Background: Retropharyngeal abscess (RPA) is an uncommon, potentially fatal condition found more frequently in children than adults. Prompt diagnosis and surgical management of this condition is imperative to prevent complications including airway obstruction and mediastinitis. Few studies have been dedicated to paediatric retropharyngeal abscess.

Methods: A retrospective analysis of 21 cases of retropharyngeal abscess at the Sydney Children’s Hospital over a 12-year period was performed.

Results: There were 12 boys and nine girls involved in the analysis. Their ages ranged from 3 months to 12 years. Common presenting symptoms and signs included fever, dysphagia, neck swelling and torticollis. Respiratory compromise was present in 29% of the children at presentation. Foreign body ingestion accounted for 10% of cases. Seventeen cases were managed with surgical drainage. Surgical approaches adopted included transoral (70%), external cervical approach (20%) and a combined approach in 10%. There was no mortality. Mediastinitis occurred in two patients, one of whom also had recurrent laryngeal nerve palsy. No other serious complications occurred.

Conclusion: Retropharyngeal abscess should be considered in all children presenting with neck pain and dysphagia. Prompt diagnosis and institution of appropriate medical and surgical therapy is imperative to prevent complications such as airway obstruction. The management of this condition should occur in a paediatric institution with appropriate medical, surgical and intensive care facilities.

Key words: retropharyngeal abscess, mediastinitis, airway obstruction, torticollis, streptococcal infection, surgical approach, antibiotics, intensive care, pharynx, child.

Abbreviations: CT, computed tomography; ICU, intensive care unit; RPA, retropharyngeal abscess; URTI, upper respiratory tract infection.

INTRODUCTION

Retropharyngeal abscess (RPA) is a rare but potentially fatal deep neck space infection.

In the paediatric population, suppuration in the retropharyngeal lymph nodes usually occurs secondary to an upper respiratory tract infection while in adults, pharyngeal foreign body is the most common aetiological factor.

Retropharyngeal abscess is a potentially fatal condition with complications including airway obstruction, mediastinitis, jugular vein thrombosis, carotid artery stenosis or rupture, atlanto-axial subluxation, cervical osteomyelitis, spinal cord abscess and meningitis. Mortality rates of 10% and complication rates of 43% have been reported.

There have been few large series looking exclusively at paediatric retropharyngeal abscess. Controversy exists regarding the preferred radiological investigation, indications for surgical management and operative approach. This controversy is demonstrated by a recent survey of the American Society of Paediatric Otolaryngologists.

The aim of this study was to review our experience with paediatric retropharyngeal abscess. Controversy exists regarding the preferred radiological investigation, indications for surgical management and operative approach. This controversy is demonstrated by a recent survey of the American Society of Paediatric Otolaryngologists.

METHODS

A computerized search of records from the Sydney Children’s Hospital over the 12-year period from 1988 to 2000 identified 21 patients who had had RPA. Clinical records were reviewed and data extracted for patient demographics, presenting symptoms and signs; relevant investigations; treatment method and postoperative morbidity and mortality. Specific management issues regarding the preferred investigation, the choice of operative or nonoperative therapy, the operative approach utilized, and postoperative airway management were recorded.

Data extraction from records was done by one investigator to ensure consistency and ease of interpretation. Any anomalies or points of interest were followed up by two investigators to ensure completeness.

RESULTS

Demographics

Of the 21 patients investigated, there were 12 boys (57%) and 9 girls (43%). The median age was 3 years and 3 months. Eighteen patients (86%) were <6 years old. The age range was from 3 months to 12 years and 10 months.

Presentation

Symptoms and signs at presentation (see Tables 1 and 2) included fever, neck swelling and cervical lymphadenopathy in 95%, 81% and 76% of cases, respectively. Torticollis was present in 67%. Respiratory compromise or drooling were present in 29% and
24%, respectively. In two cases a lumbar puncture was performed to exclude meningitis. A history of recent upper respiratory tract infection (URTI) was documented in 43% of cases. Foreign bodies accounted for two cases (10%).

Symptoms were present for a median of 5 days, with 10 cases (48%) presenting in the first 3 days. There appeared to be a second peak around 9–14 days, with seven cases (33%) presenting in this period compared with only four (19%) in the 3–9 day period. No cases presented after 14 days.

Median temperature at presentation was 38.3°C, with a range from 36.5°C to 40.0°C. Only one patient was afebrile. White cell count on presentation ranged from 12.6 to 37.7 x 10^9/L. The median white cell count was 19.7 x 10^9/L.

Forty-seven per cent of patients had been started on oral antibiotics by a local doctor, with amoxicillin being the most commonly prescribed (five cases). The median duration of oral antibiotic use before presentation was 1 day (range: 0–6 days). Seventy-six per cent of patients were up-to-date with immunizations.

### Table 1. Frequency of presenting symptoms recorded in retropharyngeal abscess

| Symptom                   | Frequency |
|---------------------------|-----------|
| Neck pain                 | 57%       |
| Decreased oral intake     | 52%       |
| Odynophagia               | 43%       |
| Preceding URTI            | 43%       |
| Sore throat               | 33%       |
| Headache                  | 24%       |
| Vomiting                  | 19%       |
| Otalgia                   | 19%       |
| Foreign body ingestion    | 10%       |
| Weight loss               | 5%        |

URTI, upper respiratory tract infection.

### Table 2. Frequency of presenting signs recorded in retropharyngeal abscess

| Sign                   | Frequency |
|------------------------|-----------|
| Fever                  | 95%       |
| Neck swelling          | 81%       |
| Cervical lymphadenopathy | 76%     |
| Torticollis            | 67%       |
| Respiratory compromise | 29%       |
| Drooling               | 24%       |
| Trismus                | 24%       |
| Irritability           | 24%       |
| Stiff neck             | 24%       |
| Lethargy               | 14%       |
| Hypotension            | 5%        |

### Investigation

Nineteen of 21 patients had a computed tomography (CT) scan performed (Fig. 1) which was diagnostic in 18 cases (95%). One case had only soft tissue swelling with no collection on presentation, however a repeat CT scan 4 days later identified a collection. In four cases (19%) free gas in the retropharyngeal space was seen on CT scan.

Lateral cervical X-ray (Fig. 2) was performed in 15 cases (71%), was diagnostic in 12 (80%) and was equivocal in three (20%). In one case where no CT was performed and lateral cervical film was equivocal, a neck ultrasound identified the abscess.

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**Fig. 1.** Axial computed tomography scan with intravenous contrast, showing a radiolucent area in the retropharyngeal space consistent with a small retropharyngeal abscess (arrowhead).

**Fig. 2.** Lateral radiograph of the neck showing widening of the retropharyngeal soft tissues (arrows).
Blood cultures were performed in 12 cases, however, only two were positive. One identified Streptococcus pyogenes and the other Staphylococcus epidermidis (a common skin contaminant). Microbiological analysis of abscess specimens was much more informative. Organisms were isolated from 14 of 15 samples. Streptococci were isolated in nine cases and were, thus, the most frequently isolated. Streptococcus pyogenes, S. pneumoniae, S. anginosus and Group B Streptococci were isolated in one case each. In five cases, Streptococci were isolated but not characterized beyond α-haemolytic, β-haemolytic or mixed. There were two isolates of Staphylococcus aureus, and four of mixed growth (not otherwise specified). No anaerobes were isolated, however, in no case were anaerobic cultures specifically obtained.

Management

Medical management with intravenous antibiotics was only adopted in four patients after radiological confirmation of retropharyngeal space infection. In these patients, CT scan demonstrated either inflammatory changes without suppuration or a very small abscess. In one case, a trial of medical management was adopted, based on CT scan identifying phlegmonous changes. However, a repeat scan 4 days later identified progression to abscess and surgical drainage was performed.

Intravenous antibiotic therapy was always started on an empirical basis before culture results were known. The most common antibiotic regimen was a combination of third generation cephalosporin, cloxacillin, and metronidazole (used in six cases).

Of 17 patients who underwent surgical treatment, 13 (76%) required one surgical procedure, while four (24%) patients required two procedures. Three of these patients had repeat intraoral drainage while the fourth required an external approach to achieve satisfactory drainage of the retropharyngeal space. Twelve patients required intraoral drainage alone, two patients underwent external drainage procedures alone, and three patients required both intraoral and external drainage.

Twelve patients (71%) were admitted to the intensive care unit (ICU) postoperatively. Ten of these patients were intubated and ventilated and two were observed without ventilation. One patient required a tracheostomy. The mean duration of intubation was 4.45 days, range 1–10 days. The mean ICU stay was 4.5 days, range 1–12 days. Mean total length of hospital stay was 8.7 days, ranging from 4 to 21 days.

Outcomes

There was no mortality in this investigation. Two patients developed mediastinitis requiring prolonged ventilatory support for 10 days and admission to ICU for 12 days. One of these patients also developed a left recurrent laryngeal nerve palsy on the same side as repeated external cervical drainage, which showed partial resolution on long-term follow up.

DISCUSSION

Retropharyngeal abscess should be a consideration regardless of the age of the patient, and there are several reports of increasing age at presentation. Fever, odynophagia and neck pain are common presenting symptoms while neck swelling, drooling and torticollis are common signs. Thorough head and neck examination should be performed. However, intraoral examination is often difficult in this group of patients. If a RPA is suspected, radiological investigation such as lateral airways X-ray and neck CT scan are indicated.

A lateral airways X-ray may be useful as a screening study, although unless gas is present, it does not discriminate between retropharyngeal space cellulitis and abscess formation. A lateral airway X-ray is best interpreted with adequate neck extension and during the inspiratory phase of respiration. Because of the difficulty obtaining satisfactory lateral X-rays in young children we would recommend CT scan when the diagnosis of RPA is suspected. The sensitivity of CT for diagnosing RPA has been reported to be 88–91%. There are few studies to support the use of ultrasound in the diagnosis of RPA, and it is not routinely performed in our institution. There is one study suggesting that an increased distance from the internal carotid artery to the cervical vertebrae could be used as a criterion, however, this study included only five cases of RPA. More evidence is required before ultrasound can be accepted in this condition.

A trial of antibiotic therapy should be used only after careful consideration of the overall clinical state of the child. If a trial of nonoperative therapy is adopted, it is imperative that careful monitoring is performed in an institution with facilities that allow for immediate operative intervention if required. The potential for development of serious complications needs to be considered when choosing to defer drainage. Most clinical situations warrant immediate incision and drainage, plus treatment with appropriate intravenous antibiotics.

Antibiotics need to be started on an empirical basis and must have broad-spectrum cover. In this study the most common organisms isolated were Streptococci and Staphylococci, which is consistent with other reported series. Other bacteria reported in RPA include Haemophilus, Neisseria, Klebsiella, other Gram-negative organisms and anaerobes. We recommend a combination of third generation cephalosporin, cloxacillin and metronidazole as initial antibiotic therapy with modification based on bacteriological culture.

Clindamycin alone has been reported as the empirical antibiotic of choice by many surgeons. We do not recommend this because up to 17% of Streptococci are resistant to this antibiotic.

It is interesting to note that there were no isolates of Haemophilus influenzae in our series, in line with the decline in systemic infections caused by this organism since the introduction of vaccination.

We would recommend intraoral drainage as the preferred route when the abscess is easily identified and accessible. Although external cervical drainage has been the traditional method of drainage we reserve this approach for abscesses that have extended to contiguous deep neck spaces such as the parapharyngeal space. Other indications for external drainage include multiloculated abscesses and persistence or recurrence of abscess following intraoral drainage.

Short-term postoperative intubation and ventilation should be considered for all patients. Our criteria for immediate postoperative extubation includes patients with small abscess with adequate drainage, no evidence of preoperative airway compromise, and appropriate postoperative monitoring with facilities and expertise available for immediate intubation if required.

CONCLUSION

Retropharyngeal abscess is a potentially fatal condition with serious complications. The diagnosis should be suspected in any
child with acute torticollis, neck swelling or drooling. Lateral cervical airways X-ray is a useful screening tool, and CT scan is the investigation of choice. Single antibiotic therapy is unlikely to provide adequate cover and is not recommended. Early surgical drainage by the intraoral route is recommended for most patients. Trial of antibiotic therapy and deferral of drainage should be reserved for those few with specific indications. The safest approach to airway control is short-term intubation and ventilation with a minority of patients not requiring ventilation.

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REFERENCES

1. Goldenberg D, Golz A, Joachims HZ. Retropharyngeal abscess: A clinical review. J. Laryngol. Otol. 1997; 111: 546–50.
2. Gianoli GJ, Espinola TE, Guarisco JL, Miller RH. Retropharyngeal space infection: Changing trends. Otolaryngol. Head Neck Surg. 1991; 105: 92–100.
3. Lalakea ML, Messner AH. Retropharyngeal abscess management in children: Current practices. Otolaryngol. Head Neck Surg. 1999; 121: 398–405.
4. Thompson JW, Cohen SR, Reddix P. Retropharyngeal Abscess in Children: A Retrospective and Historical Analysis. Laryngoscope 1988; 98: 589–92.
5. Sharma HS, Kuri DN, Hamzah M. Retropharyngeal abscess: Recent trends. Auris Nasus Larynx 1998; 25: 403–6.
6. Ungkanont K, Yellon RF, Weissman JL, Casselbrant ML, Gonzalez-Valdepena H, Bluestone CD. Head and neck space infections in infants and children. Otolaryngol. Head Neck Surg. 1995; 112: 375–82.
7. Lazor JB, Cunningham MJ, Eavey RD, Weber AL. Comparison of computed tomography and surgical findings in deep neck space infections. Otolaryngol. Head Neck Surg. 1994; 111: 746–50.
8. Chao HC, Chiu CH, Lin SJ, Lin TY. Colour Doppler ultrasonography of retropharyngeal abscess. J. Otolaryngol. 1999; 28: 138–41.
9. Choi SS, Vezina LG, Grundfast KM. Relative incidence and alternative approaches for surgical drainage of different types of deep neck abscesses in children. Arch. Otolaryngol. Head Neck Surg. 1997; 123: 1271–5.
10. Limia A, Jimenez ML, Alarcon T, Lopez-Brea M. Five-year analysis of antimicrobial susceptibility of the Streptococcus milleri group. Eur. J. Clin. Microbiol. Infect. Dis. 1999; 18: 440–4.
11. Fernandez M, Hickman ME, Baker CJ. Antimicrobial susceptibilities of group B streptococci isolated between 1992 and 1996 from patients with bacteremia or meningitis. Antimicrob. Agents Chemother. 1998; 42: 1517–19.