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The role of bacteriological studies in the management of peritonsillar abscess

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ABSTRACT

Objective: Since most patients with peritonsillar abscess (PTA) can be successfully treated with surgical drainage and empirical antibiotic therapy, routine bacteriologic studies for all patients with PTA may be unnecessary. This study tried to evaluate which patients with PTA should certainly undergo bacteriologic studies.
Methods: Hundred consecutive patients with PTA were treated and underwent culture tests of purulent contents obtained by surgical drainage between April 2008 and December 2013.
Results: In 62 of the 100 patients, 71 pathogenic bacteria were identified; 61 (86%) were Gram-positive cocci (GPC), 8 (11%) were Gram-negative rods (GNR), and 6 (8%) were anaerobes. Normal flora were isolated in 27 patients, and culture results were negative in 11 patients. Although not significant, primary (without prior antibiotic therapy) case (odds ratio (OR) = 2.19; 95% CI, 0.95–5.05) and laryngeal edema (OR = 2.04; 95% CI, 0.82–5.03) showed a tendency of associations with detection of pathogenic bacteria. After taking into account interactions between smoking habit and laryngeal edema, the covariate-adjusted OR for non-smokers with laryngeal edema was significant and showed a strong relationship (OR = 7.43; 95% confidence interval, 1.05–52.73) compared to non-smokers without laryngeal edema.
Conclusion: Although empirical antibiotic therapy was effective for most of the PTA patients, bacteriologic studies might be indispensable for the patients with laryngeal edema considering the failure of the first treatments. Particularly, the culture tests may be useful for non-smokers with laryngeal edema.

1. Introduction

Since most patients with peritonsillar abscess (PTA) recover quickly following empiric treatment, routine bacteriologic studies for all PTA patients do not appear worthwhile [1–3]. Culture-based methods are too slow, but remain standard because the DNA-based microarray methods that allow rapid bacterial specification are not widely used due to the high cost and need for technical expertise [4]. In particular, culture tests that do not detect any pathogenic bacteria seem not to be very

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cost-effective. Although even the detection of causative bacteria may result in no change of treatment for the majority of patients with PTA [3], we can at least more easily deal with the cases unresponsive to the first empiric treatments. Methods for efficiently choosing PTA patients for whom bacteriologic studies would be meaningful and beneficial are thus needed. The present study evaluated which patients with PTA showed a higher yield of pathogenic bacteria by culture testing.

2. Materials and methods

Himeji Red Cross Hospital locates at the center of Himeji city and functions as a core hospital in this area. There are few other hospitals that can admit emergency cases in the field of otolaryngology around our hospital. Thus many patients with PTA are referred to our hospital for emergencies and 100 consecutive patients with PTA have been treated and have undergone culture tests at our hospital between April 2008 and December 2013. We did not include the same cases who came back with recurrence of the disease during the period of this study and the number of 100 was just an accidental result. All PTA patients caused by odontonecrosis were not included, and there were no immunocompromised patients or patients with serious diabetes mellitus; and all patients were otherwise in their usual state of health.

Diagnosis was made on the basis of typical clinical signs, collection of pus from the abscess by surgical procedures, routine blood tests, and findings from computed tomography. Laryngeal electroendoscopy was performed for all patients on the initial visit to observe if laryngeal edema was present. Electroendoscope is the flexible endoscope which is combined with CCD-camera. It transforms the pictures to electric signals which are visible on the TV-monitor. The resolution of the electroendoscope is much superior to that of classical endoscope.

For these 100 patients, bacteria from purulent specimens obtained by surgical drainage were cultured and identified. Specimens were cultured onto 5% blood agar, chocolate agar, MacConkey, and anaerobic plates (all from Becton, Dickinson and Company, Tokyo, Japan). Plates were incubated at 36 °C in a carbon dioxide-enriched atmosphere for 18–24 h, or anaerobically for 48 h. Speciation for microorganisms was performed by standard methods [5]. Isolation of low pathogenic bacteria such as *α-streptococcus*, *Neisseria* species, *Lactobacillus* species, coagulase-negative *staphylococcus*, *Corynebacterium diphtheria*, *Prevotella* species, and *Fusobacterium nonnecrophorum* were defined as normal flora, but were defined as pathogenic bacteria when overwhelmingly predominant in the sample.

We first assessed univariate associations between demographic/clinical characteristics and detection of pathogenic bacteria. Crude odds ratios (ORs) were then estimated and logistic regression modeling was used to examine multivariate associations adjusted by other factors. Adjusted variables were sex, age (categorized into strata of 6–19, 20–39, 40–64, and 65–76 years old), primary case (referral or primary), laryngeal edema, and smoking habit. In 5 models of multivariate analysis, we also considered interaction between smoking habit and laryngeal edema, and estimated ORs for combined variables (reference was non-smokers without laryngeal edema). ORs and 95% confidence intervals (CIs) were calculated, and p values of less than 0.05 (two-sided test) were considered statistically significant. All analyses were performed using SPSS version 21.0J software (SPSS, Armonk, NY) and STATA/SE 12.1 (Stata Corp, College Station, TX).

3. Results

3.1. Overall outcomes

The demographic and clinical characteristics of 100 patients are shown in Table 1. Fortunately empirical antibiotic therapy was effective for all of the 100 patients and no patients died of this disease. The patients comprised 80 males and 20 females (mean age, 38.0 years; range, 6–76 years). In 54 patients (54.0%), antibiotic therapy had already been administered by their family doctors prior to the initial visit. The prescribed antibiotics (and corresponding proportions among the 54 patients) were as follows: cephalosporin, 20 patients (37.0%); fluoroquinolone, 15 patients (27.8%); macrolide, 4 patients (7.4%); penicillin, 4 patients (7.4%); clindamycin, 3 patients (5.6%); fosfomycin, 1 patient (1.9%); and unknown, 15 patients (27.8%).

Laryngeal edema was observed in 33 patients (33.0%). The main region of laryngeal edema was as follows: arytenoid, 19 patients (57.6%); epiglottis, 3 patients (9.1%); arytenoid and epiglottis, 11 patients (33.3%) (Fig. 1). The laryngeal edema involved the symptoms of swallowing pain in 26 patients (78.8%), and dyspnea in 6 patients (18.2%). Tracheotomy was performed in 1 case.

Sixty-two patients (62.0%) were smokers. Laryngeal edema was observed in 19 (30.6%) of 62 smokers, and 14 (36.8%) of 38 non-smokers. There was no significant difference in the occurrence of laryngeal edema between smokers and non-smokers ($p = 0.5224$).

Among all 100 PTA patients, pathogenic bacteria were isolated from 62 patients. Normal flora were isolated in

Table 1
Demographic and clinical characteristics of the 100 patients.

	n	%
Sex		
Female	20	20.0
Male	80	80.0
Age		
6–19	13	13.0
20–39	44	44.0
40–64	32	32.0
65–76	11	11.0
Primary case		
Referral	54	54.0
Primary	46	46.0
Edema		
(−)	67	67.0
(+)	33	33.0
Smoking		
(−)	38	38.0
(+)	62	62.0