

Difficult Airway Management in a Pediatric Patient with Retropharyngeal Abscess

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CASE DESCRIPTION

A 13-month old, 10-kg, otherwise healthy female presented to an outside hospital after with respiratory distress in the setting of a recent upper respiratory infection. She experienced hypoxic respiratory failure In the emergency department and was intubated at an outside hospital with a 4.0 uncuffed endotracheal tube (ETT) prior to being transferred to our institution. The airway was reportedly difficult with ten attempts made before tracheal intubation.

Upon arrival to the PICU, the patient underwent a computed tomography (CT) scan of her head and neck showing airway obstruction secondary to a 2.1x5.4x10.9cm retropharyngeal abscess which extended from the skull base to T2 with extension into the mediastinum (Fig. 1). A collaborative decision was made between the PICU, ENT, pediatric surgery, and anesthesia teams to bring the patient to the OR for emergent drainage of the abscess.

Following transport to the OR for emergent drainage of the abscess, the patient developed an air leak with increasingly difficult ventilation, requiring tube exchange. Under visualization with video laryngoscopy, a 3.5 cuffed ETT was passed with some resistance directly beside the 4.0 uncuffed ETT through the vocal cords and the 4.0 tube was removed. Upon connection to the ventilator, end-tidal CO₂ and bilateral breath sounds were absent. Fiberoptic bronchoscopy through the ETT showed the tube had bent. During this time, the patient became hypoxemic and bradycardic resulting in cardiac arrest and initiation of cardiopulmonary resuscitation. After further intervention including unsuccessful abscess drainage and fiberoptic evaluation, the patient was successfully reintubated with another 3.5 cuffed ETT and ROSC was achieved.

The patient was placed on an epinephrine infusion and returned to the PICU for further stabilization with no additional surgical interventions.

Figure 1. Sagittal view of retropharyngeal abscess



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DISCUSSION

Given the unusually large size and extensive nature of this retropharyngeal abscess (RPA), airway management in this case was particularly challenging. Our review of the literature showed few case reports of airway management in pediatric patients with RPA. Strategies in these patients varied from successful intubation using direct laryngoscopy to emergent tracheotomy.^{1, 2, 3} A review from 2019 compiled data from the Pediatric Difficult Intubation (PeDI) registry from 13 pediatric centers. The incidence of unexpected difficult bag mask ventilation was 7% with decreasing age being a significant risk factor.⁴ The incidence of difficult laryngoscopy ranged from 0.06%-3% with unanticipated difficult intubation being 0.03%.⁴

Another study found that the occurrence of complications (e.g.: hypoxemia, cardiac arrest, etc.) resulting from difficult intubation was associated with two or more tracheal intubation attempts, weight < 10kg, short thyromental distance, and three direct attempts prior to indirect attempt.⁵ One of these criteria are applicable to our case. In a critical "can't intubate, can't ventilate" scenario, much like this one, ideally there should be a surgical team available to perform emergent tracheostomy. Of course, in our case ENT was in the operating room, and pediatric general and cardiothoracic surgery were on standby. However, if they cannot be available the final pathway on the emergency pathway of the ASA difficult airway algorithm is to call for help for invasive access. Interestingly, one study showed that on an 8kg piglet model, 22/30 physicians were unable to perform cricothyroidotomy within four minutes.⁶ This shows an increased need for continued simulation and education on this life-saving procedure that anesthesiologists should be prepared to perform in a worst-case scenario where help is not available.

Perhaps the most important takeaway from this scenario is to always have several contingency plans available to optimize oxygenation and ventilation in an anticipated difficult airway, such as in this case with a known recent history of difficult intubation and an anatomic airway obstruction. Despite following the ASA Difficult Airway Algorithm for pediatrics, anatomic distortion can significantly impact airway management and requires additional consideration and planning. It is important to present this case and share knowledge gained from this experience with anesthesiologists who may find themselves in a similar clinical scenario given that it is a rare occurrence.