Safety of Pediatric Short-Stay Tonsillectomy

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Objective: To determine the safety of a relatively brief (<3-hour) period of postoperative observation prior to discharge in children undergoing outpatient tonsillectomy.

Design: Retrospective chart review.

Setting: Tertiary care children’s hospital and public teaching hospital.

Patients: The records of all patients (12 years of age who underwent tonsillectomy or adenotonsillectomy from November 1995 through July 1997 were reviewed. A total of 143 patients scheduled for ambulatory treatment were identified; 9 were excluded owing to insufficient follow-up. The remaining 134 patients made up the study group.

Main Outcome Measures: (1) Duration of observation prior to discharge; (2) complication rates.

Results: The mean age of the study population was 6.1 ± 2.6 (mean ± SD) years. Obstructive sleep apnea was an indication for surgery in 86.5%. Eleven (8.2%) of 134 planned outpatients were electively admitted from the recovery room for inpatient observation, most often because of respiratory compromise. Patients admitted from the recovery room were significantly younger (mean age, 4.0 years) than those who were discharged as planned (6.3 years, P<.001). One hundred twenty-three patients were discharged from the recovery room as anticipated, following a mean ± SD duration of postoperative observation of 144 ± 48 minutes. Overall, 5 (4.1%) of these 123 outpatients suffered complications after discharge. Two patients (1.6%) experienced primary bleeding, both at 8 hours after surgery. Four patients (3.2%) were readmitted. The complication rate did not vary significantly with the duration of postoperative observation (P=.71).

Conclusion: A short postoperative observation period is safe, with a low rate of complications, in appropriately selected children scheduled for ambulatory tonsillectomy.


IN THE LAST DECADE, children undergoing tonsillectomy and adenotonsillectomy have increasingly been treated on an ambulatory basis. While outpatient treatment has been documented to be safe for appropriately selected patients, the optimum length of postoperative observation before discharge has not clearly been established. Ideally, patients should be observed for a sufficient period to minimize complications, while maximizing the cost-effective use of healthcare resources.

As we have gained experience with ambulatory tonsillectomy at our institutions, we have been encouraged to gradually decrease the length of postoperative observation before discharge. At present, it is our practice to perform tonsillectomy in children for both obstructive and inflammatory indications without a fixed mandatory minimum observation period. Because we commonly discharge patients far earlier than 6 hours after surgery, the goal of the present study was to determine the safety and efficacy of our relatively brief (<3-hour) observation period compared with the standard observation periods (≤6 hours) reported in the literature.

RESULTS

Of the 134 patients in the study group, 50 (37.3%) were female and 84 (62.7%) were male, with a mean ± SD age of 6.1 ± 2.6 years (median age, 5.7 years; age range, 0.9-12.6 years) (Figure 1). Twenty-nine patients (21.6%) were 3 years of age or younger. Evidence of obstructed breathing, including OSAS, was the primary indication for surgery in 96 patients (71.6%), with an additional 20 patients (14.9%) un-
PATIENTS AND METHODS

All patients 12 years of age or younger who underwent tonsillectomy or adenotonsillectomy at Lucile Packard Children’s Hospital at Stanford, Stanford, Calif (a tertiary care children’s hospital), and Santa Clara Valley Medical Center, San Jose, Calif (a public teaching hospital), from November 1995 through July 1997 were identified through a search of operating room databases. The records of 189 patients thus identified were retrospectively reviewed. All patients scheduled for ambulatory treatment were eligible for inclusion. Fifty-four patients were excluded; 46 owing to planned inpatient admission (24% of the total population), and 9 owing to insufficient follow-up. Inpatient admission was elected according to individual physician judgment, most commonly for significant coexisting illnesses (such as severe asthma, developmental delay, cerebral palsy or hypotonia, morbid obesity, seizure disorder, or a history of organ transplantation), evidence of severe sleep apnea, social issues, or occasionally for age 3 years or younger. Neither age 3 years or younger nor obstructive sleep apnea syndrome (OSAS) was considered an absolute indication for inpatient treatment. The remaining 134 patients scheduled for ambulatory treatment made up the study group.

The following data were extracted from the records of study patients: age, sex, presence of associated medical conditions, indication for surgery, surgical technique, and duration of postoperative observation (time from admission to the recovery room until discharge from the hospital). In one hospital, patients were discharged directly from the RR, while in the other, the total duration of observation included a period of observation in the ambulatory surgical unit (ASU) prior to discharge. The incidence of unplanned admission from the RR, as well as the incidence of postoperative complications after discharge, was noted. Charts were reviewed for evidence of bleeding, respiratory events, emesis, or insufficient oral intake requiring an emergency department visit or readmission to the hospital. Data were analyzed using descriptive statistics. The significance of differences between groups was evaluated using the Student t test.

Conversion to inpatient status was most frequently prompted by respiratory events, including apnea, desaturation, and/or stridor (7 patients [5%]). Respiratory compromise occurred in 4 (14%) of 29 patients 3 years of age or younger, but in only 3 (3%) of 105 children older than 3 years. All patients experiencing airway complications had a preoperative diagnosis of OSAS. Once discharged from the hospital, none of these patients experienced further complications.

Patients admitted from the RR were significantly younger (mean age, 4.0 ± 1.6 years) than those who were discharged as planned (6.3 ± 2.6 years, P < .001). While 1 patient had an additional underlying diagnosis of mild asthma, there were no complicating medical illnesses in the remainder of these patients. There were no differences in operative technique, steroid use, or indication for surgery in patients requiring unscheduled admission as compared with the outpatient group as a whole.

One hundred twenty-three patients (91.8%) were undergoing surgery for the combined indications of obstructed breathing and tonsillitis. Tonsillitis without evidence of obstruction was the indication for surgery in 11 patients (8.2%).

One hundred twenty-two children (91.0%) underwent adenotonsillectomy, and 12 (9.0%) underwent tonsillectomy alone. Electrodissection tonsillectomy was performed in 88 cases (65.7%), while 46 patients (34.3%) underwent sharp dissection tonsillectomy according to individual surgeon preference. Adenoidectomies were performed with a curette. Hemostasis was obtained with electrocautery and nasopharyngeal packs. With occasional exception, procedures were performed by resident surgeons with attending supervision. Forty-six patients (34.3%) received an intravenous antibiotic, and 61 (45.5%) received intravenous dexamethasone before surgery, most commonly at a dose of approximately 0.5 mg/kg. All patients were discharged on a regimen of oral antibiotics, most commonly amoxicillin.

Eleven (8.2%) of 134 planned outpatients required an unscheduled inpatient admission based on clinical assessment in the RR, including 7 (24%) of 29 patients 3 years of age or younger.

<table>
<thead>
<tr>
<th>Age/Sex</th>
<th>Reason</th>
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<tbody>
<tr>
<td>14 mo/M</td>
<td>Stridor</td>
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<tr>
<td>2 y/F</td>
<td>Failure to void</td>
</tr>
<tr>
<td>3 y/M</td>
<td>Desaturation to 68% O2</td>
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<tr>
<td>3 y/M</td>
<td>Desaturation to 75% O2</td>
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<td>3 y/F</td>
<td>Desaturation to 80% O2</td>
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<tr>
<td>3 y/F</td>
<td>Protracted emesis</td>
</tr>
<tr>
<td>3 y/M</td>
<td>Protracted emesis</td>
</tr>
<tr>
<td>5 y/M</td>
<td>Apnea, desaturation to 89% O2</td>
</tr>
<tr>
<td>6 y/M</td>
<td>Desaturation to 88% O2</td>
</tr>
<tr>
<td>6 y/M</td>
<td>Purulent sputum, rule out pneumonia</td>
</tr>
<tr>
<td>6 y/M</td>
<td>Apnea/hypopnea</td>
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The following data were extracted from the records of study patients: age, sex, presence of associated medical conditions, indication for surgery, surgical technique, and duration of postoperative observation (time from admission to the recovery room until discharge from the hospital).
take before discharge. The duration of postoperative observation for the patients in the RR/ASU ranged from 55 to 310 minutes (mean ± SD, 144 ± 48 minutes [2.4 ± 0.8 hours]) (Figure 2). Observation time in the RR/ASU was occasionally prolonged by nonclinical factors, such as transportation and medication delays.

Patients in the outpatient group were followed up after surgery for 30 ± 44 (mean ± SD) days. Five (4.1%) of these 123 outpatients suffered complications (Table). Four patients (3.2%) were readmitted to the hospital after discharge from the RR/ASU. Two patients experienced primary bleeding, for a rate of 1.6%. No patients experienced secondary bleeding. Among patients initially discharged as planned, the incidence of emesis and/or inadequate oral intake requiring readmission or an emergency department visit was 2.4%. No respiratory complications were noted after discharge.

The duration of postoperative observation in the RR/ASU did not vary significantly between patients with and without complications (157 ± 76 minutes vs 143 ± 46 minutes, respectively, P = .71). While patients who suffered a complication tended to be somewhat older than patients whose course was uncomplicated (8.2 ± 2.4 years vs 6.2 ± 2.5 years), this difference was not statistically significant (P = .14). There were no complications in patients 3 years of age or younger after discharge from the RR/ASU.

Ambulatory management has become the standard of care for many children undergoing tonsillectomy and adenotonsillectomy. Since Chiang et al reported in 1968 on 40 000 cases of outpatient tonsillectomy with little morbidity and no mortality, numerous other authors have documented the safety and cost-effectiveness of this approach.1-4 However, there has been ongoing and justifiable concern regarding what constitutes an adequate period of postoperative observation before discharge. Based on a retrospective study of 2600 inpatient tonsil and adenoid procedures, Carithers et al in 1987 recommended that patients should be observed for 8 to 10 hours after surgery. Subsequent studies suggest that many authors consider a minimum postoperative observation period of 6 to 8 hours to be standard.2,3,7-9

There are few studies in the literature suggesting that shorter periods of observation may be equally safe. Mitchell et al and Gabalski et al have suggested that posttonsillectomy observation may be safely reduced to 4 hours. In a retrospective study, Colclasure and Graham reported a complication rate of 1.4% among 3340 children and adults observed for an average of 2.25 hours after tonsil and adenoid procedures. Finally, Nicklaus et al reported a retrospective series involving 233 children who underwent ambulatory tonsillectomy, with a mean postoperative observation period of 136 ± 48 minutes, and an overall complication rate of 9%, including primary and secondary bleeding (1.7% and 3.0%, respectively), nausea and vomiting (2.5%), and dehydration (1.3%). The incidence of complications after discharge from the hospital was 4.3%. While Nicklaus and colleagues concluded that short periods of observation are safe and cost-effective, letters of response to their article were highly critical of this approach.13,14

The current article provides additional support for the safety and efficacy of a short period of postoperative observation in ambulatory pediatric adenotonsillectomy. The average length of observation in our study of 144 ± 48 minutes is nearly identical to that reported by Colclasure and Graham and Nicklaus et al. Although retrospective and modest in size, our overall outpatient complication rate of 4.1% confirms our clinical impression of excellent clinical outcomes. Specific complications will be discussed in turn.

Postoperative hemorrhage is clearly the most dangerous potential complication after adenotonsillectomy. In the present series, 2 patients had primary hemorrhages, for a rate of 1.6%, with spontaneous resolution in 1 case. Our experience compares favorably with the primary hemorrhage rates of 0.006% to 4.2% reported in the literature for large series of patients observed for a minimum of 6 hours after surgery.6,9 Without question, careful patient selection, with attention to the availability of transportation and proximity to the hospital, is critical to the safety of ambulatory adenotonsillectomy, regardless of the length of observation.

Refractory or problematic emesis has been reported in 1.1% to 10.0% of patients after adenotonsillectomy.3,4,6,8,9,12-15 Poor oral intake and/or dehydration occurs in 0.5% to 1.9% of patients in all age groups,4,7,8,12 but may be as high as 4.0% to 9.7% in children 3 years of age or younger.6,16 For purposes of the present study, emesis and poor oral intake were recorded as complications...
The mean duration of observation following ambulatory adenotonsillectomy in this study was $144 \pm 48$ minutes. Young age and sleep-disordered breathing were associated with some increased risk; nonetheless, respiratory complications were identified early, and the majority of children in these categories were successfully treated on an outpatient basis. Our postonsillectomy management protocol is associated with a low rate of complications that compares favorably with the complication rates reported in the literature for standard observation periods of 6 hours or more. While the length of observation may vary for individual patients, our study confirms that a relatively short period of postoperative observation is both safe and cost-effective for selected children undergoing ambulatory adenotonsillectomy.

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REFERENCES