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ORIGINAL ARTICLE

Clinical Features of Peritonsillar Abscess in Children

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Key Words
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Background: Peritonsillar abscess is an acute infection located between the capsule of the palatine tonsil and the superior constrictor muscle of the pharynx. The reports regarding pediatric cases have been scanty.
Methods: A retrospective study was conducted to investigate the patients less than 18 years of age hospitalized at a medical center with a final diagnosis of peritonsillar abscess from January 1999 through December 2009. Only those who were confirmed by the drainage of pus from the peritonsillar spaces or confirmed by a computed tomography (CT) scan were enrolled.
Results: In total, 56 children, 31 male and 25 female, were included. The mean age was 12.9 ± 4.6 years, ranging from 9 months to 17.9 years. Nineteen (34%) were less than 12 years of age. All 37 children ≧12 years of age complained of sore throat, but only 68% of children less than 12 years of age complained of sore throat. Thirty-one patients (55%) with a characteristic presentation of fever and sore throat plus an asymmetric swollen/bulging tonsil with or without uvular deviation suggestive of the diagnosis received surgical drainage at emergency department immediately, and 87% of them were older than 12 years of age. Twenty-five (45%) children needed a CT scan to confirm the diagnosis. The most common empirical antibiotics were penicillin-containing regimens. The predominant organisms identified were *Streptococcus* species. Eight children were treated successfully with antibiotics alone. No case was fatal.

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Conclusion: Two-thirds of the children with peritonsillar abscess were ≥12 years of age. Not every patient <12 years of age had a characteristic presentation, and a CT scan was usually needed to confirm the diagnosis.

1. Introduction

Peritonsillar abscess is an acute infection located between the capsule of the palatine tonsil and the superior constrictor muscle of the pharynx[1] and often results in emergency visit because of the severe pain and swallowing problem. This disease can occur in all age groups, but teenagers and young adults are most frequently affected.[2] With numerous vital structures in its proximity, a delayed diagnosis of peritonsillar abscess may result in a catastrophic complication such as airway obstruction or jugular vein thrombosis.[3] Since the papers regarding childhood peritonsillar abscess are scarce, we retrospectively reviewed such cases treated in our hospital to make a comparative study by age of the clinical features.

2. Materials and Methods

After approval of the institutional review board, we searched the medical records database of Chang Gung Memorial Hospital, a tertiary medical center in northern Taiwan, from 1999 to 2009. Children younger than 18 years of age who had peritonsillar abscess were identified using the International Classification of Disease, 9th revision (ICD-9) codes 475 (peritonsillar abscess). Only those who had flank pus drained from the peritonsillar spaces or were radiologically diagnosed by computed tomography (CT) were enrolled into this study. The criterion for confirmation of an abscess by CT was rim enhancement.

The data collected included age, sex, season, past history of acute tonsillar pharyngeal infection, duration of symptoms, white blood cell (WBC) count, C-reactive protein (CRP), methods of drainage and anesthesia, microorganisms identified and antibiotics resistance from culture and sensitivity testing, and length of hospital stay.

Descriptive statistics for continuous variables such as laboratory parameters were calculated and are reported as the means ± standard deviation (SD). The Mann-Whitney U test was used to detect continuous variables differences between two groups, while the chi-squared and Fisher's exact tests were used to compare the categorical variables. All tests were considered to be significant at $p < 0.05$.

3. Results

3.1. Demographic data

A total of 56 cases of peritonsillar abscess were identified over the 11-year period (Figure 1). Thirty-one (55%) patients were male and 25 (45%) female. The mean age was 12.9 ± 4.6 years, ranging from 9 months to 17.9 years, and 19 (34%) children were younger than 12 years of age.

3.2. Clinical features

The clinical presentations of these 56 children are summarized in Table 1. The most common symptom was sore throat in 50 (89%), followed by fever in 38 (68%). All 37 children ≥12 years of age complained of sore throat, and 73% of them were diagnosed immediately and received a bedside surgical drainage at the emergency department (ED). By contrast, only 68% of 19 children <12 years of age complained of sore throat. For 19 children <12 years of age, the most common symptom was fever in 18 children (95%). A history of a preceding upper respiratory tract infection was identified in 18% of the patients.

Of 31 patients with clinically apparent peritonsillar abscesses, all had sore throat and asymmetric swollen/bulging tonsil and 12 even presented with uvular deviation. Twenty-seven (87%) of these 31 patients were older than 12 years, and all 31 patients were drained at ED immediately. A further 14 patients were diagnosed and received aspiration or incision within 3 days of admission; seven (50%, $p = 0.02$) patients were younger than 12 years of age and 10 (71%, $p = 0.007$) patients had sore throat. However, three children were diagnosed and received a surgical drainage 4 days after admission. The first case was a 9-year-old girl who had juvenile rheumatoid arthritis, received azathioprine and was hospitalized because of prolonged fever for 7 days and dyspnea. WBC count was 1.1×10^9/L, and no abnormal finding of high-resolution computed tomography of the lung was noted. Empiric vancomycin

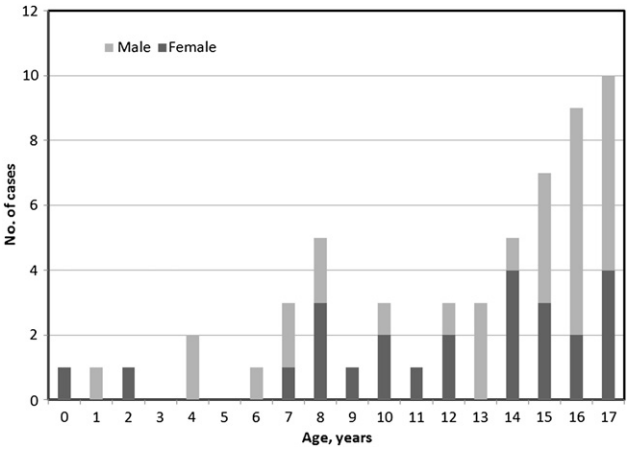

Figure 1 Distribution of age and sex among 56 children with peritonsillar abscess.

Table 1 Comparison of clinical presentations of 56 children with peritonsillar abscess by age.

Symptoms/signs	< 12 years ($N = 19$)	≥12 years ($N = 37$)	Total ($N = 56$)	p value
Sore throat	13 (68)	37 (100)	50 (89)	0.001
Fever	18 (95)	20 (54)	38 (68)	0.002
Uvular deviation	8 (42)	16 (43)	24 (43)	1.0
Trismus	4 (21)	12 (32)	16 (29)	0.534
Neck mass	17 (89)	17 (46)	34 (61)	0.02
Neck tenderness	14 (74)	15 (41)	29 (52)	0.025

Data presented as *n* (%).

(40 mg/kg/day) and ceftazidime (100 mg/kg/day) were administered initially. Four days later, a CT scan examination was performed because of severe sore throat and peritonsillar abscess was found, a surgical intervention was performed and fever subsided one day later. The second case was a 4-year-old boy, who presented with fever and neck stiffness at the ED. Since meningitis was impressed initially, he received a lumbar puncture. Because no clinical improvement was noted, a head and neck CT scan was performed and the diagnosis of peritonsillar abscess was made, then he received a surgical drainage. The third case was a 14-year-old girl who complained of sore throat and fever, and physical examination showed severe trismus. She received empiric antibiotics initially. Because the clinical response was unsatisfactory, a CT scan of head and neck was performed to confirm the diagnosis. She received a surgical drainage and the symptoms and signs were resolved.

3.3. Treatment

All 56 patients received intravenous antibiotics therapy. Empirically, 33 (59%) children received penicillin-containing regimens (alone in nine, plus gentamicin in 15, plus clindamycin in four, plus gentamicin and clindamycin in five), 18 children received amoxicillin/clavulanate-containing regimens (alone in 12, plus gentamicin in five, and plus ciprofloxacin in 1), three children received ampicillin/sulbactam, and one each received oxacillin plus gentamicin and vancomycin plus ceftazidime. A CT scan was performed in 25 (45%) patients (Figure 2). Of 48 patients receiving a surgical drainage, 31 (65%) children received the surgical drainage on the day of admission. Upon exploration, purulent materials were found for 45 (94%) procedures and in three (6%) cases, all of whom were less than 12 years of age, no fluid was found at the time of surgery. The remaining eight patients were treated successfully with intravenous antibiotics alone.

3.4. Culture results

Of the 45 pus specimens sent for cultures, a positive result was found in 43 patients (Table 2). The predominant organisms identified were *Streptococcus* species (72%), followed by *Fusobacterium* species (44%). From 31 (72%) of these cases, polymicrobial pathogens were identified. Anaerobic bacteria were identified in 32 (74%) cases.

3.5. Surgical versus nonsurgical group

The comparison between the surgical and nonsurgical groups are summarized in Table 3. The duration of hospital stay ranged from 2 to 14 days, with a mean stay of 6.0 days. The children with antibiotics treatment alone were younger and had a longer duration of hospital stay.

3.6. Complications

Of the 56 children, one child (2%) had airway compression requiring intubation, two children had parapharyngeal space involvement, and all were younger than 12 years of age. All the children were discharged from our hospital without any complication. One child had recurrent peritonsillar abscess and he received tonsillectomy 6 months later.

4. Discussion

Results from the present study indicated that peritonsillar abscess in the pediatric population occurred mainly in

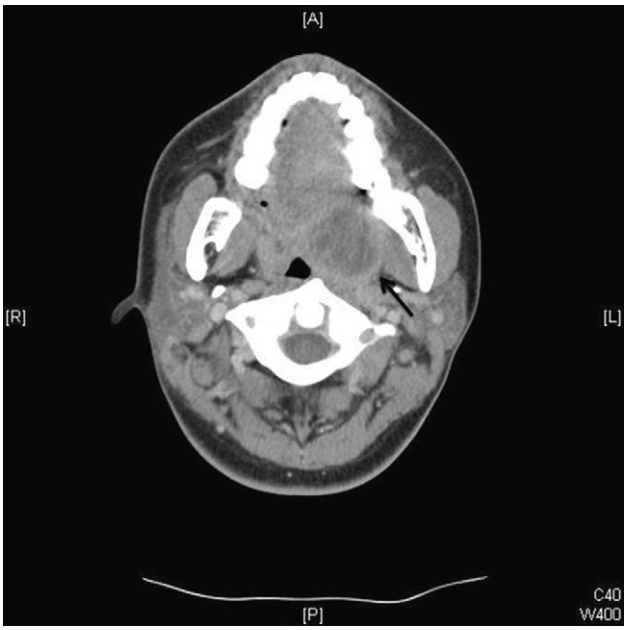

Figure 2 Example of a peritonsillar abscess demonstrated on contrast-enhanced axial computed tomography. Arrow shows a 3 × 3 cm abscess formation with ring of enhancement.

Table 2 Distribution of bacterial pathogens in 43 children with peritonsillar abscess.

Bacteria	*n* (%)*
Streptococcus	31 (72)
Streptococcus viridans	22 (51)
Streptococcus pyogenes	9 (21)
Staphylococcus	3 (7)
Staphylococcus aureus	2 (5)
Coagulase-negative *Staphylococcus*	1 (2)
Fusobacterium	19 (44)
Fusobacterium nucleatum	13 (30)
Fusobacterium necrophorum	2 (5)
Peptostreptococcus spp.	7 (16)
Neisseria sp	7 (16)
Prevotella	9 (21)
Prevotella melaninogenica	5 (12)
Stomatococcus	3 (7)
Veillonella	10 (23)
Other	7 (16)

* Polymicrobial agents were identified in 31 patients; single pathogen was identified in 12 patients (28%), and included *F. nucleatum* in three patients, *Streptococcus pyogenes* in two, Coagulase-negative *Staphylococcus* in two, *Fusobacterium* sp. in two, *Streptococcus viridans*, *Veillonella parvula* and unidentified Gram-positive bacillus in one each.

adolescents. The age distribution was similar to previous reports.[2,4–9] Although peritonsillar abscess was much less common in children less than 12 years of age, they usually had no specific clinical presentations which pinpointed the diagnosis. For children younger than 12 years of age, the most common presentation was fever, rather than sore throat, which cannot be clearly indicated by children. Neck mass and tenderness were among the common presentations, since the peritonsillar space infection can spread into other deep neck spaces more easily in children. Therefore, some children may not present with symptoms directly referable to the oropharynx; additionally, an adequate examination of the oropharynx is usually difficult for them.[10] These conditions might lead to a misdiagnosis such as meningitis or parapharyngeal space infection in these children. In contrast, all children older than 12 years of age complained of sore throat, a detailed physical examination could be achieved, the diagnosis of peritonsillar abscess could be made presumably and thus 73% of them received a surgical drainage immediately after a careful history-taking and meticulous physical examination.

CT scan is an important imaging modality in the acute setting for non-traumatic, infectious, inflammatory, and neoplastic conditions of the head and neck.[11] In this study, 55% of the patients had specific presentations which pinpointed the diagnosis, and they received surgical drainage at ED immediately without further imaging studies. These indicate that a routine CT scan examination to confirm the diagnosis is not needed if the clinical presentation is specific and suggestive. However, all three children with a delayed diagnosis in the present study needed a CT scan examination to confirm the diagnosis. A CT scan can be used if the diagnosis is uncertain, a full clinical examination cannot take place (e.g., when severe trismus is present), a deep neck space infection or complication is suspected, or the patient does not respond to the therapy satisfactorily.[11] Although CT scan is a useful tool to diagnose peritonsillar abscess, physicians should be aware that the risk of cancer from exposure to ionizing radiation is much greater for pediatric patients.[12]

Whether all the patients with peritonsillar abscess need surgical drainage is still a controversial question.[1] Schraff et al[6] indicated that an antibiotic therapy alone is not adequate. However, not all foci are drainable (e.g., too thickened to drain). The procedure of aspiration is also potentially risky because of the possibility of injury to the internal carotid artery.[3] In this study, eight children treated with antibiotics alone recovered smoothly but they had a longer hospital stay, and two of them had concurrent parapharyngeal space infection.[13] Antibiotic therapy alone is another option for those without airway compromise. Physicians should consider the benefits and risks of the operation to determine which one is better for each individual child.

Consistent with previous reports,[4–9] polymicrobial agents, particularly anaerobics, accounted for most (>70%) pediatric cases of peritonsillar abscess. Thus, Cherukuri et al[14] questioned the need for routine microbiological investigations. We think that the abscess should be aspirated or drained; it is better sending a pus specimen for bacterial culture. The results are valuable and can be used as a guide for the choice of antibiotic regimen, especially for those with a poor response to the treatment.

Table 3 Comparison between those receiving surgical and nonsurgical procedures.

Characteristics	Surgical group ($N = 48$)	Nonsurgical group ($N = 8$)	*p* value
Age (yr)	13.3 ± 4.7	10.1 ± 2.8	0.018
<12 yr	2 (4.2%)	6 (75%)	
WBC ($\times 10^9$/L)	15.2 ± 5.4	19.6 ± 7.5	0.15
WBC > 15×10^9/L	26 (54%)	6 (75%)	0.44
Serum CRP level (mg/L)	82.4 ± 64.0	94.8 ± 73.7	0.67
CRP > 60 mg/L	22* (61%)	5 (63%)	>0.99
Computed tomography scan	17 (35%)	8 (100%)	0.001
Duration of hospital stay (d)	5.7 ± 2.5	8.1 ± 1.9	<0.001

CRP = C-reactive protein; WBC = white blood cell.
* $n = 36$.

There was no fatal case in the present study; however, peritonsillar abscess is a potentially lethal condition. It may result in airway obstruction, jugular vein thrombosis, mediastinitis and even carotid artery rupture.[3] Once the abscess spontaneously ruptures, it may result in aspiration pneumonia. Therefore, prompt diagnosis and management is mandatory for a good outcome.

Conclusively, the clinical presentations of childhood peritonsillar abscess are different between children $\geqq$12 years of age and children $<$12 years of age. A history of fever and sore throat plus a physical sign of an asymmetric swollen/bulging tonsil with or without uvular deviation are suggestive of the diagnosis. A CT scan can be used if the diagnosis is not confirmed. A successful treatment with antibiotics alone helps the physician make a balanced decision between conservative treatment and surgical drainage for pediatric peritonsillar abscess.

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