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Outcomes of reduced postoperative stay following outpatient pediatric tonsillectomy☆

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KEYWORDS
Tonsillectomy;
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Summary

Objective: To assess outcomes of reduced postoperative recovery room observation times and associated complication rates following outpatient pediatric adenotonsillectomy at a tertiary care medical center outpatient facility over a 7.5-year period.
Study design: Retrospective chart review.
Methods: Charts from all outpatient pediatric adenotonsillectomies performed by one surgeon from January 1998 through June 2005 at a tertiary care center were reviewed.
Results: Seven hundred and ninety seven (797) charts had sufficient documentation to be included in this study. Mean patient age was 6.8 years (median 5.5 years, range 2—21 years). There were 53 patients under 3 years old (6.64%), 655 patients age 3—12 years (82.18%), and 89 patients age 12—21 years (11.17%). Mean postoperative recovery room observation time prior to discharge was 1.47 h (median 1.33 h, range 0.45—7.25 h). Primary (<24 h postoperative) complication rate was 0.0075%, and secondary (>24 h postoperative) complication rate was 0.0063%. There were no significant differences in duration of postoperative recovery room observation or postoperative complications between the three age groups ($p = 0.10$).
Conclusions: Very brief postoperative observation periods following outpatient pediatric adenotonsillectomy may be considered safe, without added risk nor increased short-term or long-term complications. While individual cases may merit prolonged postoperative observation periods, the majority of study patients had no postoperative complications despite shorter recovery room stays than described in prior reports. These data support safety and efficacy of reduced postoperative stays. Our data should be considered in order to increase the efficiency and cost effectiveness of outpatient surgery centers where such procedures are performed.

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1. Introduction

Although outpatient pediatric tonsillectomy and adenotonsillectomy have become widely practiced in the last two decades, a consensus on the required length of postoperative observation following such procedures has not yet been established. The overall complication rate following tonsillectomy is in the 3—10% range, and includes hemorrhage, airway obstruction, and dehydration as the most common postoperative morbidities. In our institution, very brief (<2 h) postoperative observation of select patients following outpatient adenotonsillectomy has become increasingly common.

We present our experience with reduced postoperative recovery room observation times and their associated complication rates. A retrospective chart review of 797 patients who underwent outpatient pediatric adenotonsillectomy at a single academic outpatient facility was performed to determine the safety of shorter observation periods as compared to the longer observation periods of 4—8 h previously reported in the literature [1,2].

2. Materials and methods

Medical records from all outpatient pediatric tonsillectomies performed by one pediatric otolaryngologist from January 1998 through June 2005 at the UCLA Medical Center Outpatient Surgery Center were reviewed. The majority of patients underwent concomitant adenoidectomy. All patients received intraoperative dexamethasone 0.3 mg/kg and antibiotics (ampicillin 25 mg/kg or clindamycin 10 mg/kg for penicillin-allergic patients) and 5 days of low-dose postoperative amoxicillin or azithromycin for penicillin-allergic patients. Only patients with a preoperative anesthesia classification of ASA-1 and ASA-2 based on criteria by the American Society of Anesthesiologists were considered for ambulatory treatment. Contraindications for outpatient adenotonsillectomy included age less than 20 months, known history of a bleeding disorder, developmental delay, craniofacial disorders, chromosomal abnormalities, history of prematurity <33 weeks, malignancy, cardiac disease, or severe immunodeficiency requiring hospitalization or parenteral therapy. In our institution, history of obstructive sleep disorder and age less than 3 years are not considered contraindications for outpatient adenotonsillectomy. Data were collected for patient age, gender, duration of postoperative recovery room stay, and complications. Complications were classified as either primary (<24 h postoperative) or secondary (>24 h postoperative).

Patients were divided into three groups based on age: (1) <3 years, (2) 3—12 years, and (3) 12—21 years. For each age group, the mean, median, and range of postoperative recovery room observation times were tabulated. Time 'zero' was considered to be the time of a patient's arrival in the recovery room. By this point, all patients had previously been extubated in the operating room, and were breathing spontaneously without mechanical support such as bag-mask ventilation or laryngeal mask airway. Patients proceeded directly from the operating room to the recovery room where the parents or guardians would meet them upon arrival. The endpoint of the observation period was considered to be discharge from the recovery room via wheelchair to the hospital parking lot with the parents or guardians under the guidance of a patient escort. The Student's *t*-test was utilized to determine if there was a statistically significant difference in duration of postoperative recovery room observation or postoperative complications between the three age groups.

3. Results

Medical records of 893 pediatric patients who underwent outpatient adenotonsillectomy were reviewed. Of these, 797 patient charts had sufficient documentation to be included in the present study. Ninety-six patients were eliminated for various factors including: insufficient documentation of 'time in' or 'time out' of recovery room, ambiguous records, or lost records. No patients were eliminated from the cohort due to observed complications. There were 436 males and 361 females, with a mean age of 6.8 years (median 5.5 years, range 1.9—21 years). Fifty-three (53) patients were <3 years old (6.64%), 655 patients were age 3—12 years (82.18%), and 89 patients were age 12—21 years

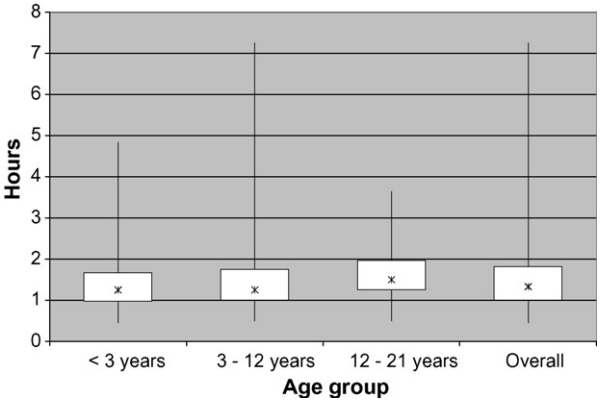

Fig. 1 Distribution of postoperative recovery room observation times (h) by age group.

Table 1 Postoperative complications

Primary complications (<24 h postoperative)	Secondary complications (>24 h postoperative)
2 years old M, oxygen desaturation to 86%	4 years old F, bleeding on POD 5
3 years old F, oxygen desaturation to 60%	5 years old M, bleeding on POD 5
4 years old M, oxygen desaturation to 80%	7 years old F, bleeding on POD 6
4 years old F, bleeding immediately after surgery	7 years old F, bleeding on POD 12
5 years old M, bleeding 95 min after surgery	10 years old M, bleeding on POD 7
13 years old M, bleeding 90 min after surgery	

M, male; F, female; POD, postoperative day.

(11.17%). The majority of the patients in the <3 year age group were between 2.5 and 3 years of age.

The distribution of postoperative recovery room observation times for each age group is presented in Fig. 1. The mean postoperative recovery room observation time prior to discharge for patients <3 years old was 1.40 h (median 1.25 h, range 0.45—4.83 h). The mean for patients age 3—12 years was 1.45 h (median 1.25 h, range 0.50—7.25 h), and for patients 12—21 years was 1.65 h (median 1.50 h, range 0.50—3.63 h). The overall mean for all patients was 1.47 h (median 1.33 h, range 0.45—7.25 h).

Eleven (11) postoperative complications were identified. The types of complications encountered are presented in Table 1. The primary (<24 h postoperative) complication rate was 0.0075%, and the secondary (>24 h postoperative) complication rate was 0.0063%. There were no significant differences in duration of postoperative recovery room observation or postoperative complications between the three age groups ($p = 0.10$).

4. Discussion

In recent decades, several authors have reported that outpatient pediatric adenotonsillectomy is safe for select patients and have offered variable recommendations on the appropriate length of postoperative observation prior to discharge [1-3]. When Carithers et al. first reported on the postoperative complications of 2944 pediatric adenotonsillectomy patients in 1987, their analysis suggested that adenotonsillectomy patients should be observed for a minimum of 8—10 h postoperatively to minimize risk of subsequent complications [4].

Gabalski et al. performed a prospective study of 534 pediatric patients to determine the incidence of complications with respect to each postoperative hour following adenotonsillectomy. All patients in their series were observed for at least 5 h postoperatively. The authors encountered no complications during the fifth and sixth postoperative hours and, as a result, concluded that a minimum of 4 h of postoperative observation was safe [5]. Mitchell et al. provided support for this recommendation through a retrospective study which demonstrated that even for children younger than 3 years, patients requiring overnight hospital admission were in the minority and could safely be identified in the first 4 postoperative hours [6].

Several studies have demonstrated that observation periods shorter than 4 h may be safe. Colclasure and Graham reported a retrospective series of 3340 patients who underwent outpatient tonsillectomy with a mean postoperative observation time of 2.25 h and overall complication rate of 1.4%. They identified only five patients (0.15%) as those who would have been hospitalized at the time the complication occurred had all patients been hospitalized for 48 h postoperatively; as a result, they proposed that the risk level was sufficiently low that outpatient adenotonsillectomy was safe in appropriately selected patients, even with a postoperative observation period shorter than 4 h [3].

Nicklaus et al. reported a series of 233 patients who were observed for a mean of 136 min, with an overall complication rate of 9% [7]. Lalakea et al. reported a retrospective series of 143 pediatric patients who were observed for an average of 144 min with an overall complication rate of 4.1% [8]. The present study is the first retrospective series to demonstrate a very low rate of complications with a mean postoperative observation period as short as 88 min.

Rothschild et al. reviewed records of 153 pediatric patients who underwent ambulatory adenotonsillectomy in order to identify high-risk subgroups who would have benefited from overnight admission following surgery. The authors found that patients age 3 years and younger in their series were at high risk of significant delay in oral rehydration, and those with obstructive sleep apnea syndrome (OSAS) were at increased risk for postoperative airway compromise. Accordingly, the authors suggested that these subgroups may benefit from inpatient surgery [9]. In our institution, age less than 3 years and OSAS are not considered contraindications to outpatient surgery in carefully selected patients.

Guidelines for outpatient treatment include age $\geq$2, and/or weight of $\geq$13 kg in order to minimize risk of postoperative dehydration in those patients with small body surface area. Additionally, patients with craniofacial disorders, Down syndrome, metabolic disorders, developmental delay, and OSAS with oxygen desaturations lower than 90% by overnight polysomnography are admitted for postoperative monitoring. Thus, no patients with these attributes are included in the current cohort.

Postoperative hemorrhage occurred in eight patients in this series. In three of these cases, oral bleeding was first noted while patients were still being monitored in the postoperative recovery room. Oropharyngeal examination of these patients revealed no active bleeding; thus, these patients were administered intravenous fluids, observed for additional time in the recovery room, and subsequently discharged home without further incident. In the remaining five cases, oral bleeding occurred on postoperative days 5, 6, 7, and 12. Patients presented to the emergency department where oropharyngeal examination revealed active bleeding from the tonsillectomy site. They were brought to the operating room for wound exploration and cautery. Bleeding was well controlled following cautery, and the patients were observed in the hospital for 12—24 h postoperatively.

Oxygen desaturation occurred in three cases in this series. Two of these cases involved transient ($<$60 s) desaturations to 86% and 80%, respectively. In both cases, patients were given oxygen by face mask and monitored for 2—3 additional hours in the recovery room until oxygen saturation remained stable $>$95% on room air. These patients were subsequently discharged home directly from the recovery room. In the remaining case, a patient with documented obstructive airway disease experienced an oxygen desaturation to 60% after 5 h of postoperative monitoring. Oxygen by face mask improved saturation to 96%, and inpatient admission was strongly advised. Nonetheless, the patient's family opted to discharge the patient home against medical advice. He had no secondary postoperative complications.

It is controversial as to the minimum amount of time that a child needs to remain under observation following outpatient pediatric tonsillectomy. The present study provides evidence that very brief postoperative observation periods do not increase risk of immediate or delayed complications. The mean recovery room observation time of 88 min in our study is considerably shorter than those described in prior studies, which report the safety of brief postoperative observation periods ranging from 135 to 144 min [1,7,8].

Postoperative care in the outpatient setting focuses on stabilization after general anesthetic emergence, airway maintenance, hydration, pain control, resumption of pre-anesthetic consciousness levels, and identification of bleeding. With improvement of anesthetic techniques, prophylactic antiemetics, and decreased surgical times, reduction of prolonged postoperative observation is feasible. In our institution, patients must achieve a postoperative Aldrete score of 10 out of a possible 10 in order to be discharged, which indicates adequate activity, respirations, oxygen saturation, consciousness, and circulatory status. The Aldrete score is a standardized measure of neurologic and hemodynamic status following general anesthesia [10,11]. Necessity to tolerate oral intake remains an area of question in standardizing early postoperative care. In our outpatient facility, oral intake is not a requirement prior to discharge. There were no episodes of primary or secondary postoperative dehydration in our cohort. Absence of oral intake requirement may have contributed to our reduced observation times. Complication rates in the present study were lower than those reported in other studies, which range from 0.8% to 6% [8,12—15]. Since all procedures were performed in a tertiary care outpatient facility in a large metropolitan area, it is possible that some patients who lived outside of the hospital environs may have sought treatment at outside facilities for postoperative complications, which were not recorded in our medical record system. Such unrecorded complications may have included patients with dehydration. Follow-up telephone calls were not made unless patients called to report specific complications.

5. Conclusion

Very brief postoperative observation periods following outpatient pediatric adenotonsillectomy may be considered safe, with no added risk or increased short-term or long-term complications. While individual cases may merit prolonged postoperative observation periods, the majority of study patients had no postoperative complications despite shorter recovery room stays than described in prior reports. Although few postoperative complications were observed in this series, there is potential for a higher incidence to occur in different clinical settings. Furthermore, we were unable to quantify duration of recovery, patient discomfort, or amount of time for patients and families to return to preoperative activities in this retrospective study. These data support the safety and efficacy of reduced postoperative stays when tonsillectomy is performed

by an experienced surgeon in a facility where anesthesiologists and nursing staff are trained in outpatient pediatric surgical care. Our data should be considered in order to increase the efficiency and cost effectiveness of outpatient surgery centers where such procedures are performed.

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