

Parotid abscesses : A ten-year review in King Chulalongkorn Memorial Hospital

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- Objective** : *To report cases of parotid abscesses admitted to King Chulalongkorn Memorial Hospital during 1988-1997*
- Setting** : *Department of Otolaryngology, Faculty of Medicine, Chulalongkorn University*
- Design** : *Retrospective descriptive study*
- Subject** : *Consecutive inpatient cases with parotid abscesses from January 1988-December 1997*
- Method** : *Data extracted from outpatient records and admission charts were reviewed and analyzed for predisposing factors, clinical presentations, diagnostic tools, causative organisms, treatment options and complications.*
- Results** : *Sixty-two cases were compiled. Diabetes mellitus was the major predisposing factor (24.19%). The clinical manifestations included pain, swelling, trismus, high fever, mass over the parotid region and pus from the Stensen's duct orifice. Of the 46 cases with complete bacteriologic studies, there were eight cases of mixed organisms and 47 strains of causative bacteria. The bacteria that caused parotid abscess were 20 strains of gram-positive aerobic bacteria, 14 strains of gram-negative aerobic bacteria, 11 strains of anaerobic bacteria and two mycobacteria.*

Conclusions : *Diabetes mellitus is the major predisposing factor of parotid abscess and is even more important when it is found concomitantly with other predisposing factors. Gram positive bacteria, especially Staphylococcus aureus, are the major cause. However, there is a tendency of increasing mixed organisms, particularly gram negative and anaerobic bacteria, so broad spectrum antibiotics should be seriously considered, especially in the case of inadequate prior antibiotic treatment and severely debilitated, immunosuppressive and compromised hosts.*

Key words : *Parotid abscess, Acute suppurative parotitis, Parotid gland.*

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- วัตถุประสงค์** : เพื่อรายงานผู้ป่วยโรคฝีของต่อมน้ำลายพาโรทิดในโรงพยาบาลจุฬาลงกรณ์
ในช่วงปี พ.ศ. 2531 - 2540
- รูปแบบของการศึกษา** : การศึกษาเชิงพรรณนาค้นหลัง
- หน่วยงาน** : ภาควิชาโสต นาสิก ลาริงซ์วิทยา คณะแพทยศาสตร์ จุฬาลงกรณ์-
มหาวิทยาลัย
- กลุ่มเป้าหมาย** : ผู้ป่วยฝีของต่อมน้ำลายพาโรทิดทุกรายที่รับไว้รักษาในโรงพยาบาล
จุฬาลงกรณ์ในช่วงปี พ.ศ. 2531 - 2540
- วิธีการศึกษา** : รวบรวมและวิเคราะห์ข้อมูลจากบัตรผู้ป่วยนอกและเพิ่มผู้ป่วยใน
- ผลของการศึกษา** : ผู้ป่วยฝีของต่อมน้ำลายพาโรทิด 62 ราย พบว่าเบาหวานเป็นปัจจัยหนุนที่
สำคัญของการเกิดโรคนี้ (24.19%) อาการสำคัญคือ ปวด บวม อ้าปากไม่ขึ้น
มีไข้สูง มีก้อนบริเวณตำแหน่งของต่อมน้ำลายพาโรทิดและหนองจากรูเปิด
ของ Stensen's duct จากการเพาะเชื้อในผู้ป่วย 46 ราย พบมีการติดเชื้อแบบ
ผสมหลายสายพันธุ์ 8 ราย ผลการเพาะเชื้อทั้งหมดพบแบคทีเรียที่เป็นสาเหตุ
47 สายพันธุ์ เป็นแอโรบิกแบคทีเรียแกรมบวก 20 สายพันธุ์ แอโรบิก
แบคทีเรียแกรมลบ 14 สายพันธุ์ แอนแอโรบิกแบคทีเรีย 11 สายพันธุ์ และ
มายโคแบคทีเรีย 2 สายพันธุ์
- บทสรุป** : เบาหวานเป็นปัจจัยหนุนที่สำคัญของการเกิดโรคนี้และจะทวีความรุนแรง
ของโรคมามากขึ้นถ้าหากมีปัจจัยเสี่ยงอื่นเสริมด้วย แบคทีเรียแกรมบวกโดย
เฉพาะอย่างยิ่ง *Staphylococcus aureus* ยังคงเป็นสาเหตุส่วนใหญ่ของการ
เกิดโรคนี้ แต่อย่างไรก็ตามจากการศึกษาค้นครั้งนี้ได้แสดงให้เห็นถึงแนวโน้ม
ของการติดเชื้อแบบผสมจากแบคทีเรียแกรมลบและแอนแอโรบิกแบคทีเรีย
มากขึ้น ดังนั้นการรักษาจะต้องให้ความสำคัญกับการใช้ยาปฏิชีวนะที่สามารถ
ครอบคลุมเชื้อดังกล่าว โดยเฉพาะในรายที่เคยได้ยาปฏิชีวนะไม่เพียงพอมา
ก่อน ผู้ป่วยที่มีร่างกายอ่อนแอ ผู้ป่วยรับยากดภูมิคุ้มกันและมีแนวโน้มที่จะ
มีการติดเชื้อได้ง่าย

Parotid abscess (acute suppurative parotitis) is an uncommon disease which usually occurs in debilitated and dehydrated patients with poor oral hygiene.⁽¹⁾ The pathophysiology is often related to the decrease of salivary flow from dehydration and stasis. The bacteria ascend from the oral cavity in a retrograde fashion and multiply in the parotid gland to form an abscess. *Staphylococcus aureus*, *Streptococcus viridans*, *Streptococcus pyogenes*, *Streptococcus pneumoniae* and *Hemophilus influenzae* are the common pathogens,⁽²⁾

Clinical features of parotid abscess usually include the rapid onset of pain, swelling, induration of the involved gland and pus from the Stensen's duct orifice. Systemic manifestations are fever, chills, malaise and leukocytosis with neutrophilia. However, because of the vertical separation of the parotid fascia and thick capsule, a fluctuating mass of the parotid is seldom present even in the most advanced stage of suppuration. So, in the case of progressive edema and induration, an abscess should be suspected. Needle aspiration, ultrasound or CAT-scan is sometimes necessary for confirmation of diagnosis. Treatment of acute suppurative parotitis is composed of systemic antibiotics, fluid and electrolyte replacement and surgical drainage of loculated abscesses.

Our objective is to report on the clinical presentations, bacteriology, diagnosis and treatment of this disease. The trend of changes in predisposing factors and pathological organisms is discussed.

Patients and methods

This retrospective study included all patients who were admitted to the Department of Otolaryngology of King Chulalongkorn Memorial Hospital

during 1988-1997. The outpatient records and admission charts were analyzed for predisposing factors, clinical presentations, diagnostic tools, causative organisms, treatment options and complications.

Results

Sixty-two cases of parotid abscesses were reviewed with the age range from 17 to 85 years with an average age of 43.6 ± 18.2 years. There were 29 males (46.77%) and 33 females (53.23%). Thirty-three cases (53.23%) were on the left side and 29 (46.77%) were on the right side. There was not any bilateral involvement at the initial presentations, but two cases developed bilateral involvement during hospitalization. Thirty-eight cases had the demonstrable predisposing factors (Table 1) and six of them had multiple factors. Diabetes mellitus was the most common factor (15 cases or 24.19%) and only one case had AIDS. There was no correlation between age group and parotid abscess. The duration of symptoms ranged from 1 to 30 days with an average of 8 ± 7.3 days. The majority of cases (83.87%) presented with pain and swelling. Other manifestations included trismus, high fever, mass, dysphagia, pus coming from the Stensen's duct orifice and cervical lymphadenopathy. (Table 2) There was no case of facial palsy. The white blood cell count ranged from 2,100 to 33,600 cells/cu.mm. with a shift to the right, except for cases with leukopenia from AIDS and acute lymphoblastic leukemia. Thirty-nine cases were tested for HIV antibody and one was found to be HIV-positive.

The definitive diagnosis of parotid abscess was documented from the clinical presentation of suppurative discharge from the Stensen's duct orifice (15 cases) or from aspiration at the indurated area

(27 cases), hypo-echoic appearance in ultrasonographic examinations (11 cases) and abscess formation in CAT-scans (6 cases).

Table 1. Predisposing factors of parotid abscesses.

Predisposing factors	Number	Percent
Non-predisposing factors	24	38.71
Predisposing factors	38	61.29
- Diabetic mellitus	15	24.19
- Dental caries/poor oral hygiene	9	14.51
- Hematopoietic malignancy	4	6.45
- Severe alcoholism and hepatic encephalopathy	3	4.84
- Obesity	2	3.22
- Sjögren syndrome	2	3.22
- Chronic renal disease	2	3.22
- Stone	2	3.22
- Tumor with radiation	2	3.22
- Mucoepidermoid	2	3.22
- AIDS	1	1.61
Total	62	100.00

Table 2. Signs and symptoms of 62 parotid abscess cases.

Signs & Symptoms	Number	Percent
Pain	52	83.87
Swelling	52	83.87
Trismus	31	50.00
High fever	25	40.32
Mass	20	32.26
Dysphagia	17	27.42
Pus from Stensen's duct	15	24.19
Cervical lymphadenopathy	4	6.45
Total	62	100.00

Gram's stain, AFB stain, culture with sensitivity for both aerobic and anaerobic organisms were obtained in 46 cases. Of these 46 cases, causative organisms were grown in 36 cases and the other 10 cases yielded no growth. Eight cases were mixed infection, of which six were mixed aerobic and anaerobic bacteria and two were mixed aerobic bacteria.

Of the thirty-six cases in which pathogenic bacteria were found, there were 47 strains of causative bacteria of which 20 strains were gram-positive aerobic bacteria, 14 strains were gram-negative aerobic bacteria,

11 strains were anaerobic bacteria and two were mycobacteria. (Table 3) The most common gram-positive aerobic bacteria was *S. aureus*. Gram-negative aerobic and anaerobic bacteria were klebsiella species and peptostreptococci, respectively.

At the time of diagnosis, 22 cases (35.48%) had received prior antibiotic treatment (mostly cloxacillin or dicloxacillin) which resulted in no growth in eight cases and mixed organisms in seven cases. In this prior antibiotic treatment group, there were nine strains of gram negative bacteria and five strains of anaerobic bacteria.

Table 3. Causative organisms of parotid abscess cases.

Causative organism	Number (percent)
Gram-positive aerobic bacteria	20 (42.55)
- Staphylococcus aureus	6
- Streptococcus milleri	4
- α -hemolytic streptococcus	3
- Corynebacterium spp.	3
- Non-hemolytic streptococcus, not group D	2
- Streptococcus pneumoniae	1
- B.subtilis	1
Gram-negative aerobic bacteria	14 (29.79)
- Klebsiella spp.	7
- Enterobacter spp.	2
- Salmonella group B	2
- Salmonella group D	1
- Pseudomonas aeruginosa	1
- Proteus spp.	1
Anaerobic organism	11 (23.40)
- Peptostreptococcus spp.	6
- Bacteroides spp.	1
- Fusobacterium spp.	1
- Clostridium perfringens	1
- Phorphylomonas spp.	1
- Actinomyces israelii	1
Mycobacterium spp.	2 (4.26)

There were five cases that had concomitant other space infections. Of these cases, four had masseteric space involvement and the other with underlying disease (acute lymphoblastic leukemia) later developed retropharyngeal abscess. There was no parapharyngeal space involvement in this series. In case of simultaneous parotid and masseteric space involvement, diagnosis of the parotid abscess was based on ultrasound and CAT-scan.

Treatment options included drainage and use of parenteral antibiotics that covered gram positive bacteria initially and specific antibiotics after the results of culture and sensitivity were known. Parotid abscesses in 38 patients were drained by elevating a standard parotidectomy flap and drainage of multiple locules with preservation of the facial nerves. Seventeen cases were treated successfully by administration of antibiotics and aspiration at the suspected area. Superficial parotidectomy was performed in five cases because of abscess recurrence, and total parotidectomy was performed in two cases due to stone lodging in the Stensen's duct.

Fifty-nine cases were cured after surgical drainage with or without parotidectomy and parenteral antibiotic treatment. Three cases died of the underlying acute lymphoblastic leukemia and hepatic encephalopathy, and complicated meningitis. There was no facial nerve injury from surgical treatment. Seven cases had recurrence two weeks to three years after the initial drainage.

Discussion

The predisposing factors of parotid abscesses included debilitation, fluid restriction after surgery, irradiation, sialolithiasis, granulomatous disease and

tumor obstruction. In this report, the most common predisposing factor was diabetes mellitus (24.19%) that caused sialosis of parotid parenchyma and partial obstruction of the duct.⁽⁴⁾ In spite of the increasing incidence of AIDS, there was only one case of abscess formation in an HIV-positive patient, and mycobacterium was the etiologic agent. An abscess may originate from lymphoepithelial cyst formation in the parotid gland apart from cervical lymphadenopathy.⁽⁵⁾

Acute suppurative parotitis should be differentiated from viral parotitis (mumps) which is usually endemic and produces no pus, and parotid swelling from the non-infectious disorders. These include alcoholism, connective tissue disease, benign and malignant tumors and drug-related disorders. Suppurative parotitis is differentiated from these disorders by identifying the pus coming from the Stensen's duct orifice after bimanual massage over the gland or obtaining pus from needle aspiration. In our series, there were only 15 cases (24.19%) disclosing pus from the Stensen's duct orifice, so it does not absolutely rule out suppurative parotitis if purulent discharge is not visualized at the Stensen's duct orifice.⁽⁶⁾

A large abscess may extend into the nearby masseteric and parapharyngeal spaces. Pus which extends into the parapharyngeal space or upper neck area may cause descending necrotising fasciitis.⁽⁷⁾ In this report, there were four cases of simultaneous masseteric space abscesses at the initial presentation. In cases of multiple space involvement or cases for which definitive diagnosis cannot be made, ultrasonography and CAT-scan are necessary. They will show hypo-echoic resolution in the parotid area and abscess formation, respectively.

Gram-positive aerobic bacteria, especially *S. aureus*, are the most common pathogen isolated from

acute suppurative parotitis and abscess. In our series, 47 causative organisms were identified. Gram-positive aerobic bacteria was the most common cause and, consequently *S. aureus* was the dominant organism. However, there was an increasing frequency of mixed organisms with anaerobic bacteria and gram-negative aerobic bacteria (8 cases) especially in the cases with prior antibiotic treatment for cellulitis stage. This finding corresponds with a recent paper which revealed an increasing tendency of mixed organism with anaerobic bacteria and gram-negative aerobic bacteria.⁽⁸⁾ In the patients who received prior antibiotic treatment and were severely debilitated, immunocompromised and serological positive for HIV, investigations such as gram's stain, AFB stain and culture with sensitivity are necessary for planning treatment options.

Adequate hydration, administration of parenteral antibiotics, and correcting underlying and precipitating factors are essential for the management of parotid abscesses. The choice of antibiotics depends on the culture and sensitivity tests. Empirical antibiotic treatment before identification of organisms is necessary and it should be broad-spectrum and cover all possible aerobic and anaerobic pathogens, especially β -lactamase-producing bacteria and methicillin-resistant staphylococci. Penicillinase-resistant penicillin, first generation cephalosporin, clindamycin, metronidazole plus macrolides, penicillin plus β -lactamase inhibitor are initial drugs of choice. In the hospital-acquired infection, severely debilitated and immunosuppressive patients or patients receiving inadequate prior antibiotic treatment, the antibiotics covering gram negative bacteria should be added.^(9,10)

Most of suppurative parotitis cases respond well to antibiotic therapy, however, some parotitis cases

form abscesses and require surgical drainage. Needle aspiration, incision and drainage and parotidectomy are needed in special cases. The facial nerve is the important structures at risk during surgery and should be avoided. In of the 38 cases that had their abscesses drained, none had facial nerve injury. There were seven cases of recurrent abscess formation within two weeks to three years after the initial drainage. In these particular cases, it was necessary to determine the underlying diseases and the precipitating factors. Sialographic, immunologic and cytologic studies were necessary for investigations. Two cases of Sjögren syndrome were diagnosed by these investigations and by lip biopsy. Treatment of recurrent parotitis with superficial parotidectomy or total parotidectomy is still controversial.⁽¹¹⁾

Conclusions

1. Diabetes mellitus is the major predisposing factor of parotid abscess (24.19%) and is more important when it is concomitant with the other predisposing factors.

2. Even though gram positive bacteria, especially *S. aureus*, is the major cause of parotid abscess, there is a changing trend to mixed organisms with increasing incidence of gram negative and anaerobic bacteria. Antibiotics that cover all possible causative bacteria should be seriously considered, especially in cases with inadequate prior antibiotic treatment, or severely debilitated, immunocompressive and compromised hosts.

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