Original Article

Is there a consensus on peritonsillar abscess management?—an audit of a tertiary hospital in Australia

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Background: Peritonsillar abscess is the most common deep space infection of the head and neck. It can have life threatening complications if inadequately treated. The study aimed to analyse the workup and management trends of peritonsillar abscess presentations in a tertiary Australian hospital.

Methods: A retrospective electronic medical records review was undertaken on all patients who presented with peritonsillar abscess or peritonsillar cellulitis between July 1, 2016 and June 30, 2021, at Nepean Hospital, Sydney, Australia. Data on age, sex, Aboriginal and/or Torres Strait Islander background, length of stay, month of presentation, smoking and alcohol status, microbiology, utilisation of computed tomography (CT) scan, management (medical and/or surgical), tonsillectomy performed, and tonsillar malignancy were extracted and analysed.

Results: A total of 291 patients were identified in this 5-year period. The mean age was 34 years with a male predominance (56%). Group A *Streptococcus* and *Streptococcus milleri* were the most common pathogens, although 29% of swabs grew normal respiratory flora or no growth at all. CT scans were performed for 26% of patients. Combination intravenous antibiotics and steroids were used as the preferred medical management for 97% of patients. Needle aspiration and incision and drainage as a combination surgical therapy was performed for 40% of cases.

Conclusions: There is considerable heterogeneity within the workup and management of peritonsillar abscess presentations in this tertiary Australian hospital. The role of swabs is questionable given it did not change management. CT scans are not recommended routinely. Further studies are warranted to formulate a consensus for the workup and management of peritonsillar abscesses.

Keywords: Peritonsillar abscess (PTA); antibiotics; needle aspiration; tonsillectomy; Australia

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Introduction

Peritonsillar abscess (PTA), also known as quinsy, is the most common deep space infection of the head and neck and one of the most common ear, nose and throat (ENT) presentations to the emergency department. It has an incidence of 30 cases per 100,000 in the United States (1). The median ages have been reported to be between 20 to 35 years with a male predominance (2,3). It is believed to be as a result of acute tonsillitis or obstruction of the Weber glands within the superior pole of the tonsil (4). Risk factors may include recurrent tonsillitis, alcohol consumption and smoking, with the latter increasing the risk by up to 150%

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(5-7). Additionally, PTAs are known to be polymicrobial with the most common causative organisms being Group A *Streptococcus* (GAS) and *Fusobacterium* (8).

Patients with PTA can present with fever, progressive sore throat, dysphagia, odynophagia, otalgia, and a muffled voice. Examination would typically reveal one or more of trismus, unilateral peritonsillar swelling and erythema, contralateral displacement of the uvula, ipsilateral tender cervical lymphadenopathy and drooling (9). Along with antibiotic and steroid therapy, treatment consists of surgical drainage which can include needle aspiration (NA), incision and drainage (I&D), and quinsy/abscess tonsillectomy (AT) (10). If untreated or inadequately treated, complications may arise including parapharyngeal space abscess, descending mediastinitis, necrotizing fasciitis and airway obstruction (11).

On review of the literature, there has been no Australian epidemiological study of PTA. Nepean Hospital is a tertiary referral hospital in Western Sydney which services approximately 380,000 people, including both adults and children. We present a retrospective audit from this tertiary hospital to determine whether there is a consensus on PTA workup including indication for computed tomography (CT) scans and subsequent management. We present this article in accordance with the STROBE reporting checklist (https://www.theajo.com/article/view/10.21037/ajo-22-24/rc).

Methods

This retrospective study was conducted in accordance with the Declaration of Helsinki (as revised in 2013) and approved by the Research Ethics and Governance Committee at Nepean Blue Mountains Local Health District (No. 2021/ETH11140). Informed consent for this retrospective analysis was waived.

An electronic medical record review from Cerner FirstNet database was undertaken by two investigators on all patients who presented to the emergency department in the 5-year period between July 1, 2016 and June 30, 2021, at Nepean Hospital, Sydney, New South Wales, Australia. The search terms were "peritonsillar abscess" and "peritonsillar cellulitis". Exclusion terms were "tonsillitis" and "sore throat". Eligibility criteria included patients of any age who were diagnosed with PTA or peritonsillar cellulitis (PTC). Data on age, sex, Aboriginal and/or Torres Islander background, length of stay, month of presentation, smoking and alcohol status, microbiology, utilisation of CT scan, management (medical and/or surgical), tonsillectomy performed and tonsillar malignancy were collected. Diagnosis of PTA was made on the basis of visual detection of peritonsillar pus (i.e., on NA, I&D or AT). Smoking and alcohol status were defined qualitatively as the vast majority of medical records did not include defined pack years or grams of alcohol, respectively. Records which did not include smoking or alcohol history were automatically designated as being non-smokers or non-drinkers, respectively. Any discrepancy regarding the data collection and analysis was resolved by discussion between the two investigators.

Statistical analysis

All statistical analyses were performed using IBM's SPSS Statistics program Version 28. Continuous parametric data were expressed as mean ± standard deviation (SD), non-parametric continuous data were expressed as median [interquartile range (IQR)], and categorical data were expressed as percentages.

Results

Patient demographics

A total of 291 patients (163 male and 128 female) were identified over the 5-year period, of whom 14 identified as Aboriginal and/or Torres Strait Islander (*Table 1*). The mean age was 34 years (SD 16.8 years; range, 3 to 87 years), and the median length of stay was 1 day (IQR, 1 day). PTA was diagnosed in 85% of patients, while the rest had PTC. Among the patients with PTA, 40% were smokers and 24% consumed alcohol. Unilateral peritonsillar swelling was seen in 98% of cases, while 2% had bilateral peritonsillar swelling. CT scans were performed for 19% (n=43) of all patients who initially presented to Nepean Hospital, compared to 48% (n=32) of all patients who initially presented to referring hospitals (*Table 2*).

Seasonal variability

The season with the highest presentations of PTA was winter (28%), followed by spring (26%), autumn (26%) and summer (20%) (*Table 1*).

Microbiology

Peritonsillar swabs were sent for microscopy, culture and

Table 1 General demographics

Variable	N [%]
Sex	
Male	163 [56]
Female	128 [44]
Aboriginal and/or Torres Strait Islander	
Yes	14 [5]
No	277 [95]
Diagnosis	
Peritonsillar abscess	248 [85]
Peritonsillar cellulitis	43 [15]
Smoker	
Yes	116 [40]
No	175 [60]
Alcohol consumption	
Yes	69 [24]
No	222 [76]
Season of presentation	
Summer	57 [20]
Autumn	75 [26]
Winter	82 [28]
Spring	77 [26]

Table 2 Imaging

CT scan	N [%]
Total	75 [26]
Nepean Hospital	43 [19[‡]]
Referring Hospital	32 [48[§]]

[‡], percentage of patients who initially presented to Nepean Hospital; [§], percentage of patients who initially presented to referring hospitals. CT, computed tomography.

sensitivity for 37% (n=107) of patients, of which 27% grew GAS and 26% *Streptococcus milleri* (SM), while 29% grew normal respiratory flora or no growth at all (*Table 3*).

Medical and surgical management

Ninety-seven percent of patients were initially medically managed with intravenous antibiotics and corticosteroids, while the rest were managed with intravenous antibiotics alone. Benzylpenicillin was used in 88% of patients, either as a single agent (51%) or in combination with metronidazole (37%). Other antibiotics utilised were amoxicillin with clavulanic acid, ceftriaxone, or clindamycin (*Table 4*). Reasons for differences in antibiotic treatment were patient allergy profile and consultant preference. The corticosteroid of choice was a single dose of dexamethasone (91%), while prolonged courses were used in patients with worsening peritonsillar swelling and/or airway concerns. Surgical management consisted of NA (24%), I&D (8%), combination of both (40%), or AT (3%), while the rest (25%) were managed medically alone, as outlined in *Table 4*.

Table 3 Peritonsillar abscess swab results

Microorganisms	N [%]
Normal respiratory flora or no growth	31 [29]
Group A *Streptococcus*	29 [27]
Streptococcus Milleri	28 [26]
Fusobacterium necrophorum	14 [13]
Other[†]	5 [5]

[†], others include *Klebsiella pneumoniae*, *Streptococcus pneumoniae*, *Haemophilus influenza*, and methicillin-resistant Staphylococcus aureus.

Tonsillectomy and tonsillar malignancy

Apart from 3% who underwent AT during their admission, 15% (n=45) underwent delayed elective tonsillectomy at Nepean Hospital. Two patients were diagnosed with tonsillar cancer; both p16-positive squamous cell carcinoma. They were both non-smokers. There were no data on tonsillar asymmetry, which may have represented malignancy.

Discussion

Despite being one of the most common ENT presentations to the emergency department, the workup and management of PTA seems to be quite heterogenous. In this 5-year retrospective audit, 291 patients were included with a median length of stay of 1 day. The mean age was 34 years with a male predominance, being consistent with current literature (9,12).

Table 4 Medical and surgical management

Intervention	N [%]
Medical management	
Antibiotic	
Benzylpenicillin	149 [51]
Benzylpenicillin and metronidazole	108 [37]
Amoxicillin with clavulanic acid	17 [6]
Ceftriaxone and metronidazole	15 [5]
Clindamycin	2 [1]
Dexamethasone	
None	8 [3]
Single dose	265 [91]
Prolonged dose	18 [6]
Surgical management	
None	73 [25]
NA	69 [24]
I&D	23 [8]
NA and I&D	118 [40]
AT	8 [3]

NA, needle aspiration; I&D, incision and drainage; AT, abscess tonsillectomy.

Diagnosis

Patients with PTA can present with a myriad of signs and symptoms, which can include fever, dysphagia, otalgia, muffled (or hot-potato) voice and ipsilateral throat pain. On examination there can be trismus, swelling of the oropharynx and medialisation of the tonsil, contralateral uvular deviation, tonsillar exudate and ipsilateral cervical lymphadenopathy (13). Although initially all patients were diagnosed with PTA, after further review and interventions, 15% were subsequently diagnosed as having PTC instead. Interestingly, two patients were diagnosed with tonsillar cancer after undergoing further investigations. The Liverpool peritonsillar abscess score (LPS) was developed by clinicians in the United Kingdom to aid Emergency Physicians and General Practitioners in predicting the likelihood of a patient presenting with signs and symptoms suggestive of PTA. This tool has been reported to have a sensitivity and specificity of 96% and 87%, respectively, and may become a useful tool in our setting once it has undergone external validation (14). Furthermore, artificial intelligence (AI) and machine learning (ML) technology have also been utilised to aid in the diagnosis of PTAs, however much improvement is still needed before being considered as a reliable aid (15).

Seasonal variability

Even though it is not widely accepted, seasonal variability in PTA presentations has previously been shown in some studies from North America with peak incidence occurring between November to December and April to May (16,17). Although the peak incidence in our study was in winter, the month with the highest presentation was in October, which is considered spring in the southern hemisphere.

Utility of CT scans

Although allowing more accurate delineation of PTA prior to surgical intervention, the use of CT scans has been questioned as it places the patient at risk of ionising radiation and possible delay in treatment (18,19). Indications for CT scan includes clinical suspicion of infective spread beyond the peritonsillar space, representation after discharge, recollection of pus, abnormal appearing tonsils and patient factors that increase susceptibility to infections such as being immunocompromised or diabetic (10).

In our study, CT scans were performed for 26% (n=75) of patients with a large discrepancy between the proportion of scans performed at referring hospitals (48%) when compared to Nepean Hospital (19%). Despite not being a criterion for referral, one reasonable explanation for the comparatively high number of CT scans could be the lack of ENT services at referring hospitals. Other reasons for performing CT scans included concerning features on physical examination (e.g., medialisation of the lateral pharyngeal wall) and limited clinical improvement despite initiation of management.

Microbiology and role of swabs

PTAs are known to be polymicrobial. The most commonly isolated aerobes have been GAS and SM, and the most common anaerobe being *Fusobacterium necrophorum* (FN) (4,8,9). Additionally, in several retrospective studies, infectious mononucleosis was reported as a coinfection in up to 6% of cases (9,20). Our study is consistent with current literature with 66% of swabs isolating one of GAS, SM or FN, although 29% grew normal respiratory flora,

or no growth at all. One possible explanation for this is that some patients may have already commenced antibiotic therapy in the community prior to presenting to the emergency department. In addition, it is important to note that swabs in this hospital have a turnaround time of 48 to 72 hours, hence the patient would most likely be discharged prior to return of results. Furthermore, each swab costs the healthcare system $22 (21). Given the above, swab results may not change management and hence their utility is questionable. However, there are certain circumstances where swab results may be of benefit; these include cases of recurrent or persistent infection, or in diabetic or immunocompromised patients (10).

Medical management

The management of PTA can be divided into medical and surgical. Medical management consists of antibiotics with or without intravenous steroid therapy. This has previously been shown to be equally effective as surgical management when comparing complications and failure rates (22). All our patients received medical therapy, compared with 75% who in addition to medical management also received surgical therapy. According to the Therapeutic Guidelines, intravenous benzylpenicillin is recommended as first line therapy for PTA or PTC for 1 to 2 days following successful abscess drainage or after clinical improvement based on signs and symptoms (23). This is consistent with our study, with 88% receiving intravenous benzylpenicillin with or without metronidazole. However, a prospective study of 200 patients concluded that metronidazole with penicillin does not enhance recovery when compared to penicillin alone, but in fact increases adverse events (24). Furthermore, because of its polymicrobial nature, one study encouraged the use of broad-spectrum antibiotics such as ceftriaxone plus clindamycin, although antibiotic resistance should always be considered (22). Given the lack of robust management guidelines for PTA, this has also resulted in treatment heterogeneity within our study with 12% receiving non-penicillin antibiotics. Conversely, there seemed to be a consensus with the use of intravenous dexamethasone, with 91% receiving a single dose.

Surgical management

Surgical management consists of NA, I&D and/or AT. A Cochrane Review comparing NA and I&D showed low quality evidence suggesting I&D being associated with a lower chance of recurrence, although NA was less painful (13). However, another study suggested AT to be an expedient way of simultaneously treating the PTA and preventing recurrence (22). Furthermore, systemic corticosteroids such as intravenous dexamethasone, in conjunction with surgical management have been shown to reduce pain and accelerate clinical recovery (25). In our investigation, 40% underwent both NA and I&D, with 3% undergoing AT. The main reason for the high percentage of "dual" surgical interventions was that once a pocket of pus had been found with NA, an I&D was performed to help ensure good evacuation of pus from the entire abscess cavity. Conversely, it was also seen that if NA was unsuccessful in aspirating pus, then an I&D was performed as the subsequent method. Interestingly, a New Zealand study of 1,773 individuals reported all their patients underwent NA followed by I&D (26). Reasons for performing AT were failure of bedside NA and I&D leading to reaccumulation of the abscess and threatened airway, a potentially lethal complication of PTA.

Limitations

One of the main limitations of this study is that of retrospective audits; their inherent risk for bias. Furthermore, with the exclusion terms of "sore throat" and "tonsillitis", it is possible that a number of PTA presentations may not have been included in this study. Additionally, the assigning of patients with no data on smoking and alcohol consumption as non-smokers and non-drinkers respectively, may have biased the results, possibly undervaluing these two groups. Finally, our data only capture encounters at Nepean and its referring hospitals and hence numbers such as delayed tonsillectomies at other facilities could not be accounted for.

Conclusions

There is considerable heterogeneity within the workup and management of PTA presentations in this tertiary Australian hospital. We found the mean age at presentation to be 34 years with a male predominance. Although swab results did not change management, the main microorganisms identified were GAS and SM. Similarly, CT scans did not change management either, and hence are not recommended routinely. Intravenous benzylpenicillin with or without metronidazole, and a single dose of intravenous dexamethasone were the mainstay medical management,

with NA and I&D as a combination therapy being the surgical treatment of choice. Further prospective studies are warranted to help formulate a consensus for the workup and management of PTA.

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Footnote

Reporting Checklist: The authors have completed the STROBE reporting checklist. Available at https://www.theajo.com/article/view/10.21037/ajo-22-24/rc

Data Sharing Statement: Available at https://www.theajo.com/article/view/10.21037/ajo-22-24/dss

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013), and approved by the Research Ethics and Governance Committee at Nepean Blue Mountains Local Health District (No. 2021/ETH11140). Informed consent for this retrospective analysis was waived.

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