

Comparison of Peritonsillar Bupivacaine versus Peritonsillar Dexamethasone in Post-Tonsillectomy Pain Management

Najeebullah Khan¹, Mirza Khizar Hameed², Iftikhar Aslam³, Irshad Ali⁴, Amir Akbar⁵, Nudrat Khalil⁶

¹ Department of ENT, Fauji Foundation Hospital, Rawalpindi.

² HOD, Department of ENT, Fauji Foundation Hospital, Rawalpindi.

³ Department of ENT, Fauji Foundation Hospital, Rawalpindi.

^{4,5,6} Consultant Department of ENT, Fauji Foundation Hospital, Rawalpindi.

Author's Contribution

^{1,2} Conception of study

^{2,3,4,5} Experimentation/Study conduction

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¹ Manuscript Writing

^{2,3,6} Critical Review

⁶ Facilitation and Material analysis

Corresponding Author

Dr. Mirza Khizar Hameed,

HOD,

Department of ENT,

Fauji Foundation Hospital,

Rawalpindi

Email: mirzakhizar@gmail.com

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Abstract

Objective: To compare the efficacy of Peritonsillar Dexamethasone versus Peritonsillar Bupivacaine in managing post-tonsillectomy pain in children.

Setting & Period: ENT Department, Fauji Foundation Hospital (FFH), Rawalpindi from 01-06-2019 to 31-11-2020.

Material and Methods: A total of sixty patients of both genders between ages of 5-15 years fulfilling the recognized criteria for tonsillectomy were selected by non-probability convenient technique. Sample size was calculated by WHO calculator taking level of significance = 5%, power of the test = 80%, population means \pm SD 0.24 ± 0.18 , anticipated population means \pm SD = 0.38 ± 0.10 . They were equally divided into two groups of 30 each; Group A received peritonsillar Bupivacaine while Group B received peritonsillar Dexamethasone. Mean post-tonsillectomy Visual Analogue Score (VAS) at 1st, 2nd, and 7th day were recorded in both groups and compared using independent sample t test.

Results: In group A the Mean post-tonsillectomy VAS at 24 hours was 6.73 ± 1.44 SD while in group B it was 5.93 ± 1.26 SD (p-value 0.025). Mean post-tonsillectomy VAS at 48 hours was 5.60 ± 1.25 SD and 4.37 ± 1.03 SD (p-value 0.000) respectively in groups A and B. On the 7th post-operative day, Mean VAS was noted as 3.27 ± 0.74 SD and 2.30 ± 0.79 SD (p-value 0.000) respectively in groups A and B.

Conclusion: Peritonsillar Dexamethasone is more effective than peritonsillar Bupivacaine in controlling post-tonsillectomy pain in children. A statistically significant difference was noted for mean post-tonsillectomy VAS at 1st, 2nd, and 7th day.

Keywords: Tonsillectomy, visual analogue score, postoperative pain, dexamethasone, bupivacaine.

Introduction

Paired palatine tonsils, composed of lymphoid tissue, lie on the lateral wall of the oropharynx, between the palatoglossus anteriorly and the palatoglossus posteriorly. Along with adenoids, lingual and tubal tonsils they participate in the formation of Waldeyer's ring, thus responsible for providing immunity to the child during the early years of life.¹

The tonsillar branch of the Glossopharyngeal nerve is the main nerve supply of the palatine tonsils. As it crosses the lower lateral surface of the tonsil, it is vulnerable to damage during a tonsillectomy, hence responsible for referred otalgia.²

Tonsillectomy is the surgical procedure for the removal of palatine tonsils. It remained a common procedure to treat recurrent infections of the tonsils, but nowadays, tonsillectomy is considered to be among the most condemned surgeries. Mostly, it is performed for the management of sleep apnoea due to grossly enlarged tonsils causing mechanical obstruction, after the second attack of peritonsillar abscess and septic tonsillitis.³ Due to changing indications, the frequency with which tonsillectomy is performed has reduced remarkably in the recent era.⁴ In the United States, the number of tonsillectomies has reduced from 970,000 in 1965 to 289,000 in 2010.⁵ Similarly, in England, the total number of tonsillectomies has reduced drastically by 2014.⁶

Tonsillectomy involves two techniques, the "cold" or "hot" technique. The conventional cold technique is superior as regards post-operative pain, but the newer hot techniques as electrocautery, have gained favour due to lesser bleeding and lesser time taken. Other new techniques employed nowadays include lasers, ultrasound, as well as coblation, etc.⁷

Postoperative pain certainly causes a variable amount of discomfort in the immediate post-operative period.⁸ Although there is individual variation in pain threshold among the patients, occasionally it is prolonged and constant, though not severe in intensity.⁹ Post-tonsillectomy pain is a common problem causing a reduction in oral intake, thus resulting in dehydration and delay in recovery.¹⁰ Acetaminophen is the most common drug administered to lower post-tonsillectomy pain; however, it cannot relieve pain completely.¹¹ NSAIDs as Ibuprofen are the other commonly prescribed analgesics to control post-tonsillectomy pain.¹²

Children undergoing tonsillectomy do experience preoperative anxiety, which is an important factor causing post-operative pain. Hence proper pre-

operative counseling in this regard is an effective tool in preparing the patient to bear the post-operative pain.¹³

Several intraoperative interventions are employed to reduce post-operative pain, such as an intravenous injection of dexamethasone. It also reduces the incidence of nausea and vomiting.

Saline gargles and many commercially available types of mouthwash and sprays are also advised, but most of them are not found effective.¹⁴

Although post-operative treatment with oral steroids is not recommended routinely, various studies have recommended a single intra-operative injection of dexamethasone for effective control of post-operative pain.¹⁵

Since Bupivacaine and its derivatives cause long-lasting analgesia due to their greater effect on sensory blocking, they have gained popularity as effective post-operative agents among the local anaesthetics. But due to their neuro and cardiotoxicity, they have been replaced by Levobupivacaine, which has similar analgesic effects though the lesser duration of action.⁹ Since control of post-tonsillectomy pain is the biggest challenge any ENT surgeon has to face while doing tonsillectomy, as most of these patients are young children, the search for an ideal post-tonsillectomy analgesic agent is a big dream. As post tonsillectomy pain compromises diet intake as well, further hampering an early post-operative recovery, in search of such an ideal, a study was carried out to compare effects of peritonsillar dexamethasone versus peritonsillar bupivacaine in terms of management of post-operative pain in children undergoing tonsillectomy.

Materials and Methods

This randomized controlled study was carried out at the Department of ENT, Fauji Foundation Hospital Rawalpindi from 01 June 2019 to 31 November 2020. After seeking approval from Hospital Ethical Committee, a total of sixty patients of either sex, requiring tonsillectomy were selected by non-probability convenient sampling in the ENT OPD. Sample size was calculated by WHO calculator taking level of significance = 5%, power of the test = 80%, population means \pm SD 0.24 ± 0.18 , anticipated population means \pm SD = 0.38 ± 0.10 . The sample size was 30 in each group. Informed consent of patients or patients' parents was taken after explaining the study protocol.

A detailed medical history was taken and a complete physical examination was done. The criteria for inclusion were age bracket of 5-15 years of either gender, having a positive history of Obstructive Sleep Apnoea, or recurrent episodes of acute tonsillitis in such a frequency that was hindering their normal daily routines. Patients with a history of any such episode of acute tonsillitis or fever due to any other cause in the last two weeks were not included in the study. Patients with a history of any bleeding disorders, Diabetes Mellitus, renal impairment, liver disease, intake of analgesics or anticoagulants in the past three weeks, or having malnutrition, mental handicap were also not included.

Bleeding profile of all patients and screening for contagious viral illnesses including Hepatitis B and Hepatitis C were done. Full blood count and urine routine examination were also performed.

Patients were asked to select an envelope labeled either A or B, by blind method, upon which they were divided into two groups.

- Group-A: Received peritonsillar bupivacaine
- Group-B: Received peritonsillar dexamethasone.

Tonsillectomies in all patients were performed by cold dissection method under General Anesthesia and antimicrobial cover (Amoxicillin in a dose of 25 mg/kg/day). Intraoperative hemostasis was secured primarily by pressure, while bipolar diathermy was used when considered necessary. After hemostasis peritonsillar tissues were infiltrated with bupivacaine or dexamethasone injections in groups A & B respectively.

Post-operatively all the patients were retained in the ward for at least 48 hours. Those found fit after 48 hours of stay in the ward were discharged on Oral Amoxicillin (25mg/kg/day) and Paracetamol (45mg/kg/day) for 5 days. A soft diet was advised for 1-2 days after the procedure and routine food after that period. A hot, spicy, and sour diet was discouraged during the follow-up period. Patients were reviewed in the ENT OPD after one week.

Post-operative pain was assessed and charted according to the attached Visual Analogue Score on days 1, 2, and 7. All the data were entered into a Proforma. Scores of 7-10 were considered significant.

The data were analyzed using statistical software SPSS version 20.0. Descriptive statistics were used to calculate Mean and Standard Deviation for age, gender, and pain score. Frequency and percentage were calculated for qualitative variables like gender, age, and pain after 24 hours, 48 hours, and 7 days. An

independent sample *t*-test was used to compare post tonsillectomy pain in both groups.

Results

The mean age was 10.20 years \pm 2.94 SD in group A (Bupivacaine), while in group B (Dexamethasone) it was 11.13 years \pm 2.86 SD (Table 1). Male patients were predominant in both groups with the proportion of 70.0% and 63.3% in group A and group B respectively (Table 2). Patients were further classified based on age which is illustrated in Table 3.

Mean post-tonsillectomy VAS at 24 hours was 6.73 \pm 1.44 SD in group A, while in group B it was 5.93 \pm 1.26 SD (*p*-value 0.025) as shown in Table 4. Mean post-tonsillectomy VAS at 48 hours was 5.60 \pm 1.25 SD in group A, while in group B it was 4.37 \pm 1.03 SD (*p*-value 0.000) as shown in Table 5. Furthermore, on the 7th day following tonsillectomy Mean VAS was noted as 3.27 \pm 0.74 SD in group A, while in group B it was 2.30 \pm 0.79 SD (*p*-value 0.000). (Table 6)

Table 1: Gender distribution in both groups (n = 60)

Gender	Group		Total
	A (BUPIVAC AINE)	B (DEXAMET HASONE)	
Males	21 (70.0%)	19 (63.3%)	40 (66.7%)
Females	9 (30.0%)	11 (36.7%)	20 (33.3%)
Total	30	30	60

Table 2: Mean age in both groups (n=60)

Group	Mean Age (Years)	Std. Deviation
A (BUPIVACAINE)	10.20	\pm 2.94
B (DEXAMETHASONE)	11.13	\pm 2.86

Table 3: Distribution of both groups in different age groups (n = 60)

Age Groups	Group		Total
	A (BUPIVA CAINE)	B (DEXAMET HASONE)	
5-10 years	14 (46.7%)	9 (30.0%)	23 (38.3%)
11-15 years	16 (53.3%)	21 (70.0%)	37 (61.7%)
TOTAL	30	30	60

Table 1: Mean postoperative pain score at 24 hours in both groups (n=60)

Group	Post-operative Pain Score at 24 Hours	Std. Deviation	P-value t-test
A (BUPIVAC AINE)	6.73	±1.44	0.025
B (DEXAMET HASONE)	5.93	±1.26	

Table 2: Mean postoperative pain score at 48 hours in both groups (n=60)

Group	Post-operative Pain Score at 48 Hours	Std. Deviation	P-Value T-Test
A (BUPIVAC AINE)	5.60	±1.25	0.000
B (DEXAMET HASONE)	4.37	±1.03	

Table 3: Mean postoperative pain score at 7th day in both groups (n=60)

Group	Post-operative Pain Score at 7 th Day	Std. Deviation	P-Value T-Test
A (BUPIVAC AINE)	3.27	±0.74	0.000
B (DEXAMET HASONE)	2.30	±0.79	

Discussion

Tonsillectomy is one of the oldest and commonest surgical procedures in the field of ENT.¹⁶ Tonsillectomy by dissection by extracapsular technique is by far the commonest 'cold' surgical technique.¹⁷ Various 'hot' surgical techniques like cautery, laser, coblation, harmonic scalpel have been introduced in the recent past in order to gain better control on post-operative bleeding and pain.¹⁸ It is post-operative pain, which is the most important factor for which a patient consults the surgeon. Due to this pain, the child refuses to take a diet orally, which not only causes dehydration but also increases the intensity of pain.¹⁹ Age may be a contributing factor as

the intensity of pain among adults is much more as compared to that in children.²⁰

Our results are similar to the few previously conducted studies on post-tonsillectomy pain control using bupivacaine or dexamethasone. In a study, Kilinc L et al (2019) compared local infiltration of dexamethasone with bupivacaine and serum respectively, and proved the superiority of dexamethasone over the other two, in getting an effective post-operative analgesia.²¹

In a controlled clinical trial comparing the effects of local infiltration of steroids and levobupivacaine, Aysenur et al (2014) observed that the patients receiving steroids, required fewer analgesics post-operatively.²²

In a similar study, Ju NY et al (2013) showed that the combination of ropivacaine and dexamethasone infiltration was very effective in reducing postoperative pain leading to an early discharge from the hospital.²³

Haytoglu S et al (2015) also recommended local infiltration of bupivacaine for post-operative pain reduction in oral surgeries.²⁴ In yet another study, Erdogan et al (2014) showed intraoperative infiltration of levobupivacaine as an effective step in achieving better postoperative pain control.²⁵ In contrast, Schoem SR et al (1993) observed no significant post-operative analgesia among the patients undergoing tonsillectomy.²⁶ This observation was also confirmed by a study by Nordahl SH et al (1999).²⁷ Whereas, Tuhanioglu B and Erkan SO found no difference between intravenous dexamethasone, infiltrated dexamethasone, and infiltrated bupivacaine in gaining an effective post-operative pain control.²⁸

In another study, Aprill MM (1996) showed preoperative intravenous dexamethasone to be more effective in decreasing post-operative morbidity.²⁹ Zhang X et al (2014) also recommended bupivacaine as an effective and reliable local agent for achieving better post-operative pain control.³⁰

Gao W et al (2015) showed local administration of dexamethasone as an effective agent in getting better post-operative pain control in the early post-operative period.³¹ On the other hand, in another study by Montazeri K (2009) this observation was refuted.³²

In yet another study, Basuni AS et al (2013) showed that local infiltration of a combination of dexamethasone and levobupivacaine gives better postoperative analgesia than the combination of the two given intravenously.³³

In summary, our study results and previously published studies are similar in claiming that

dexamethasone is more effective than bupivacaine for controlling post-operative pain following tonsillectomy in children. Based on our study, further guidelines could be developed that can ultimately help achieve better post-operative analgesia and reduced post-operative morbidity in children undergoing tonsillectomy.

However, we must acknowledge limitations in our study. First, it has been done on a very small segment of the population. Secondly, the population of our study belonged to a specific area of the country. So, to reduce the impact of these limitations, a large-scale study at a national level is recommended.

Conclusion

Peritonsillar dexamethasone is more effective than peritonsillar bupivacaine in managing post-tonsillectomy pain in children.

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