Management of the Critical Pediatric Airway – A Review of Team Coordination and Management Algorithm
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Conclusion: The outcomes of pediatric patients with critical airways can be optimized by using a multidisciplinary team approach and following an algorithm of critical airway intervention.

Objective: To facilitate function of multidisciplinary emergency airway teams and improve pediatric patient outcomes by reviewing outcomes of patients that underwent emergency airway procedures in a 10-year period at a tertiary care pediatric hospital. Methods: Retrospective Chart Review. Results: >50 of 300 patients with critical airways required acute surgical intervention. Most common underlying etiologies: trauma, foreign body aspiration, hemorrhage, and airway stenosis. Otalaryngology and Anesthesia were the most commonly involved. Intraoperative complications included: pneumothorax, hemorrhage, and need for cardiopulmonary resuscitation. 2 deaths reported: 1 related to tracheoinnominate fistula, 1 related to multi-organ failure. No deaths related to inability to obtain an airway.

Introduction: Emergency airway management in the pediatric population has an extremely high risk for morbidity and mortality for the patient. Airway management planning and multidisciplinary team coordination are needed to reduce these risks.

Case Report: On day of life 0, a term neonate with previously unrecognized holoprosencephaly and difficult airway was transferred to the Neonatal Intensive Care Unit (NICU). The patient was transferred with a laryngeal mask airway (LMA) to secure the patient’s airway. (Image 1). The patient’s vital signs were stable with the LMA in position, but there was grave concern for dislodging the LMA. After discussion of the airway management plan between Pediatric Otolaryngology, Pediatric Anesthesia, Neonatal Intensive Care, and Respiratory Therapy, the patient underwent successful tracheostomy tube placement with LMA in position in the NICU by Pediatric Otolaryngology with Pediatric Anesthesia providing anesthetic care and Neonatal Intensivists present for neonatal support.

Results: True surgical emergencies were identified in >50 of the 300 patients. The acute airway etiologies precipitating the need for intervention included: congenital malformations, foreign body aspiration, trauma, hemorrhage, infections, loss of airway, and plastic bronchitis. (Images 2 & 3).

Image 1. Neonate with holoprosencephaly and midface anomalies, airway secured with LMA prior to tracheostomy in the NICU

Image 2. Plastic Bronchitis Cast
Image 3. Pan-Facial Trauma, 6 of the fractures are shown

Critical Airway Management Algorithm
1. Spontaneous Ventilation
2. Hemodynamic Stability
3. Control of Hemorrhage, Vomit
4. Securing of Airway

Figure 1. Critical Airway Team Airway Algorithm

Otolaryngology and Anesthesia were the most commonly involved specialties. Intensive Care, Respiratory Therapy, Emergency Medicine, and Cardiothoracic Surgery specialists also participated. Critical airway management was coordinated by the team. (Figure 1). The airway management techniques used included: spontaneous ventilation, inhalational agents, avoidance of paralytics if possible, use of alternative intubation techniques, rigid bronchoscopic approaches, and awake tracheostomy. The airway management algorithm was rapidly reviewed by the teams involved and each contributed their expertise to the collaborative intervention. The airway objectives and concerns were discussed before and during the procedures. By ensuring a voice for each service, all concerns were rapidly addressed.

Discussion: The use of the critical airway management algorithm and multidisciplinary team approach has produced the best outcomes for our pediatric patients with critical airways.

References
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