Changing trends of peritonsillar abscess

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Abstract

Objective: This retrospective, cohort study aims to assess the changing characteristics of peritonsillar abscess (PTA).

Method: Data were obtained from PTA patient records admitted to a secondary hospital over a 10-year period.

Results: A total of 427 patients, aged 31.6 ± 15.2 years (range, 3–91), were treated for PTA, reflecting an incidence of 0.9/10 000/y. Forty-seven (11%) patients had more than one episode. There was no sex, seasonal, or side predominance. Thirteen (3%) patients developed complications. One hundred four (24.4%) patients were 40 years or older, had a longer hospital stay, and were prone to complications. One hundred two (23.8%) patients did not have an antecedent pharyngotonsillitis. Smoking was more common among patients with PTA as compared with the general population and was associated with more complications. A total of 283 (66.2%) patients developed PTA in spite of prior antibiotic therapy; 51.1% of smokers that received prior antibiotics had a higher incidence of Streptococcus viridans isolates.

Conclusion: Peritonsillar abscess may have changed its characteristics: affecting more older patients having a worse and longer course and PTA evolvement without antecedent tonsillitis or in spite of a prior adequate antibiotic therapy. Smoking may be a predisposing factor.

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1. Introduction

Peritonsillar abscess (PTA) is considered a suppurative complication of acute tonsillitis, which is usually treated with drainage and antibiotics. Most cases are reported among older children, adolescents, and young adults [1].

Epidemiology of PTA is not vastly discussed in the literature. Although its yearly incidence in the United States was estimated at 1 in 6500, in Northern Ireland, it was reported as 1 per 10 000 patients per year, with an average age of 26.4 years [2]. Peritonsillar abscesses were more commonly described in children older than 10 years [3]. Anecdotal reports of older individuals having PTA described worse morbidity rates [4,5].

Recently, the highest incidence of PTA was found in adults 20 to 40 years of age [6]. In addition, the usual causative bacteria seemed to alter from gram-positive cocci (mainly Streptococcus β-hemolytic group A) to anaerobes and gram-negative rods [7]. A recent study reported an increased incidence along with a more aggressive presentation of PTA among the pediatric population [8].

Our impression was that during recent years, we have encountered more patients with PTA without an antecedent tonsillitis, a higher incidence of older patients, and abscess evolvement despite adequate antibiotic therapy.

The purpose of this retrospective study was to examine some of the possible changing trends of PTA during a 10-year period.

2. Patients and methods

The population of this study included all patients having PTA (International Classification of Diseases 9 [ICD9] code 475), hospitalized and treated between January 1, 1998, and
December 31, 2007, in a secondary care urban medical center. The work has been approved by the institutional review board.

Medical records were retrospectively reviewed for age, sex, duration of symptoms, abscess side, prior antibiotic therapy, hospital stay, history of recurrent tonsillitis, previous PTA, culture results, comorbidities, smoking habits, and complications. Patients were further divided into 2 age groups (≥40 years or younger), which were then compared.

Incision and drainage were performed for all patients with PTA, usually upon arrival. A microbiological culture was routinely obtained with a standard swab or a syringe aspiration. Antibiotic therapy (mostly amoxicillin/clavunate) was commenced after drainage, along with fluid resuscitation, analgesics, and antiseptic mouthwash.

Statistical analysis was performed with SPSS for Windows version 10.0 software. χ² Analysis, Pearson exact test, and 2-tailed t tests were used. P < .05 was considered significant.

3. Results

In the 10-year period studied (1998–2007), 451 patients were hospitalized with the diagnosis of PTA. However, only 427 medical records were fully retrieved. For the purpose of epidemiologic analysis, only the data from the first PTA occurrence were accounted in all the patients (N = 427). However, for microbiological assessment, all available culture results obtained from all PTA episodes were considered (n = 349). For the purpose of this study, we subdivided the 10-year period to 2 groups: “early years” (1998–2002) and “late years” (2003–2007).

3.1. Age

The patients were aged 31.6 ± 15.2 years (mean ± SD; range, 3–91 years). Age frequency distribution is shown in Fig. 1.

3.2. Sex

There were 234 (54.8%) male and 193 (45.2%) female patients.

3.3. Side

A total of 220 (51.5%) patients had a left side PTA, 206 (48.3%) patients had a right side PTA, and 1 patient had a simultaneous bilateral PTA.

3.4. Seasonal presentation

Seasons were defined as follows: winter (December to February), spring (March to May), summer (June to August), and autumn (September to November). Peritonsillar abscess was equally distributed along the year: winter (116 patients, 27.2%), spring (118 patients, 27.6%), summer (98 patients, 23%), and autumn (95 patients, 22.2%).

3.5. Symptoms duration

Upon arrival, patients were questioned about their symptoms, that is, fever, odynophagia, sore throat, prior antibiotic therapy, oral intake difficulties, and course of illness. The period between symptoms onset and hospital admission was 4 ± 2.6 days (mean ± SD; range, 1–21 days).

3.6. Smoking

A total of 144 (33.7%) patients were smokers. This rate was significantly higher than the smoking rate in the general population, which was reported to be 25.5% by the Israeli Health National Registry in 2004 (P = .04). Among the smokers, 129 cultures were available for review.

3.7. Peritonsillar abscess recurrence

There were 47 (11%) patients who were hospitalized more than once having different recurrent episodes of PTA: 36 patients had 2 different episodes, 10 patients had 3 episodes, and 1 patient was admitted 4 times. A significant male predominance was observed (63%, P = .023). Among these patients, smoking rate was similar to the general population (24.7% vs 25.5%, respectively; P = .98).

3.8. Hospital stay

The patients stayed in the hospital in a range of 1 to 11 days (mean ± SD, 3.42 ± 1.3 days). Hospital stay of smokers was similar to that of nonsmokers.

Fig. 1. Age frequency distribution (N = 427).
3.9. Comorbidities

Seventy-nine (18.5%) patients had comorbidities; cardiovascular disease, diabetes, and asthma being the most frequent. Other comorbidities were drug abuse, alcohol abuse, thyroid disease, neurologic disease, liver disease, and pregnancy. None of the comorbidities were identified as a significant risk factor for having a PTA ($P = .71$).

3.10. Complications

Thirteen (3%) patients had complications, namely, parapharyngeal cellulitis or supraglottic edema, and they required a longer hospital stay. Patients who received antibiotic therapy before admission did not have a significantly increased complication rate, as compared with patients who were untreated ($P = .166$). Although 6 of 13 complicated patients were smokers, this observation did not reveal a significant predisposition for smokers to have PTA complications more than nonsmokers (4.1% vs 2.5%, respectively; $P = .354$).

3.11. Patients 40 years or older

This age group, consisting of 104 (24.4%) patients with an average age of 52.6 ± 11.9 years (mean ± SD; range, 40–91 years), was assessed separately and compared with the younger group, whose average age was 24.8 ± 8.4 years (mean ± SD; range, 3–75 years). There were 72 (65.3%) males and 36 (34.6%) females in the older age group, similar to the sex partition in the younger group, both groups having a significant male predominance ($P = .024$). Seasonal distribution and symptom duration were similar in both age groups. However, older patients had a longer hospital stay as compared with younger patients (3.7 ± 1.7 vs 3.3 ± 1.1 days, respectively; $P = .047$), and the smoking rate in this age group was significantly higher than in younger patients (42.3% and 30.9%, respectively; $P = .02$). Complication rate was also significantly higher as compared with younger patients (2.3% and 0.7%, respectively; $P < .001$). Although not statistically significant, the relative proportion of older patients was higher in the last 5 years (2003–2007) than in the first 5 years (1998–2002) of the study (26.1% and 22.3%, respectively; $P = .11$) (Table 1).

3.12. Microbiology

Of 349 available cultures, 169 were reported as “no growth.” Both aerobic and anaerobic cultures were carried out only when samples contained enough material and only if signed as obtained from an abscess. Otherwise, specimens were tested only for *Streptococcus β*-hemolytic group A. Table 2 summarizes all positive isolate cultures. *Candida albicans* was grown in 2 immunocompetent patients. Microbiological relative incidence breakdown according to age group is shown in Fig. 2.

Table 3 summarizes culture results in smokers and nonsmokers, with or without prior antibiotic therapy. Prior antibiotic therapy was given in 66 (51.1%) of 129 PTA cases in smokers. Among this specific group, there was a significantly higher incidence of *Streptococcus viridans* isolates compared with previously untreated smoking patients (25.7% and 15.8%, respectively; $P = .04$).

3.13. Antecedent tonsillitis

One hundred two (21%) patients developed PTA without having antecedent acute pharyngitis or tonsillitis.

3.14. Prior antibiotic therapy

Of the total enrolled cases ($n = 486$), 283 (58.2%) patients received antibiotic therapy for acute tonsillitis or pharyngitis before PTA evolvement and admission, whereas 203 (41.8%) patients began antibiotic therapy only after admission. A significantly higher rate of patients received prior antibiotic therapy in the last years of the study (46.1%) when compared with patients in the first 5 years of the study (61.9%). However, even this treatment failed to prevent PTA evolution ($P = .04$).

Analysis of preadmission antibiotic therapy revealed that oral penicillin was administered to 21.2% of the cases ($n = 103$), whereas 13% ($n = 63$ cases) received amoxycillin/clavulanic acid; amoxycillin was given to 11.9% ($n = 58$ cases); 3.7% received macrolides ($n = 18$ cases), mostly due

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Epidemiologic trends throughout the years, patient oriented ($N = 427$)</th>
</tr>
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<tbody>
<tr>
<td>Period</td>
<td>No. of patients</td>
</tr>
<tr>
<td>---------</td>
<td>----------------</td>
</tr>
<tr>
<td>1998–2002</td>
<td>201</td>
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<tr>
<td>2003–2007</td>
<td>226</td>
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</tbody>
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<table>
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<tr>
<th>Table 2</th>
<th>Positive isolates ($n = 180$)</th>
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<tr>
<td>Organism</td>
<td>Frequency</td>
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<tr>
<td><em>S. viridans</em></td>
<td>53</td>
</tr>
<tr>
<td><em>Streptococcus β</em>-hemolytic group A</td>
<td>43</td>
</tr>
<tr>
<td>Other gram-positive cocci</td>
<td>32</td>
</tr>
<tr>
<td>Mixed flora</td>
<td>18</td>
</tr>
<tr>
<td>Gram-negative rods</td>
<td>17</td>
</tr>
<tr>
<td>Anaerobes*</td>
<td>8</td>
</tr>
<tr>
<td><em>Staphylococcus</em> sp</td>
<td>7</td>
</tr>
<tr>
<td><em>C. albicans</em></td>
<td>2</td>
</tr>
</tbody>
</table>

* Bacteroides fragilis, Prevotella melaninogenica, and Fusobacterium species.
to penicillin allergy; and 10 more cases received another antibiotic. Twenty-one patients (4.3%) received more than 1 antibiotic therapy regimen before admission. Ten patients who received preadmission antibiotic therapy could not recall the details. Prior antibiotic therapy increased the no-growth rate, as expected, but also changed culture bacteriology, with more frequent gram-negative and anaerobe isolates (Table 3).

Patients who did not receive antibiotic therapy before admission tended to stay longer than those treated; however, this was not statistically significant (38% and 29%, respectively; P = .052).

Comparison of cultures in older patients (40 years or older) to those obtained from younger patients was significantly associated with a higher rate of gram-positive cocci infection, that is, mixed Streptococcal species (38% vs 11%, respectively; P < .001), as well as with gram-negative rods infection (9% vs 2.5%, respectively; P = .02) (Fig. 2).

### Table 3

<table>
<thead>
<tr>
<th>Patient group</th>
<th>Culture result</th>
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<tbody>
<tr>
<td></td>
<td>Streptococcus</td>
</tr>
<tr>
<td></td>
<td>β-hemolytic group A</td>
</tr>
<tr>
<td>Without prior antibiotic therapy (n = 66)</td>
<td>10</td>
</tr>
<tr>
<td>With prior antibiotic therapy (n = 63)</td>
<td>3</td>
</tr>
</tbody>
</table>

### 4. Discussion

The database of the current study was derived from a secondary care urban medical center serving a community of some 500,000 people. Four hundred fifty-one patients with PTA were treated over a 10-year period at our institution patients, that is, an incidence of 0.9 in a population of 10,000/y, similar to that reported in the United States [2], Northern Ireland [2], and the United Kingdom [9].

It appears that the classic characteristics of PTA have changed in the last years. Reported culture results also vary due to different laboratory processing. Earlier reports demonstrated anaerobic predominance [7], whereas later studies often reported polymicrobial growth, including aerobic and anaerobic bacteria originating from the oral bacterial flora [4,10,11]. In addition, there may be dissimilarity of microbiological causatives in different parts of the world. Megalaman et al [7] recently demonstrated an increasing incidence of gram-negative aerobic bacteria causing PTA in India, whereas Sakae et al [12] reported most cases to be polymicrobial, with anaerobic predominance, in Brazilian patients.

The current study revealed that 169 (48.4%) of 349 available cultures were reported as no growth, whereas positive cultures were reported in the remaining 180 (52.6%) cases. The ratio of positive isolates, as well as the microbiological culture results, was similar to the previously reported percentage of 30% to 50% in other patients with PTA [3].

It is noteworthy that more than half of the patients received an adequate empirical antibiotic therapy for pharyngotonsillitis, before PTA presentation and admission. In our opinion, the clinical presentation of PTA has changed through the years, despite advances in antibiotic therapy, in addition to other more “traditional” explanations, such as the limited bioavailability of antibiotic therapy within the abscess, resistance of pathogenic bacteria to antibiotic therapy, and the possible role of Weber glands in the pathogenesis of PTA [1]. Antibiotic therapy was given to more patients in the last 5 years of the study, as compared with the patients in the first 5 years of the study (61.9% vs 46.1%, respectively), which implies a more liberal use of antibiotic therapy in the outpatient setting in recent years. However, antecedent antibiotic therapy did not only fail to prevent abscess evolvement, as also reported earlier [13,14],...
but may also have altered positive cultures incidence and results, having \textit{S viridans} the more frequently isolate in this group. These observations may imply some of PTA trends in recent years.

Peritonsillar abscess has traditionally been regarded as the end point of a continuum beginning as acute pharyngotonsillitis. However, a recent study reported that about two thirds of patients did not complain of a sore throat before PTA diagnosis\cite{15}. Indeed, in this presented cohort, every fifth PTA patient (21\%) did not have an antecedent acute pharyngotonsillitis. This observation may suggest a different or an additional etiology for developing a PTA rather than being regarded as a complication of acute pharyngotonsillitis. An additional information regarding the linkage of PTA and pharyngotonsillitis may be attributed to the unexpected discrepancy between the peak occurrence of PTA and that of tonsillitis among children and young adults, that is, the mean age of pharyngotonsillitis was 6 and the mean age of PTA was 13 years\cite{16}.

It appears that smoking has a role in the occurrence of PTA, especially among older patients. Smoking has an adverse effect on periodontal health, and it also affects the microflora of the oral cavity. Tobacco smoking causes pronounced structural reorganization of the gingival mucosa and its atrophic changes and reduces oral mucosal immunity, with a higher oral \textit{Candida} carriage prevalence and a higher oral candidosis rate in smokers\cite{17}. Van Winkelhoff et al\cite{18} showed that microbiological gingival and mucosal cultures from smokers had a significant higher prevalence of anaerobes. This observation was in agreement with earlier reports, which have also shown the impact of smoking on oral flora. In addition, PTA evolution in smokers was associated with a higher but nonsignificant complication rate, and significantly higher incidence of \textit{S viridans} and other gram-positive cocci isolates and, to a lesser extent, with anaerobes.

Information regarding older patients with PTA is limited. A retrospective study of 724 patients with PTA from Japan reported an estimated rate of 25\% of patients aged years 40 or older\cite{16}, whereas a recently published review of 128 PTA cases in Northern Ireland reported 11\% of their patients with PTA to be 40 years or older\cite{2}. In the present study, 24.4\% of the patients were aged 40 years or older. By dividing the present cohort into 2 periods, 1998–2002 and 2003–2007, and comparing the occurrence of older patients, a trend for more older patients with PTA in the later period was demonstrated, although not statistically significant (\(P = .11\)). In addition to other reports\cite{6,8,19}, this observation may suggest that either PTA is becoming more frequent in older age groups than anticipated or it may reflect the growing proportion of this age group in the general population.

Although PTA in the pediatric age group is associated with low morbidity rate, short hospitalization period, and a low complication rate\cite{20}, PTA in the older age group was reported to be associated with substantial morbidity and mortality rates\cite{4,5}. Focused on patients aged 40 years or older in this study, some characterizations of PTA in this age group were well distinguished. Because of a longer hospitalization period, higher smoking rate, concurrent comorbidities, and a higher complication rate, this group of patients may be defined as a “high-risk” group. In addition, PTA cultures in this age group revealed a higher incidence of gram-positive cocci and gram-negative rods; therefore, a different antibiotic strategy should be considered from that prescribed for younger patients.

5. Conclusion

Peritonsillar abscess has gradually changed its classic characteristics. As presented in this study, PTA often occurs without an antecedent acute pharyngotonsillitis, and antibiotic therapy did not prevent developing an abscess. Peritonsillar abscesses was found to affect a greater rate of older patients than considered before. Patients in this age group had a longer and a more complicated course of the disease, in addition of having different culture results than in the younger age group. These observations may suggest that older patients having PTA should be considered as a high-risk group. Smoking may be a predisposing factor for PTA evolution and having a higher complication rate.

Acknowledgment

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References

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