IS THE COLD STEEL DISSECTION METHOD STILL THE MOST EFFECTIVE METHOD OF TONSILLECTOMY?

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ABSTRACT

Objective: To compare post operative the efficacy of tonsillectomy performed by cold steel dissection and bipolar diathermy method.

Study Design: Randomized controlled trial.

Place and Duration of Study: ENT department POF Hospital Wah from Jan 2013 to Jan 2015.

Material and Methods: All the patients presenting with recurrent acute tonsillitis and fulfilling the criterion were included. Two groups of 40 patients each were constituted randomly irrespective of age and sex. Cold steel dissection tonsillectomy was carried out on group A patients while group B was operated by bipolar diathermy method. Patients were examined on 2nd, 10th and 14th post-operative days by the surgeon who was blind about the procedures on these patients. Patients were evaluated for per operative hemorrhage, post-operative hemorrhage and amount of pain experienced by the patients post operatively.

Results: Mean age in group A was 25.5 years while it was 24.5 years in group B. There was no significant difference between the operative times of both groups; it was 15.90 minutes for cold steel tonsillectomy and 12.50 minutes for bipolar diathermy group. There was statistically significant difference between the blood losses in both groups. In cold steel it was 90.20 ml while in bipolar diathermy group it was 20.50 ml. Bipolar diathermy tonsillectomy groups experienced more pain at all post-operative visits. Healing was less in bipolar diathermy group as compared to cold steel tonsillectomy at 14th day.

Conclusion: This study shows that the both procedures have advantages and disadvantages. Cold steel dissection tonsillectomy was found superior in healing and less amount of pain while the bipolar diathermy method caused less per operative blood loss and more pain.

Keywords: Bipolar diathermy, Cold steel dissection tonsillectomy, Healing of tonsillar fossa, Secondary hemorrhage.

INTRODUCTION

Tonsils are the collection of lymphoid tissue at the lateral wall of the oropharnx[1]. These immuno-competent tissues are the immune system's first line of defense against ingested or inhaled foreign pathogens[2]. Tonsils have on their surface specialized antigen capture cells called M cells that allow for the uptake of antigens produced by pathogens. These M cells then alert the underlying B cells and T cells in the tonsil that a pathogen is present and an immune response is stimulated. B cells are activated and proliferate in areas called germinal centers in the tonsil. These germinal centers are places where B memory cells are created and secretory antibody (IgA) is produced[3].

Recent studies have provided evidence that the tonsils produce T lymphocytes, also known as T-cells, in a manner similar to, but different from, the way the thymus does[4].

It was JL Paradise[5] who in 1983 described the criterion of recurrent acute tonsillitis. According to the criterion 7 attacks of recurrent acute tonsillitis in one year, 5 or more attacks per year for two years and 3 or more attacks per year for the last 3 years constitute an absolute indication for tonsillectomy. Although the tonsillectomy operation was popular before this

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but it was Celsius who carried out first documented tonsillectomy in first century AD[6]. Tonsillectomy has been a common operation in otolaryngology, with over 1 million tonsillectomies being performed annually in the UK in the 1960's and 70's. However, recently, this figure has fallen considerably[7]. Although the tonsillectomy is a quick operation, morbidity may be significant. Hemorrhage, apnea, pain, fever and poor oral fluid intake are all possible effects of surgery[8]. All these effects can be minimized in experienced hands and improved techniques. There is no consensus on the best technique for a tonsillectomy. In the past, the guillotine or tonsillotome technique was used, but because of higher morbidity, this technique has been reported as unsatisfactory and its use has been decreased worldwide[9]. Now a days at least 7 different methods are in vogue to carry out tonsillectomy. Bipolar diathermy tonsillectomy is one of these procedures. Many studies have been carried out in an attempt to identify the safest procedure for the patients. Since then the operation evolved and now a days tonsillectomy is carried out by at least 7 different methods. The cold steel dissection method of tonsillectomy is the oldest after the guillotine method. It is time tested but carries some disadvantages. This study was carried out to compare the time tested method of cold steel dissection method with the relatively newer technique, the bipolar diathermy method. In cold steel dissection method, a tonsillar dissector made of steel is used to dissect the tonsils out of their bed. Then hemostasis is carried out by suture ligation of the bleeding vessels. While in bipolar diathermy method, bipolar forceps is used to remove the tonsils from the bed followed by cautry of the bleeding points. Both procedures carry advantages and disadvantages. We studied different per operative and post operative parameters to compare the efficacy of both the procedures. The per operative blood loss, post operative hemorrhage, post operative pain and healing of the tonsillar fossa were studied and results recorded. The post operative pain was measured by using the numeric rating scale (NRS-11) [Annex 1]. These scales measure the pain on 11 points and divide it in mild, moderate and severe pain. Our study highlights the advantages and disadvantages of both the procedures which will help clinicians to select the best available method for their patients.

MATERIAL AND METHODS

This randomized control trial was conducted at ENT department POF hospital Wah from January 2013 to January 2015. A total of 80 patients (n=80) were included in the study irrespective of age and sex. They were selected on the bases of history and clinical examination. On history the selection criterion of recurrent attacks of acute tonsillitis was took as seven attacks per year for the last one year, 5 attacks per year for the last two years or 3 attacks per year for the last three years. Each attack of acute tonsillitis was accompanied by high grade intermittent fever, odynophagia and enlargement of jugulo-diagastric lymph nodes. Persistent redness of anterior faucial pillars and palpable jugulodiagastric lymph nodes were the clinical signs for the inclusion in the study. Prominence of the tonsils alone was not taken as inclusion criterion unless accompanied by history of recurrent attacks acute of tonsillitis. Patients of sleep apnea syndrome due to prominent tonsils and history of recurrent acute tonsillitis were also included. Patients less than 3 years and more than 40 years were excluded from the study. Patients with chronic rhinosinusitis causing pharyngitis were also excluded. Probability convenient sampling was done and groups were allotted randomly using the random number table. Patients were randomly distributed in two groups of 40 patients each. Group A was assigned to those patients who underwent cold steel dissection tonsillectomy. While group B was assigned to the tonsillectomy by bipolar diathermy method. The patients were not informed about the surgical procedure for removal of their tonsils. The operating surgeon performed tonsillectomy on each patient according to a set pattern of surgical steps. Cold

steel tonsillectomy by dissection method was carried out on group A and bipolar diathermy was used for tonsillectomy in group B. In cold steel group hemostasis was secured by ligation of the bleeding points. Operative time was recorded from incision till the completion of hemostasis. Blood loss was recorded in the form of blood in the suction unit bottle and weight of the cotton balls used during the procedure. All patients were given Co-amoxiclav 8mg/kg body weight/day for 7 days and Acetaminophen 15mg/kg/day for 7 days. Post operatively the patients were examined on 2nd, 10th and 14th day by another surgeon who was blind about the procedure performed on these patients. The operative time, amount of bleeding during the procedure, post operative hemorrhage, healing of tonsillar fossa and amount of pain were recorded on each visit. The post-operative pain was measured using Numeric Rating Scale (NRS 11).

Numeric Rating Scale

The Numeric Rating Scale (NRS-11) is an 11–point scale for patient self-reporting of pain. It is for adults and children.

Rating	Pain Level
0	No Pain
1 – 3	Mild Pain (nagging, annoying, interfering little with ADLs)
4 – 6	Moderate Pain (interferes significantly with ADLs)
7 – 10	Severe Pain (disabling; unable to perform ADLs)

Table-I: Post operative pain perception of the patients.

S. No	Pain perception on 2nd day		Pain perception on 10th day	
	Group A (n=40)	Group B (n=40)	Group A (n=40)	Group B (n=40)
1 NRS-11 score (0)	-	-	2 (5%)	-
2 NRS-11score (1-3) Mild pain	-	-	38 (95%)	-
3 NRS-11 score (4-6) Moderate pain	4 (10%)	0	-	4(10%)
4 NRS-11 score (7-10) Severe Pain	36 (90%)	40 (100%)	-	36 (90%)

Data Analysis

All the data were fed and analyzed by using SPSS. v. 13. Mean and standard deviation were calculated for quantitative variables. Categorical varaibles were presented by frequency and percentage. Independent sample t-test was applied on data to determine the statistical significance for quantitative variables between groups. Chi square test was applied for the comparison of categorical variables between groups. A *p*-value <0.05 considered to be a significant value.

RESULTS

Total 80 patients were selected 40 in each group. Group A comprised of 15 (37.5%) male and 25 (62.5%) female patients while group B consisted of 17 (42.5%) male and 23 (57.5%) female patients. The mean age in group A was 25.5 ± 8.34 years while in group B it was 24.5 ± 9.45 years (*p*=0.672). There was a significant difference between the operative times of the two procedures. Mean operative time for cold steel dissection tonsillectomy was 15.90 ± 4.30 minutes while it was 12.50 ± 3.40 minutes for tonsillectomy performed by bipolar diathermy (*p*<0.001). Blood loss was significantly more in cold steel tonsillectomy and came out to be 90.20 ± 5.30 ml (*p*<0.001) as compared to bipolar

diathermy tonsillectomy, where the mean blood loss was only 20.50 ± 5.00 ml. The amount of pain experienced by the patients who underwent bipolar diathermy tonsillectomy was a significantly higher. On 2nd post operative day patients in both groups described their pain via NRS-11 as severe. But there was difference of 10% in favor of cold steel tonsillectomy. As 4 (10%) patients in this group described their pain as moderate on NRS-11 score. On 10th postoperative day only 2 (5%) patients in cold steel tonsillectomy group was pain free and 38 (95%) patients experienced mild pain on NRS-11 (p<0.001) (table-I). In bipolar diathermy tonsillectomy group 36 (90%) patients' experienced moderate pain and 4 patients (10%) described their pain as mild while no patient was pain free (p<0.040). There was no significant difference in the rate of post operative secondary hemorrhage. In group A the rate of secondary hemorrhage was recorded as 2.5% (1 patient) while in bipolar diathermy tonsillectomy 2 patients (5%) reported with secondary hemorrhage. Healing of the tonsillar fossa after the operation is a sensitive indicator of post operative infection and degree of pain experienced by the patients. If the pain is severe the patient wouldn't eat enough and healing will be effected. In cold steel tonsillectomy 38 (95%) patients showed complete healing on 14th post operative day while in group B only 16 (40%) patients showed complete healing of their tonsillar fossa (p<0.001).

DISCUSSION

Leinbach RF et al[10] compared hot and cold tonsillectomy in a retrospective study. They found that more patients with pain worse on the electro dissection side (148 of 293 = 51%) than the cold knife side (33 of 293 [11%]; p=0.001) on postoperative days 4 to 10. These findings support our experience. We kept the dose of analgesics uniform in all patients but in their study they give more dose to those patients who felt more pain. There were significantly more analgesic doses after surgery with electro dissection (means 26.7 versus 19.2; p=0.028) and higher pain scores for adults undergoing electro dissection (means, 2.6 versus 0.8; significance could not be determined). These findings are similar to our study except that there were no differences in hemorrhage rates.

Silveira H et al[11] performed sixty tonsillectomies in a prospective study carried out in children under the age of 14 years. They showed results similar to our study and found that the blood loss and duration of surgery were significantly decreased in bipolar diathermy group (p<0.001), but the healing process, directly assessed by the aspect of tonsillar fossa on the 10th day was markedly delayed. In their study the intensity of pain was slightly higher in the bipolar diathermy group compared with the cold steel tonsillectomy group, but in our study there was significant difference between the pain felt by the patients in both groups. No difference on duration of hospitalization was found between the two groups. Two post-operative hemorrhages occurred (one in each group), and no major complications were registered.

A multiunit prospective randomized pilot study was conducted in Belfast by Raut VV et al[12]. They used bipolar scissors for tonsillectomy and compared it with traditional cold steel tonsillectomy. The mean age of the study population was 14.3 years. Sixty-eight percent of the children were girls. They found that the median intra-operative blood loss was 6 ml for bipolar scissors tonsillectomy and 86 ml for cold dissection tonsillectomy (p<0.001). The median operative time was 10.5 min for bipolar scissors tonsillectomy compared to 14.5 min for the cold dissection method (p=0.001). In contradiction to general perception there was no statistically significant difference in the pain scores between the two methods (p>0.05). We didn't experience any reactionary hemorrhage in both the groups but in their study the overall reactionary hemorrhage rate was 4% while the overall secondary hemorrhage rate was 14%. The hospital readmission rate was 4%. But unlike our study the reactionary and secondary hemorrhage rates were unaffected by the surgical method.

CONCLUSION

This study shows that the both procedures have advantages and disadvantages. Cold steel dissection tonsillectomy was found superior in healing and less amount of pain while the bipolar diathermy method caused less per operative blood loss and more pain.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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