Original Research Article

Role of bupivacaine in reducing post tonsillectomy pain

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Abstract

Background: Post-tonsillectomy pain remains a problem of considerable clinical importance in pediatric as well as adult population. The pre-emptive method used for relieving post-operative pain is Bupivacaine infiltration. **Aim:** To assess the effect of pre-incisional peritonsillar infiltration of 0.5% bupivacaine on post-tonsillectomy pain. **Material and Methods:** A total of 50 cases between age group of 7 to 50 years of both sexes admitted for tonsillectomy were included in the study. These 50 cases were divided into two groups and 25 in each group. Patients in Bupivacaine group were received 1 to 3ml of 0.5% bupivacaine into the peritonsillar fossa 5 minutes before the tonsillectomy. Patients were also asked to describe their pain on a Visual Analog Scale postoperatively. **Results:** The pain score using Behavioral Observational Pain Scale in Bupivacaine group it was 0.28 at 0 hour, 0.56 at 1 hours,1.28 at 2nd hours, 1.12 at 4th hours and 1.08 at 8th hours, while in non-bupivacaine group it was1.76 at 0 hours, 2.48 at 1 hours, 3.24 at 2nd hour, 3.68 at 4th hour and 3.96 at 8th hour post-operatively. Subjective moderate to severe pain was reported in 8%, 20% 25.7%, 22.9% and 20% of patients in Bupivacaine group and in 32%, 44%, 54.3%, 74.3% and 85.7% of patients in non- bupivacaine at 0,1, 2, 4 and 8 hours postoperatively. **Conclusion:** Pre-incisional infiltration of bupivacaine into the peritonsillar region is an effective method to reduce postoperative pain.

Keywords: Tonsillectomy, Bupivacaine, subjective pain, Behavioral observational pain scale

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Email: dsd1991@live.in
Received Date: 10/11/2019 Revised Date: 11/12/2019 Accepted Date: 23/01/2020
DOI: https://doi.org/10.26611/10161422

Access this article online

Quick Response Code:

Website: www.medpulse.in

Accessed Date: 11 May 2020

INTRODUCTION

One of the most frequently performed surgical procedures in ENT is Tonsillectomy. Pain is the commonest morbidity associated with this procedure along with several others that can cause delay in starting the oral intake and discharge from the hospital. Children are the most common patients undergoing tonsillectomy and they have low pain threshold, so undergoing such procedure has negative psychological effects on them and their families.[1] Various methods are being used to reduce pain of post-tonsillectomy. Some of the most effective methods for managing post-tonsillectomy pain are local anesthetics in the form of pre-incisional or post-incisional peritonsillar infiltration and also topical post-incisional spray or packing, although some studies refute their use.[2] The pre-emptive method used for relieving post-operative pain is Bupivacaine infiltration. This is hypothesized that local anesthetics act by impeding noxious stimulation of C-fiber afferent neurons, diminishing excitability of dorsal horn neurons. This action leads to prolonged analgesia even up to 10 days after the surgery according to some studies.[3,4] Present study was performed to assess the effect of pre-incisional peritonsillar infiltration of 0.5% bupivacaine on post-tonsillectomy pain.

MATERIAL AND METHODS

A total of 50 cases between age group of 7 to 50 years of both sexes admitted for tonsillectomy were included in the study. These 50 cases were divided into two groups and 25 in each group (random allocation of 2 groups was done using lottery system).

How to cite this article: Deepinder Singh Dhillon, Jitendra Rathod, R B Bohra, Reena Vare, Ashfaque Ansari. Role of bupivacaine in reducing post tonsillectomy pain. *MedPulse International Journal of ENT.* May 2020; 14(2): 12-15. https://www.medpulse.in/ENT/

Inclusion criteria

Chronic tonsillitis. Recurrent infections of throat: a) Seven or more episodes in 1 year, or b) Five episodes per year for 2 years, or c) Three episodes per year for 3 years, or d) Two weeks or more of lost school or work n 1 year. Hypertrophy of tonsils causing: a) airway obstruction (sleep apnoea) b) difficulty in deglutition

Exclusion criteria

Haemoglobin level less than 10g%. Presence of acute infection in upper respiratory tract. Overt or submucous cleft palate. Bleeding disorders (leukemia, purpura, aplastic anemia or hemophilia). Uncontrolled systemic disease (diabetes, cardiac disease, hypertension or asthma). Known Hypersensitivity to Bupivacaine

Methodology

Ethical approval was obtained from Institutional Ethics Committee. Written consent was taken from all patients or their parents (in a case of pediatric patient). As departmental protocol, all the patients were admitted in the hospital 1 day before the Pre-anesthetic checkup was done and patients received bupivacaine test dose the day before surgery. None of the patients showed allergic reaction to bupivacaine test dose. Detailed ENT examination was done. Routine investigations such as CBC, serum creatinine, serum electrolytes, urea, blood group, bleeding time, clotting time, HIV, HbsAg, X-ray chest (PA view) were done.

A standard anesthetic protocol was constructed for all patients. The protocol consisted of the following:

- Premedication: Glycopyrolate 0.005mg/kg, Midazolam 1mg/20kg, Fortwin 2-4mg/kg intravenous before the surgery
- Induction: Propofol 2mg/kg or Thiopental 5mg/kg intravenously, Scoline 2mg/kg intravenously
- Intubation: Cuffed oral or nasal endotracheal intubation
- Maintenance: Vecrunium 0.08mg/kg, Oxygen and Nitrous Oxide (oxygen saturation >96%), Sevoflurane 1%
- Reversal: Neostigmin 0.0.5mg/kg IV, Glycopyrolate 0.005mg/kg IV

Patients underwent tonsillectomy using standard cold steel dissection method and hemostasis was achieved by using silk ligature. Patients in Bupivacaine group were received 1 to 3ml of 0.5% bupivacaine into the peritonsillar fossa at upper pole, middle part and lower pole of each tonsil (totally 2- 6ml) 5 minutes before the tonsillectomy. After the surgery, patients were asked to evaluate the severity of pain at 0, 1, 2, 4,8 and 24 hours after the surgery to evaluate the severity of pain. First, "Behavioral Observational Pain Scale" (BOPS) which has been shown to be valuable in pre-school pediatrics and second, "Simple Descriptive Method" (SDM) in which patients were asked to describe their pain as mild, moderate or severe. Patients were also asked to describe their pain on a Visual Analog Scale graduated 10cc The latter is useful mostly in adults and older children. Till 8 hours after surgery analgesic was not administered for patients unless pain score was more than 4 or severe pain was reported by the patients. In this case 25 to 50mg of diclofenac were injected IM, afterntest dose, as rescue analgesic. After 8 to 24 hours, depending upon the level of pain, diclofenac or paracetamol in forms of injection, Syrup, tablet or suppository was administered for all the patients. Patients were advised to start their oral intake 6 hours after the surgery wherever possible, and start of oral intake was recorded at 6 and 8 hours after the surgery. Patients were discharged from the hospital 2 days post operatively if there was no severe pain and if the patient was able to take normal diet. In latter case, patients were admitted for 1 to 2 more days. No complication of surgery or infiltration of Bupivacaine was seen in patients.

RESULTS

The average age of the patients in this study was 18 years, the youngest was 7 and the oldest was 48 years old. The average age of the patients in Bupivacaine group was 16 years and in non bupivacaine group 20 years. There was no statistically significant difference between the Bupivacaine and non bupivacaine ($P>0.05$). Patients with complaint of difficulty in swallowing, were constituting 44.3% of patients, among them 42.90% were in Bupivacaine group and 45.7% in non bupivacaine group. There was no statistically significant difference between the Bupivacaine and non bupivacaine groups ($P>0.05$). Tonsillar hypertrophy was the most common finding on examination of the patients. It was present in variable degrees in 44 (88.6%) patients. There was equal distribution of tonsils enlargement in both groups. There was no statistically significant difference between the Bupivacaine and non bupivacaine group ($P>0.05$). The average of pain score, using Behavioral Observational Pain Scale, at 0, 1, 2, 4 and 8 hours after the surgery was 0.95, 1.45, 2.2 ,2.35 and 2.5 respectively. In Bupivacaine group it was 0.28 at 0 hour, 0.56 at 1 hours,1.28 at 2nd hours, 1.12 at 4 th hours and 1.08 at 8 th hours, while in non-bupivacaine group it was1.76 at 0 hours, 2.48 at 1 hours, 3.24 at 2nd hour, 3.68 at 4th hour and 3.96 at 8th hour post operatively. The difference between the Bupivacaine and non-bupivacaine groups was statistically significant ($P<0.05$).

Table 1: Comparison of pain score

	0 hr	1 hr	2 hrs	4 hrs	8 hrs	24 hrs
All patients	0.9	1.4	2.2	2.3	2.5	1.64
Bupivacaine	0.2	0.5	1.2	1.1	1	0.6
Non bupivacaine	1.7	2.4	3.2	3.6	3.9	2.68

Subjective moderate to severe pain was present in 10(20%) patients at 0 hours,16(38%) at 1 hours, 20 (40%) patients at 2nd hour ,24 (48.6%) patients at 4th hour and in 26 (52.9%) patients at 8th hour after the surgery. It was reported in 8%, 20% 25.7%, 22.9% and 20% of patients in Bupivacaine group and in 32%, 44%, 54.3%, 74.3% and 85.7% of patients in non- bupivacaine at 0,1, 2, 4 and 8 hours postoperatively. The difference between the Bupivacaine and non-bupivacaine groups was statistically significant ($P<0.05$).

Table 2: Comparison of subjective pain

	0 hr	1 hr	2 hrs	4 hrs	8 hrs	24 hrs
All patients	20	32	40	48.6	52.9	26
Bupivacaine	8	20	25.7	22.9	20	12
Non bupivacaine	32	44	54.3	74.3	85.7	40

The patients in the bupivacaine group did not require any analgesic until upto 8 hours after surgery. In the non bupivacaine group however patients started to give a pain score of 4 and above stating from the 4th hour post tonsillectomy and needed analgesic.

DISCUSSION

There have been several studies published to assess the effect of different methods used for post-tonsillectomy pain reduction. Some studies have been done on pediatric or adult age groups, while others were included both pediatric and adult patients. There are some differences in the age which has been considered as pediatric age group in different studies. In our study the age group of patients was 7-50 years of age. Pain is one of the most common complications after tonsillectomy which can cause delay in starting oral intake, leading to dehydration of the patients, particularly in children. It may also prevent early return to school or work after the surgery. In a study on 129 children whom underwent tonsillectomy as a day case, patients reported considerable pain which lasted more than 7 days. Warnock *et al.*... found that a trajectory of intense or moderately intense pain for the first 3 days, followed by a gradual decline over the next 4 days. They also found that in general, post-tonsillectomy pain was poorly managed by health professionals and parents.[5] Bupivacaine is one of the most commonly used agents for management of pain after the tonsillectomy/adeno-tonsillectomy. There are many reports of its usefulness, although some reports suggest no role for Bupivacaine in postoperative analgesia. Jebeles JA *et al...* reported that pre-incisional infiltration of Bupivacaine of the tonsils markedly decreases the intensity of pain following tonsillectomy, even till the 10th postoperative day.[6] They have performed another study and have reported the short and long term pain reduction after Adeno-tonsillectomy in children using this method.[7] Infiltration of Bupivacaine by Molliex *et al...* resulted in reduction of pain after tonsillectomy, but no significant difference found between the analgesics in patients underwent infiltration of Bupivacaine, before and after the surgery.[8] Straut *et al...* suggest that peritonsillar infiltration of Bupivacaine is moderately useful for children tonsillectomies.[9] Bupivacaine infiltration provided prolonged postoperative pain in Morten Johansen *et al...* study however no effect found in the intake of analgesics.[10] The level of pain is assessed in different time intervals by different authors including immediately after the operation, 0.5, 1, 2, 3, 4, 5, 6, 7, 8, 12, 24 hours and daily up to 10 days after the surgery. No specific reason is mentioned as the cause for choosing these time intervals in any article. In our study pain was assessed at 0, 1, 2, 3, 4, 8 and 24 hours after surgery. Wong AK *et al...*[11] studied 43 pediatric patients aged 2-10 years were undergoing tonsillectomy with or without adenoidectomy. They compared the effect of 0.5% Bupivacaine infiltration or spray and saline spray into the peritonsillar fossa after the surgery on post-operative pain. They used “objective pain score” to measure the level of pain but the factors which have been used in that system is not mentioned in their published article. Using that method, they recorded the level of pain immediately and 30 minutes after the surgery in the recovery room and immediately, 4, 8 and 12hours after the patients were shifted to the ward. The level of pain was significantly lower in Bupivacaine infiltration group only immediately after the surgery. Although the level of pain in other time intervals was lower in bupivacaine infiltration group, but this difference was not statistically significant.

CONCLUSION

Bupivacaine can be considered as a safe drug to be used for infiltration in tonsillectomy surgery. Pre-incisional

infiltration of bupivacaine into the peritonsillar region is an effective method to reduce postoperative pain.

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Source of Support: None Declared
Conflict of Interest: None Declared