

Comparison between Cold Dissection Snare Method and Bipolar Electrodissection Method in Tonsillectomy

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Abstract Tonsillectomy is one of the commonest surgical procedures performed in the field of Otorhinolaryngology. Over the last century many different procedures and techniques have been described, of which Cold Dissection-Snare method and Bipolar Electro dissection method are commonly used. The literature remains divided over which method is better. **Objective:** To compare Cold Dissection-Snare method and Bipolar Electro dissection method in tonsillectomy with respect to intraoperative blood loss and operative time taken. **Materials and methods:** Study is based on analysis of 40 patients aged between 5 to 40 yrs undergoing tonsillectomy in the Department of ENT at Meenakshi Medical College Hospital and Research Institute. Tonsillectomy is performed under general anaesthesia. Left sided tonsillectomies done by Bipolar Electro dissection and right side by Cold Dissection-Snare method, thus eliminating other potential influencing physiological factors. Amount of intraoperative blood loss is measured by calculating the difference in weight of swabs before and after use during surgery and then adding it to the total volume of blood collected in respective suction bottles. Operative time taken is also recorded. **Result:** Blood loss was significantly less with the Bipolar Electro dissection method (BED), averaging 47.13 ± 8.24 ml compared to 52.23 ± 9.68 ml averaged in Cold Dissection Snare method in tonsillectomy. There was significant difference in operative time between both methods, 15.45 ± 3.93 min on Bipolar Electro dissection side versus 18.03 ± 4.03 min on Cold Dissection-Snare side. **Conclusion:** In the present study, it was found that Bipolar Electro dissection was associated with a significant decrease in surgical time and intraoperative blood loss compared to the Cold Dissection-Snare method.

Keywords Tonsillectomy, Electrocautery, Dissection snare, Electro dissection

1. Introduction

Infectious and inflammatory diseases involving the tonsils account for a significant proportion of childhood illnesses and often result in tonsillectomy; one of the most common surgical procedures of childhood [1]. It's probably the earliest described surgical intervention in Otorhinolaryngology. Tonsillectomy is performed by a variety of techniques [2]. These techniques have evolved over the years aiming to make the procedure safe and decrease the surgical time, intra operative blood loss, postoperative morbidity and complications [3]. It was not until the beginning of the twentieth century that Worthington [4] and Waugh [5, 6] described the modern technique of tonsillectomy by dissection. In 1968, Remington-Hobbs described the use of diathermy for removal of tonsils [7]. Despite the developments in techniques and technology, tonsillectomy still carries a relatively high risk of morbidity [8]. The two most commonly used techniques are Cold

Dissection-Snare and Electro dissection. As a matter of fact, these are the mostly discussed techniques in the literature [2, 3, 9, 10, 11].

This prospective study is to compare cold dissection-snare method of tonsillectomy with Bipolar Electro dissection method of tonsillectomy, in a group of 40 patients aged 5-40yrs at Meenakshi Medical College Hospital and Research Institute over a period of time from Sept 2011 – Sept 2013.

2. Materials and Methods

This present study entitled “Comparison between Cold Dissection-Snare method and Bipolar Electro dissection method in tonsillectomy” is a prospective study conducted in Meenakshi Medical College & Research Institute in the year 2011-2013.

Study is based on analysis of 40 patients aged between 5-40 years undergoing tonsillectomy in Department of ENT in Meenakshi Medical College Hospital and Research Institute. Each case after being screened from the outpatient department will undergo a general physical examination, local ENT, laboratory and radiological examination.

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Inclusion criteria:

- Patients aged between 5 to 40 yrs with
 - ◀ Recurrent acute exacerbation of chronic tonsillitis (3-4 episodes for 2-3 yrs) and/or
 - ◀ Hypertrophied tonsils causing obstructive symptoms

Exclusion criteria:

- Children suffering from tonsillitis of age less than 5 years.
- Patients requiring adenoidectomy.
- Underlying bleeding and clotting disorders.
- Quinsy.
- Pregnancy and lactation.
- Submucous cleft palate.
- Chronic systemic illnesses.

Method of collection of data

- All the patients involved were explained in detail about the procedure and involvement in this study and a voluntary informed consent was obtained for the same.
- After obtaining detailed history, a thorough local clinical examination of throat, ears, nose, and neck were done. A general examination was also done.
- They were subjected to basic investigation for fitness of surgery under general anesthesia like Hb, TC, DC, ESR, BT, CT, Blood grouping and typing, Platelet count, aPTT, urine routine, HIV, HbSag, ECG, Chest X-ray, X-ray Nasopharynx & X-ray P.N.S.

Surgery was performed by the same surgeon. Under General Anaesthesia after oral/nasal endotracheal intubation, patient is positioned at the edge of the bed and a sand bag was applied between the shoulders to assume Rose's Position. Boyle Davis mouth gag along with bipod stand was applied for adequate exposure of the oro-pharynx. A known quantity of saline (150 ml) was taken in the bowl and used for intermittent suction, to prevent blockage separately for each fossa.



Figure 1. Right Side Inferior Pedicle of Tonsil Being Snared

Right sided tonsillectomy was chosen for Cold Dissection-Snare method (CDS) (FIGURE 1) and left side for Bipolar Electro dissection (FIGURE 2). In this method per se patients became their own controls thus eliminating other potential influencing physiological factors.



Figure 2. Left Side Bipolar Electrodissection in Progress

Operating time was recorded from the time of incision to complete haemostasis on that side using a stop watch.

Cold dissection tonsillectomy was done by making a palatoglossal incision using toothed Waugh forceps. Then the peritonsillar loose areolar plane was identified and dissected from superior pole to inferior pole by mollison's blunt dissector. Inferior pedicle was snared with Eve's snare. After dissection tonsillar fossa was packed for a few minutes. On removal of gauze, bleeders if any were ligated. Suction was applied to nose and nasopharynx. Complete haemostasis was confirmed before bipolar electro dissection was started on next side. Then the remaining saline taken in the bowl for dissection side was sucked into the suction bottle.

In BED (left) side, surgery was performed by dissecting & coagulating with the same bipolar forcep. Using the bipolar forceps, a palatoglossal incision was done; the peritonsillar loose areolar plane was identified and dissected from superior to inferior pole. Care was taken to remain close to cleavage within its capsule. Minimum voltage current was used to allow coagulation but to prevent charring using the electrosurgical unit model 'Martin MEMB2' set at power 20 watts. After securing haemostasis by coagulation, the nose and nasopharynx were sucked. Then the remaining saline taken in the bowl for bipolar electro dissection side was sucked into the suction bottle.

Amount of blood loss for each fossa will be measured by calorimetric method of estimation (swab weighing technique) [12] by calculating the difference in weights of soaked cotton ball and gauze bits used for pressure haemostasis before and after use separately for each fossa using a weighing balance, and then adding the total so obtained (1gm=1ml) [13, 14] to the volume of blood collected in the respective suction bottles minus 150 ml of normal saline for that side (FIGURE 3).

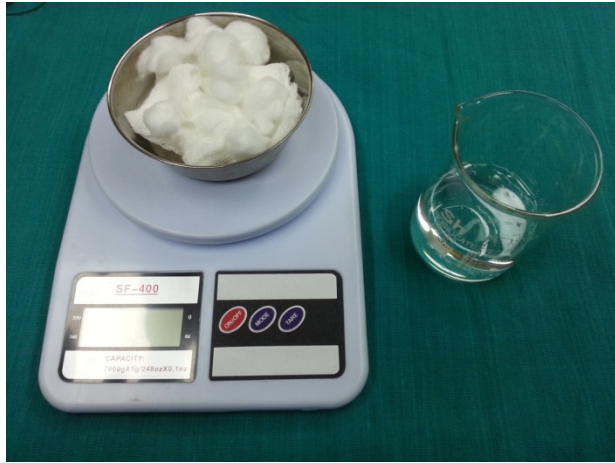


Figure 3. Weighing Scale & Measuring Beaker

Severity of post-op pain was asked for at 24 hours post operatively, for each side. The patients were reminded about the standard postoperative care. All the patients received prophylactic antibiotic therapy in the postoperative period and were given their first oral food intake—water, milk, and ice-cream- in the postoperative 4th hour.

The patient was advised about routine mouth care and betadine mouth gargle after meals. Patient was followed up for one month following surgery. Furthermore they had been instructed to report early if patient is not feeding well or if there is an episode of bleeding or increasing pain.

3. Observations and Results

The study showed maximum incidence of tonsillitis in the age group of 11-20 years (18 cases out of 40 cases studied) followed by the 5-10 years group. The study showed females had higher incidence of tonsillitis compared to males (57.5%).

The incidence of presenting complaints in patients presenting with tonsillitis as well as the signs they presented

with were analyzed.

- ❖ **Symptoms** - Throat pain was the predominant presenting symptom in about 82.5 % of cases. The next common complaint was difficulty in swallowing in 72.5% of cases and 32.5% of cases had difficulty in breathing.
- ❖ **SIGNS-** All cases had enlarged tonsils. 60% of cases on examination had enlargement of jugulo-digastric lymph nodes and 10% of cases had positive Erwin Moore sign.

All cases presented with bilateral tonsillar enlargement. Majority (47.5%) presented with grade 2 tonsillar enlargement or tonsils occupying 25 to 50% of oropharynx .

Median intra-operative blood loss was 47.13ml (SD 8.24) for Bipolar Electro-dissection tonsillectomy and 52.23ml (SD 9.68) for Cold Dissection-Snare tonsillectomy, $P < 0.05$.

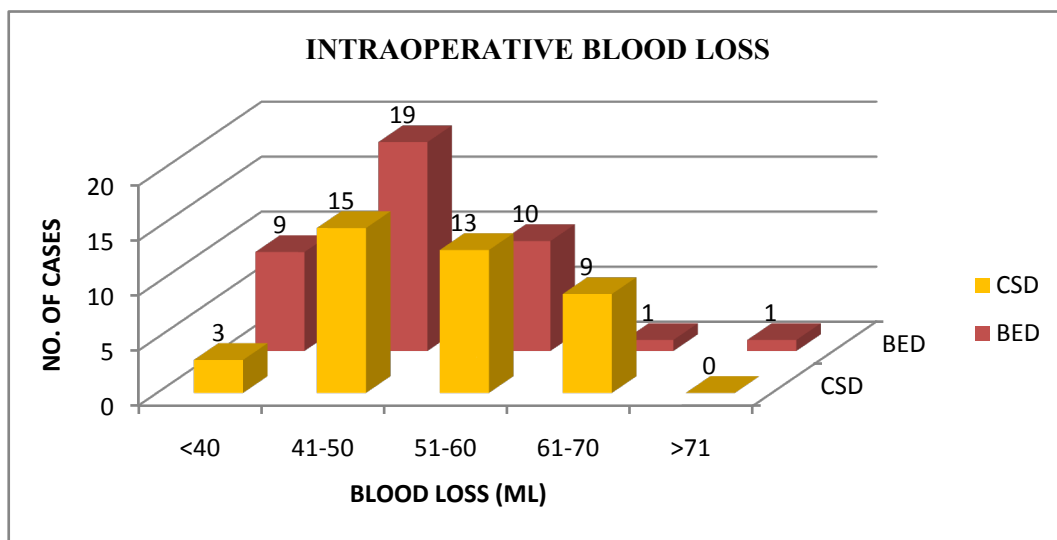
The median operative time was 15.45min (SD 3.93) for Bipolar Electro-Dissection tonsillectomy compared to 18.03min (SD 4.03) for the Cold Dissection-Snare method, $P < 0.05$.

All patients were asked about postoperative pain at 24 hours. There was no significant difference in postoperative pain on the first postoperative day between BED side and CDS side (i.e., 17.5% versus 10%) ($p > 0.05$).

There was no significant difference in postoperative bleeding between CDS side and BED side, only one case reported with secondary haemorrhage from left side (BED). (TABLE 1, GRAPH 1)

Table 1. Intraoperative Blood Loss – Comparison between CDS and BED Methods

Method	Amount of blood loss (ml)				
	<40	41-50	51-60	61-70	>71
CSD	3	15	13	9	0
BED	9	19	10	1	1



Graph 1. Intraoperative Blood Loss – Comparison between CDS and BED Methods

4. Discussion

Tonsillectomy may be performed by different techniques [2] these techniques have evolved over the time with the objective of reducing the morbidity and complications associated with the procedure. All these techniques have advantages as well as drawbacks, as reported by the surgeons from time to time, but none of them has been accepted as the single best technique universally [15].

Operating time, intra-operative blood loss, postoperative pain, return to normal diet and activity and secondary haemorrhage are the points of concern that have divided the surgeons between different techniques and are the objectives of clinical research going around globally.

In the present study, the self-paired comparison between CDS and BED techniques reduced bias and increased precision of the study. Factors influencing the outcomes might not be equal in unpaired groups, such as age, tonsil size, and degree of infection, concomitant medication, hypertensive status, and surgical indication.

A detailed study regarding the age and sex of the patients was done. The observations were tabulated. Maximum incidence of tonsillitis was in the age group of 11-20 years followed by the 5-10 years group, together accounting for 75% of cases. Females had higher incidence when compared to males (57.5%).

The study showed that in the incidence of presenting complaints in patients presenting with tonsillitis throat pain was the predominant symptom in about 82.5 % of cases. The next common complaint was difficulty in swallowing in 72.5% of the cases which ranged from dysphagia to solids and liquids.

All cases presented with bilateral tonsillar enlargement. Majority (47.5%) presented with grade '2' tonsillar enlargement i.e., tonsils occupying 25 to 50% of oropharynx, 10% of the cases had positive Ervine Moore's sign and 60% of cases on examination had enlargement of jugulo digastric lymph nodes bilateral.

In this study, the operative time and intraoperative blood loss were found to be significantly less in the BED method. In a series of study by Blomgren *et al.* [16], on electrodissection tonsillectomy, they conclude that this technique was fast and resulted in little intraoperative bleed. Similar results were reported in many other studies by Pang [2], Silveira *et al* [11], Kirazli *et al* [17] & Raut *et al* [18, 19]. These findings may be attributed to the ability of diathermy to dissect the tonsils and coagulate the blood vessels simultaneously.

In the present study intraoperative bleeding on both side showed a significant difference with the BED; averaging 47.13 ± 8.24 ml compared to 52 ± 9.68 ml for CDS tonsillectomy; ($P < 0.05$). Mann *et al* [20], compared blood loss by electrocoagulation method versus dissection method in 95 patients, according to them average blood loss by hot method was markedly less, it was 11.8 ml and in cold it was 66.3 ml for each tonsil separately.

In another study by Kousha *et al* the average amount of

bleeding related to electrocautery tonsillectomy was 41.2 ± 2.46 ml and in cold dissection, tonsillectomy was 73.13 ± 3.37 ml ($P < 0.05$) [21]. Kujawski had a mean blood loss of 12 ml (SD 18 ml) in the diathermy group and 36 ml (SD 35 ml) in the dissection group [22] & Nunez found a mean blood loss of 15.1 ml (SD 11.7 ml) and 33.7 ml (SD 18.4 ml), respectively [23]. The literature on the subject by Trent [24], Atallah *et al* [9] & Leach *et al* [25] also supports the present study.

In our study there was significant difference in operative time between both sides 15.45 min (± 3.93) in BED side versus 18.03 min (± 4.03) on CDS side, ($P < 0.05$). Similar observation was seen in the study by Kousha *et al* [21] whose mean time of operation was 9.1 ± 0.39 minutes and 15.11 ± 0.65 respectively ($P < 0.05$).

There was no difference in the mean operating time between the two groups in a study by Kujawski (36.9 minutes for diathermy and 35.9 minutes for dissection) [22]. Similar findings were seen in studies by Lassaletta *et al* [26], Weimert TA *et al* [27], Roy A *et al* [28] and Pizzuto MP *et al* [29]. There are studies pointing to an opposite direction done by Szermetaw [30] and Watson MG [31].

Pain is a very difficult response to study, as it is a highly subjective symptom with significant person to person variability. Our study design enabled an effective comparative assessment of pain by using the patient as his or her own control thus eliminating inter personal pain threshold.

There was no significant difference in postoperative pain on the first postoperative day in the diathermy group compared to the cold dissection group (17.5% versus 10%) ($p > 0.05$). Higher pain scores have been reported with electrodissection in studies done by Gendy S *et al* [3] and Atallah *et al* [9]. Increased pain reported with electrodissection could possibly be on account of various factors like experience with the technique, length of disease, amount of energy used during the procedure etc rather than the modality alone.

Cardozo AA and colleagues have noted statistically significant positive relationship between the total amount of bipolar diathermy used and postoperative pain [32]. Still in another study by Atallah *et al* an increase in pain and a related prolongation of oral intake time in the postoperative period in bipolar cautery tonsillectomy group was found [9]. Increase in post operative pain in intensity and duration in bipolar diathermy cases; was also observed by Sood *et al* [33] and Me Gregor *et al* [34].

One cases of secondary haemorrhage was seen in our study from the BED side, which settled with conservative medical treatment. Pang YT has reported incidence of postoperative haemorrhage as 1.7% with bipolar diathermy tonsillectomy compared to 3.4% with cold dissection, carrying no statistical significance [2]. Stephen O'Leary *et al* in his study reported that the difference in the risk of bleeding after dissection and diathermy tonsillectomy did not reach statistical significance [35]. Whereas Gendy S and colleagues have reported a higher incidence of secondary

haemorrhage with bipolar dissection (2.3%) compared to cold dissection (1%) in a study including 545 children [3].

Similarly Lowe D *et al* after conducting a prospective national audit concluded that hot tonsillectomy techniques are associated with substantially high risk of secondary haemorrhage [36]. Increase in post operative haemorrhage has also been reported by Tay H L [37], Raut *et al* [19], Mann *et al* [20] and Weimert *et al* [38]. One explanation for higher post-tonsillectomy bleeding 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 [16].

Limitations of the study

1. Inflammable anaesthetic gases such as ether cannot be used along with bipolar diathermy.
2. Weighing errors due to environmental factors like airflow in Operation Theater.
3. Methods for calculating weight contributed by secretions of upper airway during the surgery needs more research in future studies.

5. Conclusions

Out of many available techniques for the tonsillectomy cold dissection and snare method and electrocautery methods are the most followed ones and there is significantly less blood loss in the electrocautery method of tonsillectomy. And with other parameters of comparison like operative time, post operative pains and bleeding electrocautery stands higher in position.

REFERENCES

- [1] Wiatrak BJ, Woolley AL. pharyngitis and adenotonsillar disease. In: Cummings CW, Flint PW, Harker LA, Haughey BH, Richardson MA, Robbins KT, *et al*. Cummings Otolaryngology; Head & Neck Surgery. 4th ed. Baltimore: Elsevier, Mosby, 2005: 4135-65. 237.
- [2] Pang YT. Paediatric tonsillectomy: bipolar electrodissection and dissection/snare compared. *J Laryngol Otol*. 1995; 109(8): 733-6.
- [3] Gendy S, O'Leary M, Colreavy M, Rowley H, O'Dwyer T, Blayney A. Tonsillectomy--cold dissection vs. hot dissection: a prospective study. *Ir Med J*. 2005; 98(10): 243-4.
- [4] T.C. Worthington, A simple method of excision of the faucial tonsil, *JAMA* 48 (1907)1761-1762.
- [5] G.E. Waugh, A simple operation for the removal of tonsils with notes on 900 cases, *Lancet* 1 (1909) 1314-1315.
- [6] G.E. Waugh, An operation for the total excision of tonsils [Letter], *Lancet* 2 (1909) 572.
- [7] C. Remington-Hobbs, Diathermy in dissection tonsillectomy and retrograde dissection adenoidectomy, *J Laryngol Otol* 82 (1968) 953-962.
- [8] Sargi Z, Younis RT. Tonsillectomy and adenoidectomy techniques: past, present and future. *ORL J Otorhinolaryngol Relat* 2007; 69(6):331-5.
- [9] Atallah N, Kumar M, Hilali A, Hickey S. Post-operative pain in tonsillectomy: bipolar electrodissection technique vs dissection ligation technique. A double-blind randomized prospective trial. *J Laryngol Otol*. 2000; 114(9): 667-70.
- [10] Bukhari MA, Al-Ammar AY. Monopolar electrodissection versus cold dissection tonsillectomy among children. *Saudi Med J*. 2007; 28(10):1525-8.
- [11] Silveira H, Soares JS, Lima HA. Tonsillectomy: cold dissection versus bipolar electrodissection. *Int J Pediatric Otorhinolaryngol*. 2003; 67(4):345-51.
- [12] Kishore Chandra Prasad, Sampath Chandra Prasad. Assessment of Operative Blood Loss and the Factors Affecting it in Tonsillectomy and Adenotonsillectomy -Indian *J Otolaryngol Head Neck Surg* (2011) 63(4):343-348.
- [13] Karan Sharma, Devinder Kumar. Ligation Versus Bipolar Diathermy for Haemostasis in Tonsillectomy: A Comparative Study- Indian *J Otolaryngol Head Neck Surg* (2011) 63(1): 15-19.
- [14] Langford Richard M, Mythen Monty C (2000) Critical care; Fluid, electrolyte and acid-base balance; blood transfusion. Bailey and Love's short practice of surgery 23:40-63.
- [15] Burton MJ, Doree C. Coblation versus other surgical techniques for tonsillectomy. *Cochrane Database Syst Rev*. 2007; (3):CD004619. Comment in: *Otolaryngol Head Neck Surg*. 2008; 138(1):4-7.
- [16] Blomgren K, Qvarnberg YH, Valtonen HJ (2001) A prospective study on pros and cons of electrodissection tonsillectomy. *Laryngoscope* 111:478-482.
- [17] Kirazli T, Bilgen C, Midilli R, Ogüt F, Uyar M, Kedek A. Bipolar electrodissection tonsillectomy in children. *Eur Arch Otorhinolaryngol*. 2005; 262(9):716-8.
- [18] V.V. Raut, N. Bhat, A.R. Sinnathuray, J.B. Kinsella, M. Stevenson, J.G. Toner, Bipolar scissors versus cold dissection for pediatric tonsillectomy—a prospective, randomized pilot study, *Int J Pediatr Otorhinolaryngol* 64 (1) (2002) 9-15.
- [19] V.V. Raut, N. Bhat, J.B. Kinsella, J.G. Toner, A.R. Sinnathuray, M. Stevenson, Bipolar scissors versus cold dissection tonsillectomy: a prospective, randomized multiunit study, *Laryngoscope* 111 (12) (2001) 2178-2182.
- [20] Mann DG, George CST, Scheiner GD, Imber P, Mlynarczyk FA (1984) Tonsillectomy-some like it hot. *Laryngoscope* 94:677-679.
- [21] Kousha *et al*. *Journal of Research in Medical Sciences* May & June 2007; Vol 12, No 3.
- [22] Kujawski 1997 Kujawski O, Dulguerov P, Gysin C, Lehmann W. Microscopic tonsillectomy: a double-blind randomized trial. *Otolaryngology - Head and Neck Surgery* 1997; 117(6): 641-7.
- [23] Nunez DA, Provan J, Crawford M. Electrocautery (hot) vs cold dissection and snare tonsillectomy - a randomized trial. *Archives of Otolaryngology - Head and Neck Surgery* 2000; 126(7):837-41.

- [24] Trent CS. Electrocautery versus epinephrine-injection tonsillectomy. *Ear Nose Throat J* 1993; 72:520.
- [25] Leach J, Manning S, Schaefer S. Comparison of two methods of tonsillectomy. *Laryngoscope* 1993; 103: 619.
- [26] Lassaletta L, Martin G, Villafruela MA, Bolanos C, Alvarez-Vicent JJ. Pediatric tonsillectomy: postoperative morbidity comparing microsurgical bipolar dissection versus cold sharp dissection. *Int J Pediatr Otorhinolaryngol* 1997; 41:307.
- [27] Weimert TA, Babyak JW, Richter HJ. Electro dissection tonsillectomy. *Arch Otolaryngol Head Neck Surg* 1990; 116:186.
- [28] Roy A, De la Rosa C, Vecchio YA. Bleeding following tonsillectomy. A study of electrocoagulation and ligation techniques. *Arch Otolaryngol* 1976; 102:9.
- [29] Pizzuto MP, Brodsky L, Duffy L, Gendler J, Nauenberg E. A comparison of micro bipolar cautery dissection to hot knife and cold knife cautery tonsillectomy. *Int J Pediatric Otorhinolaryngol* 2000; 52:239.
- [30] Szeremeta W, Novelty NJ, Benninger M. Postoperative bleeding in tonsillectomy patients. *Ear Nose Throat J* 1996; 75:373.
- [31] Watson MG, Dawes PJ, Samuel PR, Marshall HF, Rayappa C, Hill J, et al. A study of haemostasis following tonsillectomy comparing ligatures with diathermy. *J Laryngol Otol* 1993; 107: 711.
- [32] Cardozo AA, Hallikeri C, Lawrence H, Sankar V, Hargreaves S. Teenage and adult tonsillectomy: dose-response relationship between diathermy energy used and morbidity. *Clin Otolaryngol*. 2007; 32(5): 366–71.
- [33] Sood S., Strachan D.R., Bipolar scissors Tonsillectomy (letter) *Clinical, Otolaryngol*, 1999; 24, 465
- [34] Fiona B. Mac Gregor, David M. Albert, Abir K. Bhattacharya, Post Operative Morbidity following paediatric Tonsillectomy a comparison of bipolar diathermy dissection and Blunt dissection, *International Journal of paediatric Otorhinolaryngology* 1995,31:1-6.
- [35] O'Leary S, Vorrath J. Postoperative bleeding after diathermy and dissection tonsillectomy. *Laryngoscope*. 2005; 115(4): 591-4.
- [36] Lowe D, van der Meulen J, Cromwell D, Lewsey J, Copley L, Browne J, *et al*. Key messages from the National Prospective Tonsillectomy Audit. *Laryngoscope*. 2007; 117(4):717–24.
- [37] Tay HL. Post Operative morbidity in electro dissection tonsillectomy. *J Laryngol Otol*. 1995; 109: 209-211.
- [38] Thomas A. Weimert, John W. Badyak, Harry J. Richter, Electrodissection Tonsillectomy *Arch Otolaryngology Head Neck Surg* - 1990, 116; 186-188.