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RISK FACTORS FOR PERITONSILLAR ABSCESS RECURRENCE

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List of abbreviation and acronyms

PTA – Peritonsillar abscess

RT – Recurrent tonsillitis

1. Abstract

Introduction: Peritonsillar abscess (PTA) is the most common deep neck space infection, resulting from the accumulation of pus in the peritonsillar space. Controversy exists regarding the best management for this potentially fatal infection after the acute episode. Some authors recommend performing a tonsillectomy after the first episode, while others do not recommend a tonsillectomy at all.

Objective: This study aims to characterize epidemiology, clinical features, management and follow-up of patients with PTA, to identify possible predictors of peritonsillar abscess recurrence.

Methods: We retrospectively analyzed patients diagnosed with PTA, hospitalized between 2011 and 2015, at a tertiary otorhinolaryngology department.

Results: This study included 283 patients, aged 37.2 ± 14.8 years [18-89 years]. An history of recurrent tonsillitis was significantly more common in females (p=0.03). In total, 14.1% of patients had PTA recurrence. PTA recurrence`s population was younger and had more frequently a previous history of recurrent tonsillitis. There were no significant differences in other clinical or demographic characteristics between patients with or without PTA recurrence. Seventy five percent of patients had a recurrent episode in the period of 1 year. In total, 40.8% of patients were proposed to tonsillectomy.

Conclusion: In this cohort of PTA, less than half of patients are proposed to tonsillectomy after the first episode. When the option if for a conservative strategy, there is a non-negligible recurrence rate, mainly during the first year. Previous recurrent tonsillitis and younger age patients showed more frequent recurrent PTA episodes.

Keywords: Peritonsillar abscess; Recurrence; Risk factors; Recurrent tonsillitis; Medical therapy; Surgical therapy; Age; Tonsillectomy**.**

2. Resumo

Introdução: O abcesso periamigdalino é a infeção cervical profunda mais comum, resultante da acumulação de pus no espaço periamigdalino. Permanece controversa a orientação terapêutica ideal para esta infeção potencialmente fatal, após o episódio agudo. Enquanto alguns autores recomendam a realização de amigdalectomia após o primeiro episódio, outros excluem, absolutamente, essa hipótese.

Objetivo: Este estudo tem como objetivo caraterizar a epidemiologia, a clínica, o tratamento e o *follow-up* dos pacientes com abcesso periamigdalino e identificar eventuais fatores preditivos de recorrência de abcesso periamigdalino.

Métodos: Foram analisados, retrospetivamente, os doentes diagnosticados com abcesso periamigdalino no período compreendido entre 2011 e 2015, num serviço terciário de Otorrinolaringologia.

Resultados: Este estudo incluiu 283 doentes com 37.2 ± 14.8 anos [18-89 anos]. Antecedentes de amigdalite de repetição foram significativamente mais prevalentes em mulheres (p=0.03). A taxa de recorrência de abcesso periamigdalino foi de 14.1%. O grupo de doentes com recorrência de abcesso periamigdalino foi mais jovem e apresentou mais frequentemente história de amigdalite recorrente. Não foram encontradas diferenças estatisticamente significativas em outras características clínicas ou demográficas entre pacientes com ou sem recorrências de AP. Setenta e cinco porcento dos doentes recidivaram no período de 1 ano. No total, 40.8% dos doentes foram propostos para amigdalectomia.

Conclusão: Neste estudo, menos de metade dos doentes foram propostos para amigdalectomia após o primeiro episódio de AP. Quando se optou por uma estratégia conservadora de tratamento, obteve-se uma taxa de recorrência não negligenciável, principalmente, durante o

primeiro ano de follow-up. Doentes com história de amigdalite recorrente e doentes mais jovens desenvolveram mais recorrências de AP.

Palavras-chave: Abcesso periamigdalino; Fatores de risco; Recorrência; Amigdalite recorrente; Tratamento médico; Tratamento cirúrgico; Idade; Amigdalectomia.

3. Introduction

Peritonsillar abscess (PTA) is a collection of pus between the fibrous capsule of the palatine tonsil and the superior constrictor muscle of the pharynx, mostly coming from the adjacent soft tissues, as seen in cases of acute tonsillitis or obstruction of the Weber glands (1,2).

It is the most common deep neck space infection, both in children (49%) and adults (30%) (3), with 30 cases diagnosed per 100.000 of the US population (4) and a higher incidence between the thirtieth and fiftieth decades (5). The diagnosis is usually clinical (6) with the help of needle aspiration or imagiology (7). Treatment management requires broad-spectrum antibiotics (8), with or without surgical drainage of the abscess, via needle aspiration, or incision and drainage under either local or general anesthesia (1). Prompt treatment is essential because PTA can spread to adjacent tissues and give rise to potentially life-threatening complications such as upper airway obstruction, descending mediastinitis, pericarditis, *Lemierre's* Syndrome, carotid artery erosion, septic shock and death (8-11).

The ideal therapy for a PTA would be the one giving the patient a minimal risk of complications, a rapid resolution of symptoms and also a minimal recurrence rate, but there is little consensus on proper management of the infection (4,12). While some studies demonstrated that patients treated medically can achieve success rates similar to patients treated with initial surgical management (13), others suggest that surgical drainage of the pus should be performed as early as possible (1,14).

Regarding the indication for tonsillectomy after an episode of peritonsillar infection, as described in the literature (15), we usually offer it to younger patients with repeated tonsillitis living far from our hospital, but we do not consider PTA as an absolute criterion for tonsillectomy. Recurrent PTA patients are almost always offered a delayed tonsillectomy.

About 25% of patients with a PTA end up having a delayed tonsillectomy (16). If it was known, previously, which patients would most probably recur, it would have been more reasonable to schedule them to operate than waiting for a recurrence. On the other hand, we may be performing too many tonsillectomies on patients that would have not recurred, with patient and society´s health care system serious implications.

This study aims to identify predictors of PTA recurrence, trying to help elucidating which patients with a PTA will really benefit from a tonsillectomy.

4. Methods

This study included all patients diagnosed with PTA (International Classification of Diseases 9 [ICD9] code 475), admitted at the emergency of Centro Hospitalar e Universitário de Coimbra between 1st January 2011 and 31st December 2015. Information was obtained from patients' medical records. Patients without complete medical records or wrong diagnosis were excluded. We obtained a total of 283 patients.

Variables analyzed included gender, age, prior duration of symptoms, onset of symptoms, abscess side, prior therapies, length of hospital stay, type of treatment during hospitalization, previous history of recurrent tonsillitis, recurrence of PTA, abscess side on recurrence and tonsillectomy enlistment.

Data were analyzed by using Statistical Package for the social sciences (SPSS) for Windows version 24. A p value < 0.05 was considered statistically significant.

5. Results

Clinical characteristics of the global population

There were 283 patients diagnosed with PTA between 2011 and 2015. The mean age was 37.2 ± 14.8 years [17-89 years] with 68% of patients between the ages of 18 and 40 years old (figure 1). There were 54.4% males and 45.6% females. The majority of PTA cases were on the left side - 52% - and 48% were on the right side. There were no records of bilateral PTA.

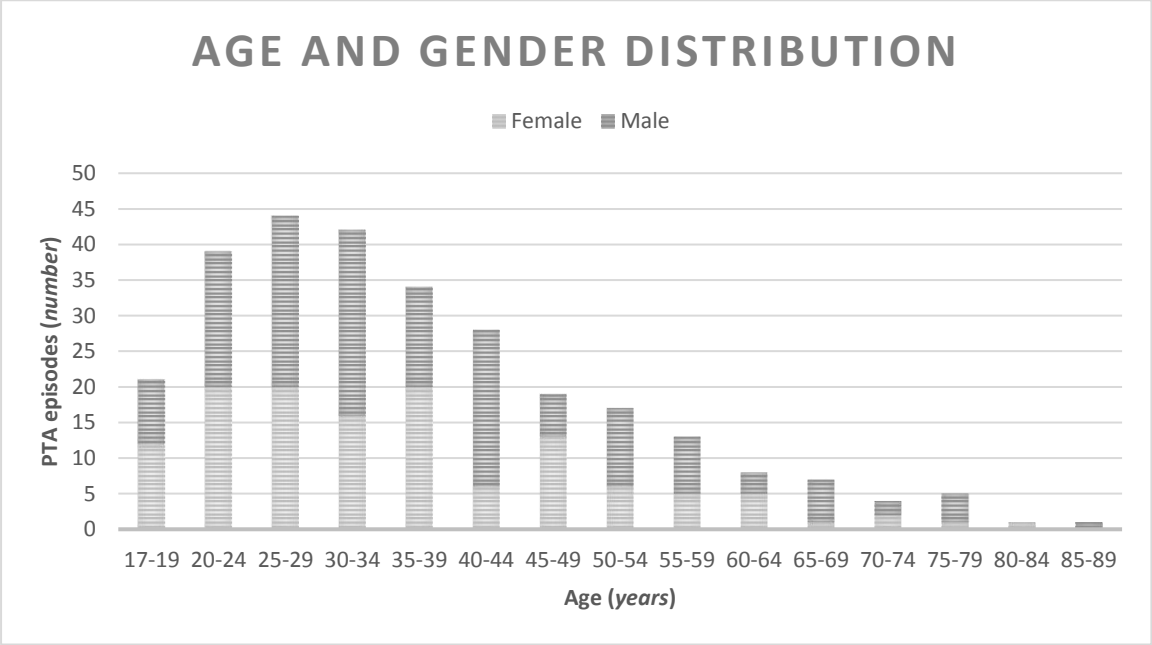

Figure 1. Age and gender distribution of patients with PTA at the moment of the first episode

Almost 60% of the patients presented during the "hot seasons" - Spring (30.7%) and Summer (27.9%). We found 20.8% and 20.5% cases of PTA in the "cold seasons" of Autumn and Winter, respectively.

The mean duration of symptoms until diagnosis was 4.6 ± 3.7 days (0-21 days). Almost all patients complained of odynophagia (99.6%), 66.5% of inadequate food intake, 52.7% of

trismus and 43.3% of fever. At the moment of diagnosis 80% of patients were already under medications, either antibiotic therapy or anti-inflammatory drugs.

Patients were admitted in the hospital for 4.3 ± 2.1 days (2-20 days) and the duration of stay tended to be longer for those who did not receive prior treatments than for those who did (4.5 ± 3.3 vs 4.3 ± 1.8 days for previously treated patients, p=0.077).

Regarding the past history, 23.1% of patients had recurrent tonsillitis prior to developing PTA with a statistically significant predominance of females (p=0.03).

PTA recurrences

We observed 14.1% of PTA recurrences in our study.

The comparison between patients with or without PTA recurrences in what concerns to their clinical features is described in Table 1.

Table 1. Base line demographic characteristics. Comparison between patients with PTA recurrence and patients without PTA recurrence episodes in terms of clinical features

Clinical features	No PTA recurrence	PTA recurrence	P Value	F Value
Age (in years)	37.8±15.2	34.1±11.6	**0.046**	**4,019**
Male sex (%)	55.1	50	n.s	-
Recurrent Tonsillitis (%)	21.8	30	**0.044**	**4,090**
Hospital length stay (in days)	4.3±2.2	4.25±1.7	n.s.	-

The recurrence rate was higher in the group only exposed to medical treatment (16.67%) compared to the surgical drainage group (13.8%) (p=0.647).

The mean time until the first recurrent episode was 8.6 ± 7.8 months (mean ± SD; range 1-29 months) with the majority of patients (75%) developing it in the first year of follow-up, as illustrated in Figure 2. Only 3 patients (7.5%) had recurrent episodes on the opposite side.

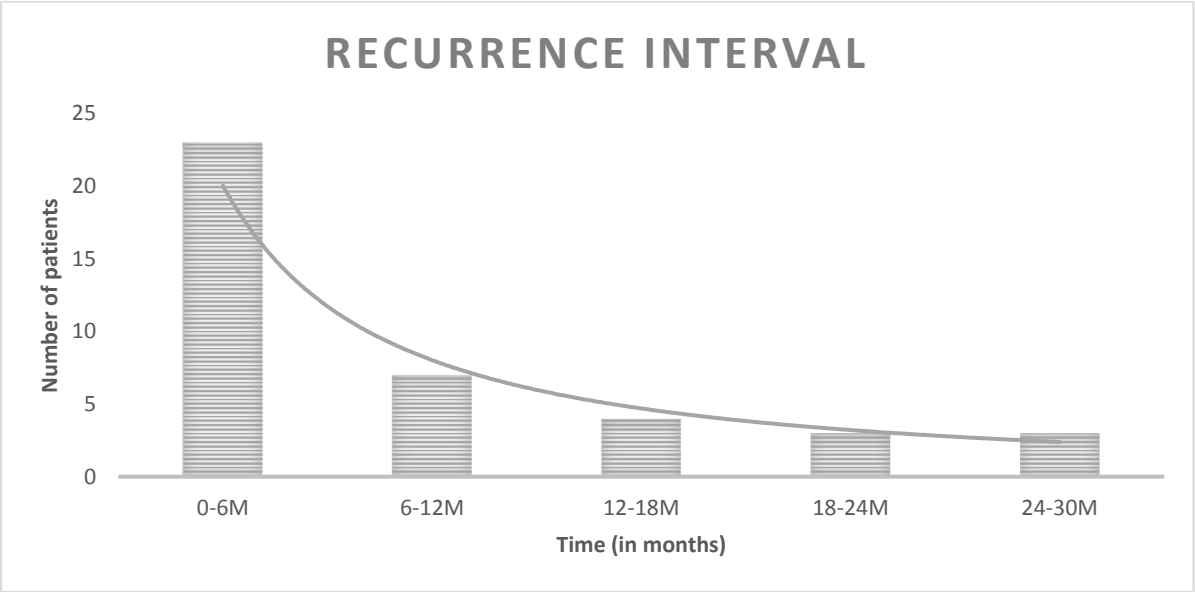

Figure 2. Time interval until the first PTA recurrent episode

Treatment options

Conservative medical treatment was the preferred choice for 10.6% of patients, while 89.4% of patients received both medical and surgical drainage of the abscess during hospital stay.

Antibiotic therapy was given to all patients with ceftriaxone-metronidazole (84.7%), cefuroxime-clindamycin (4.4%) and amoxicillin-clavulanic acid (3.9%) being the most frequent. Ceftriaxone, cefuroxime, clarithromycin-metronidazole, ciprofloxacin-metronidazole and azithromycin were less frequently prescribed. No statistically significant difference was found between the prescribed antibiotics and the rate of PTA recurrence or for the use of

monotherapy versus combination antibiotic therapy and the rate of PTA recurrence (p=0.367 and p=0.154, respectively).

One hundred fifty-five patients (66.5%) received corticotherapy. No correlation was found between the use of corticotherapy and either the length of stay in the hospital and the recurrence rate for our patients (p=0.117 and p=0.085, respectively).

After resolution of PTA acute episode, 40.8% patients were enrolled for delayed tonsillectomy.

6. Discussion

Our recurrence rate for PTA was 14.1%, similar to what was published by Galioto *et al* (6) who described a recurrence rate of PTA between 10-15% and Estevao *et al* (17) who presented a recurrence rate of 16% in a small Portuguese study published in 2014.

History of recurrent tonsillitis and younger ages showed to significantly increase the risk for recurrence of PTA, and the initial management for this infection (either medical or surgical) didn't influence its prognosis.

In our study, PTA was more frequent among younger patients (Figure 1), with almost 70% of them younger than 40 years old, as described before by other authors (18,19). Similar to Shaul *et al* (20), we found a statistically significant lower age in patients with recurrent episodes (34.1± 11.6 vs 37.8±15.2 years, $F(40,243)=4,019$, $p=0.046$).

The majority of PTA episodes occurred in the warmer weather seasons as described in a recent study published by Freire *et al* (22).

The mean length of hospital stay was 4.3 ± 2.1 days. Those who did not receive prior treatment required a longer hospital stay. Nevertheless, gender, season, length of hospital stay and prior therapies were not significantly related to the recurrence rate.

History of recurrent tonsillitis was more frequent in women (23,24). Various studies stated that RT could be a risk factor for PTA recurrence (12,20,25), with Kronenberg *et al* describing a four-fold increased risk in these patients (19). We noticed a statistically significant higher prevalence of recurrences in the group of patients with RT history ($F(40,202)=4,090$, $p=0.044$), as published by Wolf *et al* (26).

PTA management protocol in our institution consists of a diagnosis' confirmation by needle aspiration, eventually followed by incision and drainage. Intravenous broad-spectrum antibiotherapy and corticotherapy were instituted in the majority of cases. In total, 10.6% of patients were treated with course of medical therapy without abscess drainage.

Controversy exists regarding the best initial management for this infection. While some studies (15) highlight the efficacy of surgical techniques, mostly for the benefit of faster symptom relief, others suggest that medical treatment alone can be as effective and doesn't carry the risk of surgical complications, the costs and the discomfort of a surgical procedure (3,13). Battaglia *et al* (14) presented similar results comparing medical to surgical management, but the distinction between abscess and cellulitis was not clearly stated. We didn't find a significant difference in what concerns to the recurrence rate of PTA between these two groups ($p=0.647$), which emphasizes the results of the previously mentioned studies on the efficacy of medical management alone.

We found no significant difference in recurrence rate regarding the antibiotic therapy used either in monotherapy or combination antibiotic therapy. Bimodal therapy with ceftriaxone and metronidazole was instituted in approximately 85% of cases. Initial empiric therapy should include broad coverage for beta-lactamase-producing bacteria, including *Staphylococcus aureus, Streptococcus pyogenes, Streptococcus viridans* and anaerobic gram-negative bacilli, until culture results are available. A Finnish group published a randomized, prospective, double blind placebo-controlled trial with 552 patients (27) and demonstrated that metronidazole neither enhanced recovery nor prevented recurrence and, instead, increased the number of reported adverse effects when combined with penicillin.

Corticotherapy has been described as a safe and effective adjunctive therapy that helps to reduce patients' pain scores and length of hospital stay, and improves symptoms at 24 hours

without any additional morbidity when compared to IV antibiotics alone (28-30). No correlation was found between corticotherapy use and the length of stay in the hospital for our patients. Also, as expected, corticotherapy didn't influence the recurrence rate but, interestingly, recurrent episodes were more frequent in the group of patients treated with corticoids (p=0.085).

Seventy five percent of PTA recurrences occurred within the first year of follow-up (Figure 3), which has important clinical implications, as previously mentioned (20).

There is a lack of consensus in the literature on the role and timing of a delayed tonsillectomy. While some authors suggest it should be performed routinely after a single episode to prevent further recurrences, others advise it only for patients who have certain predictable risk factors for recurrence, such as, history of tonsillitis (31). In contrast, proponents of conservative management argue it unnecessarily exposes patients to the risks of general anesthesia and surgery (16,18). In our department 115 (40.8%) underwent an elective tonsillectomy.

Our study presents some limitations. First, as a retrospective study, information was obtained from medical records. Also, an expansion of the database could provide sufficient data to obtain a larger number of statistically significant results, despite sample size estimation and power analysis for this clinical research were previously calculated.

Finally, we suggest further studies to identify a cut-off age in which surveillance overlaps tonsillectomy as a safe and effective management for this group of patients.

7. Conclusions

Our recurrence rate was 14.1% and it was not related with the choice of medical or surgical management. Younger patients with history of recurrent tonsillitis are recommended to perform a delayed tonsillectomy. Older patients present a significantly reduced risk for recurrence of PTA, which could help us to surveille this patients with a more conservative approach after an acute episode. Seventy five percent of patients had the first recurrent episode in the period of 12 months, which questions the prophylactic role of a delayed elective tonsillectomy in asymptomatic and non-recurring patients after 1 year of follow-up.

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