

A COMPARATIVE STUDY ON POST-OPERATIVE PAIN BETWEEN BIPOLAR DIATHERMY AND LIGATION IN TONSILLECTOMY

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ABSTRACT

BACKGROUND

Tonsillectomy is one of the most commonly performed surgeries worldwide. It is usually safe and simple, but haemorrhage is the most feared complication post tonsillectomy because of the risk of airway obstruction, shock and ultimately death if inappropriately treated or untreated. There are many methods to control post-operative haemorrhage and the commonest are ligation method and bipolar diathermy coagulation. Excessive pain is one complication of tonsillectomy and this is usually due to tissue trauma.¹

The aim of this study was to compare the intensity and duration of post-operative pain in patients using bipolar diathermy and ligation in tonsillectomy.

MATERIALS AND METHODS

All patients who underwent tonsillectomy in 5-15 age group in a one-year study period were included in the study. The study was conducted after getting ethical clearance and permission from parents. Patients were admitted one day prior to surgery and selection was simple random selection. Assessment of intensity of pain was done by using a Visual Analog scale.² Study Setting- Study conducted in 80 patients in age group of 5-15 years, who underwent tonsillectomy in Otorhinolaryngology department, Government Medical College, Kottayam. Study Design- It is a comparative observational study.

RESULTS

The study showed no significant difference in intensity of pain in tonsillectomy in ligation and bipolar techniques.

CONCLUSION

The post-operative pain after tonsillectomy may vary widely and little information is available in literature. This is a study on post-operative pain and no significant difference obtained in these groups.

KEYWORDS

Tonsillectomy, Ligation, Bipolar Diathermy, Visual Analog Scale.

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BACKGROUND

Modern tonsillectomy began in early years of 20th century with development of dissection tonsillectomy in Baltimore by Worthington (1907) and in London by Waugh (1909) and guillotine tonsillectomy in New Castle by Whillis and Pybus (1910). Ligation of bleeding vessels within tonsillar fossa was considered extremely difficult and was first employed on a regular basis by Cohen (1919). Diathermy is a significantly faster method of haemostasis resulting in shorter operative and anaesthetic time.

Tonsillectomy is the most frequently performed surgical procedure in both children and adults. There are several operative techniques for tonsillectomy of which dissection and snare is the commonly used method. Bleeding and post-

operative pain are the two major complications of tonsillectomy. However, studies on intensity and duration of pain after tonsillectomy are limited. In our study the method we used is dissection and snare and haemostasis is attained either by ligation of bleeding points or using bipolar diathermy coagulation. This is a comparative study on intensity of post-operative pain between bipolar diathermy coagulation and ligation as a method of haemostasis.

MATERIALS AND METHODS

80 patients who were subjected for tonsillectomy in Otorhinolaryngology department, Government Medical College, Kottayam in a one-year period is studied. All were in the age group of 5 to 15 years. In this study all were chronic tonsillitis with symptoms like airway obstruction, speech defect or with history of peritonsillar abscesses. Of the 80 patients, bleeding was controlled with ligature in 40 patients and the remaining 40 with bipolar diathermy. All data including age, gender and outcome measures are entered in a data base and analysed with Microsoft Excel SPSS version 16. 80 patients with chronic tonsillitis were studied.

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The cases excluded were acute cases, cases of malignancy and cases done as a part of other operations. Dissection and snare is the method we used for removing the tonsils. All cases were done under general anaesthesia. Dissection and snare was the method used. After dissection of tonsil from its fossa in one group all the bleeding points were ligated. In the diathermy group all the bleeding points were cauterised using bipolar diathermy and haemostasis attained.

After surgery all cases were kept for observation in the recovery phase, pulse monitored every 15 minutes for 4 hours, every 30 minutes for further 4 hours and then hourly. They were shifted to ward after complete recovery from anaesthesia. Monitoring of vital signs was done for the next 24 hours. Assessment of intensity of pain was done by using Visual analog Scale for pain. Patients were briefed about the Visual Analog Scale prior to surgery and assessment done after they were fully recovered from anaesthesia. Analysis of data was done with Microsoft Excel SPSS version 16.

RESULTS

80 patients with chronic tonsillitis were studied. The commonest symptom in our patients were recurrent sore throat. Other major symptoms were mouth breathing, snoring, nasal obstruction and obstructive sleep apnoea. For the control of haemorrhage, ligation was the technique used in 40 cases and bipolar diathermy coagulation was in rest of 40 candidates. The age of the patient included in our study ranged between 5 and 15. 61% were in 5-7, 24% were in 8-10 and the rest 15% were in 11-15 age groups. 69% (55 patients) were males and the rest 31% (25 patients) were females. Among the 40 patients in diathermy coagulation group, 29 were males and 11 were females; and among 40 ligation group, 26 were males and 14 were females.

On day 1, 16.2% (13 patients) of total patients had moderate pain and 83.8% (67 patients) had severe pain on Visual analog scale. In ligation group 16% (7 patients) had moderate and 84% (33 patients) had severe pain. In diathermy group 15% (6 patients) had moderate and 85% (34 patients) had severe pain. (Chi square value of 0.09 with a p value of 0.761). There is not much difference between the pains in the two procedures.

On 2nd day 30% (12 patients) subjects who underwent ligation and 25% (10 patients) of those who underwent diathermy coagulation had severe pain. 70% (28 patients) of ligation group and 75% (30 patients) of diathermy group had moderate pain. (Chi square value of 0.251 with a p value of 0.803). There is no significant difference between pain in these two groups in the second day.

On 3rd day none of the patients had severe pain. 75% (30 patients) in ligation group and 77.5% (31 patients) in diathermy group had moderate pain and 25% (10 patients) in ligation group and 22.5% (9 patients) had only mild pain.

On the 4th day 15% (6 patients) of the ligation group and 20% (8 patients) of the diathermy group had moderate pain. 85% (34 patients) of ligation group and 80% (32 patients) of the diathermy group had experienced only mild pain. (Chi square value of 0.346 with a p value of 0.770).

On first follow up none of the patients had severe or moderate pain. 75% (30 patients) of ligation group and 70% (28 patients) of the diathermy group experienced only mild pain. (Chi square value 0.251 with a p value of 0.803).

On 2nd follow up, 15% (6 patients) of ligation group and 17.5% (7 patients) of diathermy group experienced mild pain. 85% (34 patients) of ligation group 82.5% (33 patients) of diathermy group had no pain at all. (Chi square value 0.092 with a p value of 1.00). On 3rd follow up none of the patients complained of pain.

In this study, it is found that in tonsillectomy patients there is no significant difference in post-operative pain in either using ligation or diathermy coagulation as method of haemostasis.

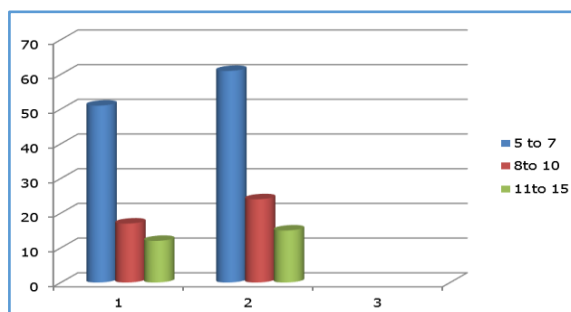


Figure 1. Showing Age Distribution

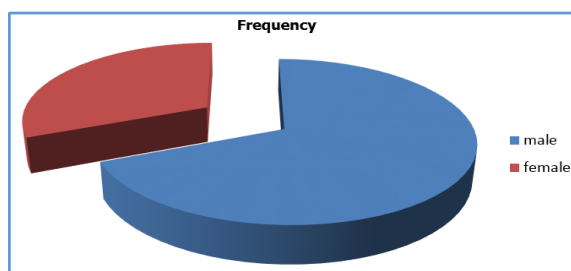


Figure 2. Showing Gender Distribution

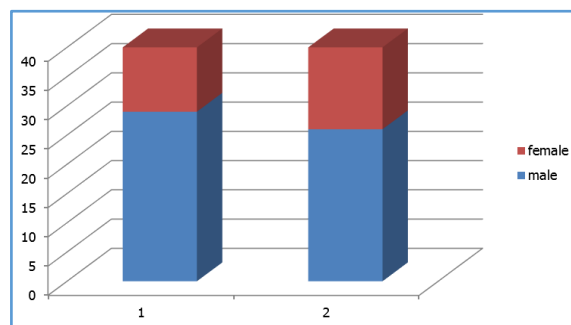


Figure 3. Showing Gender Distribution among Diathermy and Ligation

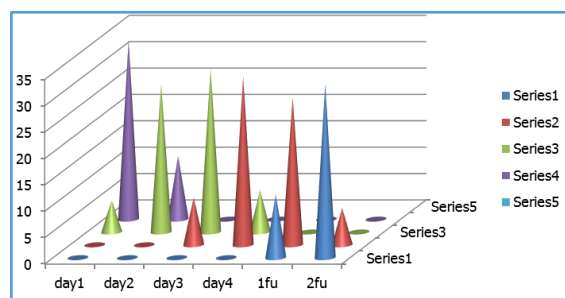


Figure 4. Pain in Diathermy Group

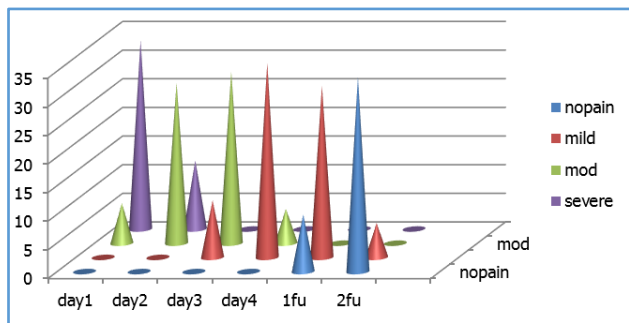


Figure 5. Pain in Ligation Group

Age Group	Frequency	Percentage
5 to 7	51	61
8 to 10	17	24
11 to 15	12	15

Table 1. Showing Age Distribution

Gender	Frequency	Percentage
Male	55	69
Female	25	31

Table 2. Showing Gender

Gender	Diathermy	Ligation
Male	29	26
Female	11	14

Table 3. Showing Gender Distribution among Diathermy and Ligation

	No pain	Mild	Mod	Severe
Day 1	0	0	6	34
Day 2	0	0	28	12
Day 3	0	9	31	0
Day 4	0	32	8	0
1 fu	12	28	0	0
2 fu	33	7	0	0

Table 4. Showing Pain in Diathermy Group

	No pain	Mild	Mod	Severe
Day 1	0	0	7	33
Day 2	0	0	28	12
Day 3	0	10	30	0
Day 4	0	34	6	0
1 fu	10	30	0	0
2 fu	34	6	0	0

Table 5. Pain in Ligation Group

Score 0	no pain
Score 1-3	mild pain
Score 4-6	moderate pain
Score 7-10	severe pain

Table 6. Pain Score in Visual Analog Scale

DISCUSSION

Tonsillectomy is a common surgical procedure performed by a variety of techniques. Surgical techniques have evolved over the years aiming to make the procedure safe and decrease the post-operative morbidity and complications. Guillotine method was the oldest, which is abandoned because of the risks of bleeding. Until about 10 years ago dissection tonsillectomy (first described by Edwin Pynchon in 1890) with haemostasis performed with ties or diathermy was the standard but more recently there has been an

explosion of different dissection instruments described in an effort to try and to reduce post operative pain and haemorrhage associated with the procedure.³

Dissection technique include dissection and snare method, methods using diathermy or electro cautery, coblation, harmonic scalpel, Laser dissection are other techniques of tonsillectomy. In this study dissection and snare is the method used for removing the tonsils. Complications of tonsillectomy can be classified into immediate, intermediate and delayed. Immediate complications include anaesthetic complications, intra operative bleeding and trauma to the surrounding structures. Intermediate complications are mostly haemorrhage and are termed reactionary haemorrhage. Delayed is secondary haemorrhage due to infection. Post-operative pain is usually due to tissue trauma, injury to pillars, spasm of inflamed muscles and nerve irritation. Many topical agents have been used to control the postoperative bleeding by the surgeons. Hydrogen peroxide is one such agent where the incidence of oozing and active bleeding decreased. The post-operative blood loss due to this was found to be reduced by 32%. Bismuth subgallate is another topical agent used as a haemostatic agent (Agarwal et al). It is relatively insoluble and poorly absorbed in the body and is a powerful astringent. Application of haemocoagulase also found to be effective in control of haemorrhage in post tonsillectomy patients.^{4*}. Local infiltration of Bupivacaine is tried to reduce the post-operative pain in studies.

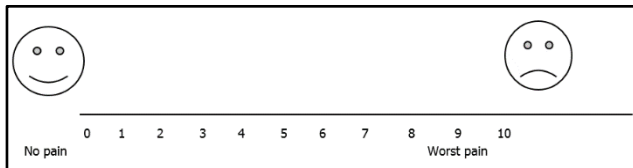
In this study we used dissection and snare method and haemostasis attained by bipolar diathermy coagulation and ligation of bleeding points. It is done under general anaesthesia with maintenance of airway using orotracheal tubes. Appropriate exposure of the tonsils through the open mouth is usually achieved with a Boyle Davis mouth gag. The tonsil is grasped and retracted forcefully towards the midline allowing identification of the intended plane of dissection, i.e. the soft areolar tissue between the capsule of the tonsil and the constrictor muscle of the pharynx. The surgical plane is then entered with minimal loss of or trauma to the mucosal tissue of the anterior pillar of the fauces and uvula. In this process all instruments are directed at the tonsil rather than laterally into the tonsillar fossa to avoid trauma to the glossopharyngeal nerve and carotid arteries. The most essential part of tonsillectomy is complete control of haemorrhage, which may be achieved initially by placing swabs in each fossa, and then traditionally, by ties or diathermy to any bleeding points. At the end of the procedure blood clots need to be aspirated from the nasopharynx to avoid obstruction of the airway post extubation.

Diathermy is quicker but is possibly related to increased risk of secondary haemorrhage. Electrocautery is the method of choice in patients at high risk of bacteremia.⁵ The radiofrequency tonsillectomy is a newer method and is less painful. Studies showed that harmonic scalpel is associated with less post-operative pain but haemorrhage was similar to standard procedures. Kothari et al. compared Laser tonsillectomy with standard dissection method and found

significant less perioperative haemorrhage and more post operative pain.

Visual Analog Scale (VAS)- In this study Visual analog scale (VAS) for pain is the questionnaire used for evaluating pain. It is a single item scale administered as a paper and pencil measure and was acceptable to patients. This scale is a continuous scale comprised of a horizontal line 10 centimetres in length anchored by 2 verbal descriptors at each end. The VAS score is determined by measuring from the left hand end to the point that the patient marks and high score indicate greater pain.

Pain Score of Visual Analog Scale- Score 0- no pain, Score 1-3 mild pain, Score 4-6 moderate pain & Score 7-10 severe pain.



In this study, all patients were examined, and assessment made once they were fully recovered from anaesthesia. Post-operative pain was assessed at 6 hours after recovery from anaesthesia by means of Visual analog scale. The scoring was done on daily basis till the patient get discharged from the hospital. Episodes of post-operative bleeding were also noted along with other information. First follow up done on seventh day and second and third were after one-month interval. All were discharged on same antibiotic and analgesics.

Pain and dysphagia are common in early post-operative period of tonsillectomy. Most children require more than a week to return to normal diet and to resume normal functioning.

Several studies have compared the effect of ligation of vessels with bipolar diathermy as a method of haemostasis. Carmody et al; Malik et al Watson et al found that reactionary haemorrhage was 3 times more frequent in patients where ligation was used.⁶ Choy et al concluded that bipolar diathermy is equally good in control of haemorrhage and is not more painful. Tay in 1995 compared bipolar diathermy and ligation as haemostasis method and no significant difference in pain is observed. A higher incidence of secondary haemorrhage was noted in those patients in whom diathermy was used for haemostasis rather than ligatures.⁷ (Siodlak MZ, Gleeson MJ, Wengraf CL). Ray et al in panama studied 376 cases equally split between bipolar diathermy and ligation found no difference in haemorrhage rate but 40 % reduction in operation time with diathermy, however there was increased pain in diathermy group.

The use of diathermy to secure haemostasis in tonsillectomy remain controversial in UK (Murty and Watson, 1990). 44% of otolaryngologists in U K use diathermy where as 56% don't use it thinking that it increases post op haemorrhage, pain and morbidity. One explanation for

higher post-tonsillectomy bleed rates after diathermy techniques may be related to greater thermal damage as the result of excessively high-power settings or excessively frequent or prolonged application of diathermy.⁸

Ligation versus bipolar diathermy for haemorrhage in Tonsillectomy: A comparative study by Dr P K Moonka noted less pain in diathermy group. A T K Choy and APSu noted no significant difference in postoperative pain and haemorrhage. Post tonsillectomy pain with ligation and bipolar diathermy A prospective randomised study in children and adults by department of Otorhinolaryngology; South Warwick Shire Hospital, Warwick, U K found no difference in post-operative pain in adults with diathermy. Arif Raza Khan & Aziz Khan, Khyber teaching hospital, Peshawar in 2007 noted no difference in pain and haemorrhage in ligation and bipolar diathermy.

We found no significant difference in pain in our study of tonsillectomy with ligation versus diathermy coagulation in children as the method of haemostasis.

CONCLUSION

Both ligation and bipolar diathermy are good haemostatic techniques in tonsillectomy. On review of literature there is not much difference in post-operative pain or haemorrhage in these two techniques. In our study there is no significant difference in post-operative pain in these two techniques.

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