

Retropharyngeal abscess: a clinical review

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Abstract

Retropharyngeal abscesses are uncommon but potentially lethal infections, especially in the paediatric population under the age of five years. Abscesses in this group are classically secondary to upper respiratory infections especially oropharyngeal infections, while in the adult group they are usually secondary to trauma, foreign bodies, or as a complication of dental infections. Early diagnosis and the wide spread use of antibiotics have made these infections less common today. Between the years 1985–1996, 19 cases of retropharyngeal abscesses were treated in our department. Factors such as age, sex, aetiology, presenting signs, symptoms, methods of diagnosis, treatment and complications were reviewed. Thirty-two per cent of the cases were secondary trauma. A lateral neck film showing widening of the prevertebral space was the most important diagnostic tool, computed tomography (CT) scan was used in 63 per cent of cases to verify the signs of an abscess and to provide more accurate anatomical localization.

Thirteen cases required surgical drainage. The single most commonly isolated pathogen was *Streptococcus pyogenes*. There were no deaths and only one recurrence requiring repeated surgical drainage. One case was complicated by a spinal canal abscess. We also report two cases of retropharyngeal abscess in children caused by swallowing of unusual foreign bodies.

Key words: Abscess; Pharynx; Review, multicase

Introduction

The retropharyngeal space is an important potential space in the deep neck. In the young child the retropharyngeal space contains lymph nodes which drain the nasal cavity, nasopharynx, paranasal sinuses, and soft palate (Manjusha and Edwards, 1995) and offer a path for the spread of infection from this space into the mediastinum as well as to other deep neck compartments. The clinical presentation and preceding medical history may differ in various age groups with retropharyngeal abscess. In small children there is typically a history of an acute upper respiratory infection. In adults a history of foreign body, external trauma (Pickles, 1988), or iatrogenic instrumentation such as oesophagoscopy and oral tracheal intubation may be elucidated. Some less common causes such as tuberculosis (de Clercq and Chole, 1980), syphilis and vertebral fractures must be ruled out (Wong and Novotny, 1978). Patients may present with fever, odynophagia, dysphagia, dyspnoea, drooling, cervical rigidity (torticollis), a 'hot potato' or hyponasal voice, and sepsis. On inspection one might see a bulging of the pharyngeal wall; sometimes one-sided, as the midline raphe of the superior constrictor muscle attaches to the prevertebral fascia containing the abscess to one side. This sign is often difficult to detect in small children both because of the small size of the

oropharynx and because of the pooling of secretions in the hypopharynx. The mucosa itself may be swollen and inflamed. The lateral neck plain film is often enough to make the diagnosis. Characteristically a widened soft tissue shadow which may overlie the cervical vertebrae is seen. The normal dimensions of the retropharyngeal and retrotracheal space were defined by Wholey in 1958. The normal dimensions of the retropharyngeal space in both children and adults is between 4 to 7 mm, measured from the most anterior aspect of C2 to the soft tissues of the posterior pharyngeal wall. The retrotracheal space, measured from the anterior-inferior aspect of C6 to the posterior pharyngeal wall should be no more than 14 mm in children and 22 mm in adults. Other useful radiological signs in patients with retropharyngeal abscess are loss of the normal cervical lordosis with straightening of the cervical spine and the presence of air or foreign body in the soft tissues.

CT is helpful in making the diagnosis as it allows identification of the clinical stage of the infection and thus differentiates cellulitis from an abscess. It is also useful in defining the vascular structures of the neck and their potential involvement, as well as delineating exactly which neck spaces are involved, thus localizing the lesion before surgical drainage.

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Treatment consists of control of the airway, nothing per os (NPO), intravenous antibiotics, and surgical drainage. Perioral drainage is often sufficient for uncomplicated infections that have not compromised the airway or violated other deep neck spaces. For more serious infections and abscesses that have spread to other deep neck compartments, external drainage with vertical incision along the anterior border of the SCM muscle is necessary. The abscess is then opened between the carotid sheath and the inferior constrictor muscle.

Complications may be very severe since the retropharyngeal space is contiguous with the mediastinum and spread of the infection downward may cause mediastinitis. Other complications include airway obstruction and rupture of the abscess resulting in aspiration of pus and severe pneumonia.

Anatomy of the retropharyngeal space

The retropharyngeal space (or retrovisceral space) is a potential space that exists between the posterior aspect of the visceral layer and the alar division of the deep layer of cervical fascia. It extends from the base of the skull to the mediastinum at the level of the first or second thoracic vertebrae (Seid *et al.*, 1979) where the middle layer of deep cervical fascia fuses with the alar layer. The space contains connective tissue and lymph nodes (nodes of Henley) (Coulthard and Isaacs, 1991) which are arranged in two lateral chains separated by a midline raphe. The greatest number of lymph nodes are found in children under the age of five years, accounting for the relatively high incidence of acute upper respiratory infection induced retropharyngeal abscesses in this age group.

Materials and methods

Case charts of all the diagnosed retropharyngeal abscesses between the years 1985–1996 were reviewed retrospectively. Diagnoses in all cases was based on widening of the retropharyngeal space to at least twice the diameter of the cervical vertebrae on the lateral neck plain film, in addition to the characteristic clinical picture. Most diagnoses were confirmed by CT and/or intra-operatively. We reviewed factors such as age, sex, aetiology, clinical presentation, methods of diagnosis, and outcome. Microorganisms responsible for the abscess were cultured from pus collected at the time of surgical drainage.

Results

A total of 19 patients were diagnosed and treated for retropharyngeal abscess at Rambam Medical Center between the years 1985–1996. Sixteen were males and three were females. Patients ranged in age from one to 69 years. Seven cases were under five years of age, three cases were between six to 16 years of age and nine cases were over the age of 17 (adults). Aetiology was recorded as secondary to

preceding illness, no prodrome or precipitating illness (idiopathic) or traumatic. Traumatic cases were subclassified as foreign body ingestion or external trauma to the pharynx.

Seven cases were due to trauma, in nine cases a preceding illness was noted and in the remaining seven cases no precipitating illness or factor was elicited. Amongst the children under the age of five years, five cases had a previous recent history of an upper respiratory infection, one case was secondary to swallowing a foreign body and one case was due to penetrating oral trauma. Of the three cases in the age group between six to 16 years, one case was due to swallowing a foreign body, one case had a prior history of an upper respiratory infection and one case was of idiopathic origin. Amongst the age group above 17 years, three cases were caused by ingestion of a foreign body, one case was preceded by an upper respiratory infection, and five cases were idiopathic in origin.

The most common presenting signs were fever, torticollis, trismus, and pharyngeal swelling. The presenting symptoms were primarily a sore throat and dysphagia. A lateral X-ray film of the neck was performed and showed widening of the prevertebral soft tissue space in all cases. A CT scan was performed in 12 cases. Treatment consisted of IV antibiotics alone in eight cases and IV antibiotics combined with surgical drainage in the remaining 11 cases. Of the surgical procedures eight were transoral and three were external drainage.

Microorganisms were isolated from eight of the 11 surgically drained abscesses. The single commonest isolated organism was *Streptococcus pyogenes*. One case was complicated by a cervical spinal canal abscess. One case required repeated external surgical drainage. There were no deaths in this series.

Case 1

A five-year-old boy was brought into the paediatric emergency room after drinking a soft drink from a glass bottle with a crack in the bottom. The child had immediately vomited a small amount of blood and was taken by his parents to the emergency room. There he was examined by a paediatrician and released. The following evening the child was brought back to the emergency room with a fever of 38°C, odynophagia, a high-pitched squeaky voice, and refusal to extend his neck actively. No dysphagia nor drooling were noted. Inspection of the mouth and oropharynx was unremarkable. There was tenderness in the submental area of the neck and a limited range of motion of the neck passively. A lateral film of the neck revealed widening of the retropharyngeal space, evidence of air in the soft tissue, and a thin transverse white line suspected of representing a shard of glass (Figure 1). Intravenous antibiotic treatment was begun, NPO was ordered and an emergency CT examination of the neck was performed. The CT showed clear signs of an enlarged retropharyngeal space containing air and a white transverse line 8 mm in length at the level of



FIG. 1

Lateral neck film showing widening of the retropharyngeal space, air in the soft tissue, and a thin transverse white line representing a shard of glass.

C2-3 with a density similar to that of cartilage. The child was afebrile, although a worsening in the limitation of motion of the neck and a more pronounced voice change were noted.

Under general anaesthesia a pharyngoscopic examination was performed and an entrance wound, surrounded by white fibrous material, was visualized at the level of the hypopharynx.

An incision was made and a large amount of pus was drained. Widening of the incision and exploration of the area were performed in an attempt to locate and remove the suspected shard of glass, but none was found.

The child was maintained on iv antibiotics and NPO for the next three days. The range of motion of the neck returned to normal. Serial lateral X-rays showed a reduction in the swelling of prevertebral tissues and the child was discharged. His voice returned to normal pitch only two weeks later.

Although no glass was recovered surgically it was concluded that the retropharyngeal abscess was indeed secondary to swallowing a shard of glass based on the history of accidental swallowing of broken glass, radiological evidence of a foreign body in the retropharyngeal space on both plain film and CT, and the endoscopic finding of an entrance wound adjacent to a surgically drained abscess.

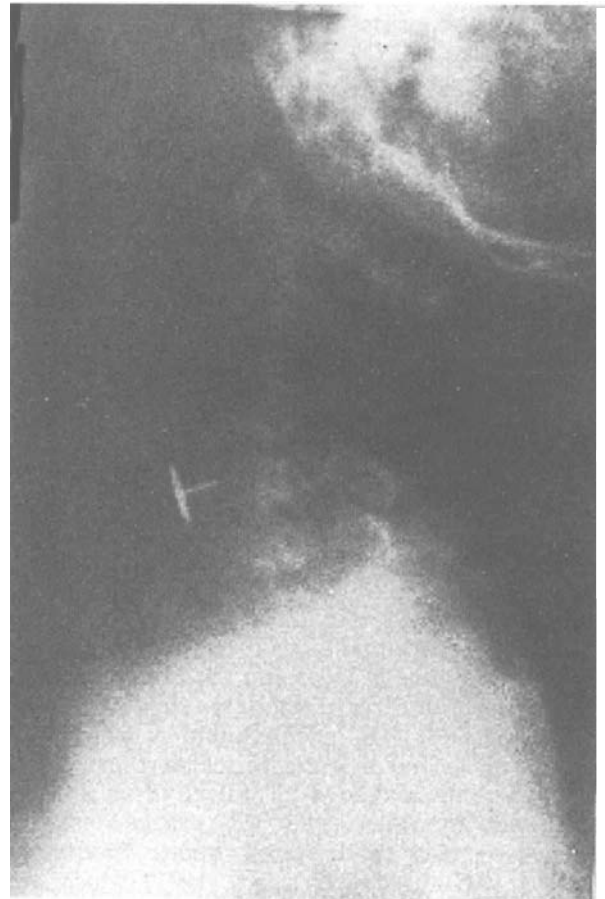


FIG. 2

Lateral neck X-ray demonstrating a drawing-pin in the thickened prevertebral space.

Case 2

A seven-year-old previously healthy boy complaining of a sore throat was diagnosed by his primary care physician as suffering from acute tonsillitis. Treatment with penicillin was initiated. Three days later he was referred to the emergency room because of lack of improvement despite the antibiotic treatment and presented with fever, a sore throat and dysphagia.

Upon presentation the child was in a moderate condition, had a fever of 39.2°C, drooling and a limited range of motion of the neck. Severe trismus prevented an examination of the oral cavity.

A lateral neck X-ray was performed which demonstrated widening of the retropharyngeal space. In addition a radiopaque object was noted in the retropharyngeal space at the level of C5-6 (Figure 2).

The patient was taken to the operating room, a pharyngoscopy was performed and the foreign body (a drawing pin) was removed under general anaesthesia. Upon removal of the pin a large amount of pus was drained from the entrance wound. An incision was made to widen the entrance wound. No external drainage was performed. The pus was cultured and a mixture of *Staphylococcus aureus* and *Streptococcus pneumoniae* was isolated.

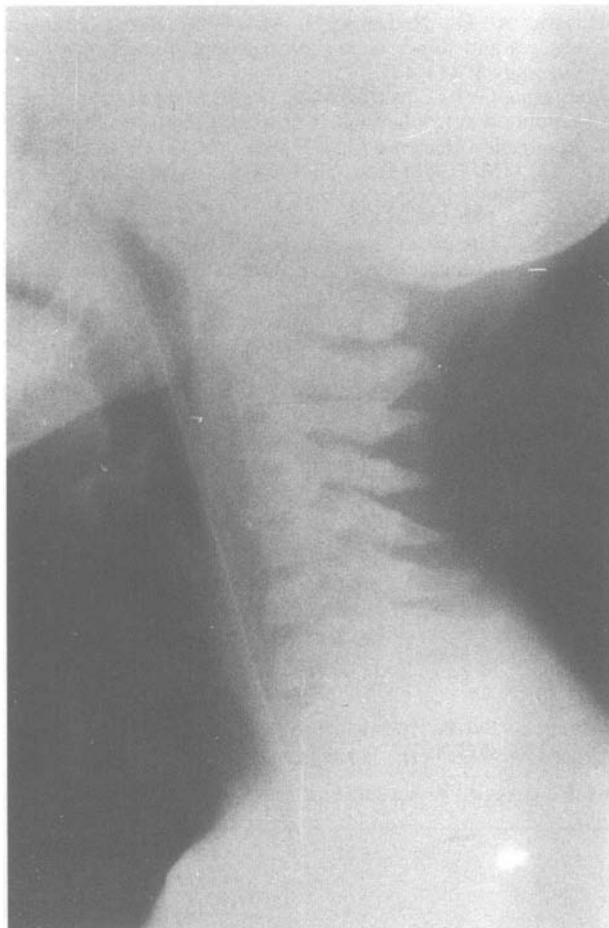


FIG. 3

Post-operative lateral neck film after removal of the drawing-pin shows marked reduction in retropharyngeal swelling.

The child was placed on i.v. antibiotics, a nasogastric tube was inserted and NPO was ordered for four days. At that time clinical improvement was noted, the nasogastric tube was removed and a serial lateral neck film showed a reduction in the amount of retropharyngeal swelling (Figure 3). The child recovered fully. In retrospect the child remembered that while hanging posters at school he held a number of drawing-pins in his mouth and had not even realize that he had swallowed one.

Discussion

Retropharyngeal abscess is considered a disease most common in very young children. Our report covered a wide range of age groups and shows an overwhelming prevalence in the adult population (47 per cent) while the young paediatric population comprises only 36 per cent. Other studies have shown a slight male predominance (Coulthard and Issacs, 1991). In our series males comprised 84 per cent of the patients. A retropharyngeal abscess may result from lymphatic spread of infection from the ear, nose or throat. A history of such a preceding infection is most common in children under the age of five as they possess the largest number of retropharyngeal lymph nodes. A prior history of

such an infection was found in most of the children under the age of five years (71 per cent) while the remaining were secondary to trauma or foreign body ingestion. In the adult subgroup a retropharyngeal abscess is usually due to some form of trauma (Pontell *et al.*, 1995) or foreign body ingestion or secondary to an odontogenic infection (Husaru and Nedzelski, 1979). We found, however, that most of the abscesses in this group were of idiopathic origin (56 per cent).

The clinical presentation in almost all of the patients was classic with fever (84 per cent), sore throat (73 per cent), dysphagia (68 per cent) and torticollis (68 per cent) being the most common complaints. Small children obviously had less specific complaints. Drooling, which was found only in the paediatric patients was considered the equivalent of dysphagia seen in adults. Sixty-eight per cent of the patients presented with pharyngeal mass or bulging. A lateral radiograph was performed and considered diagnostic in all cases. A lateral film was considered diagnostic of a retropharyngeal abscess if the retropharyngeal space, measured from the posterior wall of the pharynx and the anterior border of the second cervical vertebrae was widened to more than twice the diameter of the cervical vertebrae. Other helpful radiological signs include gas in the prevertebral tissue, evidence of a foreign body, and loss of the normal curvature of the cervical spine.

Widening of the retropharyngeal space can be caused by retropharyngeal cellulitis or oedema or may even be an artefact due to over flexion of the neck while filming. For this reason CT is often very helpful. A CT scan can differentiate between cellulitis and an abscess, it also provides better localization of the level of the abscess and identification of possible extension of the abscess across fascial planes thus changing the form of surgical treatment required. Eleven cases were treated by surgical drainage, of these eight were drained transorally and the remaining three externally. Criteria for external drainage was a clinical or radiological suspicion of spread of the abscess across fascial planes to include other deep neck compartments. All surgically treated cases were cultured. There was bacterial growth in nine of these cases (73 per cent). The single most common organism isolated was *Streptococcus pyogenes*, followed by *Staphylococcus aureus*. Other studies show *Staphylococcus aureus* to be the most common single pathogen involved followed by *Streptococcus pyogenes* and *Klebsiella* sp (Hasaru and Nedzelski, 1979; Seid *et al.*, 1979; Pontell *et al.*, 1995).

On the basis of these organisms we treated our patients with a penicillinase-resistant penicillin. The remaining eight cases were treated with antibiotics alone, showed quick resolution of symptoms and thus surgical drainage was not performed. The only complication in our series was a spinal canal abscess caused by direct extension from the retropharyngeal space, which resolved following drainage. Recur-

rence was noted in one patient and required repeated surgical drainage. There were no deaths in this series.

Conclusion

Retropharyngeal abscess is a serious disease that must be recognized early to avoid potentially lethal complications. Although thought of as a paediatric disease, our series contained fewer children than adults due to perhaps, to the earlier and more widespread use of antibiotics in the paediatric population. In the adult population we found a large number of patients with clinical and radiological evidence of retropharyngeal abscess with no prior history of foreign body ingestion or trauma. Systemic antibiotic therapy should be started at once and must be directed towards the most common pathogens.

References

- Coulthard, M., Isaacs, D. (1991) Retropharyngeal abscess. *Archives of Disease in Childhood* **66**: 1227–1230.
- De Clercq, L. D., Chole, R. A. (1980) Retropharyngeal abscess in the adult. *Otolaryngology – Head and Neck Surgery* **88**: 684–689.
- Husaru, A. D., Nedzelski, J. M. (1979) Retropharyngeal abscess and upper airway obstruction. *Journal of Otolaryngology* **8**: 443–447.
- Manjusha, G. J., Edwards, M. S. (1995) Clinical indicators of childhood retropharyngeal abscess. *American Journal of Emergency Medicine* **13**: 333–336.
- Pickles, J. M. (1988) Retropharyngeal abscess complicating a neck wound (A case report). *Journal of Laryngology and Otology* **102**: 552–553.
- Pontell, J., Har-El, G., Lucente, F. E. (1995) Retropharyngeal abscess: Clinical review. *Ear, Nose and Throat Journal* **74**: 701–704.
- Seid, A. B., Dunbar, J. S., Cotton, R. T. (1979) Retropharyngeal abscesses in children revisited. *Laryngoscope* **89**: 1717–1724.
- Wholey, M. H., Bruwer, A. J., Baker, H. L. (1958) The lateral roentgenogram of the neck. *Radiology* **71**: 350–356.
- Wong, Y. K., Novotny, G. M. (1978) Retropharyngeal space – A review of anatomy, pathology and clinical presentation. *Journal of Otolaryngology* **7**: 528–536.

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