

INFRATEMPORAL FOSSA INFECTION WITH INFERIOR ALVEOLAR NERVE INVOLVEMENT

İnferior Alveolar Sinir Tutulumlu İnfratemporal Abse Enfeksiyonu

Yusuf EMES, Serhat YALÇIN, Buket AYBAR, İtir Şebnem BİLİCİ

Received: 16/09/2015

Accepted: 28/12/2015

ABSTRACT

Abscess of the infratemporal fossa is a rare complication which can be difficult to diagnose. It occurs mostly due to dental infection, tooth extraction, fractures and/or infections involving the maxillary sinus. This condition can be life threatening if not dealt with immediately. The maxillofacial surgeon must be aware of the symptoms and clinical findings of the infection of the infratemporal fossa in order to initiate the treatment as soon as possible. In this case report, a patient with an infratemporal fossa infection presenting with an unusual symptom of inferior alveolar nerve involvement is presented.

Keywords: Infratemporal abscess; facial space infection; abscess; infratemporal space infection

ÖZ

Nadir görülen bir komplikasyon olan infratemporal fossa absesi tanı koyulması zor bir durumdur. Çoğunlukla diş kaynaklı enfeksiyonlara, diş çekimine, maksiller sinüsü ilgilendiren kırıklara ve enfeksiyonlara bağlı olarak ortaya çıkar. Acil olarak müdahale edilmez ise yaşamı tehdit eden bir klinik tablo oluşabilir. Tedaviye erken başlanabilmesi için maksillofasiyal cerrahların infratemporal fossa enfeksiyonlarının belirtileri ve klinik bulguları hakkında yeterli bilgiye sahip olmaları gereklidir. Bu makalede bir hastada inferior alveolar sinir tutulumu gibi sıradışı bir bulgu ile ortaya çıkan infratemporal fossa enfeksiyonunun sunulması amaçlanmıştır.

Anahtar kelimeler: İnfratemporal abse; fasiyal loca enfeksiyonu; abse; infratemporal loca enfeksiyonu



Introduction

Infratemporal space is an important part of the head and neck region due to serious complications that may be seen whenever a pathologic condition takes place in this fossa (1-3). Infection of the infratemporal space is a rare clinical condition which occurs mostly due to dental infection, tooth extraction, fractures involving the maxillary sinus and infections of the maxillary sinus. Generally, the cause is the fracture of the maxillary antrum or the infection of a maxillary molar tooth (4-8). With regard to the proximity to some important anatomical areas of the head, dealing with infratemporal space infection needs great consideration both in examination and surgical practice (1, 9).

Being superiorly bounded by the sphenoid bone, the infections of the infratemporal space may spread to the cavernous sinus through the pterygoid plexus or to the orbit due to a path through the ophthalmic veins (10). Being scantily described in the literature, infection of the infratemporal fossa can be a life threatening situation that should be dealt with immediately (11). Infratemporal space abscess is usually difficult to diagnose because this space is surrounded with bones like mandibular ramus, sphenoid bone and lateral pterygoid plate which prevents the abscess to give symptoms like swelling and/or erythema. The main symptom that may provide some clue about infratemporal space infection is trismus. When the infection affects the pterygoid muscles, trismus takes place and if swelling and pain are also present, an infratemporal space infection should be considered in the diagnostic process. In this case report, a patient with an infratemporal fossa abscess presenting with a rare complication of numbness of the lower lip is described.

Case Report

A 38 years old female patient was referred to our clinic with complaints of severe pain, restricted mouth opening (Figure 1), swelling in the temporalis muscle region, fever, and malaise following the extraction of the upper right third molar tooth. The patient stated that her complaints have started 9 days prior to admission. Three days after the extraction of her upper right third molar tooth she claimed to have felt pain and swelling in the related region. She also reported that multiple injections had been performed by her dentist in order to obtain sufficient anesthesia.



Figure 1. Extraoral view of the patient showing restricted mouth opening.

Dentist had referred the patient to an oral and maxillofacial surgeon who has prescribed ciprofloxacin 500 mg twice a day. However, her complaints had started to increase, including restriction of the mouth opening. Five days after starting to use antibiotics, the patient claimed to have felt numbness in the right half of her lower lip, accompanied by severe headache and fever. Narcotic analgesics had been also prescribed by a neurologist, which did not alleviate the clinical symptoms. The patient was referred to our clinic when magnetic resonance imaging (MRI) revealed abscess formation in the infratemporal space region (Figure 2).

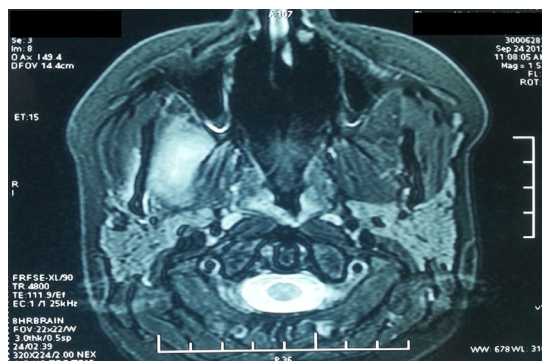


Figure 2. Magnetic resonance imaging of the patient that shows abscess formation in the infratemporal space.

The patient's blood count was within normal ranges. However she had a high C-reactive protein (CRP) measurement of 1.17 mg/L. The patient's history revealed numbness of the lower lip in the affected side. Swelling was visible in the right temporal region. The pain was most intense in the retromaxillary region during palpation. When the aspiration of puss was achieved using a 5 cc syringe, the abscess was drained through an intraoral incision in the tuber region. The incision was done using a No: 15 surgical blade, then drainage of the puss was done using a blunt forceps followed by drain insertion. The patient was prescribed 600 mg of intramuscular clindamycin twice a day and 500 mg of ornidazole twice a day orally. 20 mg of tenoxicam was also given orally once a day for pain relief and to reduce the inflammation. The systemic condition of the patient started to improve on the following day. The anesthesia of the lower lip started to decrease and the patient started to feel paresthesia on the third day following the drainage. The drain was removed on the same day. Postoperative MR images showed a decrease in the abscess. The mouth opening reached its normal range on the fifteenth day (Figure 3) and the numbness of the lip recovered completely on the 3rd month.



Figure 3. Extraoral view of the patient 1 week after the surgical drainage of the abscess. Note the increase in the mouth opening.

Discussion

Generally, infratemporal space infection is described as an uncommon complication and it is usually caused by tooth extraction and dental infections. Most cases occur due to spread from other masticatory spaces. However Leventhal and Schwartz (12) have reported a case of an infected infratemporal

space as a complication of dental injection and they suggested that a hematoma resulting from the injury to the pterygoid plexus during dental injection to the maxillary region could be the cause of the infection. A previous dental or sinus infection, as well as fracture of the sinus wall, are also among the most frequent causes of this infection. Gallagher and Marley (5) have also reported an infratemporal fossa infection following the extraction of an uninfected maxillary third molar, and they also have related this condition to the hematoma of the pterygoid plexus. It is not possible to determine whether the tooth in our case had been infected prior to extraction. On the other hand, according to the patient's statement, she had multiple injections during the initial tooth extraction procedure to maintain the level of local anesthesia, which may be the sign of an infected tooth.

Clinical diagnosis of the infratemporal fossa abscess can be difficult. Prescription of narcotic analgesics by a neurologist proves that, not only dentists, but also physicians trained in other medical fields can fail to diagnose this entity clinically. Computed tomography (CT) scans are useful diagnostic tools in such conditions, as they can clearly differentiate cellulitis and abscess formation (13). MRI is also very useful in the infratemporal fossa infection cases. It helps the diagnosis, especially if a neoplasm is also suspected. Also, MRI provides more information on perineural infiltration and intracranial involvement when compared to CT (14). In our case, abscess formation in the infratemporal space was clearly visible in the patient's MRI. We could not find any previous reports regarding the anesthesia of the inferior alveolar nerve due to infection of the infratemporal space. Sensory and motor roots of the mandibular nerve unite in the infratemporal fossa after leaving the middle cranial fossa. Then, the trunk splits into two, which are the anterior and the posterior divisions. Inferior alveolar nerve is a branch of this posterior division. We believe that the anesthesia of the lower lip is due to the pressure of the abscess formation in this region to the inferior alveolar branch of the mandibular nerve. The potential risk of subsequent infection is present as it can spread to the orbit and skull base. Therefore, infratemporal fossa infections are clinical conditions which should be dealt with immediately. In the present case, the patient's condition has improved significantly following the drainage.

Oral surgeons must be familiar with the infection of the infratemporal fossa as a potentially life

threatening, diagnostically challenging and rare condition. The patient presented in this case report has developed a swelling in the temporal region, making the diagnosis easier, but temporal swelling may not always be present in each case. Even though the involvement of the branches of the mandibular nerve have not been previously described in the literature, it must be kept in mind that if infratemporal or pterygomaxillary space infections are suspected due to limited mouth opening accompanied by malaise, fever, pain and unilateral anesthesia or paresthesia of the lower lip following an infection or a surgical procedure in the posterior maxilla, CT and MRI scans must be obtained swiftly to confirm the diagnosis. Infratemporal space infection can be observed after maxillary molar infections, a *posterior superior alveolar nerve* or inferior alveolar nerve blocks as well as mandibular third molar infections that spread to pterygomandibular space (15). The usual symptoms of infratemporal space infections are orbital edema, swelling above the zygomatic arch in front of the ear, severe trismus, pain, lymphadenopathy and fever (16). In the intraoral examination, the mucosa posterior to the zygomatico-alveolar process may appear hyperemic and can be painful on palpation (17). The symptom lip numbness presented in this case has not been previously reported. It is obvious that a simple tooth extraction in the posterior maxillary region can cause a serious complication such as infratemporal space infection. The diagnosis should be established early and treatment should be started without delay because the infection can spread to the skull base and this can be life-threatening for the patient. Drainage is the main treatment in these cases. Intraoral incision must be made in the mucobuccal sulcus in the superior posterior direction between the coronoid process and maxillary third molars (15, 16).

Conclusion

When the patient has symptoms of pain, trismus, sensory deficits, fever or malaise following an extraction procedure, the clinician should consider the possibility of a postoperative infection. If the clinician still has doubts after evaluating the patient clinically, an MRI or CT scan should be performed. Blood count and CRP can help to reveal the infection, so that further spreading of the infection can be prevented. Infections of the infratemporal fossa can occur due to tooth extraction or needle insertion into the pterygoid plexus, and may have life threatening results if not

managed properly. Infection of the infratemporal space may be difficult to diagnose. Trismus and pain in the retromolar region are often observed in these patients. We have also detected paresthesia in the lower lip as a result of inferior alveolar nerve involvement in the infratemporal space infection.

Source of funding

None declared

Conflict of interest

None declared

References

1. Fonseca RJ. Oral and maxillofacial surgery, 1st ed. Philadelphia: W.B. Saunders;2000: 237-239.
2. Langdon JD, Berkovitz BKB, Moxham BJ. Surgical Anatomy of the Infratemporal Fossa. London: Martin Dunitz;2003.
3. Miloro M, Ghali GE, Larsen PE, Waite PD. Peterson's Principles of Oral and Maxillofacial Surgery, 5th ed. Hamilton: BC Decker; 2008:318-24.
4. Chossegros C, Cheynet F, Conrath J. Infratemporal space infection after temporomandibular arthroscopy: An unusual complication. J Oral Maxillofac Surg 1995;53(8):949-951.
5. Gallagher J, Marley J. Infratemporal and submasseteric infection following extraction of a non-infected maxillary third molar. Br Dent J 2003;194(6):307-309.
6. Raghava N, Evans K, Basu S. Infratemporal fossa abscess: Complication of maxillary sinusitis. J Laryngol Otol 2004;118(5):377-378.
7. Schwimmer AM, Roth SE, Morrison SN. The use of computerized tomography in the diagnosis and management of temporal and infratemporal space abscesses. Oral Surg Oral Med Oral Pathol 1988;66(1):17-20.
8. Weiss BR. Infratemporal fossa abscess unusual complication of maxillary sinus fracture. Laryngoscope 1977;87(7):1130-1133.
9. Akst LM, Albani BJ, Strome M. Subacute infratemporal fossa cellulitis with subsequent abscess formation in an immunocompromised patient. Am J Otolaryngol 2005;26(1):35-38.
10. Headley DB, Dolan KD. Infratemporal fossa abscess. Ann Otol Rhinol Laryngol 1991;100(6):516-517.

11. Mesgarzadeh AH, Ghavimi MA, Gok G, Zarghami A. Infratemporal space infection following maxillary third molar extraction in an uncontrolled diabetic patient. *J Dent Res Dent Clin Dent Prospects* 2012;6(3):113-115.
12. Leventhal D, Schwartz DN. Infratemporal fossa abscess: Complication of dental injection. *Arch Otolaryngol Head Neck Surg* 2008;134(5):551-553.
13. Nishizaki K, Ogawa T, Akagi H, Sato K, Masuda Y. Computed tomographic findings in two cases of cellulitis of the infratemporal fossa with abscess formation. *Ann Otol Rhinol Laryngol* 1998;107(9 Pt 1):807-809.
14. Chong VF, Fan YF. Pictorial review: Radiology of the masticator space. *Clin Radiol* 1996;51(7):457-465.
15. Williams TP. *Surgical Pathology: Fonseca RJ. Oral and Maxillofacial Surgery 5, Elsevier Health Sciences, 2000;77-117.*
16. Fragiskos DF. *Odontogenic Infections: Fragiskos DF. Oral Surgery Germany: Springer, 2007;205-242.*
17. Peker E, Karaca İR. Odontojenik enfeksiyon kaynaklı fasyaların apseleri. *GÜ Diş Hek Fak Derg* 2012;29(2):129-137.

Corresponding Author:**Yusuf EMES**

Department of Oral and Maxillofacial Surgery
Faculty of Dentistry Istanbul University
34093-Capa-Fatih/Istanbul, Turkey.
Phone: +90 212 414 20 20/30312
e-mail: yusufemes@yahoo.com