

## **Peritonsillar Abscess at a Dedicated Otolaryngology Emergency Department**

M. Fitzsimons, K. Williams, S. Knowles, C. Carroll

Royal Victoria Eye and Ear Hospital, Dublin 2.

### **Abstract**

#### ***Aim***

Peritonsillar abscess (PTA) is the most common suppurative complication of acute tonsillitis. It requires urgent specialist treatment due to the risk of progression to airway compromise. We aimed to review referral pathways to a dedicated otolaryngology emergency department (ORL-ED), identify causative organisms and discuss COVID-19 implications.

#### ***Methods***

A retrospective review of patients presenting to the ORL-ED between January 2018 and December 2019 was undertaken. Data extracted included demographics, referral source, treatment, microbiology results and length of stay. Statistical analysis of seasonal variation of presentation and causative organisms employed Chi-Square and Fisher's Exact Test, respectively.

#### ***Results***

There were 53 PTA presentations. 51 were admitted accounting for 44.3% (51/115) of ED admissions. The median patient age was 31 years (IQR 20-40yrs). GP referral accounted for 48/53 (90.6%). There was no statistically significant seasonality ( $\chi^2=5.94$ ,  $p=0.11$ ) in presentation. Microbiology samples were available for 44 patients. Streptococcus was identified in 19/44 (43.2%) patients. 85% (45/53) of patients received Co-amoxiclav.

#### ***Discussion***

PTA is a perennial condition with diverse causative organisms. Antibiotic choice should reflect this. The majority of patients are referred from primary care, emphasising the role of the GP in initial diagnosis and the importance of clinical education in this regard.

## Introduction

Peritonsillar abscess (PTA) is the most common suppurative complication of acute bacterial tonsillitis. Its annual incidence in Ireland is reported between 10-17/100,000 people<sup>1,2</sup>. The palatine tonsils are located in the lateral oropharynx in a fossa between the palatoglossus anteriorly and the palatopharyngeus posteriorly. A potential space exists between the tonsil's fibrous capsule and the superior constrictor muscle which forms part of the tonsil bed<sup>3</sup>. Spread of infection from the superior pole can result in a collection of pus in this space to form a peritonsillar abscess (or Quinsy)<sup>4</sup>. Needle aspiration and/or incision and drainage with antibiotics are the mainstay of treatment. This may be augmented with corticosteroids with some evidence to suggest that this provides quicker pain resolution<sup>5,6</sup>.

Patients with PTA present with worsening sore throat, more pronounced on the affected side. Dysphagia and odynophagia may result in drooling of saliva. Ipsilateral referred otalgia can be experienced via the glossopharyngeal nerve (CNIX). On examination, trismus may be present due to inflammation of the pterygoid musculature. Inspection of the oropharynx reveals a unilateral erythematous soft palate swelling with medial displacement of the affected tonsil and deflection of the uvula to the contralateral side<sup>4,7</sup>.

Direct spread of infection from PTA can lead to a wide range of complications including descending mediastinitis, necrotising fasciitis, retropharyngeal abscess and parapharyngeal abscess. Lemierre's Syndrome (LS), characterised by thrombophlebitis of the internal jugular vein and a typically anaerobic bacteraemia, can occur through haematogenous spread of infection. Further systemic sequelae of LS can result from sepsis and septic emboli. Although rare, LS in the setting of peritonsillar abscess tends to affect young adults (median age of 21 years in one review article<sup>8</sup>). The wide range of complications associated with PTA carries an increased mortality. The presentation of PTA and its complications often occur simultaneously<sup>8</sup>. However, early recognition of PTA is essential in order to safely and effectively manage any associated airway obstructive symptoms and prevent progression to respiratory arrest. Hence referral to a clinical setting staffed by clinicians trained to manage emergent airway obstruction is imperative when managing a patient presenting with PTA.

Evaluation of the microbiology of PTA reveals a wide variety of bacteria. Group A beta-haemolytic streptococcus (GAS) is often reported as the most commonly identified bacteria, yet it is only isolated in up to 40% of PTA samples<sup>1,9</sup>. Furthermore, a negative culture is obtained in up to a third of samples<sup>9</sup>. This leads some to question the value of routine analysis of PTA specimens<sup>10,11</sup> especially given the fact that patients are frequently much improved by the time results become available<sup>2</sup>.

GAS is transmitted through person-to-person contact via infected upper respiratory tract droplets. Corollary to this, one may anticipate a reduced incidence of PTA secondary to the use of face-coverings and social distancing measures implemented in response to the current COVID-19 pandemic.

In this study, we reviewed the presentations of patients with a diagnosis of PTA to a dedicated Otolaryngology Emergency Department (ORL-ED) in Dublin City over a 2-year period. This ED sees approximately 10,000 patients per annum and operates both an emergency GP referral pathway and self-referral service. We aimed to evaluate how patients presented (i.e. GP or self-referral), identify causative organisms and examine the seasonal variation of the condition. In addition, we will discuss considerations of PTA in the time of COVID-19.

## Methods

A retrospective chart review of all patients who presented with PTA to the Otolaryngology emergency department at the Royal Victoria Eye and Ear Hospital, Dublin between January 2018 and December 2019 was undertaken. Demographic data (age and gender), month of presentation, referral source (GP or self-referral), previous PTA, culture results, treatment and length of stay were recorded. Diagnosis of PTA was clinically based on the aspiration of pus. Aspiration samples were sent for culture and sensitivity at the discretion of the treating surgeon.

Analysis of seasonal variation of presentation and isolated pathogen employed Chi-square and Fisher's Exact tests respectively (IBM SPSS Statistics Version 26). Statistical significance was set at  $p < 0.05$ . Seasons were defined as follows: Winter = Dec, Jan, Feb, Spring = Mar, Apr, May, Summer = Jun, Jul, Aug, and Autumn = Sept, Oct, Nov.

In line with the Data Protection Commission and Department of Health in Ireland regulations, ethical approval was not required, as this was a retrospective chart review.

## Results

There were 115 admissions for all conditions via the emergency department in the study period. Peritonsillar abscess accounted for 51 (44.3%) of these admissions while a further two patients were treated for PTA, but declined admission. In 90% (48/53) of cases, patients first attended and were subsequently referred by their General Practitioner (GP) (Figure 1). There were 50 individual patients, with three suffering a second PTA during the study timeframe. The median age at presentation was 31yrs (IQR 20-40) with a male-to-female ratio of 1.65:1. The average length of stay per admission was 1.35 days (s.d. 0.62 days). Table 1 provides an overview of descriptive data on the cohort.

The majority of PTA presentations occurred in Autumn and Winter months (34/53, 64.1%). The lowest number of presentations occurred during the Summer months (8/53, 15.1%). However, the variation in the seasonal incidence of PTA was not statistically significant ( $\chi^2=5.94$ ,  $p=0.11$ ).

**Figure 1:** Referral from General Practitioner.

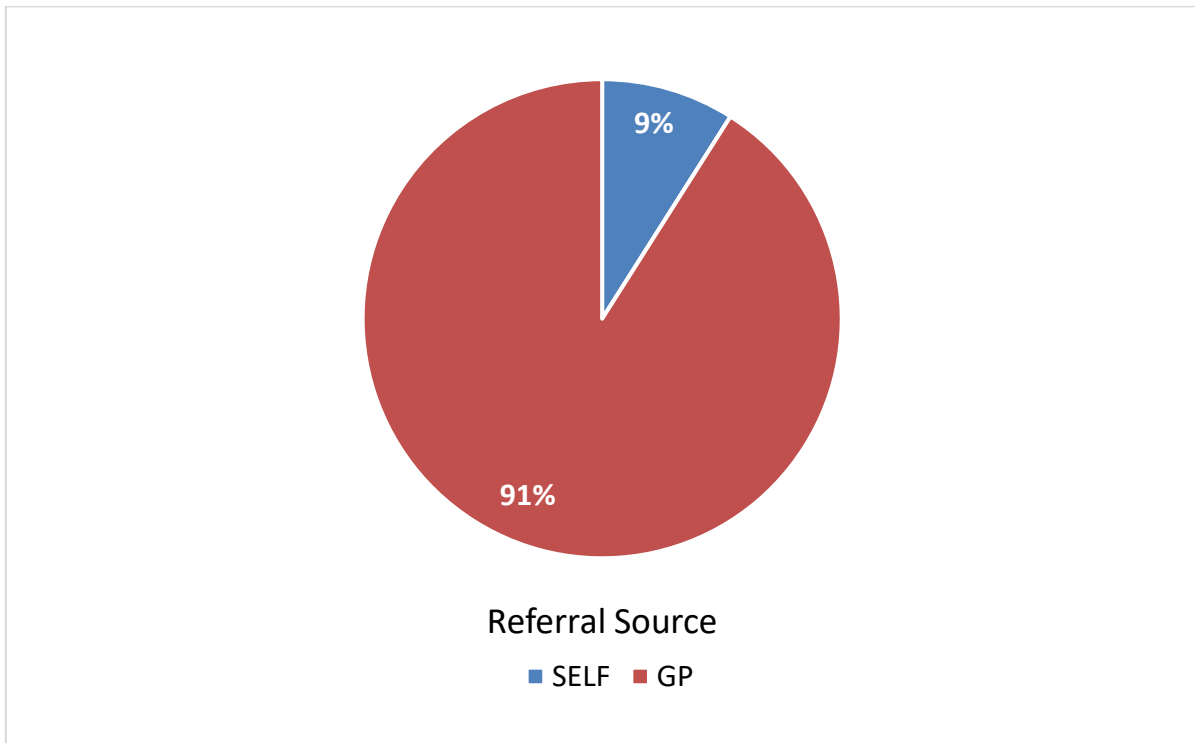


Table 1: Overview Descriptive Data	
<b>Gender (N=53)</b>	
<i>Male</i>	33 (62.3%)
<i>Female</i>	20 (37.7%)
<b>Median Age (IQR)</b>	31yrs (20-40)
<b>Season (N=53)</b>	
<i>Winter</i>	14 (26.4%)
<i>Spring</i>	11 (20.8%)
<i>Summer</i>	8 (15.1%)
<i>Autumn</i>	20 (37.7%)
<b>GP Referral Letter</b>	48 (90.6%)
<b>Previous Quinsy</b>	15 (28.3%)
<b>Mean LOS (s.d.)</b>	1.35 days (0.62)
<b>Treatment</b>	
<i>Aspiration + I&amp;D</i>	51 (96.2%)
<i>Aspiration</i>	2 (3.8%)
<i>IV Antibiotic</i>	52 (98.1%)
<i>Steroid Given</i>	23 (43.4%)

All 53 cases of PTA were diagnosed on the basis of an aspiration of pus. On review, 44/53 had culture and sensitivity of pus samples performed. Table 2 highlights the breakdown of isolated bacteria from abscess samples. A positive culture was obtained in 35/44 (79.5%) samples. Streptococcus was the single isolate in 19/44 (43.2%) of aspirate samples of which 16 (36.4%) were Group A beta-haemolytic streptococcus (GAS). Isolation of GAS did not differ across seasons ( $p=0.437$ , Fisher's Exact Test). GAS was isolated 6 times in Autumn, five in Spring, three in Winter and twice in Summer. Anaerobes were cultured in 10 samples; 8 Mixed Anaerobes, one Bacteroides and one *F. Necrophorum*. The two polymicrobial samples consisted of *S. Anginosus* with *H. Influenza* or Bacteroides.

<b>Table 2: Isolated Bacteria</b>	
<b>Sample Available</b>	44
<i>No Growth</i>	9 (20.5%)
<i>Streptococci</i>	19 (43.2%)
<i>Anaerobes</i>	10 (22.7%)
<i>Normal Flora</i>	4 (9.1%)
<i>Polymicrobial</i>	2 (4.5%)
<b>No Sample Available</b>	9

The majority (51, 96.2%) of patients were treated with aspiration, followed by incision and drainage of the abscess. The other two patients were treated with aspiration alone. All patients received antibiotics. Intravenous (IV) antibiotics were administered to the 51 patients who were admitted. Of the patients who declined admission, one received a single dose of IV antibiotics followed by a course of oral antibiotics. The other patient declined IV and was prescribed a course of oral antibiotics. No (zero) patients suffered further complications of PTA.

Co-amoxiclav 1.2grams TDS was most commonly prescribed (45/53, 84.9%). In addition, 23 (43.4%) patients received at least one dose of IV corticosteroids, mainly in the form of dexamethasone.

## **Discussion**

Peritonsillar abscess is a common emergency presentation to Otolaryngology services. Previous studies have shown that the yearly incidence in Ireland is between 10-17/100,000<sup>1,2</sup>, while other jurisdictions have demonstrated a rate as high as 37/100,000<sup>12</sup> (by comparison, the incidence of appendicitis is estimated at 113/100,000 per year<sup>13</sup>). The common nature of PTA as an emergency presentation to an Otolaryngology service is also demonstrated in our review, as PTA was the most common cause for admission (44.3%) of hospital admissions from the dedicated Otolaryngology Emergency Department, in our institution.

The General Practitioner plays an integral role in the diagnosis and early management of PTA. Of the 53 PTA presentations over the 2-year period, ~ 90% of patients had first attended and subsequently been referred by their GP. This trend highlights the importance of clinical suspicion and accurate identification of patients presenting with symptoms and signs suggestive of PTA in order to ensure timely referral to a hospital setting capable of managing all aspects of emergency airway obstruction. Patients in our study group frequently presented with pain, odynophagia, muffled voice and trismus. Secondary otalgia may be experienced as a result of irritation of the glossopharyngeal nerve (CNIX). Clinical examination usually reveals a unilateral soft palate swelling, medial displacement of the affected tonsil with deviation of the uvula to the contralateral side. Patients frequently present with tonsillitis to a primary care setting<sup>14,15</sup>. It is therefore important for the GP to be able to accurately differentiate simple uncomplicated tonsillitis from PTA. GPs should be familiar with the aforementioned clinical signs of PTA and with the available local specialist services. Suspicion of PTA, failure to improve of oral antibiotics, airway concern, and/or trismus warrants immediate referral to the nearest appropriate centre. We emphasise the need to include this clinical upskilling as part of ORL specific continuous professional development, in the primary care setting<sup>16</sup>.

The seasonal variation in the incidence of PTA has been widely reported, with many claiming to have identified a trend, however there is no consensus as to when PTA is most common<sup>17</sup>. Most (20/53) of our patients presented during the Autumn, with the fewest (8/53) presentations occurring during the summer months. However, the seasonal variation in our cohort was not statistically significant. While our study size is small (n=53), the absence of seasonality has been observed in larger samples (n=1,620)<sup>17</sup>. This highlights the need for general and emergency physicians to remain vigilant of PTA throughout the year.

A diverse range of bacteria were isolated from 44 pus samples in our study. In keeping with previously published data, GAS was most commonly isolated (16/44) in our study<sup>1,9</sup>. Regarding the seasonality of GAS-positive PTA, we found no difference throughout the year. This contrasts with Klug et al. (2014)<sup>17</sup> who did not identify an overall seasonal variation in incidence of PTA, but did find GAS-positive PTA was more prevalent in winter and spring compared to summer. However, this was a larger review of 1,620 cases which may account for the difference.

The value of routine microbiology assessment in PTA treatment is often questioned, as patients typically are much improved by the time results are available. Indeed, this was the case in our study. No patients had their antibiotic regimen altered following culture findings. Nevertheless, analysis of pus samples hold value in understanding pathogenesis of PTA and informing best treatment at a population level. It is best practice to send samples for culture and sensitivity analysis.

Considering PTA in the context of the current coronavirus (SARS-CoV-2) pandemic poses a number of questions. Firstly, it is not unreasonable to expect the incidence of PTA to fall as a consequence of widespread use of facial coverings and social distancing measures implemented to address aerosol transmission of COVID-19.

Early reports suggest an almost 50% decrease in PTA presentations at the beginning of the pandemic<sup>18,19</sup>. This may reflect a true reduction in incidence, but may be also result from patient reluctance to attend the hospital-setting during the pandemic. Further research is required in order to address these changing trends.

Secondly, inspection of the oral cavity and aspiration of PTA is associated with generation of an aerosol and spread of respiratory droplets. This poses a significant risk of coronavirus transmission should the patient be infected. All clinicians undertaking an oropharyngeal examination or aspiration of a PTA must wear appropriate personal protective equipment (PPE), which in this instance includes an FFP2 mask, goggles, long-sleeve waterproof gown, surgical gloves, and appropriate hand hygiene<sup>20,21</sup>. PTA specific guidelines were published at the outset of the pandemic by the Irish Otolaryngology Society. The recommendations were an initial 24 hour period of conservative management with hospital admission and administration of intravenous antibiotics. Incision and drainage of the PTA was only to be undertaken after 24 hours of conservative management, if the patient failed to improve clinically. However, it is again reasonable to practice primary surgical treatment (i.e. aspiration, and incision and drainage) especially given the widespread uptake of COVID-19 vaccination. Nevertheless, there still exists a risk of COVID-19 infection, in particular with new variants that may be more transmissible<sup>22</sup>. Clinicians should remain vigilant of this risk and we recommend the continued use of appropriate PPE as outlined above, including an FFP2 mask, when treating patients with PTA.

The specific limitations of this study include the sample size and retrospective data collection. The emergency department caters for patients  $\geq 14$  years old, therefore our data does not represent the occurrence of PTA in the paediatric population. Patients who were treated in our institution for PTA could have attended other institutions with subsequent episodes of PTA, we do not have this information. Similarly patients may have proceeded to scheduled tonsillectomy as definitive management for recurrent presentations of PTA at other institutions, we do not have this data.

In conclusion, the causative organisms in peritonsillar abscess are diverse. Antibiotic choice must accurately reflect this finding. The majority of patients in our review were referred from primary care, emphasising the role of the GP in the initial diagnosis. It is therefore imperative that ENT education and skills training is a core competency of the GP training program. The emergence of COVID-19 and its transmission through aerosol-generating procedures has necessitated a re-evaluation of the treatment approach to this common Otolaryngology emergency. Appropriate PPE should be worn when assessing and managing patients with PTA.

**Declaration of Conflicts of Interest:**

No conflicts of interest to declare.

**Corresponding Author:**

Michael Fitzsimons  
Royal Victoria Eye and Ear Hospital,  
Dublin 2  
E-Mail: [michaelfitzsimons@rcsi.com](mailto:michaelfitzsimons@rcsi.com)

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