STRONG CHILDREN'S RESEARCH CENTER

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ABSTRACT

Title: Pediatric Intensive Care Courses Post-Adenotonsillectomy: An Algorithm for Efficient Referral

Objectives: Obstructive Sleep Apnea Syndrome (OSAS) is highly prevalent, affecting 2 to 3% of the pediatric population. OSAS consists of repetitive episodic periods of obstruction or increased resistance in the upper airway and presents with snoring, oxygen desaturation and/or hypercapnia which can lead to neurocognitve, behavioral, and cardiovascular dysfunction. Hypertrophic adenoids and tonsils are often associated with obstructive sleep apnea and adenotonsillectomy is widely considered as the first line treatment for OSAS in children. Adenotonsillectomy, even for obstructive sleep apnea, is most commonly performed as an outpatient procedure in which children are sent home directly following surgery without overnight inpatient observation. Post-operative complications ranging from bleeding, swelling, and pain to overt upper airway obstruction are uncommon, but can be life-threatening and lead physicians to refer a subset of patients to the Pediatric Intensive Care Unit (PICU) for post-operative care. There is limited literature evaluating pre- and peri-operative risk factors that could predict which patients are likely to need airway intervention, and therefore warrant PICU admission. The aim of this retrospective study is to identify factors that could reliably predict the occurrence of post-operative airway complications.

Methods: This was a retrospective study looking at children who underwent adenotonsillectomy (T&A), isolated tonsillectomy or isolated adenoidectomy from 5/1/2006 to 4/03/2012 and were admitted to the PICU within one month from the date of surgery. Data regarding pre-operative polysomnography, the operative course and events in the PICU was collected. Parametric and non-parametric statistics were performed using SPSS software as appropriate.

Results: Data were collected from 129 patients (n = 77 male), age 55.8 ± 46.1 months, BMI-Z score 0.90 ± 1.9. Negative significant correlations were found between age in months ($r = -0.31$) and total time in the PICU and also between nadir O2 saturation recorded on pre-operative polysomnography ($r = -0.33$) and total time in the PICU (hours), $p < 0.05$. Significantly more children aged < 2 years were intubated post-operatively compared to children $\geq$ 2 years old ($p<0.05$). Likewise, children with significant medical comorbidities were more likely to be intubated post-operatively compared to children without underlying medical problems ($p<0.05$). A logistical regression analysis found that age less than 2 years, the presence of comorbid conditions, oxyhemoglobin saturation <90% recorded on overnight polysomnography, and apnea-hypopnea index on overnight polysomnography > 15 events/hour predicted need for airway intervention with 94% accuracy.

Conclusions: Careful monitoring for high-risk patients is necessary following T+A to prevent disastrous complications from upper airway compromise as the incidence of airway compromise is surprisingly high in this group of patients. Utilization of the limited resource of PICU beds and the enormous expense associated with PICU admission should be reserved for at-risk patients. This preliminary, retrospective study shows that age < 2 years, comorbid medical conditions and polysomnographic evidence of oxyhemoglobin desaturation are strong predictors for the necessity of airway intervention post-operatively. Future, large cohort studies designed to prospectively evaluate efficient resource utilization while effectively preventing the occurrence of adverse airway events in unmonitored settings and in the absence of personnel trained and readily able to provide advanced airway intervention are needed.