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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		

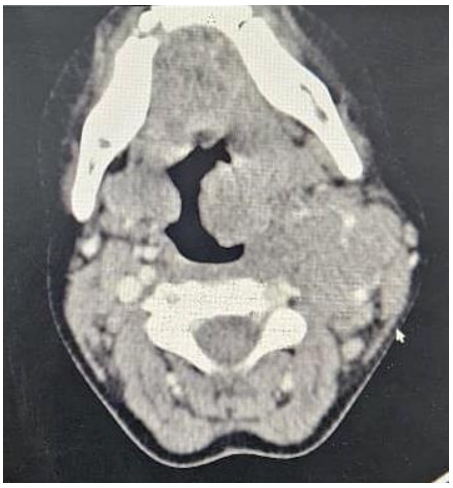

Figure 1- Horizontal view of preoperative CT scan showing large left parapharyngeal and retropharyngeal mass

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.

References

[1] Olsen KD. Tumors and surgery of the parapharyngeal space. Laryngoscope. 1994;104:1-28.

[2] Bhardwaj A, Ps S, Sood R, Malhotra M, Priya M, Saikia R. Giant pediatric de novo parapharyngeal

space pleomorphic adenoma: excision by semi trans-parotid cervical approach. Egypt J Otolaryngol. 2023;39(1):57.

[3] Marzouki H, Nujoom M, Fagih SN, Almokri RM, Zawawi F, Jamjoom R, et al. Surgical parapharyngeal space tumor analysis with case series study. Comput Intell Neurosci. 2022;2022(1):7083240.

[4] Arboleda LPA, de Mendonça RMH, Lopez EEM, Araújo ALD, Palmier NR, de Pauli Paglioni M, et al. Global frequency and distribution of head and neck cancer in pediatrics, a systematic review. Crit Rev Oncol Hemato. 2020;148:102892.

[5] Siegel RL, Miller KD, Fuchs HE, Jemal A. Cancer statistics, 2022. CA Cancer J Clin. 2022;72(1).

[6] Arboleda LPA, Hoffmann IL, Cardinalli IA, Santos Silva AR, de Mendonça RMH. Demographic and clinicopathologic distribution of head and neck malignant tumors in pediatric patients from a Brazilian population: a retrospective study. J Oral Pathol Med. 2018;47(7):696-705.

[7] Alli N, Meer S. Head and neck lymphomas: A 20-year review in an Oral Pathology Unit, Johannesburg, South Africa, a country with the highest global incidence of HIV/AIDS. Oral Oncol 2017;67:17-23.

[8] Varoquaux A, Fakhry N, Gabriel S, Garcia S, Ferretti A, Chondrogiannis S, et al. Retrostyloid parapharyngeal space tumors: a clinician and imaging perspective. Eur J Radiol 2013;82(5):773-82.

[9] Vogl TJ, Burck I, Stöver T, Helal R, editors. Parapharyngeal Space: Diagnostic Imaging and Intervention. In: RöFo-Fortschritte auf dem Gebiet der Röntgenstrahlen und der bildgebenden Verfahren. Georg Thieme Verlag KG; 2024.

[10] Grilli G, Suarez V, Muñoz MG, Costales M, Llorente JL. Parapharyngeal space primary tumours. Acta Otorrinolaringol (English Edition). 2017;68(3):138-44.

[11] Sichel J-Y, Eliashar R, Yatsiv I, Gomori JM, Nadjari M, Springer C, et al. A multidisciplinary team approach for management of a giant congenital cervical teratoma. Int J Pediatr Otorhinolaryngol. 2002;65(3):241-7.

[12] Shah SI, Holterman A-X, Licameli GR. Congenital cervical teratoma: airway management and complications. Otolaryngol Head Neck Surg. 2001;124(1):53-5.

[13] Cohen AF, Mitsudo S, Ruben RJ. Nasopharyngeal teratoma in the neonate. Int J Pediatr Otorhinolaryngo. 1987;14(2-3):187-95.

[14] Habre W, Disma N, Virag K, Becke K, Hansen TG, Jöhr M, et al. Incidence of severe critical events in paediatric anaesthesia (APRICOT): a prospective multicentre observational study in 261 hospitals in Europe. Lancet Respir Med. 2017;5(5):412-25.

[15] Fiadjoe JE, Nishisaki A, Jagannathan N, Hunyady AI, Greenberg RS, Reynolds PI, et al. Airway management complications in children with difficult tracheal intubation from the Pediatric Difficult Intubation (PeDI) registry: a prospective cohort analysis. Lancet Respir Med. 2016;4(1):37-48.

[16] Paterson N, Waterhouse P. Risk in pediatric anesthesia. Pediatr Anesth. 2011;21(8):848-57.

[17] Krishna SG, Bryant JF, Tobias JD. Management of the difficult airway in the pediatric patient. J Pediatr Intensive Care 2018;7(03):115-25.

[18] Khan SA, Matuszczak M. Management Of The Pediatric Difficult Airway: New Strategies Unveiled. Curr Anesthesiol Rep. 2024;14(3):417-25.

[19] Apfelbaum JL, Hagberg CA, Connis RT, Abdelmalak BB, Agarkar M, Dutton RP, et al. 2022 American Society of Anesthesiologists practice guidelines for management of the difficult airway. Anesthesiology. 2021;136(1):31-81.

[20] Stein ML, Argüello LAS, Staffa SJ, Heunis J, Egbuta C, Flynn SG, et al. Airway management in the paediatric difficult intubation registry: a propensity score matched analysis of outcomes over time. EClinicalMedicine. 2024;69.

[21] Tamire T, Garbessa B, Gebeyehu G, Getachew L. Tracheal Intubation-related adverse events in pediatrics anesthesia in Ethiopia. Paediatr Anaesth. 2021; 31(5):515-521.

[22] Rizvanović N, Čaušević S, Šabanović A. Conditions of endotracheal intubation with and without muscle relaxant in children. Med Glasnik. 2017;14(1).

[23] Naziri F, Amiri HA, Rabiee M, Banihashem N, Nejad FM, Shirkhani Z, Solimanian S. Endotracheal intubation without muscle relaxants in children using remifentanil and propofol: Comparative study. Saudi J Anaesth. 2015;9(4):409-12.

[24] Karanth H, Raveendra U, Shetty RB, Shetty P, Thalanjeri P. Comparative evaluation between sevoflurane and propofol for endotracheal intubation without muscle relaxants in pediatric cleft surgeries. Anesth Essays Res. 2018;12(2):434-9.

[25] Karami T, Ghaffarizadeh F. Anesthesia management in a pediatric patient with Prune belly syndrome; a case report. Iranian Journal of Pediatric Surgery. 2022;8(2):173-8.

[26] Park R, Peyton J, Fiadjoe J, Hunyady A, Kimball T, Zurakowski D, et al. The efficacy of GlideScope® videolaryngoscopy compared with direct laryngoscopy in children who are difficult to intubate: an analysis from the paediatric difficult intubation registry. Br J Anaesth. 2017;119(5):984-92.

[27] Kulkarni KS, Karnik PP, Dave NM, Agrawal B. Radiological images through an anaesthesiologists' looking glass: Airway management in cervical lipomatosis in an infant. Indian J Anaesth. 2017;61(10):846-7.

[28] Villa EK, Samar NAS. An Innovative Airway Management of an Anticipated Difficult Airway in a Pediatric Patient with Cervical Cystic Hygroma: A Case Report. Acta Med Philipp. 2024;58(9):30-4.

[29] Pham CT, Nguyen HT, Le TA, Dang TD, Pham C, Nguyen HT. Parapharyngeal Space Ganglioneuroma in a Child: A Report of a Rare Case. Cureus. 2025;17(8).