

# A 15-Month-Old Boy With Respiratory Distress and Parapharyngeal Abscess: A Case Report

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**Abstract-** Parapharyngeal abscess is a life-threatening disease. Upper respiratory tract infection is the main cause in children. We present a 15-month-old boy admitted to the emergency ward with the chief complaint of difficulty in breathing caused by parapharyngeal abscess. His condition deteriorated gradually, and he transferred to the operation theater quickly for abscess drainage and because of the difficulty in orotracheal intubation; a tracheostomy was performed. His respiratory condition deteriorated 2 days after PICU admission, and the medical team noticed an unexplainable respiratory distress. A chest x ray obtained and showed a right side pneumothorax and subcutaneous emphysema around the neck area. The case presented here, had not been diagnosed at the first examination; however, there were enough clinical clues (such as respiratory distress, drooling, torticollis, bulging of the neck, previous viral respiratory infection, possible pharyngeal trauma). The story of this case reminds us the importance of the precise physical exam and history taking which could be life-saving.

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## Introduction

Parapharyngeal abscess is a life-threatening disease, presented by fever, respiratory distress, drooling, neck torticollis, trismus, neck stiffness, muffled voice, stridor, obstructive sleep apnea, bulging of pharyngeal wall and neck lymphadenopathy (14). Upper respiratory tract infection is the main cause in children (14). Airway patency management is the first consideration and sometimes is very difficult to maintain because of anatomical disarrangement of the region (11). Parapharyngeal abscess may have several complications such as; aspiration pneumonia, pulmonary abscess, erosion or septic necrosis of the carotid sheath, extension of the infection to the posterior mediastinum and mediastinitis and post-streptococcal complication like rheumatic fever and glomerulonephritis (8). Lemierre's syndrome which is internal jugular thrombophlebitis and transverse sinus thrombosis (9) and maybe pulmonary embolic abscesses (14) are other important complications. Treatment includes antibiotic therapy and sometimes surgical drainage (14).

## Case Report

A 15-month-old boy admitted to the emergency ward with the chief complaint of difficulty in breathing and common cold. Her mother had just notified that her son afflicted by common cold for a few days.

Assessing the patient's general appearance, he had coryza and was fully conscious, ill, feverish, and irritable, with moderate respiratory distress, drooling, stridor, and normal peripheral perfusion. Examining his oral mucosa revealed mild dehydration. His respiratory rate was 34 breaths per minute, heart rate 120 beats per minute, temperature 38.5 centigrade degrees and blood pressure 100/55 mmHg. He was admitted to the emergency ward with the impression of respiratory tract infection. The laboratory tests were as follows; White blood cells: 25780/microliter, neutrophil=77.8%, lymphocyte=17.2%, monocyte=4.9%, eosinophil=0.1%, platelet=576000/microliter, C-reactive protein (CRP)=50 mg/liter (reference range up to 6). The quantity of CRP increased to 137 on the next day.

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On the next examination, he had neck torticollis, subcutaneous emphysema at the right side of the neck, bulging of the right side of the neck below the mandible angle, and two lymph nodes at the right side of the upper neck with the diameter of about 1.5\*1.5 cm with moderate tenderness and without redness. He had post nasal discharge, and oropharynx mucosa was erythematous, and not any bulging of the retropharyngeal wall was reported on the visual exam by the emergency doctor. He didn't have trismus. Considering the possibility of para-pharyngeal abscess, ceftriaxone and vancomycin prescribed.

The patient had a history of one-week upper respiratory tract infection presented by coryza, nasal congestion, and mild fever and received a course of three days amoxicillin. His mother reported that, two days before the present illness, he fell down while having a pencil in his mouth and the tip of the pencil penetrated the tissue of right side of dorsal part of his tongue that caused little bleeding which stopped quickly. The next day, his temperature raised and at the day of admission he had difficulty in breathing.

A lateral neck (Figure 1) and chest X-ray (Figure 2) at the emergency ward obtained and the neck radiography showed "Disappearance of normal neck lordosis, thickening of retropharyngeal soft tissue and retropharyngeal emphysema", which suggests retropharyngeal abscess, and by seeing the chest radiography we were suspicious to widening of mediastinal shadow which could suggest mediastinitis, there was also right paracardiac opacity. Covering the germs responsible for mediastinitis, antibiotics changed to ampicillin-sulbactam and vancomycin. Serial chest x rays obtained in order to follow up mediastinitis, and no change in mediastinal shadow was found.

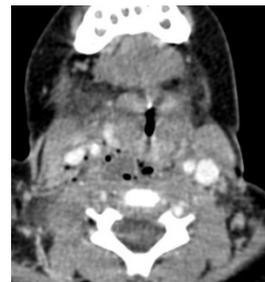


**Figure 1.** Lateral neck x-ray shows cervical spine straightening, thickening of retropharyngeal soft tissue and retropharyngeal emphysema

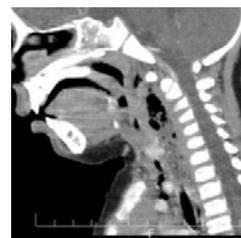


**Figure 2.** CXR shows neck and mediastinal emphysema

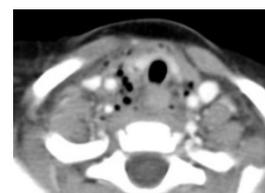
Contrast-enhanced Computed tomography of neck region (Figure 3-4-5-6) showed a 75\*18\*11 mm longitudinal retropharyngeal fluid collection with minimal ring enhancement more prominent at right side with significant air bubbles inside the collection due to retropharyngeal abscess. Extension of emphysema to bilateral carotid spaces, right posterior space of neck and superior mediastinum were also detected that together with edematous changes at thoracic inlet soft tissue were in favor of mediastinitis. Anterolateral deviation trachea to the left side was also seen.



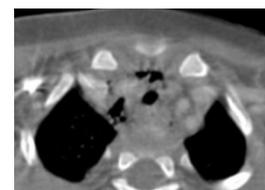
**Figure 3.** Axial CT image at glottis plan shows air containing fluid collection with mild ring enhancement at retropharyngeal space and emphysema at right carotid space due to retropharyngeal abscess



**Figure 4.** Sagittal reconstructed image shows retropharyngeal abscess from neck base through superior mediastinum



**Figure 5.** Axial CT image thoracic inlet shows soft tissue emphysema, minimal fluid and edematous change with mild tracheal deviation to left anterolateral in favor of mediastinitis



**Figure 6.** Superior mediastinal emphysema and edematous changes due to mediastinitis in axial CT image at superior mediastinal location

## Parapharyngeal abscess

His condition deteriorated gradually, and he transferred to the operation theater (OT) quickly for abscess drainage and because of the difficulty in orotracheal intubation; tracheostomy was performed and admitted to the pediatric intensive care unit (PICU) afterward. In PICU the patient had atracheostomy and receiving a low setup ventilator support and fever resolved one day after abscess evacuation.

The postoperative recovery was not uneventful. He wasn't fully conscious and seemed afflicted by hypoxia. He had a brief generalized clonic seizure and received phenytoin. Seizure didn't happen again and seizure treatment tapered in a few days. His respiratory condition deteriorated 2 days after PICU admission, and the medical team noticed an unexplainable respiratory distress. A chest x ray obtained and showed a right side pneumothorax and subcutaneous emphysema around the neck area. A chest tube placed and drained the air and taken out 3 days after the insertion and he separated from mechanical ventilator 2 days later. After 2 days of observation and stable condition, he was transferred from ICU to surgery ward. He was discharged 3 weeks later without any neurologic or other complication.

## Discussion

Galen, the great ancient Greek physician, has reported a case of retropharyngeal abscess (5). Many of the well-known names in the medical world such as; Horner, Fleming, Henoch, Allen, Cheyne, and Koplik reported this disease in the 19<sup>th</sup> century (6).

Retropharyngeal abscesses can result from dental infection, penetrating trauma to the oropharynx and vertebral osteomyelitis. It occurs most commonly in kids below 3-4 years old, and it is less common in children older than 5 years of age. It is more prevalent in boys than girls, and about two-thirds of the patients have a previous recent history of ear, nose and throat infections (14).

The cause of parapharyngeal infections is most commonly polymicrobial, and the prevalent pathogens include; group A *Streptococcus*, *Staphylococcus aureus*, and oropharyngeal anaerobic bacteria. In children less than 2 years of age, there has been an increase in the incidence of retropharyngeal abscesses, especially with *Staphylococcus aureus* including methicillin-resistant ones. *Haemophilus influenzae*, *Klebsiella* and *Mycobacterium avium* have also been responsible for the parapharyngeal abscess (14). Parapharyngeal abscess presented by persistent dysphagia following Epstein-Barr virus (12), retropharyngeal abscess caused by

*staphylococcus aureus* and *Mycobacterium Tuberculosis* after upper respiratory infection in a one month child, (presented by perioral cyanosis, crying, stridor and poor feeding, with a false diagnosis of croup) have also been reported. The latter case had been diagnosed by lateral neck X-ray (13). *Streptococcus pneumoniae* has also been reported as a cause of parapharyngeal abscess; however, it is not a common cause (1).

There are reports of abscess formation following foreign body ingestion or falling down with a pen in the mouth (5). Pharyngeal injuries caused by endotracheal intubation, endoscopy, foreign body ingestion and removal may also lead to retropharyngeal abscess (3). In children, more than 60% of retropharyngeal abscesses are caused by upper respiratory tract infections (4).

The signs and symptoms of parapharyngeal abscess include; fever, poor feeding, irritability, drooling, torticollis, neck stiffness, muffled voice, stridor, respiratory distress, obstructive sleep apnea, bulging of the posterior pharyngeal wall (in less than 50% of patients with the retropharyngeal abscess) and neck lymphadenopathy. A lateral pharyngeal abscess can present with fever, bulging of the lateral pharyngeal wall and dysphagia (14). Retropharyngeal abscess in children has the potential for extension into neighboring structures, and carotid involvement is a life-threatening complication, and it may lead to mediastinitis, vertebral osteomyelitis, airway obstruction and involvement of jugular and carotid vessels. Involvement of carotid artery can result in hemorrhage, pseudoaneurysm or acute hemiplegia. Clinical findings suggestive of arterial involvement are; recurrent, even small amount of bleeding from the throat, nose or ear, prolonged clinical course (more than 7-14 days) with continued swelling of the neck, hemorrhagic shock, an external or intraoral discoloration that indicates extravasated blood, prolonged trismus, protracted severe pain after abscess drainage and 10<sup>th</sup>, 11<sup>th</sup> and 12<sup>th</sup> cranial nerve involvement or Horner syndrome (2).

In a reported case, 3 weeks after ear piercing, pharyngeal abscess occurred and led to subluxation of atlantoaxial joint (7). Some of the other complications are; aspiration pneumonia, pulmonary abscess, erosion or septic necrosis of the carotid sheath, extension of the infection to the posterior mediastinum and mediastinitis, and post-streptococcal complication like rheumatic fever and glomerulonephritis (8). Lemierre's syndrome which is internal jugular thrombophlebitis and transverse sinus thrombosis is also an important complication of retropharyngeal abscess (9).

In the computerized tomography (CT) scan, posterior cranial fossa and upper mediastinum should also be included (9).

Comparing to the deep neck infections, peritonsillar abscess or cellulitis is common and manifests with a *sore throat, fever, dysphagia, trismus and asymmetric tonsillar bulge* (14). Peritonsillar abscess is most prevalent from November to December and from April to May, which is at the same time of the commonest time of streptococcal and exudative pharyngitis (8). Some of the differential diagnosis of peritonsillar abscess are; infectious mononucleosis, lymphoma, peritonsillar cellulitis and retropharyngeal abscess (8). Treatment includes antibiotic therapy against streptococci and anaerobic bacteria, needle aspiration, surgical drainage, and tonsillectomy. Needle aspiration may need to be repeated in a small group of patients, and if it fails to resolve, surgical drainage is required. In case of not responding to the antibiotics and needle aspiration in 24 hours, tonsillectomy should be considered (14).

Retropharyngeal lymphadenopathy is a rare presentation of Kawasaki disease and may imitate parapharyngeal abscess with respiratory signs and symptoms. In a related case report, despite surgical drainage of the abscess, fever continued. The amount of the pus was scant, swelling and fever hadn't resolved and in the 9<sup>th</sup> day of the disease when the bilateral non-purulent conjunctivitis and erythema of the extremities appeared, rash and systolic murmur had become visible on the next day, and the diagnosis of Kawasaki confirmed (10).

Lemierre disease is an uncommon infection of the parapharyngeal space, in which oropharynx infection spreads and leads to septic thrombophlebitis of the internal jugular vein and pulmonary embolic abscesses caused by *Fusobacterium necrophorum* which is an anaerobic oropharyngeal flora. It presents with acute fever, hypoxia, respiratory distress and high respiratory rate in a previously healthy young child or adolescent with recent history of pharyngitis. Chest X-ray may show several cavitory nodules, usually in both lungs and pleural effusion. It should be treated by long time intravenous antibiotics, with penicillin or cefoxitin and may be surgical drainage of metastatic abscesses of extrapulmonary sites (14).

In the treatment process, the first thing to consider is to secure the airway. Securing the airway may prevent abscess rupture and airway contamination with the abscess content. Because of the extended inflammation, visualizing and locating of glottis may be difficult (11).

More than 50% of parapharyngeal abscesses identified by CT scan can be treated without surgical drainage. Abscess drainage should be considered in case of respiratory distress or no response to the intravenous antibiotics. The empirical therapy includes a 3<sup>rd</sup> generation cephalosporin with ampicillin-sulbactam or clindamycin (for anaerobic bacteria coverage) and also considering the possibility of methicillin-resistant staphylococcus aureus (14).

The exact duration of antibiotic therapy is not known but several days of intravenous antibiotic therapy until improvement, followed by a course of oral antibiotics is usually prescribed (14).

Parapharyngeal abscesses can be fatal and should be considered in the differential diagnosis of respiratory distress and stridor. The case presented here, had not been diagnosed at the first examination, because of the crowded emergency ward and tired doctors, however there were enough clinical clues (such as respiratory distress, drooling, torticollis, bulging of neck, previous viral respiratory infection, possible pharyngeal trauma) to be highly suspicious of the diagnosis. The patient deteriorated quickly in the emergency ward, and he was lucky to have surgeons nearby for performing emergency tracheostomy operation. The anatomical distortion of the region caused by the abscess may make orotracheal intubation and even emergency tracheostomy difficult. Therefore it should be done just by expert clinicians. He might have aspiration pneumonia, from the abscess contents, or barotrauma from mechanical ventilator, as his respiratory condition deteriorated in PICU after the surgery. We don't know if the pencil trauma to his tongue was the precipitating cause of the abscess, as his mother had said it just penetrated to the dorsal part of the tongue, maybe it also had traumatized the pharynx but not noticed. Oropharynx visualization was difficult, as the child was agitated and more irritation could worsen his respiratory condition. Again this case is the reminder of precise physical exam and history taking which could be lifesaving.

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