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Comparison of Postoperative Bleeding Rates between Coblation and Scalpel-Cautery Tonsillectomy Techniques

Authors : Kevin T Kavanagh, MD, MS Somerset, KY 42503

Abstract:

Objective: The study will examine the postoperative bleeding rates of coblation compared to scalpel-snare with cautery tonsillectomy.

Type of Study: Retrospective review.

Methods: 632 tonsillectomy procedures were reviewed over a 30 month period that were performed with coblation (N = 310) or with a time-tested technique using a scalpel-snare with cautery for hemostatsis (N = 322). Postoperative bleeding was divided into three Grades: Grade III, return to the operating rooom; Grade II, office or emergency room cautery; Grade I, return to the emergency room or office, or report of bleeding.

Results: The main difference between Grades II and III was the age of the patient (mean age 8.7 years vs. 18.4 years respectively, $p < 0.008$). Thus, for analysis these two Grades were combined. If Grades II, II and III bleeding are compared, coblation had a 8.06% incidence of bleeding vs. 2.48% for the time-tested technique (corrected Chi Square $p < 0.025$). If Grades III and II bleeding are only considered, coblation had a 4.52% incidence of bleeding compared to 0.93% for the time-tested technique (corrected Chi Square $p < 0.006$). Each technique in this latter analysis had only one bleed which occurred on the day of surgery. The remainder were delayed bleeding occurring 4 to 11 days post-operatively. The coblation bleeding was spread out in time, a learning curve was not apparent.

Conclusion: The bleeding rate for coblation was similar to that reported in other studies. Because of the higher incidence of bleeding with coblation the author recommends caution when using it in settings where patients have to

travel long distances for emergency care.

Introduction:

Posttonsillar hemorrhage is a dreaded life-threatening complication for a tonsillectomy procedure. It's incidence varies by the definition of bleeding, i.e. return to operating room or blood flecks reported by parents. Blakley[1] reviewed 63 reported postoperative bleeding rates and found a mean incidence of 4.5% (standard deviation 4.7). Timing of the bleeding is usually delayed, occurring after the first day, with some reviewers reporting bleeding after two weeks of surgery.[2] Mortality rates vary from one in 12,000 [3] to one in 75,000. [4]

This study will attempt to shed light on this controversy by reviewing over 600 cases of tonsillectomy performed with either coblation or a scalpel-snare and cautery techniques.

Our patients that underwent coblation removal of their tonsils had noticeably reduced pain in the immediate postoperative period. This observation is consistent with a number of other reported studies that have demonstrated that cobaltion has less postoperative pain than electrocautery and harmonic scalpel techniques [5-7] and less visits to the emergency room for dehydration.[8]

The controversy regarding coblation centers around the possible increase in post-operative bleeding.[6] To help answer this question a retrospective chart review was performed in a solo practitioner's office.

Methods:

A retrospective chart review was carried out over a 30 month period and reviewed for bleeding. Postoperative bleeding was categorized into one of three grades. Grade III was the return to the operating room. Grade II required cautery in the office or emergency room. Grade I was any other bleeding reported by the patient or parent, with the exception that small amounts of blood-tinged sputum and blood flecks observed by the patient or parents were not counted as a Grade I bleed. All charts were reviewed twice by two different reviewers. In addition, billing records were also checked to identify any patient returning to the operating room during the survey period.

All patients were operated upon by a single surgeon. Two groups of charts were analyzed. The Scalpel-Snare with Cautery group was composed of 322 patients, the Coblation group was composed of 285 patients. Thirty-eight patients were also operated on using the harmonic scalpel during this time period and were excluded from analysis.

Procedures were performed on an outpatient basis unless the child was less than two years of age, had severe apnea or did not achieve good oral intake after the procedure. The techniques used in these two types of tonsillectomy procedures are shown in the below videos. All tonsils were removed using a subcapsular technique.

Results:

A total of 632 procedures were reviewed with 17 patients requiring a return to the operating room or outpatient cautery. The main difference between Grades II and III was the age of the patient (mean age 8.7 years vs. 18.4 years respectively, $p < 0.008$). Thus, for analysis these two Grades were combined.

The Coblation Group had a significantly increased rate of Grade II and III bleeding compared to the Scalpel-Snare with Cautery group, 4.52% to 0.93%, respectively (Chi Square $p < 0.025$ with Yate's correction). If all reported postoperative bleeding is included (Grade I, II and III) the Coblation Group had a postoperative bleeding rate of 8.06% compared to the 2.63% rate of reported bleeding in the Scalpel-Snare with Cautery Group (Chi Square $p < 0.006$ with Yate's correction).

Coblation vs. Scalpel-Snare with Cautery Tonsillectomy Techniques

Type of Procedure	No Bleeding	Bleeding			Total
		Grade I	Grade II	Grade III	Procedures
Coblation	285	11	6	8	310
Scalpel-Snare with Cautery	314	5	1	2	322
Total	599	16	7	10	632

Grade II and III bleeding: One of the Scalpel-Snare with Cautery and one Coblation Group postoperative hemorrhage was primary and occurred within a day of surgery. The remainder of the postoperative bleeding (N = 15) were delayed (secondary), occurring an average of 7.71 days after surgery with a standard deviation of 2.09. The longest time period after surgery was 10 days in two patients and 11 days in two patients.

Grade I bleeding: Three of the reported bleeding were primary, the remainder were secondary. The longest time period after the surgery was 11 days in two patients and 12 days in two patients. The average time of delayed bleeding was 8.0 days with a standard deviation of 2.93.

There was not a learning curve identified with coblation since there was equal distribution over the reviewed dates, with three occurring in the last month of the review.

Discussion:

Postoperative tonsillar bleeds are divided into primary (within the first twenty-four hours) and secondary (delayed - after discharge from the hospital). Reported rates are felt in the literature to vary by the operative technique used but comparison between different techniques is difficult due to subtleties in the technique between surgeons and the different methods of defining postoperative bleeding.[9]

One of the first reports of an increased incidence of posttonsillar hemorrhage with coblation was from Noon and Hargreaves (2003). The reported bleeding rate of 22.2% was very high and led to the discontinuation of the technique by the authors. This study only dealt with adult patients and had a very low number of subjects. However, Windfuhr, et al. reported similar findings in adult patients.[10]

A report in the Lancet[11] reviewed 11,796 patients and concluded that compared to cold steel tonsillectomy without cautery, the relative risk for post operative bleeding was 3.4 times higher with coblation, 3.1 times higher with bipolar cautery and 2.2 times higher with cold steel removal with cautery only for hemostasis.

Glade et.al.[8] reported that coblation tonsillectomy had similar rates of hemorrhage when compared to electrocautery tonsillectomy. However, when the data for primary and secondary bleeding is combined there is a definite trend for more bleeding in the patients who underwent coblation tonsillectomy (Chi-Square) $p < 0.2$. In other words, there was an 80% likelihood that the observed differences were not due to chance. This does not reach statistical significance but certainly lends support to the concern regarding postoperative bleeding in patients undergoing coblation tonsillectomy.

The Cochrane ENT Disorders Group published a review in 2007 of coblation tonsillectomy and found that there was inadequate evidence to conclude that coblation tonsillectomy had decreased postoperative pain. The report also concluded after an extensive review of the literature that there is a suggestion of increased postoperative bleeding using the coblation technique and called for more studies to further clarify this issue.[12]

The present study compared a scalpel-snare with cautery for hemostasis tonsillectomy technique with coblation. The current report found a 0.93% to 2.48% incidence of bleeding with the vast majority of patients having a secondary or delayed bleed. These results are in line with those of Arnolder et al.[2] who reported a post tonsillectomy bleeding rate of 1.78% with 85.7% being secondary bleeds. In addition, the current report found that the scalpel-snare with cautery technique produced significant less bleeding than coblation. Because of the rural setting of the practice with long distances to healthcare by many of the patients, the author has abandoned coblation as a technique for subcapsular tonsillectomy. In a recent report, Javed observed similar results and also reported abandoning coblation tonsillectomy.[13]

Other authors have reported no difference between coblation and non-coblation techniques. Divi and Benninger[14] studied 1762 patients and found similar rates of postoperative bleeding between the two techniques, but bleeding rates varied between 5.4%, 5.9% and 6.1% without counting postoperative blood-streaked sputum as bleeding.

Two other studies compared coblation with electrocautery and found a lower incidence of bleeding with coblation. Noordzij and Affleck[15] studied 48 patients and reported a 2.1% hemorrhage rate for coblation and 6.2% for unipolar electrocautery. Bellose et al.[16] studied 844 coblation tonsillectomies with a control group of 743 patients who underwent tonsillectomy by blunt dissection and bipolar diathermy for hemostasis. He reported a difference in hemorrhage in children of 2.25% to 6.19%, respectively. Higher rates for bleeding were found in adults than pediatric patients.

Conclusion:

In the author's hands the use of coblation dissection for subcapsular tonsillectomy has been abandoned. This technique has been abandoned by a number of other surgeons due to the increase in postoperative hemorrhage [10, 13, 17] and should be used with caution.

The findings of this study only apply to subcapsular dissection. Intracapsular dissection of the tonsil has been advocated by a number of authors and found to have a lower bleeding rate.[18-22]

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Possible Conflict of Interest Within Last 5 Years: ENTUSA and Dr Kavanagh has licensed educational tonsillectomy surgery videos to media production companies which produced educational videos for companies that manufacture both cautery and coblation equipment.

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