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The effectiveness of conservative management for retropharyngeal abscesses greater than 2 cm

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HIGHLIGHTS

- The retropharyngeal abscess is a deep neck space infection commonly seen in the pediatric population.
- Drainage of these abscesses is associated with multiple complications.
- Patient presenting with hoarseness requires surgical intervention.
- Conservative management can be successfully performed in patients who have abscesses that are greater than 2 cm.
- Patients treated with antibiotic alone need to be closely followed up for lack of improvement or deterioration.

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ABSTRACT

Objectives: Conservative management for retropharyngeal abscesses <2 cm is now a first line option. It is unclear if conservative management can be used to manage larger abscesses without increased morbidity and mortality.
Study design: A prospective case series was performed from 2012 to 2015 by the Otolaryngology department of the San Fernando General Hospital involving pediatric patients who presented with retropharyngeal abscesses. All patients were initially treated with antibiotics alone.
Methods: Patients with clinical features and CT scan confirmation of a retropharyngeal abscess were included in the study. Those who improved clinically and biochemically within 48 h continued to be treated conservatively and those who deteriorated had surgical intervention.
Results: Sixteen patients fulfilled the inclusion criteria. Most patients were Afro Trinidadian males between the ages of two and five who were also found to be iron deficient. Drooling was a sensitive predictor for the presence of an abscess but did not indicate the need for drainage. Hoarseness was the clinical feature that prompted surgical intervention. Sixty three percent of patients had an abscess >2 cm of which 90% improved within 48 h. One patient required surgical drainage with no increase in morbidity or mortality.
Conclusion: Conservative management of retropharyngeal abscesses >2 cm can be offered to patients during the first 48 h. If the patient demonstrates clinical and biochemical improvement, antibiotics alone can be continued. If the patient deteriorates, surgical drainage can be subsequently performed with no increase in morbidity and mortality.

1. Introduction

Deep neck space infections can occur in the pediatric population. They may result in the development of retropharyngeal, parapharyngeal and peritonsillar abscesses. The retropharyngeal abscess accounts for 40–80% of these cases and has an incidence of 7.5–13 cases per year [1–3]. They are associated with complications such as acute airway compression, aspiration of pus, mediastinitis, pericarditis, sepsis and neurological defects [4–6]. Thrombosis of the internal jugular vein, erosion into the carotid artery and formation of a carotid aneurysm have been reported in rare cases [7–9]. Therefore it is important to treat these abscesses early and as effectively as

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possible.

Until recently, surgical drainage was the only form of treatment for retropharyngeal abscesses [3,10,11]. However, adequate access to the retropharyngeal space can be difficult. Drainage is also associated with a risk of neurovascular injury, scarring, wound infection and the risk of a general anaesthetic [6]. In an attempt to avoid these problems, conservative management using intravenous antibiotics alone was advocated. Several studies have since reported success in managing pediatric patients with abscesses up to two centimeters using the conservative approach [1,2,11–13]. Most abscesses over two centimeters are still treated by surgical drainage only.

Here we present a 3 year prospective case series from a single tertiary level institution in Trinidad which evaluates the effectiveness of conservative management for the treatment of retropharyngeal abscesses in the pediatric population. Emphasis will be placed on the abscesses that are greater than two centimeters in long axis on computed tomography (CT).

2. Methods

A three year prospective case series was performed by the Otolaryngology department of the San Fernando General Hospital during the period July 1st, 2012 to June 30th, 2015. All pediatric patients with clinical features of a retropharyngeal abscess that was confirmed on a CT scan of the neck were included in the study. The imaging features that were used to define a case were the presence of a hypodense or fluid filled lesion in the neck with ring enhancement [14–16].

No patient in the study had an allergy to penicillin. However due to issues of antibiotic availability, all patients were given intravenous third generation cephalosporins and metronidazole. Broad spectrum coverage was necessary as needle aspiration under ultrasound or CT guidance was not available at the hospital and therefore the microorganisms involved could not have been identified. These were the limitations of the study.

All patients received dexamethasone every 12 h for the first three days of admission in addition to the antibiotics. The patients were observed closely for signs of deterioration. They were discharged only after their symptoms resolved completely and white blood cell counts returned to normal. Successful conservative management was documented if the patient did not require drainage of the abscess during the period of their hospitalisation. Surgical drainage was performed on patients whose symptoms failed to improve after 48 h of intravenous antibiotics, those who developed complications or who deteriorated on conservative management.

The exclusion criteria included patients who were discharged against medical advice and thus became lost to follow up, patients who had a CT scan but did not have a report documenting the dimensions of the abscess or those with clinical features of a retropharyngeal abscess but who never had a CT scan. The results were then analysed to determine the characteristics of patients who were successfully treated or failed conservative management.

3. Results

Over a three year period, eighteen patients presented to the hospital with a clinical diagnosis of a retropharyngeal abscess. However, two patients had to be excluded from the study as the exact dimensions of the abscesses on CT scan were not reported. Approximately 81% of patients were Afro Trinidadians, 13% were Indo Trinidadians and 6% were of mixed ethnicity. The male to female ratio was 11:5. The ages of the patients ranged from 16 months to eleven years. The number of patients who had a true anemia according to age and sex were 44%. All patients had an elevated white blood cell count with a leucocytosis (see Tables 1 and 2).

Table 1
The number of patients with retropharyngeal abscesses according to age group (*to nearest integer).

Number of patients	Age group (years)	Percentage of patients (%)
1	<2	6
8	2–5	50
6	5–10	38
1	10–15	6
0	15–18	0

Table 2
Comparison of the clinical features and treatment based on the size of the abscess confirmed on CT scanning.

Number of patients	Clinical features	Size of abscess (longitudinal axis)	Treatment
6	Fever, neck swelling, dysphagia, odynophagia, decreased range of neck movement, drooling, difficulty breathing, vomiting.	<2 cm	All patients resolved with antibiotics alone
6	Fever, neck swelling, dysphagia, odynophagia, decreased range of neck movement, drooling, hoarseness, cough, trismus, headache.	2–3 cm	1 patient had surgical drainage 5 patients resolved with antibiotics alone
3	Fever, neck swelling, dysphagia, odynophagia, decreased range of neck movement, drooling, cough, trismus.	3–4 cm	All patients resolved with antibiotics alone
1	Fever, neck swelling, dysphagia, odynophagia.	>4 cm	All patients resolved with antibiotics alone

The most common symptoms were fever and neck swelling which accounted for 81% and 69% of patients respectively. This was followed by cough, decreased range of neck movement, dysphagia, odynophagia, drooling, vomiting, difficulty breathing, trismus, headache and diarrhoea. Almost all patients had a preceding head and neck infection before development of the retropharyngeal abscesses. Acute tonsillitis (38%) was the most common infective cause followed by acute otitis media and upper respiratory tract infections. The etiology of the rest of cases were unknown. No cases of penetrating neck trauma were recorded.

Hospital stay ranged from two to thirty three days. The average number of days a patient spent in hospital was six. Only one patient required surgical drainage of the retropharyngeal abscess and was hospitalised for a total of seven days. Fifteen of the sixteen patients were successfully managed with conservative treatment.

4. Discussion

Retropharyngeal abscesses can develop in one of three ways. Firstly, penetrating trauma to the head or neck can result in the entry of a pathogen into the body and subsequent development of infection and abscesses. Secondly, infection of adjacent structures like the teeth can spread directly to the retropharyngeal space and lead to abscess formation. Thirdly, drainage of lymph from infected areas in the nose, paranasal sinuses, nasopharynx, oropharynx, middle ear and surrounding structures can introduce pathogens into the deep cervical nodes. Subsequent suppuration of these nodes can cause abscess formation [5,7,17].

Older studies reported the incidence of retropharyngeal abscesses to range between 1 and 4.5 cases per year [18–21]. This low value was attributed to improvements in health care, immunization and development of new antibiotics [22]. However, within the last

two decades, the incidence seems to have increased and this is reflected in our study (6 cases/year). Two reasons have been put forward to explain this finding. The first is an apparent increase in cases due to the increased availability and use of CT scans in hospitals [2,3,12]. In the past, many retropharyngeal abscesses may have been misdiagnosed and treated as cervical lymphadenopathy. A CT scan will differentiate between a node and an abscess and thus the number of reported cases of abscesses will increase. All the patients in this study had a CT scan of the neck. The second reason for the increased incidence is inappropriate antibiotic use. Due to the difficulty in performing aspirations for retropharyngeal abscesses and sometimes lack of image guided needle aspiration services, specimen for culture and sensitivity cannot be obtained. Thus a broad spectrum antibiotic has to be used. This may contribute to a rise in antibiotic resistant organisms [23].

There is no ethnic predisposition documented in the literature. However, in this study the condition occurred more frequently in Afro Trinidadian patients. The San Fernando General Hospital is located in the Southern part of the island where there is a predominance of Indo Trinidadians. However, during the time the study was conducted, the hospital accepted all acute pediatric Otolaryngology cases in Trinidad. Therefore the findings of this study are representative of the entire country and eliminates any perceived bias due to hospital location. Perhaps genetic susceptibility may have a part to play in this predisposition. The majority of affected patients were males which is similar to the findings of other studies [19,24,25].

Half of the patients in the study who developed abscesses belonged to the 2–5 years age group. Children below the age of five years have more lymphoid tissue in the retropharyngeal space [21,26]. Recurrent head and neck infections with drainage of infected lymph to the retropharyngeal nodes increases the probability that an inflamed node will suppurate and form an abscess. This may explain why this age group was more affected. Atrophy of the nodes occur as children grow older resulting in a decreased probability of abscess formation. More than forty percent of the study population were anaemic. Children who are between six months and two years of age normally undergo a rapid growth phase with increased need for iron [31]. This puts them at a high risk of developing iron deficiency anaemia. Several studies indicate that iron deficiency anaemia causes impaired cell mediated immunity which can prevent the body from fighting off infection [27–30]. This may have contributed to the development of the retropharyngeal abscesses in this age group.

Most of the patients presented with fever and neck swelling. This corresponds with the clinical features of retropharyngeal abscesses documented in most studies [9,19]. However, cellulitis and lymphadenopathy can have similar presentations. Drooling is a symptom that may be more specific to the retropharyngeal abscess as it indicates severe compression or oedema of the oesophagus. This was present in all abscesses up to 4 cm in size. However, the patient who had an abscess greater than 4 cm did not have any drooling. This may have more to do with CT scan interpretation rather than the presence of an abscess.

In this study, ring enhancement on CT scan was one of the features used to make a diagnosis of an abscess. However, the specificity of CT in diagnosing a retropharyngeal abscess is only 45–65%. It has a false negative rate of 13% and false positive rate of 10% [6,26,32]. Early stage fibrosis of a phlegmon can also produce ring enhancement [17]. Wall scalloping which was not part of the case definition used has been found to be a better indicator of the presence of an abscess [3]. The radiological limitations together with the lack of aerodigestive tract compromise suggests that for the abscess greater than four centimeters, the infection of the retropharyngeal space may have been at a very early stage and that an abscess may have not been present. Therefore, antibiotics would have been able to gain access to the infection site [33]. The symptom that prompted surgical intervention was that of hoarseness. This suggested oedema of the larynx with the possibility of acute airway obstruction and therefore conservative management was abandoned in favor of surgical drainage.

The majority of abscesses occurred after episodes of acute tonsillitis (38%), acute otitis media (13%) and upper respiratory tract infections (6%). There were no documented cases of penetrating trauma and the abscesses most likely resulted from suppuration of infected nodes. The recommended antibiotics for treatment of retropharyngeal abscesses are clindamycin, ampicillin/sulbactum, third generation cephalosporins and metronidazole [13,34]. All patients in the study were treated with an intravenous third generation cephalosporin and metronidazole. Intravenous steroids were also given to decrease the soft tissue oedema and pain.

Most papers report successful conservative management of retropharyngeal abscesses that measure up to two centimeters in long axis in children [32,35,36]. Surgical intervention is still used for the larger abscesses. In our study, approximately 63% of patients had an abscess greater than two centimeters and only 10% of this subgroup required surgical drainage. In children, retropharyngeal abscesses form within nodes instead of being limited by fascia as in adults [3]. Therefore many of the local and regional complications documented with adults rarely occur in the younger age group. A CT scan of the neck can suggest the presence of an abscess but depending on the radiological features used to make the diagnosis, the specificity may be low [3,6,17,26]. Therefore with retropharyngeal abscesses greater than two centimeters, children can be given a trial of conservative management for 48 h. They should be monitored for hoarseness as this may indicate impending airway compromise. If this occurs, drainage should be performed. Surgical intervention should not be performed for drooling alone as this symptom also occurs in patients who can be treated conservatively.

Ninety percent of patients with abscesses greater than two centimeters improved within 48 h and subsequently resolved completely on conservative management. The patient who required surgical drainage did not suffer any increased morbidity or mortality from having initial conservative management. Both forms of treatment resulted in an average hospitalisation time of six days. The patient who was treated conservatively for 33 days may have been considered for surgical intervention. However, if a patient is slowly improving both clinically and biochemically on antibiotics alone, this may not be an easy decision to make. The risk of iatrogenic injury from surgical intervention must be weighed against antimicrobial resistance and prolonged hospitalisation. The decision to change from conservative to surgical management in such a patient should be made after discussion with the patient's relatives, Otolaryngologist and Microbiologist.

5. Conclusion

The use of CT scans and the phenomenon of antibiotic resistance have resulted in an increase in the incidence of retropharyngeal abscesses. In Trinidad, an Afro Trinidadian male who is less than five years old and also has iron deficiency anemia is at a high risk of developing an abscess following a head and neck infection.

Although a CT scan of the neck is used in the diagnosis of a retropharyngeal abscess, it has limited specificity. Radiological findings should always be combined with clinical features to guide patient management. Drooling suggests compression of the soft tissues by a mass but should not be the reason for a change from conservative management. Hoarseness is the symptom that indicates the need for surgical intervention.

Conservative management has been used to successfully treat

abscesses that are smaller than two centimeters. This study proves that it can also be used to treat abscesses that are greater than two centimeters with no increase in morbidity and mortality. A trial of antibiotics should be given to larger abscesses and if there is no improvement in 48 h, surgical drainage can be performed.

Ethical approval

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Author contribution

Author 1–3 provide significant contribution in all aspects of research i.e-data collection and analysis, designing, writing and critical analysis.

Author 4 &5 –have contributing in writing and critical analysis of the articles. All authors have approved the final manuscript of the article.

Conflicts of interest

The authors declare no conflicts of interest.

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