



Original article

Prognostic factors and effects of early surgical drainage in patients with peritonsillar abscess



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ABSTRACT

Peritonsillar abscess is a frequently encountered otorhinolaryngological emergency, but the characteristics of patients with this disease have not been described in detail. The objective of this study was to delineate prognostic factors associated with peritonsillar abscess and the effects of early surgical drainage for the treatment of peritonsillar abscess. We conducted a retrospective analysis of the medical records of 240 consecutive patients with PTA during the period from 2007 to 2013. Univariate analysis indicated that the period between symptom onset and relief was significantly longer in patients with high levels of C-reactive protein (CRP) (>8.53 mg/dL, $p = 0.0073$) and without early surgical drainage of pus ($p < 0.0001$). Multivariate analysis identified both of these values as independently associated with longer duration of symptoms (high CRP, $P < 0.0001$; no early drainage, $P < 0.0001$). Univariate analysis indicated that the duration between symptom onset and complete recovery from the disease was significantly longer with age ≥ 40 years ($P = 0.0004$), no history of recurrent tonsillitis ($P = 0.022$), high CRP level ($P = 0.0017$), and no early surgical drainage of the abscess ($P = 0.0014$). Multivariate analysis identified older age ($P = 0.0004$), high CRP level ($P = 0.0001$), and no early drainage ($P < 0.0001$) as independently associated with longer duration between symptom onset and complete recovery. Early surgical drainage of the abscess is important for the treatment of peritonsillar abscess. Patients ≥ 40 years old with peritonsillar abscess and high CRP levels should be recognized as a high-risk group.

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1. 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, arising as a complication of acute tonsillitis or potentially by direct spread from infection of Weber's glands [1,2]. Management requires antimicrobial therapy with or without surgical drainage, and inadequate treatment may lead to serious complications such as airway compromise from epiglottal or

laryngeal edema, deep neck abscess of the para- or retropharyngeal spaces, or mediastinitis [3]. The characteristics of PTA and the effects of early surgical drainage for this disease have not been well described. To delineate the prognostic factors and importance of early surgical treatments, this study retrospectively investigated the clinical features of PTA patients treated in our department.

2. Materials and methods

The clinical records of 240 consecutive patients with PTA who had been treated at Himeji Red Cross Hospital between December 2007 and December 2013 were reviewed.

Diagnosis was made on the basis of typical clinical signs, collection of pus from the abscess by surgical procedures, routine

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blood tests, and findings from computed tomography (CT). Laryngeal electroendoscopy was performed for all patients. Patients showing peritonsillar cellulitis (PTC) were excluded from this study.

All patients with PTA were admitted to our department and received inpatient hospital care including intravenous antibiotics and steroids. As a rule, incision and drainage were performed under local anesthesia in the outpatient clinic prior to admission. When the patient or their family members expressed a desire for less-invasive procedures, needle aspiration was performed, and when surgical drainage was declined, only conservative treatments were provided. When the abscess seemed difficult to drain safely due to location, or initial surgical procedures failed to collect pus from the abscess, CT was performed. When CT revealed an abscess located around the inferior pole of the tonsil, close to the internal carotid artery, or too thickened to drain, only conservative treatments were provided; otherwise, surgical drainage was (re-) tried. Steroids were not administered to patients with serious diabetes mellitus (DM).

The duration between symptom onset and relief from all symptoms was defined as the time from initial onset of any symptoms (including fever, sore throat, trismus, hoarseness, otalgia, fatigue, etc.) to complete resolution of all symptoms, as reported by the patient. The time from initial onset of symptoms to the time of discharge from hospital was defined as the criterion for the duration between symptom onset and complete recovery [4–7]. Discharge was mainly based on the disappearance of symptoms and normalization of pharyngeal findings. Relationships between these two periods and several variables were assessed using Student's *t*-test for univariate analyses, and multiple regression for multivariate analyses. We defined a history of recurrent tonsillitis as more than two episodes of habitual acute tonsillitis per year [8]. Values of *P* < 0.05 were considered statistically significant. All analyses were performed using SPSS version 21.0J software (SPSS, Armonk, NY).

3. Results

3.1. Overall outcomes

The 240 patients comprised 178 males (74.2%) and 62 females (25.8%), with a mean age of 39.3 years (range, 2–89 years). PTA was on the right side in 121 patients (50.4%), on the left in 117 (48.8%), and bilateral in 2 (0.8%). In addition, 147 patients (61.3%) were smokers. Nineteen patients (7.9%) had a clinical history of recurrent tonsillitis before the development of PTA. The presenting complaint was laryngeal edema in 74 patients (30.8%), and 5 patients (2.1%) required tracheostomy. No significant differences in the location of the PTA were found between cases with and without laryngeal edema.

Mean white blood cell (WBC) count and serum C-reactive protein (CRP) level at first presentation were 14,265/ μ L (range, 2400–29,600/ μ L) and 8.50 mg/dL (range, 0.13–38.03 mg/dL), respectively.

Surgical treatment was provided for 185 patients (77.1%) at the time of first presentation, comprising incision and drainage for 181 patients and needle aspiration for the remaining 4 patients. The present study included 20 patients (8.3%) <18 years old (2 years, *n* = 1; 5 years, *n* = 1; 6 years, *n* = 2; 15 years, *n* = 3; 16 years, *n* = 6; 17 years, *n* = 3; 18 years, *n* = 4). Of these 20 patients, 18 underwent incision and drainage under local anesthesia in the outpatient clinic, while an uncooperative 5-year-old girl was admitted to the operation room for treatment under general anesthesia, and a 2-year-old boy received conservative treatment because his parents did not consent to surgical drainage. Including this last case, 55 patients (22.9%) were initially treated conservatively with administration of antibiotics with or without steroids, mainly because the

abscess seemed difficult to drain due to location. Surgical treatment was not attempted at all for 22 of these 55 patients, and was tried but failed to collect pus in the other 33 patients. Twenty of the 55 patients initially treated conservatively underwent attempted or re-attempted surgical treatment after admission. Intravenous steroid was not administered to 2 patients because of serious DM.

Mean durations between symptom onset and resolution of all symptoms or complete recovery from the disease were 3.2 days (range, 1–12 days) and 5.5 days (range, 3–19 days), respectively.

3.2. Statistical analysis of prognostic factors

Results of univariate analysis for these variables are shown in Table 1. A high level of serum CRP (≥ 8.53 mg/dL) and no drainage of the abscess at first presentation were significantly associated with delayed resolution of symptoms. Older age (≥ 40 years), no history of recurrent tonsillitis, high serum CRP level, and no drainage of the abscess at first presentation were all significantly associated with longer duration of hospitalization. Multivariate analyses to evaluate the simultaneous effects of variables (Tables 2a, b) showed both high serum CRP level and no drainage of the abscess at first presentation as factors independently associated with delayed resolution of symptoms, and older age, high serum CRP level, and no drainage of the abscess at first presentation as factors independently associated with longer duration of hospitalization.

4. Discussion

In the current patient population, the mean duration between symptom onset and resolution of symptoms of 3.2 days and the

Table 1
Univariate analysis of outcomes for 240 patients with peritonsillar abscess.

Characteristics	Symptoms ^a		Recovery ^b	
	(mean, 3.2 days)		(mean, 5.5 days)	
	Days	<i>P</i>	Days	<i>P</i>
Sex				
Male (<i>n</i> = 178, 74.2%)	3.1 \pm 1.3	0.14	5.4 \pm 1.3	0.14
Female (<i>n</i> = 62, 25.8%)	3.5 \pm 1.7		5.8 \pm 2.4	
Age (mean, 39.3 years)				
<40 (<i>n</i> = 136, 56.7%)	3.1 \pm 1.1	0.29	5.1 \pm 1.0	0.0004
≥ 40 (<i>n</i> = 104, 43.3%)	3.3 \pm 1.8		5.9 \pm 2.1	
Smoking habit				
Yes (<i>n</i> = 147, 61.3%)	3.2 \pm 1.3	0.97	5.4 \pm 1.7	0.46
No (<i>n</i> = 93, 38.8%)	3.2 \pm 1.7		5.6 \pm 1.5	
Recurrent tonsillitis^c				
Yes (<i>n</i> = 19, 7.9%)	2.8 \pm 1.1	0.12	4.9 \pm 1.0	0.022
No (<i>n</i> = 221, 92.1%)	3.2 \pm 1.5		5.5 \pm 1.7	
Laryngeal edema				
Yes (<i>n</i> = 74, 30.8%)	3.3 \pm 1.5	0.38	5.8 \pm 2.1	0.12
No (<i>n</i> = 166, 69.2%)	3.1 \pm 1.4		5.3 \pm 1.3	
WBC (mean, 14,260/μL)				
<14,260 (<i>n</i> = 133, 55.4%)	3.1 \pm 1.5	0.12	5.4 \pm 1.8	0.25
$\geq 14,260$ (<i>n</i> = 107, 44.6%)	3.3 \pm 1.4		5.6 \pm 1.4	
CRP (mean, 8.53 mg/dL)				
<8.53 (<i>n</i> = 147, 61.3%)	3.0 \pm 1.2	0.0073	5.2 \pm 1.1	0.0017
≥ 8.53 (<i>n</i> = 93, 38.7%)	3.5 \pm 1.7		5.9 \pm 2.1	
Surgical drainage^d				
Yes (<i>n</i> = 185, 77.1%)	2.9 \pm 1.1	<0.0001	5.3 \pm 1.6	0.0014
No (<i>n</i> = 55, 22.9%)	4.3 \pm 1.8		6.1 \pm 1.6	

WBC, white blood cells; CRP, C-reactive protein.

P-values were calculated using the log-rank test.

^a Symptoms, duration from initial onset of symptoms including fever, sore throat, trismus, hoarseness, otalgia, or fatigue, etc., to resolution of all symptoms.

^b Recovery, duration from initial onset of symptoms to time of discharge.

^c Recurrent tonsillitis, a history of recurrent tonsillitis was defined as more than two episodes of habitual acute tonsillitis per year.

^d Surgical drainage, incision and drainage or needle aspiration were performed under local anesthesia to drain the abscess.

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