Identification of High-risk Tonsillectomy and Adenoidectomy

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ABSTRACT

Objective: To identify children who were at risk to postoperative complications after tonsillectomy and/or adenoidectomy, and to propose a guideline for care giving of this group of patients.

Methods: Retrospective chart study of children who underwent tonsillectomy and/or adenoidectomy and required special postoperative care was performed from August 1999 to March 2005. All children were treated under supervision of the authors at the Department of Otolaryngology, Faculty of Medicine Siriraj Hospital, Mahidol University.

Results: One hundred and twenty-nine children were operated during the study period. One hundred and twenty-three charts were retrievable. Forty-seven children were included in the series. Four categories of patients, i.e., very young-age group, intensive care unit group, extended admission group, and postoperative bleeding group, were identified. Eleven children (23.4%) whose ages were less than 36 months were observed in post-anesthetic recovery unit (PACU) for 5-6 hours with oxygen saturation monitoring and oxygen supplementation. Fourteen children (29.8%) were admitted to pediatric intensive care unit (PICU) with the most common indication of morbid obesity (64.3%). Four children needed interventions, which were two intravenous dexamethasone injections and two temporary continuous positive airway pressure (CPAP) administrations in PICU. Twenty children (42.6%) had extended admission because of postoperative fever and inadequate oral intake. However, every one of them improved within 48 hours postoperatively. Two children (4.2%) had minor postoperative bleeding and one of them needed bleeding control.

Conclusion: Tonsillectomy and adenoidectomy are procedures of low morbidity in healthy children. However, very young patients and those with high-risk of co-morbidities are considered to have high chance of compromised airway and inadequate oral intake. Besides our routine admission, we suggest that children under the age of 36 months need close observation for 5-6 hours in PACU. Admission in PICU is probably necessary for children who have high-risk of co-morbidities such as morbid obesity, asthma, cardiac diseases, neuromuscular disorders, craniofacial anomalies. Adequate oral intake is needed before removing intravenous fluid line and a consideration of discharge. Extended admission is unnecessary for postoperative fever, which mostly disappears within 48 hours.

Keywords: Tonsillectomy; Adenoidectomy; high risk; Complication


Tonsillectomy and adenoidectomy (T&A) have been the most common ENT procedures performed in children. In western countries, these procedures are preferred to be done asambulatory surgery. However, the justification of outpatient care for all children undergo T&A remains questionable. At our institution, T&A have been essentially in-patient procedures by policy. Besides the regular postoperative care, there are some children who require special treatment such as close respiratory observation, intervention, and prolonged fluid supplement. To identify this group of children and create a guideline of treatment, we performed a retrospective chart review of our patients who underwent T&A and had adverse events postoperatively or required special treatment during hospitalization.

MATERIALS AND METHODS

A retrospective chart review was performed on children who underwent tonsillectomy and/or adenoidectomy under supervision of the authors at the Department of Otolaryngology, Faculty of Medicine Siriraj Hospital, Mahidol University from August 1999 to March 2005. T&A were routinely performed as inpatient procedures with postoperative overnight observation. Normally, the patients would be observed in the post-anesthetic recovery unit (PACU) for 1-2 hours before transferred to ordinary wards. Majority of patients could be discharged the following morning after they had adequate oral intake. The children who deviated from routine clinical path or needed special interventions postoperatively were included in the study. Data collection included demographic information, details of the procedures, adverse events, interventions and final outcome of the treatment.

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### RESULTS

One hundred and twenty-nine children underwent tonsillectomy and/or adenoidectomy during this six-year period. One hundred and twenty-three charts were retrieved. Forty-seven children were found to match our inclusion criteria; 44 of which undertook T&A and three received only adenoidectomy. They were divided into four groups, namely: very young age group, intensive care unit group, extended admission group, and postoperative bleeding group (Table 1). Eleven children (23.4%) were under prolonged observation period of 5-6 hours in Post Anesthetic Recovery Unit (PARU) because of their very young age (less than three years old), before being transferred to ordinary wards. These young children received monitoring and oxygen supplementation in PACU while waiting for the full recovery from general anesthesia. Observation period in PARU of these young children was uneventful. Fourteen children (29.8%) were admitted to Pediatric Intensive Care Unit (PICU) under the most common indication of morbid obesity (64.3%). The indications for PICU admission are shown in Table 2. Of these 14 children, two had partial upper airway obstruction and temporary oxygen desaturation, which improved after oxygen supplementation and intravenous dexamethasone injections. Continuous positive airway pressure (CPAP) was temporarily administrated in two cases: one child with morbid obesity, and the other, a one-year and three-month old infant who had severe obstructive sleep apnea syndrome (OSAS). No intubation was done. Twenty children had their discharge delayed (42.6%): 10 cases (50%) with prolonged fever, 6 cases (30%) had inadequate oral intake, and 4 cases (20%) had both conditions. All children who initially had poor oral intake could resume adequate diet within 48 hours. In every case, fever disappeared within 48 hours without any sequelae during the period of observation. Age, sex, procedures, and co-morbid conditions were not found to be risk factors of postoperative fever and poor oral intake. Postoperative bleeding was reported in two healthy cases with OSAS. The first case was a 5-year-old girl who had immediate bleeding at the lower pole of the right tonsil in the recovery room. The patient was then sent to the operating room for bleeding control under general anesthesia. Consequently, her postoperative observation was uneventful and she was discharged on the following day. The second case was 11-year-old girl who had only minor bleeding from right tonsillar wound on the 3rd postoperative day, and it was spontaneously resolved without any intervention. Eventually, all children successfully recovered from these adverse events and were discharged from the hospital.

### DISCUSSION

Tonsillectomy and adenoidectomy are procedures that have low morbidity. Conditioned by the coverage of health by insurance companies, in most western countries surgeons prefer to perform T&A as an outpatient surgery. Many studies showed the safety and cost-effectiveness of the outpatient procedures in healthy children. However, not all children can be treated uneventfully on an inpatient basis. Since the majority of our patients live far from the hospital and the cost of inpatient admission is much cheaper than that in western countries, our policy is therefore to admit all patients who undergo T&A for safety reasons. Nevertheless, some children need special care during hospitalization, such those with high chance of compromised airway or poor oral intake.

Nowadays, T&A are more frequently done in patients with obstructive sleep apnea syndrome (OSAS). Postoperative tissue edema and inadequate recovery from general anesthesia may result in compromised airway, which requires close respiratory monitoring and/or airway intervention. Normally, this complication does not occur except in high-risk group. This group of children has potential airway collapse from other OSAS contributing factors that still remain in spite of removal of tonsils and adenoids. Rosen GM and colleagues identified high-risk clinical criteria for the OSAS patients who underwent T&A as follows: aged less than two years, craniofacial anomalies affecting pharyngeal airway, failure to thrive, hypotonia, cor pulmonale, morbid obesity, and previous upper airway trauma or high risk polysomnography criteria. They suggested that patients with these high-risk criteria tend to have postoperative airway compromise and should have overnight observation and apnea monitoring.

Infantile OSAS due to obstructive adenoids and tonsils does occur in infants. Unique characteristics of OSAS in this age group include: male predominance, high incidence of preterm infants, failure to gain weight and high recurrence rate after surgery. Because of their small size, these patients have little reserve to combat the effects of general anesthesia and surgery that simultaneously introduce the risks of airway compromise, dehydration and bleeding. Studies reported a higher incidence of postoperative complications, 7-8% requirement for airway intervention, 5-8.6% prolonged time to resume oral diet and dehydration, in children younger than three years of age. Consequently, admission and a well-planned special post-operative care are highly recommended. For example, extension of postoperative observation in PARU for 5-6 hours before transferring patients to ordinary wards should be administrated. Oxygen supplementation and oxygen saturation monitoring could be provided to the patients in PARU while waiting for their full recovery from anesthesia and prompt to have airway intervention if needed. With this strategy in our series, all eleven young children had full and safe recovery from anesthesia without any airway intervention before transferring to ordinary wards.

### TABLE 1. Four groups of patients who were included in the study and needed special postoperative care. (PICU= Pediatric intensive care unit)

<table>
<thead>
<tr>
<th>Groups of patients</th>
<th>Number</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Extended admission</td>
<td>20</td>
<td>42.6</td>
</tr>
<tr>
<td>PICU admission</td>
<td>14</td>
<td>29.8</td>
</tr>
<tr>
<td>Very young age (&lt;3 years)</td>
<td>11</td>
<td>23.4</td>
</tr>
<tr>
<td>Postoperative bleeding</td>
<td>2</td>
<td>4.2</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>100</td>
</tr>
</tbody>
</table>

### TABLE 2. Indications for admission in PICU

<table>
<thead>
<tr>
<th>Indications for admission in PICU</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morbid obesity</td>
<td>9</td>
<td>64.3</td>
</tr>
<tr>
<td>Asthma</td>
<td>2</td>
<td>14.3</td>
</tr>
<tr>
<td>Severe OSA and very young age (1y3m)</td>
<td>1</td>
<td>7.2</td>
</tr>
<tr>
<td>Cerebral palsy with tracheal stenosis</td>
<td>1</td>
<td>7.2</td>
</tr>
<tr>
<td>Atrial septal defect</td>
<td>1</td>
<td>7.2</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
<td>100</td>
</tr>
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REFERENCES


