 2nd postoperative period was >0.1 i.e. there was no difference in pain score between two sides. But on 3rd, 4th, 5th post operative days and in average of mean, P-value was <0.05 i.e. there was less pain score in the study side in comparison to control side). Similarly patient demanded more analgesia due to pain in the control side in comparison to study side (P- value on 1st, 2nd, 3rd and 4th POD was >0.05, but was less than 0.05 on 5th POD and on an average)

Conclusion: Local infiltration of single dose of 60mg triamcinolone acetonide in tonsillar bed following tonsillectomy provides good analgesia, reduces analgesic requirement thus decreases pain in early postoperative period

Keywords: Post tonsillectomy pain, Steroids infiltration, Tonsillectomy, visual analogue scale,

INTRODUCTION

Tonsillectomy is defined as the complete removal of tonsil from its bed. Cornelius Celsus, a Roman physician and writer, was the first to describe the surgical removal of the tonsils. Tonsillectomy is one of the most common surgeries performed by an otolaryngologist. Although tonsillectomy is one of the most common surgical methods performed worldwide, postoperative morbidity still remains a significant clinical problem despite advances in anesthetic and surgical techniques.[1] Tissue injury induced acute inflammation, nerve irritation, amount of tissue damage and spasm of exposed pharyngeal muscle are known to play a role in genesis of post tonsillectomy pain. [2] Pain, nausea, vomiting and poor oral intake due to local edema are the most common morbidities following tonsillectomy.[3] Pain leads to dehydration, more need for analgesic medication, higher risk of complication (venous hypertension, hemorrhage and pulmonary aspiration), increase days of hospitalization and greater number of missed school or work days. Various researches and efforts have been made in regard to reduce the post-tonsillectomy pain. Corticosteroid is one of agent used to decrease pain. Most of the studies have measured its anti-emetic effect, but have failed to assess analgesic effect of the steroids. In fact, because of the missing data and varied outcome measures, pain could not be meaningfully analyzed by Steward et al in a meta-analysis for steroid use in tonsillectomies.[4] Local applications of small doses of steroids may lead to effective

concentration in target organ without systemic side effects.

Triamcinolone is intermediate acting synthetic glucocorticoids, 8 times potent than prednisone and 5 times as hydrocortisone. Due to the mode of action, there is some delay between administration and clinical activity of steroids. Steroid decrease production of interleukin 1,2 and interferon Gamma, prostaglandin, leukotrienes, platelet activating factor that results from activation of phospholipase A2. By inhibiting phospholipase enzyme, corticosteroids blocks both the cycloxygenase and lipoxygenase pathway and thus prostaglandin production, thereby leading to pain relief.

The study attempts to assess the amount of pain after tonsillectomy using appropriate tools. Rather than comparing pain scores in two different individuals with different pain threshold and way of expression; here we attempted to compare pain within the same individual. This study is done as various protocols have been tried but not a single standard protocol for preventing and controlling post operative pain currently exists.The aims and objectives of this study was to observe the effect of perioperative infiltration of steroids in tonsillar bed following tonsillectomy on post tonsillectomy pain

MATERIAL AND METHODS

A prospective, longitudinal, comparative, double blinded, randomized study was done in the Department of Otorhinolaryngology, Head and Neck surgery of Ganesh Man Singh Memorial Academy of ENT, Head and Neck Studies, Tribhuvan University Teaching Hospital (TUTH), Institute of Medicine, Kathmandu, Nepal during 1st October 2009 to 31st March 2011.

Patients of ≥13 yrs of age, with history of recurrent acute tonsillitis (7 episode in a year 5/year for 2 years, 3/year for 3 years) or Chronic tonsillitis (chronic sore throat, halitosis, tonsillar keratosis, peritonsillar erythemia, persistent tender cervical lymphadenopathy when other cause excluded) or with tonsillar hypertrophy other than tonsillar malignancy were included in the study. Patient who had tonsillectomy done for conditions other than recurrent acute tonsillitis, chronic tonsillitis and tonsillar hypertrophy, who were on regular systemic steroid / NSAID and tranquilizer or those patients who had post operative complication like visible intubation trauma, surgical trauma to posterior pharyngeal wall, tongue base were excluded from the study. All surgeries were done under general anaesthesia and all patients underwent cold dissection tonsillectomy. Randomization was done using lottery method, coin toss and random selection. For each patient, tonsillar beds (either left or right) was randomized as study side or control side after tonsillectomy. The operating surgeon was advised to infiltrate triamcinolone acetonide on the study side after both tonsils were removed. Patients were blinded to the protocol used in their particular case. Investigator assessing the pain was also blinded. In study side, triamcinolone acetonide 60 mg prepared as 3 ml sol (each ml=20mg) was locally infiltrated using spinal needle size 22 in tonsillar bed following tonsillectomy. 1ml was infiltrated in superior pole, 1 ml in the inferior pole and 1ml midway between the two in tonsillar bed. On control side no further procedure was done after tonsillectomy. Postoperatively patients were given Amoxycillin (30-50mg/kg/day in divided doses) every 8 hourly per orally for 7days and were advised to gargle with Povidone iodine (0.5% w/v) 6 houlry for 5 days. Post operative analgesics were given routinely and also on the demand of patient. Routinely one gram paracetamol 6 hourly was given to all the patients for first two post operative days. If additional amount of paracetamol required than those given routinely during first two days and any amount of paracetamol required from 3rd post operative day was considered as on demand analgesia. If the pain was not controlled with paracetamol, 75 mg of diclofenac sodium was given intramuscularly to patient on patient's demand.

Nausea and vomiting if occurred were recorded. At four hours after the surgery patients were asked to take oral liquids. Patients were encouraged to take solid food from the evening of the day of operation. Patients were discharged on 5th postoperative day and were followed at 2 weeks postoperatively. The patients were assessed for pain using "visual analogue scale" (VAS Scale: 0-100mm

scale with 0 = no pain and 100 = the worst possible pain) and on the basis of "demand of analgesia" demanded by patient as described above. Visual analogue Scale was translated into local language. Patients were asked to use a visual analogue scale to self evaluate the degree of pain they experienced on each side of throat everyday in the morning before using any analgesics during the first 5 post operative days (early post operative pain) in front of same investigator who was involved in the assessment of pain.

Results of study were analyzed in terms of comparison of pain using VAS in study side with control side by using Z-test for mean of VAS. Mean pain score with standard deviation and standard error was calculated. Analysis of the data was done using SPSS 11.5 software. Z- value was used to determine p value. Chi-square test was used to compare the demand of analgesia in study side and control side in all five postoperative days and in average. The P- value of less than or equal to 0.05 was taken as significant in this study.

RESULTS

A total of 50 patients fulfilled the enrolment criteria. Same patient served both as control as well as study, so 100 tonsillectomies sides were included. None of the cases were excluded and hence 100 sides were included in study and statistical analysis.

Out of 50 patients enrolled in this study; 30 were male and 20 female patients. The age of patients included in this study ranged from 13 years to 45 years. Most common age group in this study was 21-30 years (46%).There were 15 (30%) patients between 13-20years of age,11(22%) were of 31-40 years of age and 1(2%) patient was more than 40 years of age. There were 50 tonsils of grade II size followed by 33 tonsils of grade III size and tonsils of grade I and grade IV accounted for 13 and 3 in number respectively according to ASA grading system. Indication of tonsillectomy in 48(96%) was recurrent acute tonsillitis and in 2 (4%) cases it was tonsillar hypertrophy causing OSAS. In 21(42%) patients triamcinolone acetonide was infiltrated on right side and in 29 (58%) patients it was infiltrated on left side.

Mean VAS (pain) score of 50 patients of two sides (study, control) as per post operative days and in average were compared. Mean VAS score of 50 patients on 1st POD of study side was 22.08 and of control side was 25.2. On 2nd POD, scores were 20.82 of study side and 25.92 of control side. Similarly the score on 3rd, 4th and 5th POD were 14.1, 10.38 and 6.62 of study side and 20.7, 17.66 and 13.62 of control side respectively. Mean score of average (average score of all 5 POD) of study side was 14.81 and of control side was 20.54. It shows that mean VAS score of study side is less than control side in all five post operative days and in average. Though there was reduction in VAS score in all post operative days but there was more difference of VAS score on 3rd, 4th, 5th postoperative days than on 1st and 2nd postoperative days. (Fig I)

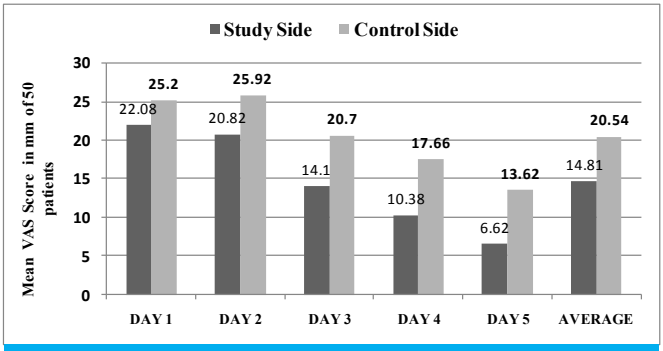

Fig I: Mean VAS score as per postoperative day and in average (n=50)

Comparison of mean of average VAS score of five postoperative days of two sides (study, control) of 50 patients individually were done. Mean of average VAS score of first five post operative days was calculated individually for both study and control side and compared. The mean of average VAS score of five postoperative days was less in 32 cases in study side than in control side. In 17 cases mean of average VAS score of five postoperative days was more in study side than in control and in one case it was equal.(Fig II)

Average requirement of analgesia during five POD was 10 grams of oral paracetamol and 150 mg of diclofenac sodium intramuscular injection. Minimum analgesia required during the five post operative days was 8 grams of oral paracetamol and maximum analgesia required during 5 postoperative days was 22 grams of oral paracetamol and 500 mg of intramuscular diclofenac sodium.

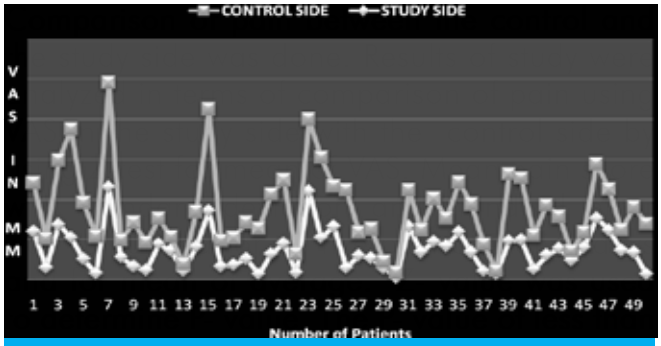

Fig II: Comparative difference of mean of average VAS score of five postoperative days, between study and control side individually (n=50)

there was no difference in pain score between two sides. But on 3rd and 4th post operative day and in average of mean, P-value was <0.05 and on 5th postoperative day P-value was <0.01, which was statistically significant i.e. there was less pain score in study side in comparison to control side (Table 1)

Postoperative pain after tonsillectomy was also assessed by demand of analgesia as demanded by patients. Shows, patient requiring demand of analgesia as per postoperative day and in average. Chi-square test was used to compare the demand of analgesia in study side and control side in all five postoperative days and in average. The P- value of less than or equal to 0.05 was taken as significant. Out of total 50 patients who underwent tonsillectomy, six patients demanded additional analgesia (one, due to pain in study side, one due to pain in

Table 1: Comparison of pain by VAS score between study side and control side (n=50)

	POST OPERATIVE DAYS											
	First POD		2nd POD		3rd POD		4th POD		5th POD		Mean of Average	
	SS	CS	SS	CS	SS	CS	SS	CS	SS	CS	SS	CS
Mean (VAS)	22.08	25.2	20.82	26.36	14.10	20.70	10.38	17.66	6.62	13.62	14.81	21.54
SD	19.96	19.64	19.12	20.95	12.52	15.18	12.70	15.18	6.63	11.86	10.32	12.5
SE	3.9		4		2.7		2.79		1.91		2.29	
Z-value	0.8		1.38		2.44		2.58		3.66		2.5	
P-value	> 0.1		>0.1		<0.05		<0.05		<0.01		<0.05	
Interpretation	Not significant		Not significant		Significant Less pain in study side		Significant Less pain in study side		Significant Less pain in study side		Significant Less pain in study side	

NB: SS: Study side, CS: Control side, POD: Postoperative day, SD: Standard deviation, SE: Standard error

Table 2: Patient requiring demand of analgesia as per postoperative day and in average (n=50)

POST OP DAY	Total no. of pt demanding analgesia	Due to pain on study side	Due to pain on control side	Due to pain on both side	Test applied (d.f=1)	p-value	Significance
1	6	1	1	4	$X^2=0$	>0.05	Not significant
2	6	1	1	4	$X^2=0$	>0.05	Not significant
3	21	2	9	10	$X^2=0.79$	>0.05	Not significant
4	18	2	9	7	$X^2=1.96$	>0.05	Not significant
5	12	2	7	3	$X^2=5$	<0.05	Significant
Total	63	8	27	28	$X^2=3.96$	<0.05	Significant

control side and four due to pain in both side) on 1st and 2nd POD. On 3rd POD 21 patients demanded analgesia (two due to pain in study side, nine due to pain in control side and 10 due to pain in both side). On 4th POD 18 patients demanded analgesia (two due to pain in study side, nine due to pain in control side and seven due to pain in both side). On 5th POD 12 patients demanded analgesia (two due to pain in study side, seven due to pain in control side and three due to pain in both side). On an average 63 patients demanded analgesia (eight due to pain in study side, 27 due to pain in control side and 28 due to pain in both side). P- value was >0.05 on 1st, 2nd, 3rd and 4th POD which was not statistically significant. But on 5th POD and on average P-value was <0.05 .i.e. patient demanded more analgesia due to pain in control side in comparison to study side which was statistically significant.

DISCUSSION

Despite advances in anaesthetic and surgical techniques, post tonsillectomy morbidity remains a significant clinical problem. Pain is one of the strong factors to determine post operative morbidity both for the patients and surgeons. But as many other factors are considered, pain doesn't get adequate space in different studies even though post tonsillectomy pain is the most important factor to be considered.

We took two sides of the same individual as control side and study side so that one side result can serve comparison group for that of other side. Pain threshold differs in different individuals, so assessment of pain in two areas in a single patient is likely to have less biasness. Using the same individual patient as his or her own control is not a new concept in evaluating post-tonsillectomy pain. Several studies have shown that when surgeons employ a different tonsillectomy technique on each side, patients are able to discern differences in pain intensity on the two sides.[5] Two other advantages of using patients as their own controls include a need for fewer patients in a given study and no need to standardize patients according to their age, weight, pain tolerances, etc[6]., all of which can have an effect on the intensity of postoperative pain. Although multiple surgeons were involved in the study and have their own dissection techniques, we believe that this difference had a minimal impact on our overall results, as all cases were done only by cold dissection method, therefore we did not attempt to control for any possible differences in technique. We did note, however, that the surgeons had comparable results with respect to the number and degree of postoperative complications.

In our study, we found that infiltration of the triamcinolone acetonide in tonsillar bed following tonsillectomy reduced the severity of pain in study side as compared to control side. Though the pain in study side was less from 1st postoperative day but P-value on 1st post operative day was >0.1 and on 2nd post operative day was >0.05 which was not statistically significant . But from 3rd postoperative day there was statistically significant decrease in postoperative pain (3rd POD, P-value= <0.05. 4th POD, P-value= <0.05. 5th POD , P-value=<0.01). When the mean of the average pain score was calculated and analyzed it also showed that there was statistically significant decrease in pain on study side as compared to the control side (P-value <0.05).

Liu and Su in 1996 in a prospective, randomized, single blinded study found that pain levels among the local injection of steroids in tonsillar pillar and bed was found to be significantly less than injection of steroid into deltoid muscle following tonsillectomy.[7] Similarly smith et al[8] found infiltration of steroid –penicillin- local anaesthetic mixture into tonsillar fossa during surgery cause immediate reduction of pain and inflammation. Also in a study by Anderson et al[9], it was found that injecting 20 mg of methylprednisolone acetate into each tonsillar fossa reduced post tonsillectomy pain but didn't significantly altered other factors such as difficulty in swallowing or resumption of normal diet.

However, Egeli and Akkaya[6] found infiltration of dexamethasone locally into tonsillar bed

showed no statistically significant difference in reducing post-operative pain. Similarly in a placebo control, single blind study by Timothy el.al [10] in 2003 found infiltrating mixture of steroid triamcinolone 60 mg plus bupivacaine 0.25% 1.5ml in tonsillar fossa locally to show no significant difference in degree of postoperative pain. Rundle[11] in his study also found injecting penicillin-steroid-anaesthetic locally was not effective than intramuscular penicillin in alleviating post-operative pain.

In our study we found pain score were significantly reduced from 3rd POD. i.e. VAS score difference between two groups increased with increasing time after surgery. This is probably due to clinical effects of steroids takes several hours to become apparent because time is required for gene transcription and protein synthesis to take place. [12] But Kayagusuz and Susaman [13] in a prospective study in 2003, done in 80 patients age ranging from 6-14 years , using VAS for pain scores found that infiltration of dexamethasone in tonsillar bed following tonsillectomy decreased post operative pain on 1st POD than on 3rd and 7th POD in comparison to the placebo group. Decreased pain score found by Kayagusuz and Susaman could be because of effect of anaesthetic drugs on first post operative day. We also found that patients demanded less analgesia due to pain in the study side in comparison to control side. Though the demand of analgesia was less from 3rd POD, it was not statistically significant (P-value > 0.05). But on 5th POD (P-value <0.05) and on an average (P-value <0.05) demand of analgesia made due to pain on control side than on study side was statistically significant. However, Egeli and Akkaya[6] in a prospective randomized study done in 52 patients aged 14-34, found that peritonsillar infiltration of dexamethasone 12 mg at peritonsillar region found to have no statistically significant difference in degree of pain medication required or demanded.

Although, narcotic analgesics are the main stay of post operative pain control, they do not completely control pain and are often discontinued due to their side effects of respiratory depression, nausea, vomiting and constipation etc. The effectiveness of analgesic action of triamcinolone shown in this study may reduce the dose of total and rescue analgesics. This study possesses several potential limitations and drawbacks. First, several surgeon were involved in the study, but each individual surgeon had comparable results with respect to the number and degree of postoperative complications, and also as same patient was used as control and study we believed that surgical technique equally affected control and study side and had minimal impact in overall result. Second the intelligence of patient to use the visual analogue scale, this drawback was tried to overcome by educating all patients one day prior of surgery and including patients of more than 13 years of age.

CONCLUSION

This study showed that infiltration of triamcinolone acetonide in tonsillar bed after tonsillectomy reduced the post-operative pain. Though the decrease in pain score was not significant on 1st and 2nd post operative day, but the intensity of pain perceived by patient (VAS) showed significant decrease on 3rd,4th, 5th post operative day and on average in the study side in comparision to control side. Average amount of demand of analgesia due to pain in study side was significantly less than due to pain in control side. So we conclude that, local infiltration of single dose of 60mg triamcinolone acetonide in tonsillar bed following tonsillectomy provided good analgesia reduced analgesic requirement thus decreased pain in early postoperative period.

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