Objective: To confirm our clinical impression that the powered microdebrider is superior to curettes for performing partial adenoidectomy (removal of the superior one half to three fourths of the adenoid pad).

Design: Observational study of 100 children undergoing partial adenoidectomy with the powered microdebrider compared with 40 children undergoing conventional partial adenoidectomy with curettes.

Setting: Private and public tertiary care centers.

Patients: All patients younger than 20 years undergoing partial adenoidectomy at the respective institutions during the study period.

Interventions: Partial adenoidectomy as indicated for chronic otitis media, airway obstruction, or chronic or recurrent tonsillitis with either the powered microdebrider or curettes.

Main Outcomes Measures: Operative time (with specific quantification of the time required for tissue removal and hemostasis), blood loss, complications, and subjective ease of use.

Results: Operative time was 59% shorter for the microdebrider group (mean, 3 minutes 22 seconds; range, 1 minute 6 seconds to 12 minutes 45 seconds) than for the conventional group (mean, 8 minutes 8 seconds; range, 1 minute 2 seconds to 22 minutes 0 seconds) \( (P < .001) \). Blood loss was comparable for both groups (powered group: mean, 2.0 mL/kg; range, 0.4 to 9.4 mL/kg; conventional group: mean, 2.0 mL/kg; range, 0.3 to 6.7 mL/kg; \( P = .34 \)). There were no intraoperative or postoperative complications in either group. Surgeon satisfaction with the microdebrider was high.

Conclusions: The powered microdebrider for partial adenoidectomy is quicker and is not associated with blood loss or complications above that of conventional partial adenoidectomy. The degree of control afforded by the microdebrider technique is of utmost value in preventing complications such as velopharyngeal insufficiency, and this is now our procedure of choice.


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PATIENTS AND METHODS

Children and young adults who underwent partial adenoidectomy, as indicated for chronic otitis media, nasal obstruction, or chronic or recurrent tonsillitis, at 3 public and private tertiary care centers during the study period from October 1997 through July 1998 were studied prospectively in this observational series. All patients younger than 20 years were included: 1 patient with a preoperative coagulopathy that required intense preoperative preparation with transfusion of clotting factors was excluded. One hundred patients underwent partial adenoidectomy with the powered microdebrider and 40 underwent partial adenoidectomy with curettes. The adenoidectomy technique (curettes vs the microdebrider) was chosen by the attending surgeon. Procedures were performed either by staff otolaryngologists (approximately 10% in each group) or by experienced otolaryngology residents under supervision (approximately 90% in each group). At least half of the procedures in each group were performed by the same resident. As curettes at the public hospital were often dull, new curettes were obtained for use in these patients to attempt to eliminate bias resulting from this factor. One set of curettes was provided by Medtronic Xomed; this study was otherwise not funded.

Partial adenoidectomy with either technique was performed under general anesthesia with the patient in the Rose position. The oral cavity was carefully examined for any signs of a palatal abnormality, and the amount of tissue resected was tailored to each patient’s individual anatomy. If a submucus cleft was suspected or if the soft palate was short, up to 50% of the adenoid pad was left undisturbed inferiorly. In the absence of abnormal anatomy, at least 20% of the adenoid pad was left inferiorly to allow adequate velopharyngeal closure. A red rubber catheter was placed for palate retraction, and a standard defogged adenoid mirror was used for visualization. Partial adenoidectomy with curettes was performed with freshly sharpened standard adenoid curettes and completed with Ionis punch forceps if necessary. Partial adenoidectomy with the microdebrider was performed with the Xomed RADenoid microresector blade at 3000 rpm in oscillate mode without irrigation. After tissue removal via either technique, electrocautery was used for hemostasis.

Data were recorded regarding patient age, weight, sex, indication for adenoidectomy, and medical and surgical history. Intraoperative parameters recorded were operative time, blood loss, submucus cleft stigma, adenoid size, palate length, and complications. Adenoid size was recorded, based on the degree of nasopharyngeal obstruction noted on evaluation with the mirror after the palate was retracted, as small to moderate (<50% obstruction), large (50%-75% obstruction), or very large (>75% obstruction). The time in minutes and seconds (minutes:seconds) was recorded on a watch with a second hand for each patient for tissue removal, hemostasis, and total time. Time began when the instrument touched the tissue and stopped when the procedure, or portion thereof being recorded, was deemed complete by the surgeon. Precise blood loss was calculated for the adenoidectomy portion of each procedure by recording the exact amount of irrigation used and the exact volume of blood and irrigation in the suction container. We did not use in-line irrigation that is available with the microdebrider for adenoidectomy, so this did not confound our measurements of irrigation and blood loss. Charts were reviewed for postoperative complications; patients who did not return for follow-up were contacted by telephone and questioned regarding complications specifically including speech or swallowing changes. Data were compiled and analyzed using a spreadsheet program (Excel version 5.0; Microsoft, Redmond, Wash). Statistical significance was evaluated with the Mann–Whitney test (SPSS for Windows Release 7.5.1 and GraphPad Instat Version 1.12a). Surgeons who had performed partial adenoidectomies on both the curette group and the microdebrider group were questioned regarding their level of satisfaction with the microdebrider and their future method of choice for partial adenoidectomy.

RESULTS

Patient demographics, indications for adenoidectomy, and sizes of adenoid pads are listed in Table 1. Results are shown graphically in Figure 3 and Figure 4. Total operative time was 08:08 for the curette group (range, 01:02-22:00) and 03:22 for the microdebrider group (range, 01:06-12:45; P<.001). A significant difference was noted in removal time, which was 03:22 for curettes (range, 00:12-14:00) vs 00:51 for the microdebrider (range, 00:07-05:10; P<.001) as well as in hemostasis time, which was 04:10 for curettes (range, 00:30-10:47) vs 02:32 for the microdebrider (range, 00:52-09:00; P<.001). Blood loss was not statistically different between groups, whether measured absolutely (48 mL [range, 5-375 mL] for curettes vs 35 mL [range, 10-200 mL] for the microdebrider; P=.66) or measured as blood loss per kilogram of body weight (2.0 mL/kg for both curette and the microdebrider group [ranges, 0.3-6.7 and 0.4-9.4 mL/kg, respectively]; P=.34). We also analyzed our results by categorizing patients based on

Figure 1. Line drawing showing partial adenoidectomy with the microdebrider. Note the amount of adenoid tissue left inferiorly to ensure adequate velopharyngeal closure.
adenoid size. Figure 5 shows total operative time as stratified for the 3 size groups. As expected, larger adenoids require more time for removal regardless of technique. The difference in mean total operative time remained statistically significant for each group at $P < .008$ for each group. The amount of total operative time saved with the microdebrider is shown in Table 2. On average, the microdebrider saved 4 minutes 46 seconds or 59% of total operative time. The amount of time saved was greatest for the largest adenoids, at 9 minutes 51 seconds or 65% of total operative time. When blood loss (per kilogram of body weight) was stratified for adenoid size, no significant differences were noted (Figure 6: $P > .05$ for all groups).

There were no intraoperative or postoperative complications in either group. Surgeon satisfaction with the microdebrider was high as rated by the 3 surgeons (2 residents and 1 attending) who used both techniques in the study. All 3 surgeons will continue to use the powered microdebrider for partial adenoidectomy in the future.
Complications of adenoidectomy are fortunately rare. Postadenoidectomy velopharyngeal insufficiency has been estimated to occur in 1 in 1500 to 1 in 10,000 cases. Nasopharyngeal stenosis and eustachian tube stenosis likely occur even less frequently. All of these complications are difficult to handle if they occur; treatments ranging in invasiveness from speech and swallowing therapy to multiple operations are required. For these reasons, these complications are better prevented than treated. Partial adenoidectomy is a technique preferred by many otolaryngologists to avoid velopharyngeal insufficiency. An appropriately sized remnant of inferior adenoid tissue is left in place to allow adequate velopharyngeal closure. The amount of tissue left behind may be tailored to each patient’s anatomic needs: more tissue is left when the palate is short, for example. This technique requires great control of tissue removal. Curettes are designed for the removal of the entire adenoid pad; they are less useful when the surgeon wishes to leave a specified amount of tissue inferiorly. The microdebrider meets the demand for precision that partial adenoidectomy requires. It has been proven ideal for handling tissue debridement during endoscopic sinus surgery, where precision is required to avoid orbital or intracranial entry or other complications. Expanded uses of the microdebrider in otolaryngology include removal of benign and malignant nasal tumors, choanal atresia repair, laryngeal papilloma removal, and adenoidectomy.

Adenoidectomy (whether partial or complete) with the microdebrider is approached in the same manner as for conventional adenoidectomy. The procedure is visualized with a handheld mirror, and the view of the operative field is identical to that of conventional adenoidectomy. Adenoidectomy with the microdebrider using a transnasal endoscopic approach has been described; we have found the addition of endoscopy to be unnecessary in most cases.

Complete adenoidectomy with the microdebrider has been shown to be faster than, and as safe as, adenoidectomy with curettes. One retrospective review of complete adenoidectomy using curettes vs the microdebrider showed that operative time was significantly faster with the microdebrider (11 vs 19 minutes) and that blood loss, recovery time, and complications were comparable. A subsequent prospective randomized trial of complete power-assisted adenoidectomy compared with curette adenoidectomy showed that again operative time was significantly faster with the microdebrider (613 seconds, or 10 minutes 13 seconds, vs 734 seconds, or 12 minutes 14 seconds) and that blood loss was significantly less with the microdebrider (15 vs 20 mL). Our results are in agreement with those of these studies. Our operative times are significantly shorter; this is likely due to the different methods of timing the procedure. Where we recorded start and stop time when the instrument touched and left the tissue, prior studies used either operative records or started and stopped recording when the mouth gag went in and out of the mouth. We showed that for partial adenoidectomy, the use of the microdebrider resulted in a statistically significant reduction of 59% in overall operative time. It was interesting to note that the reduction in operative time was not simply due to quicker tissue removal; hemostasis time was quicker with the microdebrider. Hemostasis was achieved in the same manner in both groups, perhaps reflecting a greater ability to remove all adenoid tissue down to a less vascular fascial plane with the microdebrider. This is logical due to the suction/shaving action of the microdebrider, which draws loose tissue into the window, as opposed to the pushing/cutting action of the curette blade, which may leave bleeding adenoid tissue behind. More complete tissue removal allows more rapid hemostasis with electrocautery. This difference in hemostasis time was not reflected by a statistically significant reduction in blood loss for the microdebrider group in our study, however. Stanislaw et al did show that blood loss was less in the microdebrider group, and that tissue removal was believed to be both more complete and more often to the appropriate depth with the microdebrider, as opposed to being too shallow or too deep.

Our study is limited by the lack of randomization and the participation of several different surgeons in different hospitals, and is thus subject to bias in terms of both patient population and surgeon and operating room proficiency. We have attempted to reduce bias by having the majority of cases in both groups done by the same resident using the same methods of timing and blood loss estimation. Curette adenoidectomies were done with freshly sharpened instruments to provide for optimal tissue removal. Our results are in accordance with those from a prospective randomized trial for complete adenoidectomy.
We believe that the true advantage of the microdebrider for partial adenoidectomy lies in its precision, which cannot be quantified using the results of this or any other study to date. Given the rarity of complications from adenoidectomy, an impractically large number of study participants would be required to show a difference in complication rates between the 2 procedures.

CONCLUSIONS

Partial adenoidectomy with the microdebrider is faster than partial adenoidectomy with curettes by 59%. Our results are in accordance with those demonstrating a time advantage of the microdebrider in complete adenoidectomy as well. We believe that the most important advantage to operating with the microdebrider is the precise control of tissue removal, which is especially useful in partial adenoidectomy. We have shown that partial adenoidectomy with the microdebrider is faster than that with curettes, and our impression is that due to greater control over tissue removal, it is safer as well.

REFERENCES


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