

Epidemiology and Clinical Features of Peritonsillar Abscess: Is It Related to Seasonal Variations?

Original Investigation

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Abstract

Objective: Peritonsillar abscess (PTA) is defined as pus accumulation between the tonsillar capsule and constrictor pharyngeal muscle. It can be seen as a complication of acute tonsillitis, but other mechanisms have also been proposed. In this study we aimed to reveal the seasonal variations and epidemiologic features of PTA.

Methods: This is a retrospective, observational study. We reviewed 221 patients, and together with 24 recurrent cases, 245 admissions were reviewed in total. Age, gender, the duration of admission, seasonal and monthly distribution of cases, diabetes and smoking status, white blood cell count, and C-reactive protein (CRP) levels were recorded. Monthly and seasonal incidences of PTA were reviewed to see if there is any association of climate variations and PTA incidence rate. Features associated with the length of hospitalization and recurrence were also analyzed.

Results: A total of 245 PTA cases were admitted to our clinic between June 2014 and June 2017. The highest amount of cases was observed in spring and winter. The C-reactive protein and white blood cell

count (WBC) levels were found to be positively correlated with the length of hospitalization. There was no statistically significant correlation with recurrence and smoking, the WBC levels, CRP levels, and length of prior hospitalization. Diabetes status was not found to be associated with length of hospitalization and CRP levels.

Conclusion: The present study reflects the epidemiologic and clinical features of PTA in İstanbul. Our findings showed that seasonal variation was not significant, consistent with previous studies. The highest incidence rate was observed in spring and winter. Length of hospitalization was found to be positively correlated with C-reactive protein and white blood cell count (WBC) levels. Recurrence was not statistically correlated with and smoking, the WBC levels, CRP levels, and length of hospitalization. More studies are recommended to reveal the different epidemiologic factors affecting the incidence of PTA.

Keywords: Peritonsillar abscess, tonsillitis, epidemiology, seasons



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Introduction

Peritonsillar abscess (PTA) is a localized infection defined as pus accumulation between the tonsillar capsule and constrictor pharyngeal muscle. This condition is thought to be a complication of acute tonsillitis and is mainly seen following peritonsillar cellulitis. Another theory is that inflammation of the Weber glands, minor salivary glands located close to the tonsils, may be the causative factor (1). Medical and surgical treatment is needed to relieve the symptoms, and inpatient treatment may be necessary. It is mainly seen in adolescents or young adults, but all age groups can be affected (1). It

presents as a sore throat, fever, dysphagia, trismus, and altered voice, and on examination, tonsillar hypertrophy, peritonsillar swelling, and hyperemia can be seen. This condition mainly resolves with simple drainage and medical treatment, but if adequate treatment is not implemented, it can lead to life threatening complications. Airway obstruction, mediastinitis, and hemorrhage due to vascular involvement and septicemia are highly lethal complications of PTA (2, 3). In this study, we aimed to reveal the epidemiologic and clinical findings and seasonal variations of 245 PTA cases treated in our clinic between June 2014 and June 2017.

Methods

This is a cross-sectional study including 221 patients admitted to our clinic for PTA between June 2014 and June 2017. Twenty-four cases of recurrence were observed, and in total, 245 admissions were reviewed. All the patient data were retrieved from the medical records. Our hospital is a tertiary care center in the middle of Istanbul, which has a population of almost 20 million. Patients were admitted to the clinic for close observation. Proper treatment with antibiotics and analgesics were given. Patients were hydrated intravenously if needed. Before admission, needle aspiration and incision drainage were routinely performed under local anesthesia, and the evidence of pus was used to make the definite diagnosis of PTA. Age, gender, duration of admission, seasonal and monthly distribution of cases, diabetes and smoking status, white blood cell count (WBC), and C-reactive protein (CRP) levels were recorded. Monthly and seasonal incidences of PTA were reviewed to see if there is any association of climate variations and PTA incidence rate. Features associated with the length of hospitalization and recurrence were also analyzed. Patients without purulent discharge following the incision were not included in the study. This study was approved by the Ethical Committee of Şişli Hamidiye Etfal Training and Research Hospital in January 2018. As this is a retrospective study, patient consent was not sought.

Statistical Package for the Social Sciences (SPSS) version 15.0 for Windows programme (SPSS Inc.; Chicago, IL, USA) was used. In subgroup analysis, a chi-square test was used to compare quantitative data. If two different groups were compared for quantitative variables, Mann-

Whitney U-test and Spearman's rank correlation coefficient was used. P-values of 0.05 or less were considered significant.

Results

A total of 245 PTA cases were admitted to our clinic between June 2014 and June 2017. One hundred and thirty-six patients were male (61.5%), and 85 were female (38.5%). Twenty-four patients were re-admitted for recurrence. The mean age of the patients was 29.9 ± 6.3 (range 10-83). The youngest patient was a 10-year-old male, and the oldest patient was an 83-year-old male, although PTA is not common in elderly patients. Patients were divided into four groups according to age. The PTA incidence was significantly higher in the young adult group (18-40 years old) (Table 1). In all age groups, the incidence rate was not significantly different between male and female patients ($p=0.880$) (Table 2). The mean length of hospitalization (LH) was 3.4 ± 1.3 days (range, 1-10 days). Diabetes mellitus (DM) was present in 12 of the patients (5.5%). The mean level of CRP was 121.6 ± 65.1 (range, 10-329). The mean WBC was 14.7 ± 3.7 (range, 1-30). In patients with DM, the WBC levels were significantly higher ($p=0.016$). Recurrence was detected in 24 patients (10.9%). A smoking status of patients was also recorded, and the mean pack/year smoking was found to be 7.6 ± 14.1 (range, 0-90).

Monthly and seasonal incidence rates of PTA were also evaluated. In March and April, the PTA incidences were higher, 10.6% and 11.8%, respectively. The lowest incidence rate was observed in September (3.3%). In spring, the PTA incidence was the highest (31.4%), and in summer and autumn, the incidence of PTA was found to be the lowest, 20.8% and 20% respectively (Table 3, 4).

The LH was positively correlated with the CRP and WBC levels, and these data were statistically significant ($p=0.008$, $p=0.001$), but the smoking status did not correlate with the LH ($p=0.266$) (Table 5).

Recurrence rate was found to be 10.9% (24 of 221 patients). When we compared patients with and without recurrent disease, we found that there was no statistically significant correlation with recurrence and smoking, the WBC levels, CRP levels, and length of hospitalization (Table 6).

Table 1. Age and gender distribution of patients

		n	%
Gender	Male	136	61.5
	Female	85	38.5
Age	10-18 yo	30	13.6
	18-40 yo	156	70.6
	40-60 yo	29	13.1
	>60 yo	6	2.7

yo: years old

Table 2. Age subgroups in both genders

		10-18 yo		18-40 yo		40-60 yo		>60		p
		n	%	n	%	n	%	n	%	
Gender	Male	18	60.0	98	62.8	17	58.6	3	50.0	0.880
	Female	12	40.0	58	37.2	12	41.4	3	50.0	

yo: years old

Table 3. Monthly peritonsillar abscess incidences

	Peritonsillar Abscess Incidence	
	n	%
January	25	10.2
February	19	7.8
March	26	10.6
April	29	11.8
May	22	9.0
June	17	6.9
July	20	8.2
August	14	5.7
September	8	3.3
October	24	9.8
November	17	6.9
December	24	9.8

n: number of patients

Table 4. Seasonal peritonsillar abscess incidence

	Peritonsillar Abscess Incidence	
	n	%
Winter	68	27.8
Spring	77	31.4
Summer	51	20.8
Autumn	49	20.0

n: number of patients

In diabetic patients, the WBC levels were found to be significantly increased. CRP levels and LH were not significantly different than patients without DM.

Discussion

Peritonsillar abscess is defined as pus accumulation between the constrictor pharyngeal muscle and tonsil capsule. It presents as sore throat, difficulty at swallowing, fever, and trismus, and the medical and surgical approach is usually needed (4). We reviewed a total of 221 different patients with PTA that were treated in our tertiary care center, which is in the middle of Istanbul. Istanbul has a population of around 20 million, and climate in Istanbul is similar to other Mediterranean cities. Summer months are generally hot and humid, the average highest temperature is approximately 25°C-27°C. Winters in Istanbul can be cold, and low temperatures averaging 1°C-4°C are seen in general. Spring and autumn are mild, and average temperatures of 15°C-25°C are seen (5).

Table 5. Association of patient characteristics and laboratory findings and length of hospitalization

	Smoking (Pack/Year)		Length of Hospitalization		CRP	
	rho	p	rho	p	rho	p
Smoking (Pack/Year)						
Length of Hospitalization	-0.058	0.395				
CRP	-0.046	0.494	0.385	<0.001		
WBC	0.093	0.171	0.208	0.002	0.462	<0.001

rho: Spearman's rank correlation coefficient

Table 6. Association of recurrent disease with smoking status, laboratory findings, and the length of prior hospitalization

	Recurrent Disease				p
	Not Present		Present		
	Mean±SD	Median	Mean±SD	Median	
Smoking (Pack/Year)	6.9±12.6	0	13.4±22.8	2.5	0.929
CRP	121.8±66.2	106	119.6±56.4	116	0.118
WBC	14.6±3.8	14	15.6±2.4	15.5	0.984
Length of Hospitalization	3.40±1.32	3	3.46±1.53	3	0.057

SD: Standard deviation

Peritonsillar abscess is predominantly reported in males. In our study, male-to-female ration is 1.6:1, which is consistent with previous studies (1, 4, 6) (Table 1). Incidence rates in age groups were consistent with the previous findings in the literature, and PTA is more commonly seen in the adult age group (18-40 years old), whereas recurrent tonsillitis incidence is more common than PTA in children (1, 7).

The present study shows that in winter and spring, the PTA incidence is slightly higher. In the literature, there is no consensus on seasonal variation of PTA. In general, it is thought that the PTA incidence is similar in all seasons, but Freire et al. (8) reported that PTA is more common in warmer months, and they found a positive correlation between monthly temperatures and PTA incidence rates. A recent study in Denmark showed that the seasonal variation does not have a statistical significance (9). Winters are mostly cold with occasional snow and rain, and springs are relatively warmer in Istanbul, and we believe that the season does not contribute to the PTA incidence.

In a previous study by Klug et al. (10), smoking was reported to increase the incidence of PTA. However, in our study, we found

that smoking status is not associated with the risk of recurrence and does not affect the LH.

The recurrence rates of PTA are reported to be between 9%-22%, and in our study, the recurrence rate was 10.9% (24 of 221 patients), which is consistent with the literature (11). Smoking status of patients, WBC and CRP levels, and LH were not found to be the predictors of recurrence. In a recent study by Chung et al. (12), recurrent tonsillitis and extraperitonsillar spread on a computed tomography scan were found to be the main risk factors for recurrence. In our study, we did not see any factors associated with recurrence. The recurrence rate is relatively low in our study, which can be because our study is a retrospective one, and as Istanbul is a metropolis, there are many hospitals in a small area, and there may be some patients presented to other hospitals for recurrence of PTA.

Diabetes mellitus (DM) was present in 12 of the patients (5.5%). In diabetic patients, the WBC levels were found to be significantly increased. The CRP levels and LH were not found to be different than patients without DM. DM is considered to be an immunocompromised state, and deep neck infections are more severe and higher complication rates are seen in DM patients (12). In our study, the number of patients with DM was limited, and this might be the reason for the lack of association with a more severe disease status. It is reported in several studies that DM is not a risk factor for PTA and is not associated with recurrence of PTA (12, 13).

The mean LH was 3.4±1.3 days (range, 1-10 days). Smoking status did not affect the LH and CRP levels. WBC levels were found to be positively correlated with LH. In a study by Liu et al. (14), risk factors for LH were assessed. The authors reported that smoking was not associated with LH, which was similar to our findings, and older ages, positive band form WBC, lower hemoglobin levels, and having a medical history of DM were independent predictors of longer LH. In our study, due to a limited number of patients with DM, we did not find any relationship between DM and LH.

Conclusion

The present study reflects the epidemiologic and clinical features of PTA in İstanbul. Our findings showed that seasonal variation was not significant, which was consistent with previous studies. The highest incidence rate was observed in spring, when the weather is relatively warm in Istanbul. It may indicate that the PTA incidence is not affected by the temperature. We can also conclude that acute tonsillitis, which peaks during winter and fall when the temperature is low, may not have to precede PTA. We recommend that more studies should be conducted to reveal the epidemiologic factors affecting the incidence of PTA.

Ethics Committee Approval: Ethics committee approval was received for this study from the Ethics Committee of Şişli Hamidiye Şişli Hamidiye Eftal Training and Research Hospital (1854/09.01.018).

Informed Consent: Informed consent was not received due to the retrospective nature of the study.

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