

A Case of Infantile Retropharyngeal Abscess: Anesthetic Approach to Critical Airway – A Case Report

İnfantil Retrofaringeal Apse: Kritik Hava Yoluna Anestezik Yaklaşım – Olgu Sunumu

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ABSTRACT

Retropharyngeal abscess (RPA) is a deep space neck infection that may present with nonspecific symptoms and signs, leading to life-threatening complications. Retropharyngeal abscess in the paediatric age group is particularly challenging and requires special skills and equipment. We report the anesthetic management of a 7-month old child who presented to the hospital with respiratory distress due to RPA and was scheduled for incision and drainage under general anesthesia. The use of flexible fiberoptic bronchoscope in spontaneously breathing patient, along with intraoperative ultrasonography, aided decision making for airway management. We highlight the challenges encountered while managing a large abscess compressing on the airway, where neither the percutaneous nor the intraoral technique could completely drain the abscess, posing a significant dilemma for the anesthesiologist.

Keywords: Infant, retropharyngeal abscess, respiratory distress, flexible fiberoptic bronchoscope, tracheostomy

ÖZ

Retrofaringeal apse (RFA), nonspesifik semptom ve bulgularla ortaya çıkabilen, yaşamı tehdit eden komplikasyonlara yol açabilen derin boyun enfeksiyonudur. Pediatrik yaş grubunda RFA, özel beceri ve ekipman gerektirmesi nedeniyle özellikle zorluk arz eder. Bu yazıda, RFA'ya bağlı solunum sıkıntısı ile hastaneye başvuran ve genel anestezi altında insizyon ve drenaj planlanan 7 aylık bir bebeğin anestezik yönetimi sunulmaktadır. Spontan solunumu devam eden hastada fleksibl fiberoptik bronkoskop kullanımı ve intraoperatif ultrasonografi, hava yolu yönetimine yönelik karar verme sürecinde yol gösterici olmuştur. Hava yolunu komprese eden büyük bir apsenin yönetimi sırasında karşılaşılan zorluklar vurgulanmakta; perkütan ve intraoral drenaj tekniklerinin apsenin tam olarak boşaltılmasını sağlayamaması, anesteziist açısından önemli bir ikilem oluşturmıştır.

Anahtar sözcükler: Bebek, retrofaringeal apse, solunum sıkıntısı, fleksibl fiberoptik bronkoskop, trakeostomi

INTRODUCTION

Retropharyngeal abscess (RPA) in children is caused by upper respiratory tract infection leading to life threatening airway obstruction (1). Early diagnosis and prompt management are essential to prevent complications. Airway management in infants is particularly challenging, and we aim to highlight the difficulties encountered during the anesthetic management of RPA in an infant.

CASE REPORT

A 7-month-old male child weighing 6 kg came with complaints of cough and fever for 10 days. The parents noticed a swelling over the anterolateral aspect of neck for the past 4 days, which did not subside despite antibiotic therapy. There was

no other significant past medical history. On examination, the patient was irritable and had a 2 x 2 cm tender swelling over the lateral aspect of neck. Inspiratory stridor was noted, suggesting upper airway involvement. The child's vital signs were as follows, heart rate was 136 min⁻¹ and regular, oxygen saturation was 96% while receiving oxygen 2 L min⁻¹ via nasal prongs (Romsons®, Romsons Scientific & Surgical Pvt Ltd, Agra, India) and respiratory rate was 30 cycles min⁻¹. Laboratory investigations revealed haemoglobin of 10.4 g dL⁻¹, total leukocyte count of 28,600 mm⁻³, and C-reactive protein of 134 mg dL⁻¹. Imaging studies further clarified the diagnosis. Computed tomography (CT) of the neck demonstrated a well-defined, thick-walled cystic collection in the retropharyngeal region measuring approximately 4.5 x 3.1 x 5.5 cm, causing significant mass effect on the airway (Figure 1). Ultrasonog-

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Figure 1. Computed tomography images showing retropharyngeal abscess causing mass effect on oropharynx, hypopharynx and trachea narrowed and pushed anteriorly.

raphy of the neck revealed a well-defined, thick-walled cystic lesion measuring 4.3×3.3 cm with retro tracheal extension and compression of the trachea.

The child was admitted in Paediatric intensive care unit (PICU), started on intravenous antibiotics, and scheduled for incision and drainage.

In the operating theater, standard American Society of Anesthesiologists monitors including electrocardiography, pulse oximetry, and non-invasive blood pressure were connected.

The patient was premedicated with intravenous glycopyrrolate 0.1 mg. Difficult airway cart and emergency tracheostomy setup were kept ready. Inhalational induction was performed using sevoflurane (6–8%) (Sevoflurane®, Abbott Laboratories, Chicago, USA) gradually titrated while carefully monitoring respiratory effort with 100% oxygen at 5 L min^{-1} while maintaining spontaneous ventilation with a Jackson-Rees circuit (Laerdal Medical, Stavanger, Norway) because it offers low resistance, minimal dead space, and facilitates maintenance of spontaneous ventilation in infants (2). Continuous observation of chest excursion, capnography, and oxygen saturation was performed to detect any evidence of apnoea. Neuromuscular blocking agents and opioids were avoided due to concern regarding airway collapse and respiratory depression. Intravenous dexamethasone was administered to reduce airway edema. Adequate depth of anesthesia was assessed clinically by loss of eyelash reflex, regular spontaneous respiration, and tolerance to gentle airway manipulation. Oxygen saturation remained maintained throughout airway management without significant desaturation episodes. Direct laryngoscopy was performed due to nonavailability of a videolaryngoscope as an initial airway assessment technique. The vocal cords could not be visualized due to gross oedema and blind intubation trial was avoided to prevent abscess rupture. Neuromuscular blocking agents were intentionally avoided due to concern regarding loss of airway tone and pro-

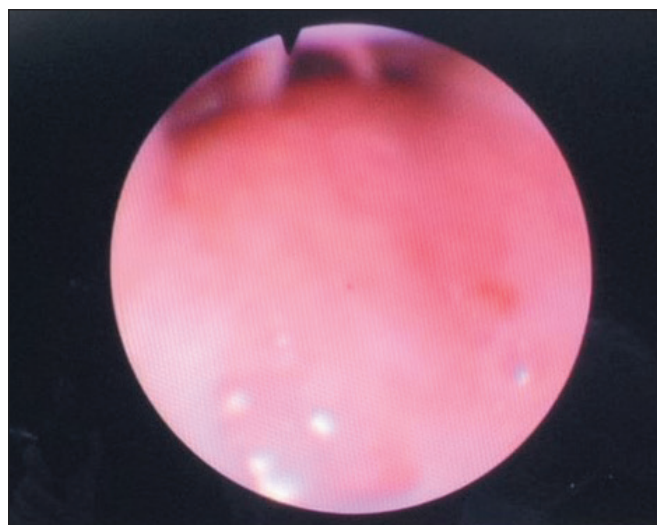


Figure 2. Fiberoptic bronchoscopy images of the upper airway.

gression to complete airway obstruction. Oxygenation during airway manipulation was maintained with intermittent mask ventilation between attempts. Difficult airway cart, emergency tracheostomy setup, and backup plans for cannot intubate cannot oxygenate situation were prepared in advance. Primary tracheostomy was not selected initially because distorted neck anatomy, extensive inflammatory edema, and concern regarding intratracheal contamination and mediastinal spread were considered to increase procedural difficulty and risk in a spontaneously breathing infant. Extraoral needle aspiration was performed and 30 mL pus was aspirated to improve airway visualization. Fiberoptic nasal intubation under spontaneous ventilation was attempted using a flexible fiberoptic bronchoscope (Karl Storz SE & Co. KG, Tuttlingen, Germany), which revealed gross oedema with only the tip of the epiglottis visible, making the passage of the endotracheal tube beyond the swelling difficult (Figure 2). Intraoperative ultrasonography using an ultrasound machine (GE Healthcare,

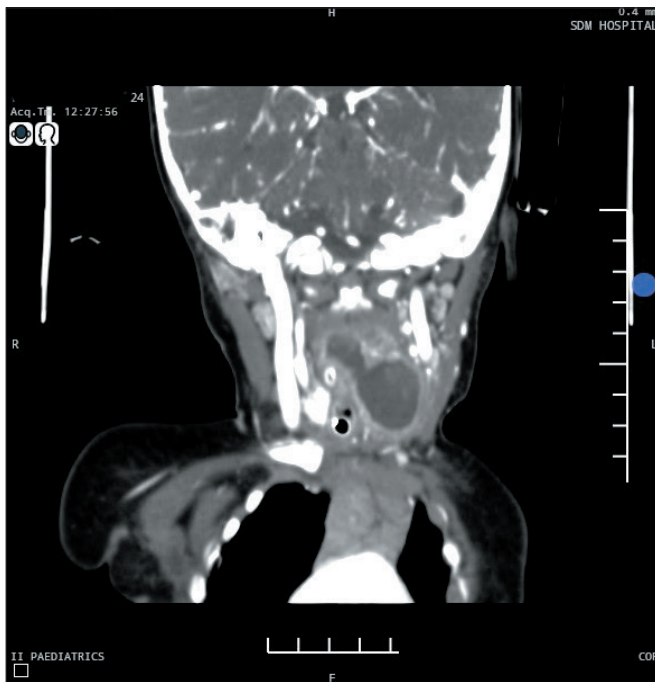


Figure 3. Computed tomography images - coronal section showing abscess on day 3 extending from C2-C7.

Chicago, IL, USA) of the neck revealed a poorly differentiated, non-suppurative retropharyngeal lesion compressing the airway. Following failed airway optimization and intraoperative ultrasonographic reassessment, tracheostomy became the safest definitive airway option. Hence, a tracheostomy was performed under ultrasound guidance using a 4.0 mm uncuffed tube (Portex®, Smiths Medical, Minneapolis, MN, USA). Intraoral drainage technique was attempted but resulted in negative aspiration due to non-suppurative nature of the lesion. The child was shifted to PICU for observation and to allow liquefaction of the abscess.

On day 3, repeated CT scan showed a well-defined hypodense collection in the retropharyngeal space extending from C2-C7 vertebrae, measuring approximately 15-20 mL, with mass effect on adjacent structures (Figure 3,4).

The child subsequently underwent successful intraoral incision and drainage under general anesthesia by the otorhinolaryngology team, following which swelling reduced and laryngoscopic visualization improved to Cormack-Lehane grade I. The child was decannulated on day 10 after resolution of airway edema.

DISCUSSION

This case demonstrates how evolving/non-suppurative pediatric RPA may render conventional decompression and advanced airway techniques ineffective, requiring dynamic reassessment and staged airway management. Diagnosis in

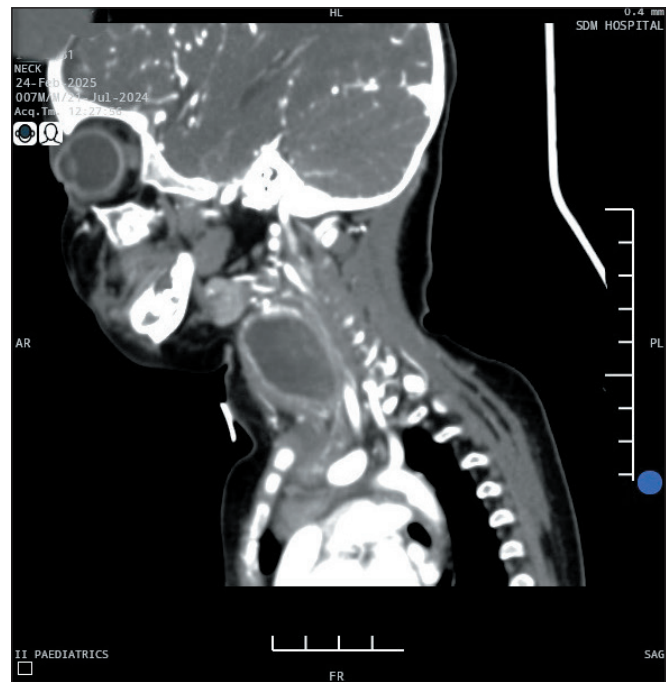


Figure 4. Computed tomography images - sagittal section showing extension of retropharyngeal abscess on day 3.

children is challenging and early detection and management are crucial, as approximately 11.6% of cases may develop severe complications (3). Early surgical drainage via transoral or transcervical and empirical antibiotic therapy is the primary treatment. Abscesses located above the hyoid bone are preferably drained intraorally, whereas those below the hyoid require external drainage (4).

With the primary concern being airway management, in our patient, inhalational induction with sevoflurane was selected as a case-specific strategy to maintain spontaneous ventilation in the setting of anticipated difficult airway management to avoid cannot ventilate, cannot intubate situation (4). Preservation of spontaneous ventilation and avoidance of neuromuscular blockade were considered important in our patient because loss of pharyngeal muscle tone could potentially worsen airway obstruction. Similarly, opioids were minimized to avoid respiratory depression in an already compromised airway. This strategy allowed preservation of airway patency while alternative airway plans were sequentially evaluated. Balhara et al. reported difficulty in ventilation, ten minutes after intubation due to evolving distal airway oedema in a patient of RPA undergoing incision and drainage under general anesthesia (5). Difficult mask ventilation and tracheal intubation can occur despite operator experience, as swollen pharyngeal walls, airway edema, and laryngeal displacement impair visualization of the larynx and vocal cords (6). According to Gore D et al. intubation failed due to bulging of the posterior pharyngeal wall, which completely obscured visual-

ization of the larynx (7). In their case, external abscess drainage collapsed the swelling and improved the laryngoscopic view, enabling airway control. However, in our patient, the swelling remained unchanged despite aspiration. Although the patient was initially diagnosed radiologically as having a RPA, intraoperative ultrasonography and failed aspiration suggested an evolving phlegmonous stage rather than a fully liquefied abscess. This distinction is clinically important because airway compromise may be severe despite the absence of a drainable collection. Recognition of this evolving stage influenced our subsequent airway management strategy and supported the decision to proceed with tracheostomy.

Point-of-care ultrasonography played a pivotal role in decision-making. While preoperative CT suggested a RPA, intraoperative ultrasonography demonstrated a poorly differentiated, non-suppurative lesion with persistent airway compression. These findings explained the failure of aspiration to improve airway visualization and prompted a change from the initial strategy of securing the airway via intubation to definitive airway management with tracheostomy. Thus, point-of-care ultrasonography functioned not only as a diagnostic tool but also as a real-time guide for airway planning.

Awake fiberoptic intubation has been considered as a relative contraindication in paediatric patients due to poor cooperation and risk of abscess rupture (6). Hui et al. described fiberoptic examination to diagnose a retropharyngeal bulge when there was no obvious swelling in a 15-month-old infant with respiratory distress (8). In our case, neither conventional laryngoscopy nor fiberoptic nasal endoscopy allowed visualization of vocal cords because of significant oedema.

To our knowledge, reports describing airway management of an evolving non-suppurative retropharyngeal lesion in an infant are limited. This case highlights several important learning points. First, non-suppurative lesions may behave differently from mature abscesses; aspiration may fail and airway anatomy may not improve despite decompression attempts. Second, dynamic reassessment is essential, as intraoperative ultrasonography may significantly alter management decisions. Third, preservation of spontaneous ventilation remains valuable in anticipated difficult pediatric airways. Finally, tracheostomy may become the safest definitive airway option even when it is not initially considered the preferred strategy and there is lack of data on airway guidelines for children less than 1 year of age (9).

CONCLUSION

The anesthetic management of a large RPA in infants poses unique challenges due to airway anatomy, risk of sudden airway obstruction and limited physiologic reserve. An additional challenge in this case was that tracheostomy was not

selected as the initial airway strategy, while subsequent attempts to secure the airway by intubation were unsuccessful. A multidisciplinary approach involving anesthetists, otorhinolaryngologist and radiologists is essential to ensure safe and effective care. Individualized clinical decision-making is essential when traditional approaches fail. This case report underscores the importance of anticipating airway difficulties and ensuring that all the modalities of airway management are readily available.

Written informed consent was obtained from the patient's parents for publication of this case report and accompanying images.

AUTHOR CONTRIBUTIONS

Conception or design of the work: RSK, IS

Data collection: RSK

Data analysis and interpretation: RSK, IS

Drafting the article: RSK

Critical revision of the article: IS

Other (study supervision, fundings, materials, etc): RSK

The authors (RSK, IS) reviewed the results and approved the final version of the manuscript.

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