



## Parotid Abscess: 15-Year Experience at a Tertiary Care Referral Center in Taiwan

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**Background:** Parotid abscess is an uncommon condition, but it can cause potentially lethal systemic infections. The aim of this study was to analyze cases with parotid abscess during 15-year period and further determine the optimal diagnostic and therapeutic modalities at a tertiary medical center in Taiwan. **Patients and Methods:** Nineteen patients diagnosed with parotid abscess were retrospectively analyzed from November 2002 to October 2017. Patients' clinical symptoms, etiology, diagnostic methods, bacteriology, and antibiotic and surgical treatment were evaluated. **Results:** Among 19 patients diagnosed with parotid abscess, 12 were male and 7 were female. Their diagnostic ages ranged from 25 to 88 years (mean 55.5 years). The most common symptoms at initial presentation were painful swelling of the intra-auricular region and fever. Typical etiologies were odontogenic infections or poor oral hygiene. Thirteen out of 18 patients with drainage of abscess showed positive finding of bacterial cultures, and the most common pathogen was *Klebsiella pneumoniae* in six patients. One patient received intravenous antibiotics alone but eventually died of sepsis. In addition to antibiotic treatment, the other 18 patients underwent a combination of antibiotic treatment and drainage of abscess. Among them, 14 patients received surgical drainage and 4 patients received ultrasound-guided needle aspiration of abscess. After drainage, all had complete resolution of disease without recurrence or sequelae during at least 1 year of follow-up. **Conclusions:** This study highlights that *K. pneumonia* is an important pathogen of parotid abscess in consideration of the rapidly increasing cases of diabetes mellitus in Taiwan. In addition to early diagnosis, parotid abscess should be managed with broad-spectrum antibiotics, adequate hydration, and appropriate drainage to prevent unwanted morbidity and mortality.

Key words: Parotid abscess, facial nerve palsy, salivary gland

## INTRODUCTION

The parotid gland is the largest and the most commonly affected salivary gland by inflammation. The parotid space is one of the 11 spaces in the deep neck region and adjacent to the parapharyngeal space. Since parotid abscess can potentially spread into deep neck spaces to cause systemic infections, it may result in life-threatening complications

such as descending mediastinitis, thrombosis of the jugular vein, upper airway obstruction, aspiration pneumonia, septic shock, rupture of the carotid artery, and necrotizing fasciitis.<sup>[1-7]</sup> To improve the outcome, we analyzed the clinical presentation of patients with parotid abscess in our hospital to clarify the optimal treatment methods for such cases.

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## PATIENTS AND METHODS

From November 2002 to October 2017, we retrospectively reviewed the medical records of inpatients with parotid abscess confirmed by computed tomography (CT) examinations and treated at the Tri-Service General Hospital, a 1400-Bed Tertiary Medical Center in Taiwan. All cases of parotid abscess, with or without parapharyngeal, or other deep neck space extension were included in the study. Acute parotitis, parapharyngeal, or other deep neck space abscesses not involving the parotid gland were excluded from the study. Ultimately, 19 cases were enrolled. Patient characteristics, disease etiology, diagnostic methods, bacteriology, treatment, duration of hospital stay, complications, and outcomes were evaluated. The study design was approved by the Hospital Institutional Review Board.

## RESULTS

There were 19 patients diagnosed with parotid abscess in our study. Among them, 12 were male and 7 were female. Diagnostic ages ranged 25–88 years with a mean age of 55.5 years [Table 1]. Eleven cases had parotid abscess on the left side and the rest were on the right side. The rest of the patients were warded for an average of 13.1 days (range: 3–37 days). Clinical symptoms and laboratory results are summarized in Table 2. The most common symptoms at presentation were painful swelling of the intra-auricular region (100%) and fever (79%). All presented with acute sudden onset of a warm, indurated, erythematous swelling of the intra-auricular region for an average of 7.5 days (range, 3–21 days) previously. Eleven patients had trismus (58%), eight patients had pus and blood in the mouth (47%), five patients had odynophagia (26%), and three patients complained of dysphagia (16%). Ipsilateral facial nerve palsy of lower motor type with House–Brackmann Grading of II was noted in one patient. One patient with non-small cell lung cancer (NSCLC) (T4N2M1) presented with sepsis. Notably, none of the patients presented with upper airway obstruction on admission.

Obvious comorbidities of parotid abscess are summarized in Table 3. Seven patients had poor oral hygiene or dental infection. Five patients had preexisting type 2 diabetes mellitus, while a sixth was diagnosed at this time. One diabetic patient also presented with pneumoconiosis. Three patients with a previous history of acute parotitis under ultrasound examination showed no abscess collection initially were managed conservatively with antibiotics. One patient was diagnosed with systemic lupus erythematosus. One patient was diagnosed with nasopharyngeal carcinoma (T1N2M0) and received chemoradiotherapy about 2 years ago. Total white cell count was raised with relative neutrophilia in ten patients (range 6200–38820/cu mm), C-reactive protein was

Table 1: Age and sex distribution of the patients

| Age (years) | Sex (number of patients) |        | Total (number of patients) |
|-------------|--------------------------|--------|----------------------------|
|             | Male                     | Female |                            |
| 0–10        | -                        | -      |                            |
| 11–20       | -                        | -      |                            |
| 21–30       | 2                        | -      |                            |
| 31–40       | 2                        | -      |                            |
| 41–50       | 1                        | 2      |                            |
| 51–60       | 4                        | 2      |                            |
| 61–70       | -                        | 1      |                            |
| 71–80       | 3                        | 1      |                            |
| 81–90       | -                        | 1      |                            |
| Total       | 12                       | 7      | 19                         |

Table 2: Symptom at presentation and laboratory data

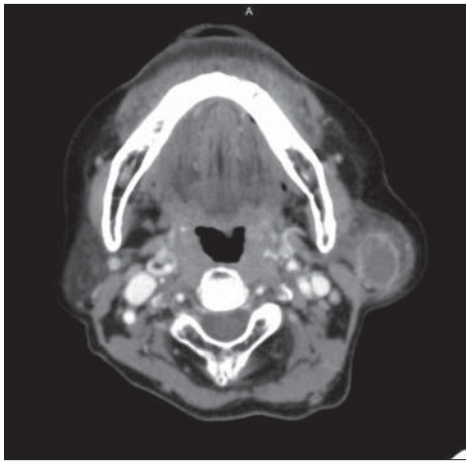
|                                     | Number patients (%) |
|-------------------------------------|---------------------|
| Symptom at presentation             |                     |
| Infra-auricle swelling              | 19 (100)            |
| Fever                               | 15 (79)             |
| Trismus                             | 11 (58)             |
| Pus in oral cavity                  | 9 (47)              |
| Odynophagia                         | 5 (26)              |
| Dysphagia                           | 3 (16)              |
| Facial asymmetry                    | 1 (5)               |
| Laboratory data                     |                     |
| Total white cell count >10,000/cumm | 10 (52)             |
| Elevated C-reactive protein         | 19 (100)            |

Table 3: Comorbidities of parotid abscess

| Comorbidity                        | Number of patients |
|------------------------------------|--------------------|
| Dental infection/poor oral hygiene | 7                  |
| Diabetes mellitus                  | 6                  |
| Acute parotitis                    | 3                  |
| Head-and-neck cancer               | 1                  |
| Systemic lupus erythematosus       | 1                  |

raised (range 1.12–10.99 mg/dL) and blood cultures were negative in all patients. All patients underwent CT scans, which showed abscess with hypodense content and contrast enhancement [Figure 1].

Initially, broad-spectrum intravenous antibiotics (11 patients with amoxicillin/clavulanate and 8 patients with clindamycin) were administered as antibiotic coverage for common pathogens and later adjusted based on the bacterial culture in all patients. One patient with NSCLC refused additional treatment. Of the other 18 patients, 14 patients underwent



**Figure 1:** Contrasted computed tomography scans showed abscess with hypodense content and contrast enhancement

surgical drainage and 4 patients underwent ultrasound-guided needle aspiration of abscess. Drainage was performed in an average of 1.5 days (range: 1–3 days) after admission. All pus from patients with surgical drainage or needle aspiration was studied with aerobic and anaerobic bacterial, mycobacterial, as well as fungal cultures. Thirteen out of 18 patients receiving drainage of abscess showed positive finding of bacterial cultures with only one predominant pathogen as follows: *Klebsiella pneumoniae* (6), *Staphylococcus aureus* (2), *Hemophilus influenza* (1), *Peptostreptococcus micros* (1), *Mycobacterium tuberculosis* (1), *Candida parapsilosis* (1), and *Salmonella* Group D (1) [Table 4]. One patient receiving intravenous antibiotics alone died, and the other 18 patients had complete resolution of disease recurrence or sequelae.

## DISCUSSION

Parotid abscess occurs mainly in newborns, premature infants, the elderly, and the immunocompromised host. Previous studies have shown that bacteria can travel down the Stensen's duct from the oral cavity to infect the parotid gland. The spread of organisms into the parotid gland may be enhanced by poor oral hygiene or dental infection, medications that suppress salivary flow, and duct obstruction with tumor or stone.<sup>1-4</sup>

Acute infection of the parotid gland is characterized by the sudden onset of a warm, indurated, erythematous swelling of the unilateral intra-auricular region extending to the angle of the jaw. Symptoms are painful swelling of the parotid, trismus, odynophagia, dysphagia, or cervical adenitis. Clinical signs are tense swelling of the gland, toxemia with marked fever and leukocytosis, and pus expressed from the duct. An abscess may occur without detectable fluctuation, due to concealment

**Table 4:** Microbiology results

| Microorganism cultured            | Number of patients |
|-----------------------------------|--------------------|
| <i>Klebsiella pneumoniae</i>      | 6                  |
| <i>Staphylococcus aureus</i>      | 2                  |
| <i>Haemophilus influenzae</i>     | 1                  |
| <i>Peptostreptococcus micros</i>  | 1                  |
| <i>Mycobacterium tuberculosis</i> | 1                  |
| <i>Candida parapsilosis</i>       | 1                  |
| <i>Salmonella</i> group D         | 1                  |
| No growth                         | 5                  |

by the dense parotid fascia and the gland itself. Spontaneous rupture of an abscess may occur into the mouth, or externally, often into the external auditory meatus between the bony and cartilaginous parts. An external rupture may persist as a fistula.<sup>1-5</sup> Parotid abscess may rarely cause facial nerve palsy. One proposed mechanism of the pathogenesis of facial nerve dysfunction is perineuritis and local toxic effects from the intense surrounding parotitis. Another possible mechanism is ischemic neuropathy related to rapid expansion of the infected parotid mass with compression of the facial nerve.<sup>8,9</sup> The infection can be fatal when it spreads to deep neck spaces to cause systemic complications.

Parotid abscess must be differentiated from other causes of parotid enlargement (i.e., connective tissue disease, benign and malignant tumors, or sialolithiasis) primarily by CT scans and ultrasound. CT scan often is the first choice because it can identify abscess size and location, relative position of the great vessels and airway, and possible underlying malignancy. In sialolithiasis, ultrasound detects 90% of stones >2 mm in the parenchyma gland or duct. Abscesses can be also punctured under CT scans or ultrasound.<sup>10-14</sup>

The most common pathogens associated with acute bacterial parotitis are *S. aureus* and anaerobes. Other common pathogens are *Streptococcus* species and Gram-negative bacilli. *Tuberculosis*, *Toruloposis glabrata*, *Salmonella*, and fungi have also been reported as etiologic agents in isolated cases.<sup>1-4,15</sup> In our series, culture results were unavailable in five patients, and no polymicrobial pathogens were noted. The most common pathogen was *K. pneumoniae* in six cases, and this finding differed from that of a previous report indicating that the most common cause of parotid abscess in Singapore was *S. aureus*.<sup>16</sup> On the other hand, *K. pneumoniae* was cultured in four diabetic patients, and this finding was compatible with one Taiwanese study in diabetic patients with deep neck infection.<sup>6</sup> In view of the rapidly increasing cases of diabetes mellitus, *K. pneumoniae* should be regarded as an important pathogen of parotid abscess in Taiwan. *Tuberculosis* accounts for 2.5%–10% of parotid pathology.<sup>17</sup> *M. tuberculosis* was

cultured in one diabetic patient with pneumoconiosis, but we found no pulmonary tuberculosis in our series. It has been reported that *S. aureus* was the most common organisms, causing facial nerve palsy, followed by *M. tuberculosis*, *Pseudomonas*, and anaerobes.<sup>8,9</sup> The patient with facial nerve palsy was caused by *S. aureus* in our study. *Candida albicans* is the most prevalent human fungal pathogen, causing severe mucosal and systemic infections in hosts with compromised immune systems.<sup>15,18</sup> Candidal abscess of the parotid gland in immunocompetent such as our case has only been reported in five cases in the literatures,<sup>19</sup> and this dearth of cases can be attributed to the candidacidal activity of the salivary proteins and their functional protection of the oral cavity. Notably, *C. parapsilosis* was cultured in our series, and it has not been reported yet in the literature. *Salmonella* is a Gram-negative motile bacillus and enteroinvasive bacterium. The serogroups of *Salmonella* are based on the O-antigen, including A, B, C1, C2, D, and E. Extraintestinal infections of *Salmonella* are infrequent and tender to occur in immunocompromised patients<sup>20-22</sup> such as a diabetic patient in our study.

Choice of antibiotic is based on the most likely pathogen. Initially, broad antimicrobial therapy (amoxicillin/clavulanate or clindamycin) is indicated to cover common pathogens. Culture-directed antibiotics are prescribed later as indicated.<sup>14</sup> To treat tuberculosis, a choice of isoniazid, rifampin, and ethambutol plus a macrolide provides the triple drug for *M. tuberculosis* and most nontuberculous mycobacteria.<sup>17</sup> Moreover, amphotericin B and azoles are the agents usually used in the treatment of invasive candidiasis.<sup>15</sup>

Besides maintaining adequate hydration and administering parenteral antimicrobial therapy, invasive drainage of the abscesses using either conventional surgical drainage or needle aspiration is required. Surgical treatment of parotid abscess involves incising the parotid parenchyma in the direction of the facial nerve until the abscess is located and evacuated. Ultrasonic-guided aspiration or CT-associated needle drainage of parotid abscess has also been advocated, and their advantages over conventional surgery are well documented. Aspiration is reliable and safe, with a low complication rate. However, if the abscess is large or/and complication is noted, surgical drainage should be performed.<sup>10-14</sup> In addition, more aggressively treat immunocompromised patients, such as those with diabetes mellitus, who tend to have more complications and longer hospital stays. Furthermore, clinicians should counsel all patients to maintain good oral hygiene, receive adequate hydration, and promptly treat bacterial infection of the oropharynx to reduce the recurrence of parotid abscess. While fairly unusual, parotid abscess can be managed properly to avoid significant morbidity and mortality.

## CONCLUSIONS

This study highlights that *K. pneumonia* is an important pathogen of parotid abscess in consideration of the rapidly increasing cases of diabetes mellitus in Taiwan. In addition to early diagnosis, parotid abscess should be managed with broad-spectrum antibiotics, adequate hydration, and appropriate drainage to prevent unwanted morbidity and mortality.

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## Conflicts of interest

There are no conflicts of interest.

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