

Prevalence of Post-tonsillectomy Bleeding as Day-case Surgery with Combination Method; Cold Dissection Tonsillectomy and Bipolar Diathermy Hemostasis

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Received: Jun 20, 2009; Final Revision: Oct 14, 2009; Accepted: Nov 14, 2009

Abstract

Objective: Post-tonsillectomy hemorrhage remains an important factor in determining the safety of performing tonsillectomy as a day case procedure. The aim of this study was to determine the safety of day case tonsillectomy by using combination method, cold dissection tonsillectomy and bipolar diathermy hemostasis.

Methods: A prospective randomized clinical study conducted on the patients who had undergone day case tonsillectomy (DCT). There were two groups (DCT and control group) each group consisting of 150 cases. Tonsillectomy was performed by using combination method; cold dissection and hemostasis was achieved by ligation of vessels with bipolar electrocautery.

Findings: We found 3 cases of post-tonsillectomy bleeding in DCT group and 4 cases in the control group. There was no statistically significant difference in the rate of post-operative hemorrhage between the two groups.

Conclusion: The findings suggest the safety of the combination of cold dissection tonsillectomy and bipolar diathermy hemostasis as day case tonsillectomy.

Iranian Journal of Pediatrics, Volume 20 (Number 2), June 2010, Pages: 187-192

Key Words: Tonsillectomy; Day Case Surgery; Bipolar Diathermy; Bleeding

Introduction

Tonsillectomy is one of the commonest otolaryngological procedures performed, representing approximately 20%-40% of surgical procedures performed in this field^[1,2].

Various surgical techniques are used to perform this operation, including blunt dissection, guillotine excision, electrocautery, cryosurgery, coblation, ultrasonic removal, laser removal, monopolar and bipolar dissection, thermal welding tonsillectomy, and ligature

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tonsillectomy [3]. There is no uniform technique of tonsillectomy throughout the world and the choice of the technique depends on the surgeon's preference. Different tonsillectomy techniques have different impact on post-operative morbidity[4]. Generally tonsillectomy is considered simple but, in comparison with other similar operations, it implies a common and sometimes serious complication[5].

Post-tonsillectomy hemorrhage remains the most serious complication of tonsillectomy. Hemorrhage has been divided into two broad categories; primary, occurring <24 hour after surgery and secondary, occurring >24 hour, commonly 5–10 days after the operation. Post-tonsillectomy secondary hemorrhage has a reported rate of 3–5% leading to re-admission to hospital [1]. Primary bleeding is generally considered to be related to surgical technique whereas environmental factors that influence oropharyngeal healing contribute to delayed (secondary) hemorrhage[6,7].

Although neither the Cochrane Collaborative review nor a more recent systematic literature review identified a difference in the rate of secondary hemorrhage after different techniques for tonsillectomy, there have been recent papers suggesting a higher bleeding rate after diathermy techniques compared with cold steel techniques[8]. Even though recent studies showed that the use of coblation technique imply a significantly higher frequency of post-tonsillectomy hemorrhage compared to “cold” blunt dissection tonsillectomy[9].

The most common technique used for removing tonsils in the United States today is monopolar electrocautery, also called a “hot” tonsillectomy, but cold dissection tonsillectomy is currently the most common method of tonsillectomy in the UK[10].

Post-tonsillectomy complications especially reactionary hemorrhage and its possible fatal outcome appear to make the surgeons delay discharging the patients and thereby hospital course becomes longer. On the other hand high incidence of tonsillectomy is time-consuming for hospital staff to take post-operative care of the patients who occupy numerous hospital beds.

This surgery imposes a lot of costs on families and government. For these reasons promotion of

day-case tonsillectomy (DCT) has occurred as a result of increasing pressure to control costs in health care delivery[11]. Many authors believed that this procedure can be performed as an outpatient procedure if patients are carefully selected[7]. However, most studies evaluating the safety of outpatient tonsillectomy provide only a follow-up of the first postoperative hours, but it seems to be inadequate post-operative follow-up[4].

In spite of several previous studies, the advantages of one technique of tonsillectomy over the other is still a grey area; hence, we decided to determine safety of a combination method: cold dissection tonsillectomy (CDT) and ligation of vessels with bipolar electrocautery, in patients who had inclusion criteria for day case tonsillectomy to try to bring some light into this question. This is the first study which evaluated whether this technique is safe for DCT or not. We did this comparison with respect to the prevalence of post-tonsillectomy bleeding, the most common time in which bleeding has occurred and if revision surgery was needed to stop bleeding. If we can show that the risk of post-tonsillectomy bleeding as day case surgery in cold dissection tonsillectomy and bipolar diathermy hemostasis is low, the surgeons will be encouraged to use this technique.

Subjects and Methods

A prospective randomized study was conducted on the patients who had underwent DCT in Dastgheib Hospital, Shiraz University of Medical Sciences, June 2005 to June 2006. The research protocol was approved by Shiraz University Ethics Committee. We also considered a control group with similar characteristics except for duration of hospitalization after operation. They were admitted after operation for at least 24 hours. The indications for operation included chronic or recurrent acute tonsillitis, and (adeno)tonsillar hypertrophy associated with positive history of snoring and restless sleep.

Every other week the surgeon used DCT and overnight admission method alternatively. The

method of randomization was block randomization. There were 150 cases in each group. The patients selected for DCT were assessed for suitability for this operation. The exclusion criteria for day case adenotonsillectomy were medical problems such as severe asthma, diabetes, coagulation disorders, hypersomnia/sleep apnea syndrome, sickle cell disease, epilepsy, heart failure, orofacial malformations, basic metabolic disorder, neurological defects, acute infection; and social reasons: no access to telephone, no access to car^[12].

The family was given detailed verbal and written information regarding the admission, operation, discharge procedures and also possible complications. All the patients were admitted on the morning.

Technique of anesthesia and operation was the same for all of the patients, by the same anesthesiologist and same surgeon. The adenoidectomy was performed by curette and hemostasis was achieved by nasopharyngeal packing, tonsillectomy was performed using cold dissection: the tonsil and capsule was dissected from surrounding tissue using scissors and/or knife, and the inferior pole was amputated with a snare and hemostasis was achieved by ligation of vessels with bipolar electrocautery.

After the operation, the patients were taken to recovery room where they were monitored by a recovery nurse (who was blind about type of the admission of the patients) until they were fully alert before transfer to the ward. All patients in the day case surgery group were observed for 6-8 hours after the operation. Prior to discharge, the patients were seen by the ENT and anesthesia staff who were blind about type of the admission of the patients. If the patients had criteria for discharge, they were allowed to go home with appropriate analgesia. The discharge criteria were:

1. The patient was awake and alert and had vital signs (temperature, blood pressure, pulse and respiratory status) within normal range for the age and emotional status
2. The patient was mobile (within the normal range for that individual) and was drinking and tolerating fluids. Patients after tonsillectomy or adenotonsillectomy were sent home prior to

the resumption of normal oral fluid intake as long as the hydration state was acceptable (no signs of dehydration).

3. The patient's pharynx has been checked for postoperative hemorrhage by ENT staff.

4. Emesis was under control; the patient's pain was relieved by oral or rectal medication.

The patients were visited by other otolaryngologist (who also was blind about type of the admission of the patients) 24 hours, 1 week, 2 weeks and a month after operation. All the data from the records were analyzed by SPSS (version 11.5), for comparison using the Fisher Exact Test. A *P*-value less than 0.05 was considered significant.

Findings

We had 150 cases in each group (DCT group and control group). The mean age was 15.97 (range 3-46) years for the former and was 15 years (range 2-48 years) for the latter. There were 56 (37%) males and 94 (62%) females in DCT group. The control group included 84 (56%) males and 66 (44%) females. 108 (72%) cases underwent tonsillectomy alone and 42 (28%) cases underwent adenotonsillectomy in DCT group. We had 55 (36%) cases of tonsillectomy and 95 (64%) cases of adenotonsillectomy in the control group.

There were 3 cases of secondary post-tonsillectomy bleeding in DCT group and 4 cases in the control group. There was no statistically significant difference in the rate of post-operative hemorrhage ($P=0.9$) between the two groups. Their descriptive data are shown in Table 1.

In DCT group two cases (number 1 and 2) were treated with intravenous antibiotics and settled with no requirement for surgical intervention. But ligation of bleeders was done in one case (number 3) under general anesthesia. There was no indication for blood transfusion in any of them. In the control group only conservative management was done for two cases (number 1 and 2) in the hospital course.

Table 1: Descriptive data about cases that developed secondary post-tonsillectomy bleeding in the DCT group and in the control group

Cases	Age	Sex	Operation	Time interval*	Hb1‡	Hb2†
Case1	16 y/o	female	T&A	5 days	14	13
Case2	16 y/o	male	T	4 days	13	11.5
Case3	19 y/o	male	T	6 days	12	11
Case1	19 y/o	Male	T	7 days	14	12
Case2	6 y/o	Male	T&A	15 days	13.7	10
Case3	7 y/o	Female	T&A	2 days	11.2	12
Case4	22 y/o	Male	T	8 days	14	13

* Time interval between operation and postoperative bleeding

‡ Hb before operation

† Hb after postoperative bleeding

But other two cases (number 3 and 4) required a return to theater for arrest of hemorrhage. None of them needed blood transfusion.

Discussion

We did the first prospective randomized control trial to analyze the prevalence and pattern of bleeding after tonsillectomy performed by a combination method: cold dissection tonsillectomy with bipolar ligation of bleeders and evaluating the safety of this procedure on a day case basis. In our study we found 3 (2%) cases of secondary postoperative hemorrhage in DCT group and 4 (2.7%) cases in the control group and there was no statistically significant difference between them. Also there was no primary hemorrhage. In recent years several surgical techniques have been introduced to decrease the duration of surgery and post-operative hospital stay and also complications of tonsillectomy especially postoperative hemorrhage. The differences among papers with respect to bleeding rates after tonsillectomy with different techniques need to be studied.

Using a telephone survey of 602 patients in 2001, Windfuhr reported a secondary hemorrhage rate of only 1% surveying 3 months post-tonsillectomy that was similar to our results.

However, in a number of previous studies the secondary hemorrhage rate was much higher in comparison with ours. Benson and Mitchell^[13] found that 16% of children had experienced some bleeding when contacted at 2 weeks post-operatively. Raut^[14] found 16.9% secondary hemorrhage rate in 200 patients while assessing 15-17 days postoperatively. Blogmren^[15] found that 32.8% of a mixed adult and pediatric population had experienced some secondary hemorrhage following tonsillectomy. Ghoter found a secondary rate of 26%. Some researchers showed post-tonsillectomy bleeding rates of 5.1 percent in adults and PTB rates of 6.75 percent in pediatric patients. In a literature-based study by Blakley, he concluded that Post-tonsillectomy bleeding rates of about 5 percent are typical^[16]. In a recent study by D'Agostino et al on 3306 patients undergoing elective adenotonsillectomy by five senior surgeons with different surgical techniques, they found late post-operative hemorrhage rate of 1.78% which started all at home^[5].

In our study, in all the cases suffering from secondary post-tonsillectomy hemorrhage, the rates of revision surgery to stop bleeding were 1 out of 3 (33%) and 2 out of 4 (50%) in DCT and control groups, respectively. There was no indication for blood transfusion in any of them.

When diathermy was introduced, many reports claimed a significant reduction of operative time and blood loss. However, pain increased with this method. Ahsan et al detected post-tonsillectomy secondary hemorrhage rate

of 9.5%. The rate of post-tonsillectomy secondary hemorrhage observed in their study was higher than the published rate of 3–5%. The role of disposable instruments and 'hot' techniques as possible factors in raised secondary hemorrhage rates has been the subject of recent UK-wide audits^[1].

Some studies showed that the rate of hemorrhage was three times higher with use of diathermy throughout an operation when compared to the traditional approach of "cold" dissection. The National Institute for Health and Clinical Excellence (NICE), together with the British Association of Otorhinolaryngologists–Head and Neck Surgeons (BAO-HNS), recommended surgeons to use as little diathermy as possible especially when it was used for both dissection and hemostasis^[17].

Stephen O'Leary et al showed that the difference in the risk of bleeding after dissection and diathermy tonsillectomy did not reach statistical significance, but the temporal pattern of hemorrhage differed. Secondary hemorrhage was more frequent after diathermy tonsillectomy^[18]. 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^[8].

In a prospective study of 120 cases of tonsillectomy conducted at ENT department, Liqueate University of Medical & Health Sciences, Jamshoro, bipolar diathermy and silk suture was used for hemostasis in different cases. In contrast to our study, it was concluded that although less time is consumed when using bipolar diathermy to achieve hemostasis during tonsillectomy, the ligation of bleeding point using silk sutures was more effective for less post operative hemorrhage^[19]. In the study of Raut et al, the overall reactionary hemorrhage was 4% while the overall secondary hemorrhage rate was 14% that seemed higher than the most figures quoted in the literature (7-9%). Also it is much higher in comparison to our study. Their study showed that bipolar scissors tonsillectomy was a relatively safe technique in children aged 10-16 years with a similar morbidity to the cold dissection method. Mann et al, and Weimer et al,

concluded in their series that there was no difference in the rate of postoperative hemorrhage for the two methods^[10].

In our study the rate of reactionary hemorrhage was 0 in both DCT and control groups. This shows that in a correct situation tonsillectomy can be performed safely as a day case surgery.

Murthy et al confirmed that the incidence of postoperative complications following adenotonsillectomy was very low (0-4.4%) and hence it was not the main factor that should dictate the length of stay^[11]. In the studies of the Jose Granell et al, primary and secondary bleeding rates were 6.27% and 0.48% respectively. They concluded that an overnight stay does not necessarily improve the management of bleeding complications.

According to their review of current literature, the overall rate of post-tonsillectomy hemorrhage in children varied from 0.3% to 7.6%^[20]. Bennet et al, based on the extremely unlikely event of a primary hemorrhage between 8-24 hr (0.1%), concluded that there was little benefit conferred overnight admission from the point of view of monitoring for primary hemorrhage^[6]. Paul Aylin et al reported that the British NHS plan has predicted that 75% of all elective operations would be carried out as day cases^[21]. Also the American Academy of Head and Neck Surgery considers tonsillectomy to be safely performed on an outpatient basis with selected cases carefully^[22].

All these trials like our study showed that the rate of primary hemorrhage was too low to dictate the length of stay. The wide variation of hemorrhage rates among different studies was probably due to different criteria used in the definitions. However all of these studies as well as ours considered adenotonsillectomy safe as a day case procedure in patients that had inclusion criteria for DCT.

Conclusion

We evaluated the safety of cold dissection tonsillectomy and bipolar diathermy hemostasis

(a combination of cold and hot technique) as day case tonsillectomy. The findings of our trial will be important to otolaryngologists for taking informed decisions regarding the use of this effective technique for tonsillectomy.

Acknowledgment

We thank the Vice Chancellor for Research of Shiraz University of Medical Sciences for their financial support and Dr M Askarinejad for data collection.

Conflict of Interest: None

References

1. Ahsan F, Rashid H, Eng C, et al. Is secondary hemorrhage after tonsillectomy in adults an infective condition? Objective measures of infection in a prospective cohort. *Clin Otolaryngol.* 2007;32(1): 24-7.
2. Evans AS, Khan AM, Young D, et al. Assessment of secondary hemorrhage rates following adult tonsillectomy - a telephone survey and literature review. *Clin Otolaryngol Allied Sci.* 2003;28(6):489-91.
3. Karatzanis A, Bourolias C, Prokopakis E, et al. Thermal welding technology vs ligature tonsillectomy: a comparative study. *Am J Otolaryngol.* 2008;29(4):238-41.
4. Windfuhr JP, Wienke A, Chen YS. Electrosurgery as a risk factor for secondary post-tonsillectomy hemorrhage. *Eur Arch Otorhinolaryngol.* 2009;266:111-6.
5. D'Agostino R, Taro V, Calevo MG. Post-tonsillectomy late hemorrhage: Is it a preferably night-time event? *Int J Pediatr Otorhinolaryngol.* 2009;73(5):713-6.
6. Wieland A, Belden L, Cunningham M. Preoperative coagulation screening for adenotonsillectomy: A review and comparison of current physician practices. *Otolaryngology-Head and Neck Surgery.* 2009;140(4):542-7.
7. Windfuhr JP, Schloendorff G, Baburi D, Kremer B. Life-threatening posttonsillectomy hemorrhage. *Laryngoscope.* 2008;118(8): 1389-94.
8. Walker P, Gillies D. Post-tonsillectomy hemorrhage rates: Are they technique-dependent? *Otolaryngol Head Neck Surg.* 2007; 136(4 Suppl): S27-31.
9. Heidemann CH, Wallén M, Aakesson M, et al. Post-tonsillectomy hemorrhage: assessment of risk factors with special attention to introduction of coblation technique. *Eur Arch Otorhinolaryngol.* 2009;266(7):1011-5.
10. Raut VV, Bhat N, Sinnathuray AR, et al. Bipolar scissors versus cold dissection for pediatric tonsillectomy - a prospective, randomized pilot study. *Int J Pediatr Otorhinolaryngol.* 2002; 64(1):9-15.
11. Murthy P, Laing MR. Admission and discharge policy adenoidectomy and tonsillectomy - a rural prospective. *J Laryngol Otol.* 1998;112(11): 1047-51.
12. Bennett AM, Clark AB, Bath AP, et al. Meta-analysis of the timing of hemorrhage after tonsillectomy: an important factor in determining the safety of performing tonsillectomy as a day case procedure. *Clin Otolaryngol.* 2005;30(5):418-23.
13. Benson-Mitchell R. Assessment of sequelae at home following adenotonsillectomy. A basis for day-case management? *Clin. Otol. Allied Sci.* 1993;18(4):282-284.
14. Raut V. (2001) Bipolar scissors versus cold dissection tonsillectomy: a prospective, randomised, multi-unit study. *Laryngoscope* 2001;111(12):2178-2182.
15. Blomgren K. (2001) A prospective study on pros and cons of electrodissection tonsillectomy. *Laryngoscope* 2001;111(3):478-482.
16. Blakley BW. Post-tonsillectomy bleeding: How much is too much? *Otolaryngol Head Neck Surg.* 2009;140(3):288-90.
17. Lowe D, Cromwell DA, Lewsey JD, et al. Diathermy power settings as a risk factor for hemorrhage after tonsillectomy. *Otolaryngol Head Neck Surg.* 2009;140(1):23-8.
18. O'Leary S, Vorrath J. Postoperative bleeding after diathermy and dissection tonsillectomy. *Laryngoscope.* 2005;115(4):591-4.
19. Siddiqui RU, Rasheed K, Rafique M. Tonsillectomy-control of hemorrhage Silk Ligation v/s Bipolar Diathermy. *Pak J Otolaryngol.* 2004;20(3):48-50.
20. Granell J, Gete P, Villafruela M, et al. Safety of outpatient tonsillectomy in children. A review of 6 years in a tertiary hospital experience. *Otolaryngol Head Neck Surg.* 2004;131(4): 383-7.
21. Aylin P, Williams S, Jarman B, et al. Trends in day surgery rates. *BMJ.* 2005; 331(7520): 803.
22. Windfuhr JP, Schloendorff G, Baburi D, et al. Lethal outcome of post-tonsillectomy hemorrhage. *Eur Arch Otorhinolaryngol.* 2008; 265(12):1527-34.