

Retropharyngeal Penetrating Injury Causing Air Collection and Mediastinitis: Case Report, Management and Review Literature

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Abstract

Pharyngeal injuries caused by trauma are common and have been reported previously in the medical literature. In some cases of a penetrating injury there is a collection of air in the retropharyngeal space that can be shown on lateral soft tissue radiography of the neck. If this condition is not diagnosed or adequately treated the patient may develop severe complications such as mediastinitis. A case is reported of a patient with penetrating injury caused by a curtain rail and the subsequent treatment with review literature are described.

Introduction

The retropharyngeal space is a potential space lying between the posterior pharyngeal wall and the anterior wall of the vertebral column which normally measures 1–7 mm and contains loose areolar connective tissue. It provides an almost unrestricted space for an expanding air collection hematoma or abscess formation, which in rare cases can cause airway compromise. The causes of such pathology in this potential space include penetrating muscular injury, fractures and hyperextension strain injuries. Pharyngeal injuries caused by trauma are common and have been reported previously in the medical literature. In some cases of a penetrating injury there is a collection of air in the retropharyngeal space that can be simply shown on lateral soft tissue radiography of the neck, but in some other cases CT neck may be necessary for prompt diagnosis and management. Pharyngeal injuries are seen commonly in medical practice, in particular in an emergency medical setting. The typical history is of a sharp object held in the patient's mouth causing an injury after a sudden movement particularly among children.

Case History

A 12-year-old female patient presented to the emergency department (ED) of Hamad General hospital. She described an accidental penetrating injury to her pharynx as she had been holding a pencil in her mouth when she bent down and fell over her face followed by deep oral cavity trauma. The pencil penetrated her pharynx in the middle part. She complained of pain (VAS 30%) * in her mouth and along her neck posteriorly. She had started to feel mild dysphagia when was brought to the ED. She described a "popping" sound when she swallowed. Mild bleeding from the site of injury was discovered. The patient was otherwise clinically stable with no significant medical problems.

On examination of her oropharynx, there was a small punctured laceration measuring 4 mm present in the pharyngeal wall posterior to the oral cavity. There was no evidence of bleeding from the wound or surgical emphysema in the neck. She was afebrile with normal vital signs.

Pain was relieved and CT of the neck requested immediately, Lateral soft tissue views of her neck showed retropharyngeal air collection and retropharyngeal emphysema (figure 1 & 2).

Lateral soft tissue views of CT neck showing retropharyngeal air and retropharyngeal emphysema.

Treatment was started with intravenous fluids and antibiotics (cefuroxime and metronidazole). She was Kept nil by mouth. The following day she started to develop

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Figure 1:



Figure 3:



Figure 2:



Figure 4:

mild fever with leukocytosis, management continued for 7 days until pain disappeared in addition to the dysphagia, A fine bore nasogastric feeding tube was inserted and enteral feeding started on the first day.

After seven days repeat lateral soft tissue CT neck films showed complete resolution of the retropharyngeal air and mediastinitis (figure 3 & 4), all laboratory tests were normal including leukocyte's level. The patient was restarted with oral feeding and discharged soon afterwards. She was completely asymptomatic when reviewed two weeks later in clinic. No further follow up was arranged.

Discussion

Injuries to the palate are commonly reported and are not normally harmful. The cause is usually trauma to the oropharynx by objects held in the mouth. Sharp objects may however perforate the soft palate and cause collection of retropharyngeal air if sufficient force is delivered. Physical evidence of injury may only be mild [1]. Foreign bodies may become trapped and can

require surgical exploration for extraction [2]. Blunt external trauma if of sufficient force may also cause pharyngeal tears [3]. Other causes of pharyngeal perforation include instrumentation and endotracheal intubation [1]. There are also reports of retropharyngeal air collecting after dental procedures [4, 5]. This has been attributed to extraction of teeth and the use of compressed air in dental drills and syringes. Retropharyngeal air accumulation can also be spontaneous; it has been reported in patients suffering with asthma [6]. Occult perforation may occur in the absence of any obvious clinical signs. Lateral soft tissue radiographs are invaluable in diagnosing retropharyngeal air accumulation and soft tissue swelling. Such radiographs should be performed routinely in all clinical cases as the perforation may be otherwise undetectable by physical examination alone [1].

There are potential serious complications such as vascular injury to the carotid arteries or infection such as mediastinitis and abscess formation. Clinical features include chest pain, rigors, shortness of breath, systemic upset, dysphagia, and pleural effusion. Pus can accumulate in the chest cavity. Mediastinitis when established has a recognized high mortality rate. Air can also tract inferiorly to cause a pneumomediastinum.

The diagnosis of a parapharyngeal or retropharyngeal space infection is suspected based on clinical presentation and established by imaging (typically computed tomography [CT]). In addition to imaging, blood cultures should be obtained on all patients with a parapharyngeal or retropharyngeal space infection regardless of whether fever is present to identify potential pathogens.

General CT findings of deep neck space infections include loss of definition between the anatomic spaces in the neck, stranding in the subcutaneous tissues, tissue enhancement, and frank abscess formation [7, 8, 9]; the location of the findings indicates whether it is a parapharyngeal or retropharyngeal space infection.

Occasionally, necrotic lymph nodes (eg, from malignant metastatic disease) can be similar in appearance to an abscess on CT (peripheral enhancement with central low attenuation); in such cases magnetic resonance imaging (MRI) can be helpful to differentiate the two [7, 8, 9].

Although CT or MRI is preferred over plain radiographs, certain findings from a plain radiograph, if performed, can also suggest a retropharyngeal space infection. These include increased thickness of the prevertebral soft tissues, air or air-fluid levels, and foreign bodies. There may be cervical lordosis with swelling and gas collections in the retropharyngeal space causing anterior displacement of the larynx and trachea. In the presence of a retropharyngeal space infection, the pharynx or upper airway is displaced anteriorly by more than one-half the width of the fourth cervical vertebral body (C4; normally, the soft tissues of the posterior wall of the hypopharynx are about 5 mm deep, less than one-third the diameter of C4).

The treatment of retropharyngeal air with no other complications is conservative with administration of intravenous prophylactic broad-spectrum antibiotics that reduces the risk of sepsis.

Immunocompetent patients with a probable oral or odontogenic source *
Ampicillin-sulbactam (3 g intravenously [IV] every six hours) or
Ceftriaxone (1 to 2 g IV every 24 hours) plus metronidazole (500 mg IV every eight hours) or
Clindamycin (600 mg IV every eight hours) plus levofloxacin (500 mg IV or orally every 24 hours)

*(i.e., from the teeth), we suggest a regimen that acts against streptococci (including clindamycin-resistant viridans streptococci), H. influenzae, and anaerobic bacteria [10, 11, 12].

Immunocompetent patients with a probable otogenic source *
Cefepime (2 g IV every 8 to 12 hours) plus metronidazole (500 mg IV every eight hours) or
Piperacillin-tazobactam (4.5 g every six hours) or
Imipenem-cilastatin (500 mg IV every six hours) or meropenem (1 g IV every eight hours)

*(i.e., from the ear or mastoids), we suggest a regimen that is acting against streptococci (including clindamycin-resistant viridans streptococci), H. influenzae, and anaerobic bacteria as well as facultative gram-negative coverage, including P. aeruginosa [10, 11, 12].

Immunocompetent patients with a probable sinogenic source *
Vancomycin plus ampicillin-sulbactam (3 g IV every six hours) or
Vancomycin plus ceftriaxone (1 to 2 g IV every 24 hours) plus metronidazole (500 mg IV every eight hours) or
Clindamycin (600 mg IV every eight hours) plus levofloxacin (500 mg IV or orally every 24 hours)

*(i.e., from the sinuses), we recommend a regimen that has activity against S. pneumoniae, M. catarrhalis, S. aureus (including MRSA), and anaerobic bacteria [10, 11, 12].

Immunocompromised host *	
Vncomycin (15 to 20 mg/kg IV every 8 to 12 hours, not to exceed 2 g per dose) or linezolid (600 mg IV every 12 hours) plus:	Cefepime (2 g IV every 8 to 12 hours) plus metronidazole (500 mg IV every eight hours) or
	Imipenem (500 mg IV every six hours) or
	Meropenem (1 g IV every eight hours) or
	Piperacillin-tazobactam (4.5 g every six hours)

*We suggest a broad-spectrum regimen that provides coverage against MRSA and P. aeruginosa, in addition to other gram-positive and gram-negative aerobes and anaerobes [10, 11, 12].

The antibiotic doses are intended for patients with normal renal function; dosing of many of these agents must be reduced in patients with renal dysfunction. Empiric antibiotic therapy can be adjusted once culture results are available.

Patients usually respond well to these measures. We used nasogastric feeding to preserve nutritional status. This is beneficial in patients where oral feeding is contraindicated for longer than a few days because of persistence of retropharyngeal air or other associated factors. Surgical intervention such as drainage of abscesses or air may sometimes be required in patients [6, 10, 11].

Patients may present with confusion in clinical picture, exclusion of other vital differential diagnosis is very important such as Aortic dissection, ACS, ARDS, pneumothorax, Cardiac tamponade and Retropharyngeal Abscess.

To achieve a thorough management, protection of airway is vital, ensure an adequate airway and it is very important to seek help as intubation may be difficult. Septic workup with adequate volume resuscitation is essential, early administration of broad-spectrum antibiotics once the diagnosis is suspected. Urgent surgical consultation for prompt surgical debridement of any abscess and necrotic tissues, this may mandate the transfer of some patients to tertiary center with highly skilled intensive care, lengthy hospitalization of more than one month is common.

Conclusion

Early and accurate diagnosis of penetrating soft tissue injuries is very important to avoid potential complications; such cases require a joint effort in management between the accident and emergency staff and the ENT surgeon. A high index of suspicion should be suspected in patients who had a recent endoscopy, bronchoscopy, intubation, esophageal dilation, esophageal foreign body and external trauma is extremely important even when the

clinical features appear mild. Conservative management that entails prophylactic antibiotics is usually sufficient for complete resolution of the retropharyngeal air as aggressive therapy has been proven to provide the best chance of recovery and avoid fatal complications with an overall lifetime mortality rate of 19%-47%.

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