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Research Article

Infratemporal Abscess in an Adolescent Following a Dental Procedure

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Keywords

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Abstract

Infections in the infratemporal region can be a major source of morbidity and have been known to occur after dental procedures. Neurovascular structures running through the infratemporal fossa serve as a source for infections to track to different areas of the head and neck. The proximity of the infratemporal fossa to other major structures makes timely diagnosis critical. Infratemporal fossa abscesses are a rare complication and only a few cases have been described in the literature. As the clinical symptoms may be non-specific, the diagnosis may be challenging for healthcare providers. We describe a patient who presented with facial swelling and trismus following wisdom tooth extraction who was found to have an infratemporal fossa abscess.

ABBREVIATIONS

CT: Computed Tomography; MRI: Magnetic Resonance Imaging

INTRODUCTION

The infratemporal fossa is an extremely important site, as it communicates with several surrounding structures including the temporal fossa, middle cranial fossa, pterygopalatine fossa, and the orbit. Multiple neurovascular structures cross the infratemporal fossa as they pass into other regions of the head and neck [1]. Infections in this region can easily spread to surrounding spaces and cause significant morbidity [2]. The mandibular branch of the trigeminal nerve, the maxillary artery, and the pterygoid venous plexus are all located within the infratemporal fossa and can be at risk. Infections may track through the pterygoid plexus to the cavernous sinus or through the ophthalmic veins into the orbit. Additionally, they may also spread superiorly toward the skull base or inferiorly to the neck [3].

Infratemporal fossa abscesses are rare and only a few cases have been reported in the literature. They frequently present after odontogenic infections, and many reported cases have been associated with dental procedures. Specifically, infections involving the maxillary molars have been noted to cause secondary infections in the infratemporal fossa. They have also been described to occur after sinusitis, maxillary sinus fractures, or *arthroscopic* jaw surgery [3,4]. Since the signs and symptoms of an infratemporal fossa abscess may be non-specific, diagnosis may be challenging for healthcare providers and proper treatment may be delayed.

CASE PRESENTATION

A 14-year-old previously healthy male presented with left-sided facial swelling and jaw stiffness. He complained of associated tenderness to palpation over the left side of his face and jaw and difficulty opening his mouth. These symptoms initially started three days after he had four wisdom teeth extracted. As his symptoms did not resolve, he was evaluated by his surgeon. Although a source of his symptoms was not found, he was started on Clindamycin due to concern for possible infection. He complained of difficulty eating secondary to pain while opening his mouth, but denied any fevers, chills, or other constitutional symptoms. He initially presented to an outside facility where computed tomography (CT) of the head revealed a hypodensity in the left infratemporal region concerning for an abscess.

On presentation to our facility, he was a febrile and his vitals were within normal limits. On physical exam, he had a firm, tender swelling approximately 2 cm in diameter along the left temporal region without surrounding erythema. He also had trismus but no lymphadenopathy or neck stiffness. His maximal incisal opening was 10 millimeters.

There was no intraoral swelling, bleeding, or purulence. His laboratory values were significant for leukocytosis, elevated C-reactive protein, and elevated erythrocyte sedimentation rate. Blood cultures were negative.

Following admission, he was started on broad spectrum antibiotics as his symptoms had not improved on Clindamycin. During his hospital course, he remained intermittently febrile,

and his inflammatory markers worsened. At this point, magnetic resonance imaging (MRI) of the face was performed, which showed extensive left masticator space edema with a loculated fluid collection measuring 5.5 cm x 1.6 cm x 2.0 cm (Figures 1,2). CT-guided drainage was subsequently performed and drained 3 mL of purulent material. The fluid culture was positive for *Streptococcus viridans*. Fungal, acid fast bacilli, and anaerobic cultures were also obtained but were negative.

This patient subsequently showed clinical improvement and his inflammatory markers trended down to normal following drainage of his abscess. A peripherally inserted central catheter was placed for long term antibiotics. He was subsequently discharged home to complete a 21-day course of antibiotics. Daily examinations showed that the left side of his face became progressively less edematous. Following discharge, he had some residual facial swelling and pain when opening his mouth, however he remained afebrile. A repeat MRI (Figures 3,4) performed two weeks after hospital discharge showed decrease in all measured dimensions of the abscess.

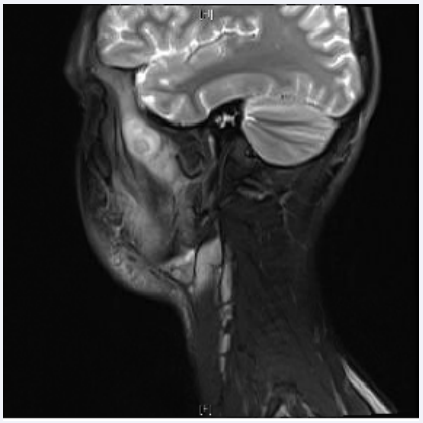

Figure 1 MRI showing extensive left masticator space edema with an abscess centered around the coronoid process. A small amount of joint effusion and thin capsular enhancement was also noted within the left temporomandibular joint.

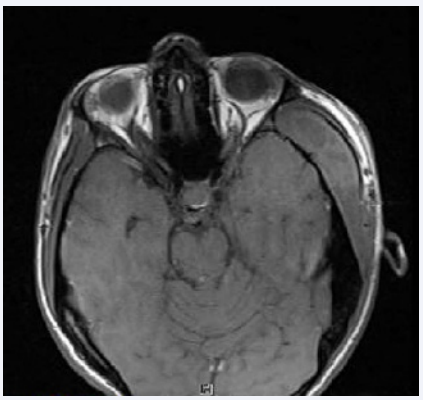

Figure 2 MRI showing extensive left masticator space edema with an abscess centered around the coronoid process. A small amount of joint effusion and thin capsular enhancement was also noted within the left temporomandibular joint.

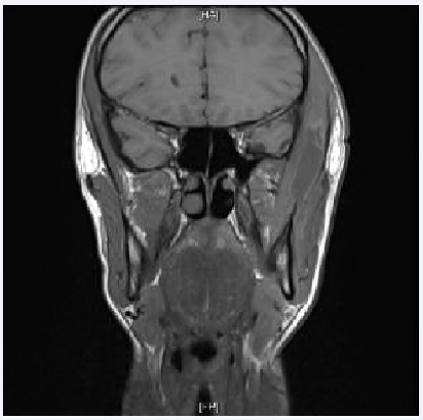

Figure 3 Follow-up MRI sixteen days after the initial MRI showed decrease in all measured dimensions of a residual fluid signal collection consistent with a resolving abscess.
Abbreviations: CT: Computed Tomography; MRI: Magnetic Resonance Imaging

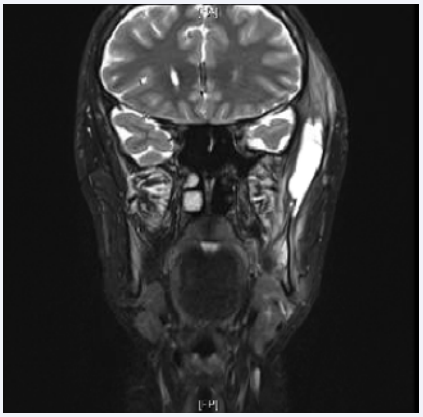

Figure 4 Follow-up MRI sixteen days after the initial MRI showed decrease in all measured dimensions of a residual fluid signal collection consistent with a resolving abscess.
Abbreviations: CT: Computed Tomography; MRI: Magnetic Resonance Imaging

DISCUSSION

Infratemporal fossa abscesses can occur due to a number of different causes, but are most commonly associated with dental infections. In a report by Dang et al., of 408 patients treated for severe dental infections, 7 were found to have infratemporal fossa abscess. The mechanism of infectious spread is not well described, but two hypotheses have been proposed. One hypothesis is that there are a number of periosteal break points 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 spread of infections [5].

As mentioned previously, 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. Infections may also track through the pterygoid plexus to the cavernous sinus or through the ophthalmic veins into the orbit. Additionally, they may also spread superiorly toward the skull base or inferiorly to the neck [6].

Causative organisms in infratemporal fossa infections include many organisms from the oral cavity. These organisms can become more pathogenic when normal barriers are disrupted, as in the case of dental procedures [7]. Finding the causative organism may be difficult as many patients may have already been treated by antibiotics at the time of diagnosis. Immunocompromised patients may be at higher risk of more serious infections, and in particular Klebsiella should be considered in diabetic individuals [8].

As the infratemporal fossa is connected to a number of other spaces in the head and neck, other infections in this region should also be considered. The differential diagnosis for infratemporal fossa abscess is broad and includes parotitis, parotid gland tumors, and temporomandibular joint disorder [9]. The clinical diagnosis of infratemporal abscesses may be difficult. In addition to a thorough head and neck exam, it is important for healthcare providers to perform an oral exam as well. Patients may often present with fever, trismus, and facial swelling. However even with these symptoms, misdiagnosis or a delay in diagnosis is common. In the study by Dang et al., the average time to diagnosis of an infratemporal fossa abscess was 16.5 days with a range from 2 to 60 days [5].

A more definitive diagnosis of an infratemporal fossa abscess generally requires either CT or MRI. A CT scan can help to differentiate soft tissue infections from abscesses and is an effective method of early detection. A ring-enhancing lesion is often noted in the case of an abscess; while homogenous swelling of the soft tissue is usually noted with soft tissue infections.MRI can better delineate the extension of the abscess and also is more effective in differentiating them from neoplasms [10].

Definitive treatment of infratemporal fossa abscesses usually requires antibiotic therapy as well as incision and drainage. A number of different approaches exist for abscess drainage, such as the transnasal approach and the intraoral approach [11]. Newer techniques for drainage have also been developed, such as endoscopic drainage [12]. Although all patients with an abscess require incision and drainage, patients who are immunocompromised are at high risk and often need prompt surgical intervention. A number of complications can result from the spread of infection, including cavernous sinus thrombosis, pericarditis, and mediastinitis. Ocular complications may be present as a result of spread to the orbit [7].

This case report highlights several key points in the workup and management of infratemporal fossa abscesses. Given the potential complications, speedy diagnosis and appropriate treatment is necessary to prevent adverse outcomes. A thorough physical exam, with an emphasis on the oral exam, is important in the evaluation as trismus may help differentiate this condition from other head and neck conditions. Providers who have a high suspicion of infratemporal fossa abscess should also have a low threshold to obtain radiographic imaging. As clinical symptoms may be non-specific, having a high degree of suspicion as well as awareness of this rare condition are both critical for accurate diagnosis.

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