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Research Article

Comparison of Peritonsillar Infiltration of Lidocaine and Bupivacaine for Management of Postoperative Pain of Tonsillectomy

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Abstract

Objectives: To compare the effects of preincisional peritonsillar infiltration of Lidocaine and Bupivacaine on post tonsillectomy pain in patient over the age of 8 years.

Methods: A double blind clinical randomized trial was conducted in patients undergoing elective tonsillectomy or adenotonsillectomy. The patients randomly allocated into three groups. Peritonsillar infiltrations with Bupivacaine, Lidocaine and Normal Saline were applied in group 1, 2 and 3 respectively. In 5th, 10th and 20th postoperative hours, the severity of Pain was evaluated by visual analogue scale (VAS).

Results: The patients of the Bupivacaine group experienced a significantly milder pain in all postoperative hours comparing the other groups. This effect was more obvious in male sex. The difference in pain sensation between Lidocaine and Saline groups was not significant.

Conclusion: Peritonsillar infiltration of Bupivacaine decreases pain in the first post-operative day after tonsillectomy whereas Lidocaine does not show a similar effect.

Keywords: Post-operative pain; Tonsillectomy; Peritonsillar infiltrations; Bupivacaine; Lidocaine

Introduction

Tonsillectomy is one of the most commonly performed surgical procedures [1]. Postoperative improvements in quality of life and behavior have been seen in children and adult patients [1,2]. The main complications of tonsillectomy are pain, hemorrhage, nausea, vomiting and dehydration [3]. In an attempt to decrease post tonsillectomy pain, various perioperative adjuvant therapies such as local anesthetics, steroids, analgesics and antibiotics have been implemented [4]. Tonsillar fossa is very sensitive, because it is well innervated by Trigeminal and Glossopharyngeal nerves. Local anesthetics can block the nerve conduction when applied to peritonsillar fossa [5]. Bupivacaine is a member of the amino amide group of local anesthetics that block the generation and conduction of nerve impulses similar to that of Lidocaine [6]. The aim of this study is to compare these two local anesthetics in a controlled and double blind manner.

Materials and Methods

Sixty patients aged 8 to 40 years (mean=13.3 ± 6.8) who were candidate for elective tonsillectomy or adenotonsillectomy enrolled the study. The cases with severe inflammatory condition such as acute pharyngitis or peritonsillar abscess, the ones with a history of bronchial asthma, cardiopulmonary disease, liver diseases, kidney diseases, hematologic diseases and coagulopathy and the known cases with allergy to Bupivacaine or Lidocaine excluded from the study. Sixty patients met the inclusion criteria. They randomly assigned into 3 groups with 20 patients each. The aim and method of the study explained for all patients or their parents and informed consent obtained. The patients were blind about the group in which there were enrolled. All patients received standard general anesthetic technique including induction with Propofol and Fentanyl and then Oxygen, Nitrous Oxide and Isoflurane for maintenance. Monitors included electrocardiography, pulse oximetry, blood pressure measurement and capnography. Before initiation of tonsillectomy, the peritonsillar area was infiltrated with a compound which was 0.5% Bupivacaine with 0.001% Epinephrine in the first group, 2% Lidocaine with 0.001% Epinephrine in the second group and Normal Saline (NaCl 0.9%) with 0.001% Epinephrine in the third (control) group. An appropriate volume of drug to cover all the peritonsillar fossa was infused by the surgeon just before the initiation of the surgery. All operations performed by one surgeon using sharp cold dissection. All patients received Acetaminophen 10mg/kg (500 mg maximum) every 6 hours after surgery. At the 5, 10 and 20 hours after operation, the patients were asked to explain their pain intensity using a visual analogue score in which 0 indicated no pain and 10 was the most imaginable severe pain. They were also asked to drink 100 ml of cold water and the pain was measured again 5 minutes afterward. An interrogator blinded to the study documented this information. The data was analyzed statistically using SPSS. The student's paired t-test and ANOVA was used to analyze the result. A P-value smaller than 0.05 was considered to be statistically significance.

Results

Between July and December 2013, sixty patients who underwent adenotonsillectomy or tonsillectomy met the inclusion criteria of our study. Of these 28 (46.7%) were males and 32 (53.3%) were females and mean age was 13.3 ± 6.8. Adenotonsillectomy was performed in 47 (78.3%) and tonsillectomy was performed in 13 (21.7%) cases. The mean age, weight and height were similar in three groups (Table 1). No major complication such as hemorrhage, air way obstruction or dehydration happened. The pain intensity declined over time in all three groups in different extents (Figure 1). The difference in pain scores between Adenotonsillectomy and Tonsillectomy cases in each group was not significant (p=0.05). Pain intensity scores between Lidocaine and Saline groups were not statistically significant neither before nor after drinking water (p-value>0.05) (Table 2). The analysis also performed for each sex and the results showed that difference in pain score in males was significance between Bupivacaine and Saline group in all postoperative hours whereas in was not significant in females (Table 3).

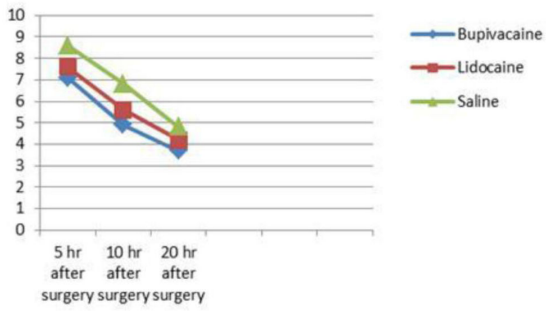

Figure 1: Mean postoperative pain scores over time.

	Bupivacaine group	Lidocaine group	Saline group
Age	12.4 ± 6.5	13.2 ± 7.2	14.2 ± 7.05
Sex(M/F)	11/9	9/11	8/12
Weight(Kg)	37.0 ± 15.2	40.1 ± 18.2	39.8 ± 13.9
Height(cm)	137.5 ± 16.1	138.4 ± 15.8	140.0 ± 15.7
AT/T	16/4	16/4	15/5

Table 1: Demographic data in three groups

		Post-operative hours					
		5	**10**	**20**	**5 + Drink**	**10 + Drink**	**20 + Drink**
Bupivacaine	Adenotonsillectomy	7.0	4.75	3.6	5.6	3.9	2.3
	Tonsillectomy	7.7	5.5	4.0	6.2	4.5	3.25
	P-Value	0.20	0.10	0.40	0.30	0.30	0.07
Lidocaine	Adenotonsillectomy	7.6	5.5	4.2	5.5	4.0	3.1
	Tonsillectomy	7.7	6.2	4.0	5.7	4.7	3.2
	P-Value	0.70	0.50	0.60	0.60	0.20	0.80
Normal Saline	Adenotonsillectomy	8.5	6.7	4.8	6.1	4.2	3.3
	Tonsillectomy	8.5	7.0	4.7	6.8	5.0	3.6
	P-Value	0.90	0.60	0.80	0.08	0.10	0.20

Table 2: Pain scores in adenotonsillectomy and tonsillectomy cases of each group + Drink= after drinking cold water.

		Post-operative hours					
		5	10	20	**5 + Drink**	**10 + Drink**	**20 + Drink**
Bupivacaine	Male	6.5 ± 1.3	4.8 ± 1.4	3.8 ± 0.9	5.4 ± 1.3	4.1 ± 1.0	3.1 ± 0.8
		P=0.001	P=0.0001	P=0.047	P=0.50	P=0.60	P=0.30
	Female	7.9 ± 1.9	5.0 ± 2.7	3.5 ± 1.8	6.0 ± 2.1	4.0 ± 2.1	3.0 ± 1.7
		P=0.50	P=0.20	P=0.40	P=0.60	P=0.70	P=0.80
	Total	7.1 ± 1.7	4.9 ± 2.0	3.7 ± 1.4	5.7 ± 1.7	4.1 ± 1.6	3.0 ± 1.2
		P=0.007	P=0.004	P=0.05	P=0.40	P=0.50	P=0.50
Lidocaine	Male	7.7 ± 1.9	5.5 ± 2.4	4.2 ± 2.0	5.2 ± 1.7	4.1 ± 2.1	3.1 ± 2.3
		P=0.10	P=0.06	P=0.20	P=0.40	P=0.60	P=0.60
	Female	7.54 ± 2.6	5.72 ± 1.9	4.2 ± 2.18	5.8 ± 1.9	4.1 ± 1.8	3.1 ± 2.4
		P=0.20	P=0.60	P=0.70	P=0.40	P=0.80	P=0.90
	Total	7.6 ± 1.9	5.6 ± 2.1	4.2 ± 2.0	5.5 ± 1.8	4.1 ± 1.9	3.1 ± 2.3

		P=0.90	P=0.80	P=0.30	P=0.30	P=0.60	P=0.70
Saline	Male	8.8 ± 0.8	7.7 ± 1.4	5.3 ± 2.1	5.8 ± 1.3	4.5 ± 1.6	3.6 ± 1.7
	Female	8.4 ± 1.7	6.1 ± 1.72	4.4 ± 1.97	6.5 ± 2.6	4.3 ± 2.1	3.2 ± 1.8
	Total	8.6 ± 1.4	6.8 ± 1.8	4.8 ± 2.0	6.2 ± 2.3	4.4 ± 1.8	3.3 ± 1.7

Table 3: Pain score in three groups for each sex and in total + Drink = after drinking cold water, P= P-Value (The P-Value< 0.05 means statistically significance).

Discussion

Tonsillectomy is a very common operation. It can cause severe post-operative pain [7]. Due to hyper excitable states during surgery, pain impulses are conducted into the central nervous system in spite of general anesthesia. Blockage of these impulses by perioperative infiltration of local anesthetic agents theoretically must have significant analgesic effect [8]. The aim of this study is to examine the effect of peritonsillar infiltration of Bupivacaine and Lidocaine on post-operative pain. Perioperative infiltration of local anesthetic agent in peritonsillar fossa for improvement of postoperative pain has been the subject of some other studies. A meta- analysis by Sun et al stated that peritonsillar infiltration of Bupivacaine is a safe and significantly effective method for relief of post tonsillectomy pain [9]. It was found that peritonsillar infiltration of Bupivacaine and Epinephrine decreases post tonsillectomy pain [10,11]. Another study demonstrated that females report more pain and use more analgesics than males after tonsillectomy [12]. It was found that Bupivacaine application in peritonsillar fossa to be not effective for pain relief after tonsillectomy [1]. Studies also demonstrated that administration of Bupivacaine and Ropivacaine are effective in decreasing post tonsillectomy pain but peritonsillar infiltration of Lidocaine was not statistically effective [2]. It was also found that Bupivacaine and Levobupivacaine are effective in reducing early post tonsillectomy pain whereas Bupivacaine had slightly longer effect [5]. It was demonstrated that peritonsillar infiltration of tramadol to provide pain control in the first 6 hours post tonsillectomy which was comparable to effects of Lidocaine [13]. Some authors have reported some complications of local anesthetic injection in the tonsillar bed. They stated that Bupivacaine infiltration may lead to upper air way obstruction and pulmonary edema. This finding is not confirmed by other studies. Other authors have occasionally reported vocal cord paralysis due to vagal block, deep cervical abscess and even brain stem stroke due to cardiac asystole [4]. It is not clear if these complications are directly related to the application of local anesthetics or not. Anyway, no large study has shown considerable complications related to local anesthetics injection. We also did not encounter any major or minor complications in our study. Considering the previous studies, it is difficult to build a uniform recommendation for the surgeons for use of local anesthetics prior to tonsillectomy. It was not clear which agent to use and who are better candidates of perioperative local anesthetic injection. In this study, we found that Bupivacaine infiltration before tonsillectomy is effective for reduction of postoperative pain during the first day after surgery. In males, this effect was statistically significant but in female, although a considerable degree of relief could be observed, the effect did not meet the statistically significance criteria. The Lidocaine made a decrease in pain scores in all patients but this effect was not statistically significant. In this way, we can strongly recommend preoperative injection of Bupivacaine for decreasing of postoperative pain in the first day after surgery especially in males. Some authors have used dynamic pain assessment (after drinking water or opening the jaw). The time of mobilization and request for additional analgesia are also used as indicators of pain [14,15]. In our study, we selected the patient older than 8 years because these patients already have learnt the numbers and give us more correct answer when they are asked about pain intensity. We believe this can improve the accuracy of the results. We also used dynamic pain assessment by measuring the pain scores after drinking some water. The factors that can conflict our results include surgical methods applied for tonsillectomy, the technique of local anesthetic application (topical or infiltration), dose and volume of local anesthetic, premedication, design of the study and assessment methods. We tried to minimalize these effects by equalization of the surgical technique, method of anesthetic application and use of blinding for patients, surgeon and interrogator. In all groups, enough volume of the agent to completely infuse the tonsillar bed was used. The exact amount of volume is dependent to the surgeon's expectation. As all the surgeries in this study were performed by a single surgeon, we can assume that a roughly equal volume of agent per surface area of tonsillar bed is injected in all patients. The technique of surgery and all the prescribed drugs before, during and after surgery other than the local anesthetic agents were similar in all patients to prevent or reduce bias [16].

Conclusion

Peritonsillar infiltration of Bupivacaine provided pain control in the first day post tonsillectomy whereas lidocaine was not effective for reduction post tonsillectomy pain.

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