MANAGEMENT OF INFRATEMPORAL ABSCESS: SERIAL OF 3 CASES

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ABSTRACT Introduction: Infratemporal abscess is not a common case because most dental infections spread through the submandibular space or to the deep neck spaces. Abscess formation in this area may lead to dangerous complications, which infection from this area might spread through the pterygoid plexus to the cavernous sinus or through the valveless ophthalmic veins into the orbit. It may result in intracranial and orbital complications. Case report: We reported 3 serial cases of infratemporal abscess at the oral and maxillofacial surgery department of Dr. Hasan Sadikin Hospital Bandung. Patients are two males and one female. They all had a history of toothache in the left lower jaw region. All of the patients underwent surgical incision drainage. Conclusion: Infratemporal abscesses are rare cases, and most of them associated with dental infections. Oral surgeons must recognize, diagnose and manage infratemporal abscess of dental origin to avoid the chance of mortality caused by delay in treatment.

KEYWORDS Infratemporal space, Abscess

Introduction

An abscess is a thick-walled cavity containing pus.[1] Staphylococcus are frequently associated with abscess formation, often with anaerobes, such as Bacteroides.[1,2] Following the path of least resistance through connective tissue and along fascial planes, abscess infection can spread distantly from its dental source, such as infratemporal space. The infratemporal fossa is located behind the zygomatic bone, and it communicates with the temporal fossa, middle cranial fossa, pterygopalatine fossa, and the orbit.[2,3,4,5] The infratemporal space extends superiorly to the infratemporal crest of sphenoid; inferiorly to lateral pterygoid muscle; laterally to temporalis tendon and ramus of mandible, medially to the lateral pterygoid plate, muscle and medial pterygoid plate; posteriorly to the parotid gland; anteriorly to the infratemporal surface of the maxilla and posterior surface of zygomatic bone (Figure 1).[6,7] The infratemporal space, along with the temporal, massteric, and pterygomandibular spaces, can be grouped as the masticator space.[7] The masticator space is defined by the superficial layer of the deep cervical fascia as it splits at the inferior border of the mandible. Deep fascial space infections of odontogenic origin were extensions of mandibular and maxillary infections. The extension of infection into the masticator space has been observed to extend superiorly against gravity; however, the pathway is poorly understood. Multiple neurovascular structures such as the mandibular branch of the trigeminal nerve, the maxillary artery, and the pterygoid venous plexus cross the infratemporal fossa as they pass into other head regions neck; therefore, infections in this region can easily spread to surrounding spaces and cause significant morbidity.

The usual symptoms of infratemporal space infections are orbital oedema, swelling above the zygomatic arch in front of the ear, severe trismus, pain, lymphadenopathy and fever. In the intraoral examination, the mucosa posterior to the zygomatico-alveolar process may appear hyperemic and painful on palpation.[8] Thus, the diagnosis of infratemporal abscess can be established by taking history and clinical examination.

Management of infratemporal abscesses usually requires incision and drainage. Several different approaches exist for abscess drainage (Figure 2).[2] Antibiotic therapy is also needed in the treatment of an infratemporal abscess. Antibiotic for infection of odontogenic origin is commonly chosen empirically. Historically, penicillins have been used as first-line agents in...
the treatment of odontogenic infections. Penicillin resistance in these pathogens has been correlated with β-lactamase production. Third-generation cephalosporins also showed good activity.[9] Metronidazole is a bactericidal agent highly active against most anaerobes, but it lacks activity against aerobic bacteria. Metronidazole is best used in conjunction with penicillin to ensure coverage against aerobic Gram-positive bacteria in serious infections. In this article, we reported serial 3 cases of infratemporal abscess secondary to odontogenic infection.

Case report

A 78 years old female patient came with swelling at the left cheek and left the infratemporal region. About 14 days before, she complained about a toothache in the left lower jaw region. Swelling at the left cheek started to appear four days later, then the swelling got bigger and extended (spread) to the left infratemporal region seven days later. She had a history of stroke two years ago and hypertension ten years ago. She had a febrile temperature on physical exam, swelling approximately 7x7x5 cm in size along the left infratemporal region (Figure 2). Her mouth opening was 3 cm. We found spontaneous drainage at the gingiva of tooth 37, and the vestibule of teeth 26-28 was elevated in the intraoral examination. Tapping pus at the infratemporal region was positive. Her laboratory values were significant for leukocytosis and elevated C-reactive protein. We diagnosed the patient with a left buccal abscess extended to the left infratemporal region. Screening Covid-19 was carried out preoperatively with a normal result. We performed incision drainage and extraction of teeth 16,27,37,36,35,34 under local anesthesia (Figure 3). She was admitted and prescribed 1 gr ceftriaxone and 500 mg metronidazole intravenous as antibiotic therapy. At the follow-up examination, the clinical outcome was found to be satisfactory. On the 4th postoperative day, the swelling was decreased (Figure 4) and fully resolved on the 15th postoperative day (Figure 5).

Case report 2

A 54 years old male patient came with swelling in the left infratemporal region. He complained about toothache on the lower left jaw region about one month ago. The swelling initially...
tially started from the left lower jaw about two weeks ago, and one week later, the swelling got bigger and extended to the left cheek and left the infratemporal region and accompanied by difficulty in opening his mouth. As his symptoms did not resolve, he was consulted by our department for further treatment. He had no history of systemic disease. From our examination, we found febrile temperature, asymmetrical face, swelling at left lower jaw with 3x3x2 cm in size extended to left infratemporal region with 6x4x2 cm in size (Figure 6). The symptoms accompanied by pain on palpation and trismus. Tapping pus at the infratemporal region was positive. His laboratory values were significant for leukocytosis and elevated C-reactive protein. We diagnosed the patient with left submandible abscess extended to the left buccal and left the infratemporal region. We performed incision and drainage; extraction of teeth 11, 12, 13, 14, 15, 16, 17, 23, 24, 25, 26, 27, 28, 31, 32, 34, 35, 38, 41, 42, 44 under local anesthesia (Figure 7). He was admitted and prescribed 1 gr ceftriaxone and 500 mg metronidazole intravenous as antibiotic therapy. The swelling was decreased at the follow-up examination on the 6th postoperative day (Figure 8) and fully resolved on the 11th postoperative day (Figure 9).

Case report 3

A 27 years old male patient consulted our department with swelling at the left lower jaw extended to the left cheek and

left the infratemporal region. About seven days before, he complained of toothache in the left lower jaw. Swelling at the left lower jaw was started to be seen two days later. As the swelling got bigger and extended to the left cheek and left the infratemporal region, he went to a private hospital and referred to our department for further treatment. He had no history of systemic disease. From our examination, we found febrile temperature; swelling at the left lower jaw, neck and infratemporal region with 6x3x2; 7x3x2; 5x3x2 cm in size (Figure 10). The symptoms were accompanied by pain on palpation, febrile temperature, tachypnea and trismus. From the intraoral examination, we found spontaneous drainage at the gingiva of tooth 38. Tapping pus at the infratemporal region was positive. His laboratory values were significant for leukocytosis and elevated C-reactive protein. Neck soft tissue X-ray was carried out (Figure 11) with impression soft tissue density with air lucent density in left and right neck area, but air column still opening. We consulted this patient to the ENT department, and they suggested performing tracheostomy and incision drainage of coli abscess. We diagnosed the patient with left submandible abscess accompanied with retropharyngeal abscess. We performed incision and drainage at left submandible, left infratemporal and left buccal; extracted teeth 46, 34, 35, 36, 37, 38; tracheostomy, incision and drainage at left coli region under general anaesthesia join op with ENT Department (Figure 12). He was admitted and prescribed 1 gr ceftriaxone and 500 mg metronidazole intravenous as antibiotic therapy. At the follow-up examination, on the 9th postoperative day, the swelling was decreased (Figure 13) and fully resolved on the 21st postoperative day (Figure 13).

Discussion

The differential diagnosis for an infratemporal abscess is broad and includes parotitis, parotid gland tumours, and temporomandibular joint disorder.[3] Salman et al. I described perform-
In our case, we establish the diagnosis of infratemporal abscess from anamnesis; clinical examination (where we can find the febrile temperature, firm and tender swelling at the infratemporal region with positive fluctuation, the onset of swelling that ranges from 7-14 days, spontaneous drainage and trismus in intraoral examination); laboratory finding (leukocytosis and elevated of C-reactive protein); aspiration of fluid and got a positive result of pus.

The infratemporal abscess has been described to occur secondary after odontogenic infection, extraction of an infected and non-infected tooth, sinusitis, maxillary sinus fractures, tonsillitis, temporomandibular arthroscopy, drug infection, local anaesthesia injections with contaminated needles in the area of tuberosity and spread from the other spaces infection.[2,3,7] In our case we believe that infratemporal abscess occurs due to odontogenic infection.

There are multiple avenues for the spread of infection. Infections from the maxillary sinus can spread through the posterior wall of the maxillary sinus, which also forms the anterior border of the infratemporal fossa. Alveolar neurovascular bundles running through canals in this region can be a source of infectious spread. Another hypothesis is that there are several periosteal breakpoints through which infection can spread from the tooth to the maxilla and through the periosteum into nearby fascial spaces. Another theory is that trauma from dental procedures (such as nerve blocks) can cause microbial seeding in the infratemporal fossa and lead to further infections. Mada Lakshmi Narayana et al. described infratemporal space abscess as secondary of masseteric space infection.[7] In our case, we believe that the mechanism of infectious spread was from the odontogenic infection that passes through the periosteal break points to the nearby facial spaces, which were directly adjacent with infratemporal space. In two patients, infection from mandibular teeth spread to the masticatory space, where the space involved is infratemporal space and masseteric and pterygomandibular spaces as a group of masticator space, and this explains why both of the patients had trismus.

Meanwhile, in one patient, the infection from the mandibular tooth didn’t spread to the masticatory space. Still, it breaks a cortical bone and runs through the periosteum, laterally to the buccal and maxilla, then breaks the maxilla’s infratemporal surface and spread to the infratemporal space. This explains why she didn’t have a trismus. Three patterns of infratemporal fossa infection have been described, (1) localization within the fossa, (2) ascending spread into temporal fossa and (3) inferior spread into parapharyngeal space.[10] If the infection spread inferiorly, pericarditis and mediastinitis may be a complication of the infratemporal abscess. When the infection affecting the maxillary and mandibular branches of the trigeminal nerve it may cause a neurosensory deficit.[4,8] Gallagher et al. and Diacono et al. reported (that) trigeminal neuralgia and paraesthesia as additional presentation due to involvement of maxillary and mandibular branches of the trigeminal nerve, which was
The infection might spread superiorly through the pterygoid plexus to the cavernous sinus or through the valveless ophthalmic veins into the orbit, which may result in intracranial and orbital complications.[7] In our case, one patient complained of difficulty opening his left eye, and his left side vision was blurry due to the spread of the abscess to the ocular area.

Definitive treatment of infratemporal abscesses usually requires antibiotic therapy as well as incision and drainage. In our case, we perform incision from the infratemporal and intraoral approach. We give empirically antibiotic, a combination of ceftriaxone and metronidazole until the bacterial culture results come out, and we also give fluid therapy with ringer lactate.

Conclusion
Infratemporal abscess is a rare case. Careful anamnesis and clinical examination are important to help us in determining an accurate diagnosis. Appropriate treatment is also important to avoid the chance of mortality caused by an infratemporal abscess.

Funding
This work did not receive any grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of Interest
There are no conflicts of interest to declare by any of the authors of this study.

References