Retropharyngeal abscess

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Abstract

Of 31 children with retropharyngeal abscess treated at this hospital between 1954 and 1990, 17 (55%) were 12 months old or less and 10 (32%) less than 6 months. Three of these 10 children were neonates, only one of whom had a predisposing congenital lesion. Fourteen children (45%) had a preceding upper respiratory illness and four (13%) had a prior history of pharyngeal trauma or ingestion of a foreign body.

In children less than 1 year old the clinical presentation was usually classical with fever, neck swelling, stridor, and pharyngeal swelling. Significantly fewer children over 1 year had neck swelling and no child over 3 years old had stridor. A lateral radiograph of the neck, when performed, had a sensitivity of 88% in diagnosis.

Bacteria isolated included pure growths of *Staphylococcus aureus* (25%), klebsiella species (13%), group A streptococcus (8%), and a mixture of Gram negative and anaerobic organisms (38%). There were two deaths. In six cases (24%) the abscess recurred necessitating further surgical drainage.

Deep infections of the head and the neck have been recognised since the time of the Greek physician Galen, who is reported to have described a case of retropharyngeal abscess.[1]

Retropharyngeal abscess is an uncommon infection of the deep neck spaces but has its highest incidence in the paediatric population. Retropharyngeal abscesses can result in acute upper airway obstruction, septicaemia, mediastinitis, aspiration pneumonia, empyema, and serious vascular complications, including thrombosis of the internal jugular vein and erosion of the internal carotid artery.[2–8]

Methods

A review was undertaken of the charts of all children in the Children's Hospital, Camperdown between 1954 and 1990 who had a discharge diagnosis of retropharyngeal abscess. Most cases were confirmed operatively or after spontaneous rupture, but some cases were defined as having retropharyngeal abscess on the basis of a characteristic clinical picture and widening of the retropharyngeal space on lateral neck radiograph to at least twice the diameter of the cervical vertebrae. We reviewed the age of patients, clinical presentation including predisposing factors such as trauma or upper respiratory infection, the organisms isolated, and the outcome. Microbiology results are reported for pus obtained by needle aspirate or surgical excision only. Conventional bacteriological techniques were used for isolation and identification of organisms. Statistical analysis was by χ^2 or Fisher's exact test for absolute numbers and Student's t test for means.

Results

A total of 31 children were treated for retropharyngeal abscess between 1954 and 1990; there were 17 boys (55%) and 14 girls (45%). The age distribution is shown in fig 1. There were 17 cases (55%) 12 months old or less and 10 cases less than 6 months (32%). Three cases (10%) presented in the neonatal period. One newborn suffered recurrent abscess formation until a pyriform fossa sinus was demonstrated and excised at age 6 months. The other two neonatal cases had no known predisposing factors such as intubation or laryngoscopy. The youngest child was age 6 days on admission and the oldest was 12·2 years.

A preceding illness including upper respiratory infection, tonsillitis, isolated cervical lymphadenitis, and herpetic gingivostomatitis in one case, was recorded in eight of 17 (47%) children under 1 year and six of 14 (43%) children over 1 year. One child had been bitten in the neck by a dog. Four children (13%) had a history of trauma to the pharynx or ingestion of a foreign body. These four cases included: (i) swallowing a safety pin which was removed two weeks before the retropharyngeal abscess developed, (ii) falling over with a pencil in the mouth and traumatising the posterior pharynx, (iii) swallowing two drawing pins, one of which was removed at drainage of the abscess, and (iv) swallowing a piece of plastic three days

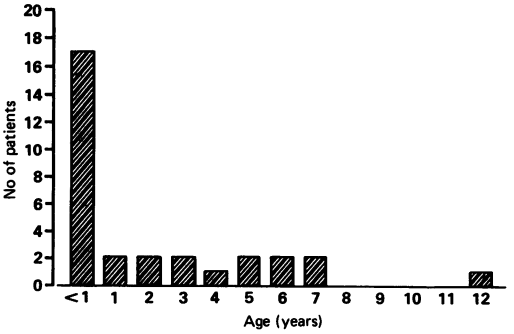

Figure 1 Age distribution of patients with retropharyngeal abscess from the Children's Hospital, Camperdown, 1954–90.

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previously. No case followed instrumentation of the oesophagus or upper airway. Therefore, in the remaining 13 cases (42%) no prodrome or precipitating factor was reported.

The presenting symptoms and signs are reviewed in table 1. In those children of 1 year or less, the presenting clinical picture was usually 'classical' with fever, stridor and neck swelling, and a pharyngeal mass was often seen. The three neonates, however, were afebrile. Children over 1 year were significantly less likely to have swelling of the neck, and stridor was not present in any child over 3 years old. The difference was not due to prior antibiotic treatment, which was equally common in children under and over a year old (table 1).

The median duration of symptoms was four days both for children under and those over 1 year old, while the mean (SD) duration of symptoms was 5·29 (4·75) days and 5·71 (4·61) days respectively ($t=0·25$, $p>0·1$).

A lateral radiograph of the neck, to display the soft tissues, was performed in 24 cases (77%) and was diagnostic in 21 (88%), showing a widened prevertebral space (fig 2). A computed tomogram of the neck was performed in only one case. Most children had a chest radiograph performed and all of these were initially abnormal.

Treatment was most often the institution of antibiotics followed by surgical incision and drainage of the abscess. Spontaneous rupture of the abscess occurred in three cases (10%); this was followed by antibiotic treatment. In five cases (16%) antibiotics alone was prescribed.

An analysis of the organisms isolated from 24 cases of retropharyngeal abscess is shown in table 2. Results are not available in those cases where the abscess ruptured spontaneously or where antibiotic treatment alone was undertaken. In the 24 cases (77%) in which culture results were available, there were six pure isolates of *Staphylococcus aureus* (25%), three pure isolates of klebsiella species (13%), two pure isolates of group A streptococcus (8%), and nine isolates (38%) included a mixture of Gram negative and anaerobic organisms. Of the four cases which followed trauma to the pharynx, the results were available in three. In these three cases there was a pure growth of klebsiella, a mixture of *Escherichia coli* with *Streptococcus faecalis* and a mixture of *E coli* with *Haemophilus influenzae* respectively.

There were two deaths, both before 1965: a 3 week old baby presented with paraplegia caused by a fracture dislocation of the atlas and axis secondary to retropharyngeal abscess; and the diagnosis was not made until necropsy in a 3 month old baby. The abscess recurred in six cases necessitating repeat surgical drainage. Tracheostomy was performed on three children before surgical drainage. Six children, all less than 1 year old, required intubation either preoperatively or postoperatively.

Table 1 Presenting features of children with retropharyngeal abscess by age from the Children's Hospital, Camperdown, 1954–90. Results are number (%)

Presenting features	*≤1 year (n=17)*	*>1 year (n=14)*	*p Value*
Fever	12 (71)	8 (57)	NS
Stridor/respiratory difficulty	12 (71)	6 (43)	NS
Neck swelling	12 (71)	2 (14)	<0·005
Pharyngeal mass	9 (53)	4 (29)	NS
Dysphagia/feeding problems	6 (35)	4 (29)	NS
Cervical lymphadenopathy	5 (29)	5 (36)	NS
Torticollis	3 (18)	1 (7)	NS
Sore throat	—	4 (29)	—
Neck pain	—	4 (29)	—
Prior antibiotic treatment	6 (35)	7 (50)	NS

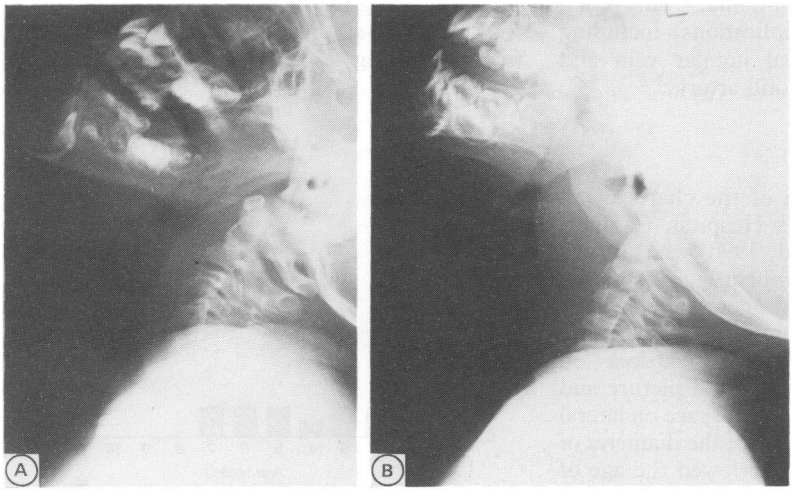

Figure 2 Lateral neck radiograph. (A) Normal film. (B) Increase in soft tissue shadow between cervical vertebrae and posterior wall of air filled pharynx indicating the presence of a retropharyngeal abscess.

ANATOMY

The anatomy of the deep neck spaces and associated fascial planes[1–3 6 7] is helpful in understanding retropharyngeal abscess (fig 3).

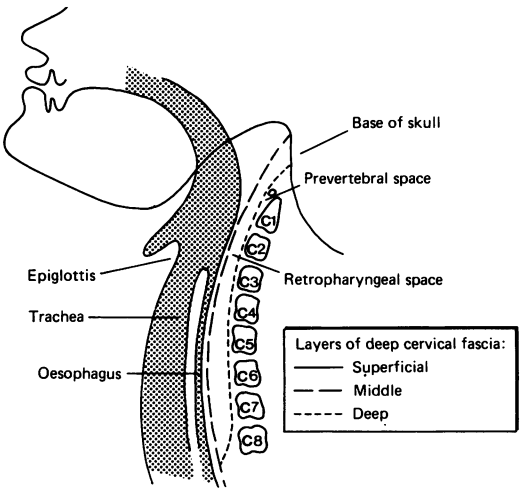

Figure 3 Mid-sagittal section of the head and neck illustrating deep neck spaces.

Table 2 Organisms isolated from 24 cases of retropharyngeal abscess from the Children's Hospital, Camperdown, 1954–90

Organisms isolated	*No (%)*
Mixed Gram negative and anaerobes	9 (37·5)
Staphylococcus aureus alone	6 (25)
Klebsiella species alone	3 (12·5)
Group A streptococcus alone	2 (8)
Staphylococcus aureus and group A streptococcus	1 (4)
Staphyloccus aureus and klebsiella species	1 (4)
Microaerophilic streptococcus	1 (4)

The retropharyngeal space lies between the buccopharyngeal fascia, which is the middle layer of the deep cervical fascia, and the prevertebral fascia, which is the deep layer. It extends from the base of the skull to the level of T1 in the superior mediastinum where the two layers fuse. Infection can spread directly into the anterior and posterior mediastinum anteriorly, so that mediastinitis is a rare complication of retropharyngeal abscess.

The retropharyngeal space contains two paramedial chains of lymph nodes which drain the nose, paranasal sinuses, nasopharynx, and adenoids. These lymph nodes are prominent in young children but involute in late childhood.[1–4] Infection of the lymph nodes can thus result from lymphatic spread from these adjacent structures and suppuration may result in abscess formation.

Discussion

Retropharyngeal abscesses are most commonly reported in children under the age of 3 years. Our population covered a wide range of ages but retropharyngeal abscess was most common in children under 12 months of age, and nearly a third were under 6 months old. Three cases presented in the neonatal period. Other studies have reported a similar age distribution at presentation,[7–9] although one study reported no cases over the age of 6 years[10] and neonatal cases are generally rare. We found a slight male preponderance (55%), which has been reported in other studies.[1 7–10]

Retropharyngeal lymphadenitis may result from spread along the lymphatics from sites of infection in the ear, nose, or throat and may subsequently form an abscess. A history of a preceding upper respiratory illness was recorded for nearly half our patients and was equally common in infants and older children. Direct implantation of pathogens can follow the impaction of a foreign body into the oropharynx.[1–4 9] However, we found that a preceding history of trauma was uncommon.

The clinical presentation is often insidious and the diagnosis may be difficult. In our study, children under 1 year of age presented 'classically' with fever, neck swelling, stridor or respiratory distress, a pharyngeal mass, cervical lymphadenopathy, and head tilt. Older children were less likely to have neck swelling and no child over 3 years had stridor. They were most likely to have specific complaints such as neck pain or stiffness and sore throat. It is possible that neck swelling is more likely to occur in younger children because of less well defined fascial planes. We did not find that older children were more likely to have delay in diagnosis.

We found that a lateral radiograph of the neck when performed had an 88% sensitivity in diagnosing retropharyngeal abscess, other cases being diagnosed clinically on the basis of pharyngeal swelling. The diagnostic radiological feature is an increase in the width of the retropharyngeal space, which is measured from the posterior wall of the pharynx, as defined by the air column within, and the anterior border of the second cervical vertebra.[6–10] A widened retropharyngeal space is usually defined as being more than twice the diameter of the cervical vertebrae. However, this appearance can be mimicked by flexing the neck, so that lateral radiographs should be taken with the neck in extension. Additional helpful radiological features include gas or a visible fluid level within an abscess cavity, the presence of a foreign body, and prevertebral muscle spasm resulting in loss of the normal curve of the cervical spine. Widening of the retropharyngeal space could be due to abscess or to inflammatory oedema without a formed abscess. A computed tomogram may differentiate between cellulitis and true abscess formation and identify abscess extension into other fascial planes.[11] Ultrasound examination might also distinguish these entities, but has not yet been adequately evaluated. A chest radiograph will assess the presence of empyema or mediastinitis.[4 12]

In five of our cases treatment comprised antibiotic therapy alone and all of these cases recovered uneventfully. Surprisingly, these children were treated towards the begining of the series when one might expect less reliance to be placed on antibiotics alone. All cases in the past 10 years have been treated with both surgical drainage and antibiotics. This finding contrasts with that of another recent study in which their surgical rate is falling slowly and most recently was 70%.[7]

We found that mixed infections with Gram negative bacilli and anaerobes were the most common isolates, although *S aureus* was the most common single organism, and three children had pure isolates of klebsiella species. Other studies have emphasised the role of mixed aerobic and anaerobic infections.[13 14] On the basis of our organisms, we would recommend a penicillinase resistant penicillin combined with a third generation cephalosporin and metronidazole or alternatively clindamycin and an aminoglycoside. We still feel, however, that surgical drainage is the mainstay of treatment because of the danger of aspiration and of airway obstruction.

Six (24%) of our cases of retropharyngeal abscess recurred and further surgical drainage was required. This figure is high compared with another report.[7] Two of the four children who sustained trauma to the pharynx suffered a recurrence. There were two deaths early in this series, one from a rare but recognised complication of retropharyngeal abscess and the other when the diagnosis was not made until necropsy. This emphasises the importance of recognising this rare, life threatening condition.

We wish to thank the surgeons of the ear, nose, and throat department at the Children's Hospital, Camperdown for the opportunity to report their patients. We thank Carol Dunn from medical illustration for the line drawing.

The three neonatal cases are to be reported in detail elsewhere.

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Acupuncture and vomiting

An interesting review article in the *Postgraduate Medical Journal* (J W Dundee and C McMillan, 1991;**67**:417–22) summarises the evidence for acupuncture as an antiemetic for postoperative vomiting, morning sickness, vomiting induced by cancer chemotherapy, and travel sickness. Apparently several acupuncture sites are suggested for control of vomiting but the one most accessible and most studied is known as Neiguan or G Jo point No 10 and is situated 'the width of 2 thumbs above the distal crease on the inner wrist in line with the middle finger'. Stimulation at the approved site may be by acupuncture with either manual rotation or electrical stimulation of the needle or by non-invasive methods such as transcutaneous electrical stimulation via surface electrodes or pressure applied either manually or by using an elastic band with a plastic stud (Choy bands, or Sea Bands). The latter are commercially available and have been hailed in the American press as a cure for sea sickness but scientific investigation of their effectiveness has produced disappointing results.

Dundee and McMillan conclude that acupuncture is effective in preventing postoperative vomiting and vomiting after cancer chemotherapy when used as an addition to standard drug treatment. In the latter case, acupuncture is better than transcutaneous electrical stimulation but the effect may be prolonged by frequent application of manual pressure.

No studies in children are mentioned on the article but its simplicity and safety make it an attractive idea. A study in migraine is said to have shown a reduction in sickness but not in pain.[1] Perhaps it would be worth a trial in severe cyclical vomiting.

How does it work? Who knows? We've all heard the endomorphin theory but there is debate about whether that is the explanation of acupuncture induced analgesia and, in any case, it doesn't seem to explain the antiemetic effect.

'. . . . . but this is wondrous strange!'

'And therefore as a stranger give it welcome
There are more things in heaven and earth, Horatio,
Than are dreamt of in your philosophy'.

But the peculiarity of our philosophy, sweet prince, is that having dreamt we must experiment. The dream comes first though; that's the hypothetico-deductive method, folks (See Peter Medawar. *Pluto's Republic*. Oxford: Oxford University Press, 1984:73–135) and *that's* the difference between medicine and magic.

ARCHIVIST

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