Appraisal of the peri-hospital management and evolving microbiology of peritonsillar abscess disease

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Abstract. Appraisal of the peri-hospital management and evolving microbiology of peritonsillar abscess disease. Objectives: Peritonsillar abscess (PTA) is a common complication of tonsillitis, yet there is limited consensus regarding its management and epidemiology. Current issues include pre-hospital care provided by general practitioners (GP) in the community (ii) the lack of standardized protocols for in-patient management and (iii) the role of routine microbiology studies in patients with PTA. We performed a retrospective review of confirmed cases of PTA presenting to a west of Ireland tertiary referral center to evaluate the peri-hospital management and role of microbiology studies in such cases. Methodology: Retrospective chart review of 200 confirmed cases of peritonsillar abscess Results: The annual incidence of PTA in the west of Ireland population was 14/100,000. Pre-hospital treatment given by Primary Care Physicians (PCP) was often deficient with 84% (42%) patients receiving no treatment prior to hospital referral. Needle aspiration was the most common technique used to drain the PTA (71%). Anaerobes were isolated in 54% (27%) of cases demonstrating an increasing importance of these bacteria in PTA disease. Metronidazole with either benzylpenicillin 72% (36%), or co-amoxiclav 82% (41%), was the most common empiric antibiotics used. Successful treatment of all cases of PTA with the use of empiric antibiotics was achieved before results arising from microbiology became available.

Conclusion: The epidemiology of PTA is not well described. We have described the epidemiology for PTA disease in the west of Ireland population for the first time. Needle aspiration was the most common drainage technique used. Empiric antibiotic treatment based on clinical response is advised with antibiotics effective against aerobic and anaerobic bacteria recommended.

Introduction

Peritonsillar abscess (PTA) is a common complication of tonsillitis characterized by the collection of pus in the peritonsillar space. Despite this there is limited data regarding the management and epidemiology of this disease. Available epidemiological studies report data relating to widely varying ethnic populations with differing incidence rates. For example, a recent study by Hanna et al. in Northern Ireland described a 1 per 10000 population incidence of PTA abscess disease. Herzon et al. reported a 30.1 per 100,000 incidence in the United States and Puerto Rico among patients 5 to 59 years of age, accounting for approximately 45,000 cases per year.

Currently no national or international guidelines on the management of PTA disease exist and this is a deficiency with respect to standardizing optimal care. Some of the management issues highlighted in the literature include (i) pre-hospital care provided by the PCP in the community (ii) the lack of standardized protocols for in-patient management and (iii) the role of routine microbiology studies in patients with PTA. With regards the former, Dunn et al. reported that patients often present to their GP with PTA before antibiotics can be prescribed. In those patients who presented early with symptoms of sore throat, provision of antibiotics however did not always prevent or reduce the risk of subsequently developing PTA. The authors suggested that this may be due to the low dose of oral antibiotics commonly prescribed by PCPs in the community setting and/or poor patient compliance. Hospital management too varies widely across health systems, including the technique used for...
benefit of routine microbiology. This data will serve to identify potential deficiencies in the current management practices and facilitate evidence based change where required.

Materials and methods

Retrospective 5-year chart review of 200 confirmed cases of PTA. Our referral base includes the counties of Galway, Mayo and Roscommon in the west of Ireland with a combined population of 414,000. In addition to epidemiological data, information on PCP management prior to referral to A&E was collated. Following admission to hospital we assessed techniques that had been used to drain the PTA and the subsequent medical management provided. Finally, we evaluated the role routine microbiology studies had on the management of PTA disease.

Results

Of the 200 cases of confirmed PTA 120 were males and 80 were females, age range 9 to 56 years. The annual incidence over the 5-year study period ranged from 11 to 17/100,000 (Table 1). December and January were the most common presenting months (Figure 1). 52% of patients had a previous history of tonsillitis and 21% previous PTA. There
Peritonsillar abscess management and epidemiology

Table 1
Annual incidence of peritonsillar abscess disease in the west of Ireland

<table>
<thead>
<tr>
<th>Year</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>11/100,000</td>
</tr>
<tr>
<td>2004</td>
<td>17/100,000</td>
</tr>
<tr>
<td>2005</td>
<td>13/100,000</td>
</tr>
<tr>
<td>2006</td>
<td>13/100,000</td>
</tr>
<tr>
<td>2007</td>
<td>14/100,000</td>
</tr>
</tbody>
</table>

were no cases of bilateral disease. 67% of patients reported symptoms of sore throat for less than or equal to 4 days prior to hospital admission.

Of the 200 cases, 58% had received some form of treatment from the GP prior to emergency department referral which had been commenced on average two days before presentation to hospital. Specifically, 43% received antibiotics alone of which penicillin (38%) or co-amoxiclav (41%) was most commonly prescribed. 11% received antibiotics with analgesia and 4% analgesia alone. 42% of patients had received no treatment prior to referral to hospital (Table 2).

The mean hospital stay was 4 days. Pus samples confirming the presence of PTA were obtained in all 200 cases. Abscess drainage was carried out using needle aspiration alone in 71%, incision and drainage (I&D) in 15% and 14% had aspiration together with I&D performed. In total, 26% of patients required repeat drainage secondary to re-accumulation of pus, 71% of which was carried out by repeat aspiration and 29% incision and drainage.

Empiric intravenous antibiotic treatment was commenced in all cases. Benzylpenicillin or co-amoxiclav with metronidazole was the most common choice of antibiotic used (Table 2). Treatment was continued on the basis of the clinical response obtained. 15% of cases required a subsequent change in antibiotics because of initial failure to respond to treatment. This was based primarily on clinical findings including persistent trismus, dysphagia and/or pyrexia and not secondary to inflammatory marker trends or microbiology results. Analgesia was given to all patients and steroids were prescribed in addition in 17% of cases with good effect.

Samples of pus were sent for microbiology the results of which showed that anaerobes were isolated in 27% of cases and streptococci in 48% (insert Table 3). Anaerobic Streptococci (70%), Fusiform bacteria (15%) and Bacteroids (15%) were the most common strains of anaerobes isolated, which were all shown to be sensitive to metronidazole. Group-A beta-haemolytic streptococci accounted for 39% of all bacteria isolated. Other aerobic organisms found included Haemophilus Influen-

Table 2
Antibiotics prescribed by general practitioners and during hospital admission for peritonsillar abscess disease (PTA).

<table>
<thead>
<tr>
<th>Antibiotic Prescribed</th>
<th>Frequency</th>
<th>Antibiotic Prescribed</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillin</td>
<td>38%</td>
<td>Benzylpenicillin &amp; Metronidazole</td>
<td>36%</td>
</tr>
<tr>
<td>Augmentum</td>
<td>41%</td>
<td>Augmentum &amp; Metronidazole</td>
<td>41%</td>
</tr>
<tr>
<td>Macrolides</td>
<td>11%</td>
<td>Clarythromycin &amp; Metronidazole</td>
<td>3%</td>
</tr>
<tr>
<td>Cephalosporins</td>
<td>3%</td>
<td>Augmentum Alone</td>
<td>13%</td>
</tr>
<tr>
<td>Others</td>
<td>7%</td>
<td>Cephalosporin</td>
<td>7%</td>
</tr>
</tbody>
</table>

Table 3
Microbiology results from pus samples obtained post abscess drainage with breakdown of the different strains of anaerobes and aerobes isolated.

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaerobes</td>
<td></td>
</tr>
<tr>
<td>• Anaerobic Streptococci</td>
<td>27%</td>
</tr>
<tr>
<td>• Fusiform Bacteria</td>
<td></td>
</tr>
<tr>
<td>• Bacteroids</td>
<td></td>
</tr>
<tr>
<td>Aerobes</td>
<td>48%</td>
</tr>
<tr>
<td>• Group A Streptococci</td>
<td></td>
</tr>
<tr>
<td>• Haemophilus Influenzae</td>
<td></td>
</tr>
<tr>
<td>• Diphtheroids</td>
<td></td>
</tr>
<tr>
<td>• Streptococci Viridans</td>
<td></td>
</tr>
<tr>
<td>• Coagulase negative staphylococci</td>
<td></td>
</tr>
<tr>
<td>Infectious Mononucleosis</td>
<td>9%</td>
</tr>
<tr>
<td>Sterile Cultures</td>
<td>16%</td>
</tr>
</tbody>
</table>
In general, the majority of acute sore throats seen in the primary care setting were treated with antibiotics with analgesia and 4% analgesia alone. Co-amoxiclav or penicillin was most commonly given by PCPs prior to hospital referral with PTA. Our results demonstrate that 42% of patients had antibiotics prescribed before referral to the emergency department. Of the 58% who had, 43% received antibiotics alone, 11% received no form of treatment from their PCP prior to hospital referral with PTA. Our results show an average annual incidence of 14 per 100,000 persons in the West of Ireland. This is similar to a previous study on the epidemiology of PTA in Northern Ireland, but it is noted that elsewhere others have reported much higher incidence rates.

We endeavored to appraise the pre-hospital care given by PCPs prior to hospital referral with PTA. Our results demonstrate that 42% of patients had received no form of treatment from their PCP prior to presentation at the emergency department. Of the 58% who had, 43% received antibiotics alone, 11% antibiotics with analgesia and 4% analgesia alone. Co-amoxiclav or penicillin was most commonly given. In general, the majority of acute sore throats seen in the primary care setting (45-98%) are treated with antibiotics. A recent Cochrane review reported a protective effect of antibiotics in the prevention of PTA, but such benefits have been contested by others. In a recent study in the UK, 58% of patients who had been seen by their GP and prescribed antibiotics before referral to the emergency department received an inappropriate prescription of which 78% received an inadequate dose of the correct antibiotic and 22% an inappropriate antibiotic. It has been highlighted that higher dose of antibiotic should be used for those at maximum risk such as male smokers aged between 21 and 40 years old, immunosuppressed or diabetic patients. Poor patient compliance may also contribute to lack of response and this may be compounded in certain cases by the difficulty in being able to swallow oral medication secondary to the progression of the sore throat.

Needle aspiration was the most common method used for abscess drainage in our study, performed in 71% of cases. Snow and colleagues reported that 91 patients who had pus drained by needle aspiration only 10% required repeat drainage. However, Wolf and colleagues compared needle aspiration to incision and drainage and found a higher incidence of residual and recurrent disease with needle aspiration compared to incision and drainage, as well as the need for repeated aspirations. In our study, out of 200 cases of PTA drainage either by needle aspiration, I&D or a combination of both, 26% of patients required further drainage secondary to re-accumulation of pus, 71% of which was carried out successfully by repeat aspiration and 29% by incision and drainage. Given that this was a retrospective review and there was no standardized protocol at the time for management of PTA, the reason for choosing aspiration over incision and drainage as the initial treatment option is unclear. On the basis of our findings and others further study is required comparing needle aspiration with incision and drainage to determine what is the optimal treatment for initial management of PTA.

The most commonly prescribed antibiotics following abscess drainage in our study were benzylpenicillin (36%) or co-amoxiclav (41%) with metronidazole. The majority of patients demonstrated an effective clinical response. There is much debate regarding the selection of antibiotics after PTA drainage. Resistance of grown bacteria to many antibiotics and the potential importance of anaerobic bacteria in development of PTA’s has been highlighted with the reported incidence of penicillin-resistant organisms ranging from 0% to 68%. This has led to some justifying the use of broad spectrum antibiotics empirically. A recent national UK survey found that benzylpenicillin with metronidazole was the most common antibiotic combination chosen for treatment of PTA. Hanna et al. found that penicillin was effective against most isolates and so is a suitable first line therapy.
Similarly, Kieff et al. found that broad spectrum antibiotics failed to show greater efficacy than penicillin alone. It is not possible to conclude on the antibiotic regime of first choice that should be used on the basis of our retrospective study. Nevertheless, given the increasing importance of anaerobic bacteria shown in this and other studies, including other head and neck infections, we recommend that patients with PTA should still be treated with antibiotics effective against both aerobic and anaerobic bacteria.

The role of microbiology studies in the management of PTA disease has been challenged. We and others have shown that in most cases empiric antibiotic treatment is effective in yielding clinical improvement before culture results become available. Despite this we accept that microbiology data offers the clinician a resource for evaluating the efficacy of chosen empiric antibiotics. This in turn allows for the most effective empiric antibiotics to be given in future presentations of PTA in the emergency department. Furthermore, pus cultures are necessary where there is a high index of suspicion for resistant organisms such as in patients who are immunocompromised, have had recurrent PTAs or are diabetic. On retrospective review of sensitivities yielded from microbiology studies performed in our patient cohort, metronidazole was confirmed as the antibiotic of choice for treatment of anaerobic organisms whereas penicillin based agents such as benzylpenicillin or co-amoxiclav were sensitive for treatment of aerobic organisms cultured. Consequently, and given the resistance of grown bacteria to many antibiotics and the potential importance of anaerobic bacteria in development of PTA’s highlighted in this and other studies, the combined empiric use of metronidazole and benzylpenicillin or co-amoxiclav used for treatment in our study would appear justified.

Culture results from our study also showed that of 74% of patients with confirmed PTA who also had tests sent to screen for infectious mononucleosis, 12.8% returned positive. These results are significantly higher compared with previous studies on the association of infectious mononucleosis with PTA in which rates as low as 1-1.8% was reported. Whether our results reflect a higher rate of simultaneous PTA and glandular fever or mixed infection, or that the positive tests for infectious mononucleosis reflect previous glandular fever exposure is unclear.

**Conclusion**

This retrospective study provides an important insight into the epidemiology of PTA and current management provided both at the community and hospital setting. The epidemiology of PTA disease in the west of Ireland population has not previously been described. Our results have highlighted some possible deficiencies in the pre-hospital treatment given by GPs. Needle aspiration was the most common technique used to drain PTA. Nevertheless, a prospective study comparing needle aspiration with incision and drainage is required before a consensus on the optimal treatment modality can be reached. The presence of anaerobes in PTA disease has also been highlighted, supporting the use of antibiotics effective against both aerobic and anaerobic bacteria. All patients in this retrospective review were treated successfully without relying on the information provided by culture and sensitivity results. Whether this is sufficient to question the role of microbiology studies in patients with PTA is unclear. Rather, a formal prospective study evaluating the efficacy of chosen empiric antibiotics in treating PTA infections based on microbiology culture and sensitivity data is warranted.

**References**


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