Comparison of Power-Assisted Adenoidectomy vs Adenoid Curette Adenoidectomy

Paul Stanislaw, Jr, MD; Peter J. Koltai, MD; Paul J. Feustel, PhD

Objective: To compare the safety and efficacy of power-assisted adenoidectomy (PAA) vs adenoid curette adenoidectomy (ACA).

Design: A prospective randomized study.

Setting: Children’s hospital of a tertiary care medical center.

Patients: Ninety patients (aged 1-13 years) underwent PAA, and 87 patients (aged 1-12 years) underwent ACA.

Main Outcome Measures: The parameters evaluated were operative time, blood loss, completeness and depth of resection, injuries to surrounding structures, short- and long-term complications, surgeon satisfaction with the procedure, and parents’ assessment of the patient’s postoperative recovery period.

Results: The PAA was 20% faster ($P < .001$) and had 27% less blood loss ($P < .001$) than the ACA. It provided a more complete resection ($P < .001$) and better control of the depth of resection ($P < .05$). Surgeon satisfaction was greater with PAA ($P < .001$). There was no difference in the recovery period or parent satisfaction. One patient in the PAA group returned to the operating room for control of postoperative bleeding, and 1 child in the ACA group returned to the hospital for postoperative dehydration.

Conclusion: The PAA provides a faster, dryer, more complete, and more surgically satisfying resection than the ACA.

PATIENTS AND METHODS

The study was approved by the Albany Medical College Committee on Research Involving Human Subjects, Albany, NY. It was limited to patients younger than 16 years who were undergoing adenoidectomy or adenoidectomy in conjunction with tympanostomy tube placement. The patients were randomized to either PAA or ACA based on an odd or even medical record number. Preoperative testing (eg, complete blood cell count, prothrombin time, and partial thromboplastin time) was left to the judgment of the senior author (P.J.K.).

The ACA began with the patient in the supine position on the operating table. General anesthesia was supplied via a transoral endotracheal tube. If the patient was to undergo a concurrent tympanostomy tube placement, it was performed at this time. The patient was then placed in the Rose position and covered with sterile drapes, with the mouth exposed. A Crowe-Davis mouth gag was used to retract the tongue and mandible. The soft palate was palpated to identify a submucosal cleft, and if none was found, 2 red rubber catheters were passed through the nose and into the oropharynx and retrieved through the mouth. The distal and proximal ends of the catheters were crossed and clamped so that they retracted the soft palate, providing access to the nasopharynx. Using a No. 5 laryngeal mirror, the adenoids were indirectly visualized and removed with an adenoid curette. The lateral bands in proximity to the torus tubaris were not dissected. Residual adenoid tissue high in the nasopharynx near the choanal sill was removed by a variety of means, including an adenoid punch, suction cautery, or transnasal Takahashi forceps. After the adenoidectomy, 1 tonsil sponge was placed in the nasopharynx for 3 minutes. It was then removed, and the bleeding was controlled with suction electrocautery at a setting of 35 W. When hemostasis was achieved, the red rubber catheters and Crowe-Davis mouth gag were removed, and the patient was turned back to the anesthetist for reversal of general anesthesia and extubation.

The technique for PAA was the same as for ACA, up to and including the visualization of the adenoids with a No. 5 laryngeal mirror. The disposable cannula of the endoscopic shaver was then bent into the curvature required for the adenoidectomy, using the accompanying bending tool. The manufacturer recommends that the blade be bent to an arc of 15°. We found this to be an inadequate curve for oral access to the nasopharynx and developed a way of overbending the cannula. The cannula is always under visual control via the laryngeal scope, and the oscillating blade. The adenoidectomy starts high in the nasopharynx, near the choanal sill. The resection is performed in a side-to-side fashion, progressing on an even level until the inferior edge of the adenoid pad is reached. The depth of adenoid resection, as well as the resection around the choana and torus tubaris, is precisely controlled. The resection of intranasal adenoid tissue can be done by directly extending the cannula up toward the posterior choana or by passing the endoscopic shaver transnasally. The tip of the oscillating cannula is always under visual control via the laryngeal mirror. After the adenoidectomy, 1 tonsil sponge is placed in the nasopharynx for 3 minutes. It is then removed, and the bleeding is controlled with suction electrocautery at a setting of 35 W. When hemostasis is achieved, the red rubber catheters and Crowe-Davis mouth gag are removed and the patient is turned back to the anesthetist for reversal of general anesthesia and extubation.

All procedures were performed as outpatient surgery, and all patients followed the same standard postadenoidectomy instructions. The operative time was defined as the moment the mouth gag was placed in the mouth, and the end of the procedure was defined as the moment the mouth gag was removed from the mouth. The operative blood loss was measured in pediatric graduated vacuum flasks for both procedures. Although not necessary for collecting adenoid tissue after ACA, a collection sock was placed into the suction line for ACA to standardize the estimation of blood loss. The blood soiling the 1 tonsil sponge per procedure was not measured. The adenoid size was recorded as mild, moderate, or marked. The completeness of the adenoid resection around the choana and torus tubaris was recorded as fair, good, or excellent. The depth of the resection was recorded as shallow, normal, or excessive. Injuries to surrounding structures and complications were recorded. Surgeon satisfaction was recorded as fair, good, or excellent. These assessments were made by the operating surgeon.

On approximately the seventh postoperative day, a telephone interview was conducted with each patient's caregiver. The incidence and duration of postoperative emesis, fever, pain, and neck stiffness were recorded. The number of days it took the patient to return to his or her preoperative diet and activities was also recorded.

Finally, the parents' level of satisfaction with the patient's recovery period was recorded as unsatisfied, satisfied, or very satisfied. The patients were seen 1 month after surgery and evaluated for postoperative problems such as velopharyngeal insufficiency, nasopharyngeal stenosis, and torticollis.

The patient's age, operative time, and time of recovery were analyzed using the t test. Blood loss and the information recorded in postoperative days were each analyzed using the Mann-Whitney U test. The categorical data were analyzed with a Yates corrected χ² test, a Fisher exact test, or a Pearson χ² test, as appropriate. The categories of fair and good for the evaluation of the resection around the torus tubaris and choana and for surgeon satisfaction were collapsed prior to analysis with the Fisher exact test.
seconds for PAA, which was 20% faster than the 12 minutes 52 seconds that ACA required (P<.001) (Table 1).

Postoperative telephone interviews were completed for 60 PAAs and 68 ACAs. They were conducted a mean of 7.7 days after surgery. There was no statistical difference between the 2 groups in regard to the incidence or duration of postoperative emesis, fever, pain, or neck stiffness (P>.50) (Table 2). The mean number of postoperative days before the patients resumed their preoperative diet was 2.2 days for both groups. The mean number of postoperative days before the patients resumed their preoperative activities was 2.3 and 2.2 days for the PAA and ACA groups, respectively. There was no statistical difference between the 2 groups for diet or activity or for the parents’ satisfaction with the patient’s recovery period (P>.50) (Figure 6).

There were no injuries to structures within the nasopharynx in either group. One patient in the PAA group returned to the operating room for control of postoperative bleeding, and 1 patient in the ACA group returned to the hospital for postoperative dehydration.

The retrospective study “Power-Assisted Adenoidectomy” introduced the use of an endoscopic shaver system with a bendable blade for transoral PAA in children. Because of the inherent limitations of that retrospective study, a randomized, prospective study was performed to accurately assess the merits of PAA. The current study was well controlled, with no significant difference between the PAA group and the ACA group in regard to patient age, sex, adenoid size, or level of training of the surgeon.

The PAA provided a significantly more complete resection around the choana and torus tubaris and significantly better control of the depth of the resection. The clinical importance of a more complete resection re-
Intuitively, a more complete resection should result in a better chance of resolving the disease process, be it nasal obstruction, adenoiditis, sinusitis, or otitis media. A common problem seen with tonsillectomy is the phenomenon of hyperplasia of any remaining lymphoid tissue. The possibility of this phenomenon taking place in another portion of the Waldeyer ring is quite high. Therefore, it is likely that an incomplete resection subjects the patient to an increased risk of recurrence of symptoms owing to hyperplasia of the remaining tissue. Of note, 2 patients in this study previously underwent adenoidectomies and had recurrence of their symptoms, requiring revision adenoidectomies. The ability of the PAA to provide a more complete resection also enables it to provide a precise limited resection when indicated (eg, in patients at risk for velopharyngeal insufficiency). It has been our experience that adenoid curettes do not have the control needed to provide a limited adenoidal resection with any certainty. It is for this reason that prior to the PAA we relied on suction cautery to perform a limited resection, but this proved to be a time-consuming process.

There was no statistical difference between PAA and ACA in regard to the incidence and duration of postoperative emesis, fever, pain, or neck stiffness. The resection of adenoid tissue and the cautery were unremarkable. However, after extubation, the patient developed a moderate amount of bleeding that did not respond to conservative measures. Therefore, the patient returned to the operating room, where the bleeding was easily controlled with suction electrocautery. The rest of the patient’s postoperative course was uneventful. This complication was due to a technical error in cautery. One patient in the ACA group returned to the hospital for postoperative dehydration. On postoperative day 1, the patient became dehydrated and required intravenous fluid administration in the emergency department. The patient was discharged home without event.

<table>
<thead>
<tr>
<th>Group</th>
<th>% of Patients</th>
<th>Average Duration of Symptoms, d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emesis</td>
<td>PAA 28 0.1</td>
<td>ACA 20 0.1</td>
</tr>
<tr>
<td>Fever*</td>
<td>PAA 9 0.3</td>
<td>ACA 10 0.2</td>
</tr>
<tr>
<td>Pain</td>
<td>PAA 34 1.1</td>
<td>ACA 42 1.2</td>
</tr>
<tr>
<td>Neck stiffness</td>
<td>PAA 17 0.6</td>
<td>ACA 13 0.2</td>
</tr>
</tbody>
</table>

*Temperatures higher than 38°C.
An adenoidectomy can be performed with a variety of instruments, such as an adenoid curette, an adenotome, an adenoid punch, a suction cauteru, or even a laser. All these methods have their advantages and disadvantages, and the choice of instrument is usually based solely on the surgeon’s personal preference. The benefit of PAA is that it is 20% faster (P<.001) and has 27% less blood loss (P<.001) than ACA. Within this study, there was a significantly higher surgeon satisfaction with PAA than with ACA. One disadvantage of PAA is the cost of the disposable blade, which is approximately $60. We must ask ourselves whether a more precise, more complete, and more surgically satisfying resection that is faster, with less blood loss, justifies the additional cost.

CONCLUSIONS

In summary, PAA provides a faster, more precise, and more complete adenoid resection with less blood loss than can be achieved with ACA. There was no statistical difference between the recovery periods for PAA and ACA (P>.50); PAA proved to be as safe as ACA; and surgeon satisfaction was greater with PAA than with ACA.

Accepted for publication February 22, 2000.

This research was supported by a grant from Linvatec Corporation, Largo, Fla.

Presented in part at the 14th Annual Meeting of the American Society of Pediatric Otolaryngology Inc, Palm Desert, Calif, April 29, 1999.

Corresponding author: Peter J. Koltai, MD, Section of Pediatric Otolaryngology, A71, Cleveland Clinic Foundation, 9500 Euclid Ave, Cleveland, OH 44195-001.

REFERENCES
