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Case Report

Difficult Airway Management in a Pediatric Patient with Parapharyngeal Mass: Case Report

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ABSTRACT

Critical airway incidents in children are among common anesthetic concerns. Due to limited apnea tolerance, any delay in airway management can quickly lead to severe complications. Unique pediatric anatomical features such as a large epiglottis, narrowed subglottic space, prominent occiput, elevated larynx position, and enlarged tongue can heighten the risk of airway obstruction. In this report, we presented a case of compromised airway due to a parapharyngeal mass in a 7-year-old patient, managed without complications.

Introduction

Parapharyngeal Space (PPS) is a pyramid-shaped area extending from the skull base to the hyoid. It consists of vital neurovascular structures, including the internal carotid arteries, internal jugular veins, cervical nerves and sympathetic chain, and also multiple lymph nodes and part of deep lobe of the parotid gland [1].

PPS lesions represent only 0.5 to 1% of all head and neck tumors, with the majority of these (80%) being benign [2]. The most prevalent tumor types are of neurogenic (35-41%) or salivary (35-45%) origin, while other histological types, such as meningiomas, hemangiomas, or lipomas, are exceedingly rare [3]. Non-Hodgkin lymphoma (NHL) is among the most common head and neck tumors in infants (28%), and the most common histological subtype is Burkitt lymphoma (BL) [4-7].

These tumors may appear as a bulging mass in the neck or oropharynx, accompanied by symptoms such as foreign body sensation, dysphagia, pharyngeal discomfort, hoarseness, obstructive sleep apnea (OSA), and abnormal nasal cavity sounds [8]. The main imaging techniques currently employed for assessing PPS tumors are contrast-enhanced computed tomography scans (CT scans) and magnetic resonance imaging (MRI) [9]. Most benign PPS tumors can be surgically excised. The rate of complications and recurrence rate is usually minimal [10].

In this report, we presented a case of compromised airway due to a parapharyngeal mass in a 7-year-old patient, managed without complications.

Case Report

A 7-year-old male child with a parapharyngeal mass diagnosed by radiologic imaging and symptoms for the past 2 months presented to Mofid Children's Hospital in

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Tehran, Iran. The patient experienced changes in phonation and snoring for 2 months, and despite multiple medical visits, a diagnosis was not made. The patient's parents reported frequent signs of upper respiratory infections over the last 5-6 months, which were treated symptomatically. They did not mention any significant medical or family history.

Laboratory test results are presented in (Table 1). The preoperative CT scan revealed a large left parapharyngeal and retropharyngeal mass, accompanied by mucosal thickening in the ethmoidal, sphenoid, and left mastoidal air cells (Figure 1).

The patient was admitted to the operating room (OR) for a diagnostic biopsy. Baseline vital signs included a heart rate of 110/min, blood pressure of 113/69 mmHg, oxygen saturation of 97%, and he was afebrile, weighing 28 kg. There were signs of mild respiratory distress and nasal obstruction. He had a 22-gauge IV line in his left hand and received 1 mg of IV midazolam and 20 mcg of IV fentanyl while being oxygenated with 8 MAC of sevoflurane. After deepening of anesthesia to the sufficient level, intubation was performed using direct laryngoscopy with a 5.5 endotracheal tube (ETT) without muscle relaxants, and spontaneous breathing was maintained. The patient received 20 mg of IV propofol and 6 mg of IV cisatracurium, with anesthesia maintained by remifentanil (0.5 mcg/kg/min) infusion and inhalational sevoflurane. Another 20-gauge IV line was established in the right hand. The patient received 400 cc of normal saline during surgery, and blood loss was minimal. Postoperative pain management was performed using 280 mg of IV paracetamol. After 90 minutes of operation, the patient was transferred to the ICU intubated.

After one day of ICU admission, all sedations were held, and the patient was transferred to the OR for the extubation process. With complete airway management considerations, the patient was extubated and monitored for 2 hours in the recovery unit, then transferred back to the ICU with stable vital signs and full orientation. The patient remained in the ICU for 2 more days with relieved upper respiratory symptoms. The patient was able to breathe normally through the nasal cavity, and respiratory distress had improved.

The pathology result showed high-grade B-cell lymphoma consistent with Burkitt lymphoma, and further treatment plans were performed under oncologists' supervision with chemotherapy and corticosteroid administration.

Table 1- Preoperative laboratory data

Test	Value	Test	Value
WBC	12.2	BUN	12
Hb	14.2	Cr	0.6
HCT	41.0%	Alkp	407
PLT	548	AST	23
BS	70	ALT	15
Na	138	Total Pro	7.6
K	4.5	Albumin	5.1
P	3.3	LDH	546
Mg	2.5	CRP	5
Ca	10.3	ESR	23
PT	12.0	INR	1.0
PTT	30		

Figure 1- Horizontal view of preoperative CT scan showing large left parapharyngeal and retropharyngeal mass

Discussion

Complications noted in the literature regarding head and neck tumors emphasize the difficulties in managing the airway prior to tumor removal [11-12]. Establishing an adequate airway takes precedence, especially if respiratory distress is present alongside the lesion [13].

Critical airway accidents in pediatrics population are a prevalent concern and remain a significant cause of morbidity and mortality within this population [14-15]. Young children are especially vulnerable during the perioperative period [16]. Due to limited apnea tolerance, any delay in addressing airway obstruction and loss of airway control in children can quickly lead to severe complications. Therefore, pre-procedure assessment and preparation for effective management of the pediatric difficult airway, whether anticipated or unanticipated, are crucial [17]. Unique pediatric anatomical features can complicate airway management. A large epiglottis, narrowed subglottic space, prominent occiput, elevated larynx position, and enlarged tongue can impede proper alignment during direct laryngoscopy (DL) and heighten the risk of airway obstruction, which may lead to rapid oxygen desaturation and bradycardia, potentially resulting in cardiac arrest [18].

Despite this critical situation, the lack of proper guidelines for pediatric airway management is troubling. However, in 2022, the American Society of Anesthesiologists (ASA) guidelines for difficult airway management were revised and for the first time, a dedicated section concerning pediatric airway was added [19].

In the past twelve years, there has been a notable surge in research focused on managing the difficult pediatric airway. This growth surpasses publication rates from earlier decades and can be linked to multiple developments: the establishment of international multicenter registries with subsequent analyses, the initiation of prospective clinical studies, improvements in airway management equipment designed for children, and the release of updated clinical guidelines dedicated to pediatric airway care. Collectively, these advances have reshaped current strategies for handling both complex and routine pediatric airway cases [20].

In this report, we presented a case of challenging airway management in a pediatric patient with a parapharyngeal mass. We employed inhalational anesthesia without muscle relaxants, and the patient was intubated without any significant difficulties.

Endotracheal intubation often necessitates the use of sedatives and analgesics to ease the procedure and minimize patient discomfort. While muscle relaxants can facilitate tracheal intubation in children, they carry the risk of prolonged paralysis and delayed neuromuscular recovery [21]. Recently, intubation without muscle relaxants has gained attention as a viable alternative, and several studies have shown that omitting muscle relaxants during pediatric anesthesia can effectively reduce muscular discomfort and accelerate postoperative recovery [22-24]. We didn't utilize muscle relaxants in our case to prevent spontaneous breathing compromise. In some cases, due to the nature of the patient's disease, neuromuscular blocking agents should be avoided. In 2022, Karami et al. managed a case of a pediatric patient with prune belly syndrome. They didn't use any muscle relaxants for airway management and used a laryngeal mask airway (LMA) instead of an ETT [25].

Different airway management methods are utilized across various experiences. In 2017, Park compared the initial success rates of DL and videolaryngoscopy (VL) in 1,295 encounters, revealing an initial success rate of 51% with VL compared to 4% with DL [26]. However, in our case, intubation was successful on the first attempt using DL.

In 2017, Kulkarni et al. managed a case of difficult airway in an infant with cervical lipomatosis. Similar to our case, they administered premedication and inhalational sevoflurane, successfully intubating the patient without the use of muscle relaxants [27]. Villa et al. (2024) presented a case of a 4-year-old female admitted due to sudden enlargement of a neck mass who was intubated under sedation while maintaining spontaneous ventilation with a pediatric flexible fiberoptic scope through a nasopharyngeal airway. They did not utilize muscle relaxants, similar to our case. However, they employed advanced airway management techniques using a fiberoptic scope [28]. In 2025, Pham et al. presented a 2-5-year-old girl with a PPS tumor. Unlike our case, they chose a more aggressive airway management protocol, and the patient underwent a tracheostomy for airway control, followed by a biopsy and subsequent surgical excision of the tumor [29].

Conclusion

Airway management in pediatric patients is highly complex and carries significant risks, especially when additional factors such as head and neck masses are present. Ensuring adequate oxygenation with minimal complications is of utmost importance. In this case, the patient with a parapharyngeal mass was successfully intubated and subsequently extubated.

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