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CASE REPORT

Isolated Maxillary Sinus Aspergilloma Associated with Tooth Extraction: Case Report
Short title: Fungus Ball of Maxillary Sinus

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Abstract
Aspergillosis is a fungal infection mainly affects the nasal cavity and paranasal sinuses in maxillofacial region. Aspergillus infection can be seen in three clinical forms as non-invasive, invasive and allergic. The non-invasive form of aspergillus also called as aspergillus mycetoma, aspergilloma or fungus ball, commonly seen in healthy individuals. Maxillary sinus aspergilloma may occur after treatments of antral teeth. Although usually asymptomatic maxillary sinus aspergilloma in some instance may exhibit clinical symptoms such as swelling, purulent discharge, chronic sinus pain, nasal congestion, headache which are similar to the other sinus infections in symptomatic patients. This case report presents the diagnosis and surgical management of maxillary sinus aspergillus infection that occurs after tooth extraction.
Key words: Fungus, paranasal sinus, aspergillosis

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Introduction

Aspergillus is a fungus commonly found in nature and also the most common fungal pathogen isolated from the paranasal sinuses (Khongkhunthian and Reichart, 2001; Harada et al., 2017). Aspergillus infection can have three clinical forms as non-invasive, invasive and allergic (Sato et al. 2010). The non-invasive form of aspergillus, mostly seen in healthy individuals, is called as aspergillus mycetoma, aspergilloma or fungus ball (Khongkhunthian and Reichart, 2001). Aspergilloma can affect all paranasal sinuses, but it is especially seen in maxillary sinus (Shin et al., 2016). Unlike other paranasal sinuses predisposing local factors that contribute the occurrence of this fungal infection in the maxillary sinus are considered as dental procedures that cause perforation of the sinus membrane such as tooth extraction and endodontic treatment

(Khongkhunthian and Reichart, 2001; Martins and Ribeiro Rosa, 2004).

The clinical course of maxillary sinus aspergilloma is usually asymptomatic (Harada et al., 2017). However, in symptomatic cases, the clinical symptoms of aspergilloma are usually not specific and include nasal discharge, chronic sinus pain, nasal congestion, headache, and orbicular pain (Sohn et al., 2009; Guivarc'h et al., 2015). Radiographically, aspergilloma shows a dense, opaque, foreign body appearance in the maxillary sinus and is usually detected during routine dental examination (Torul et al., 2018). Providing the natural sinus drainage after removal of the lesion by Caldwell-Luc operation or endoscopic surgical techniques is sufficient for the treatment of aspergilloma. Generally, anti-fungal therapy is not required (Khongkhunthian and Reichart, 2001; Harada et al., 2017).

In this case report, the diagnosis and surgical treatment of maxillary sinus aspergilloma that occur after tooth extraction, is presented.

Case Report

A 40-year-old female patient presented to our clinic with temporomandibular joint problems. The patient's general health was unremarkable. In clinical examination, no pathology was observed. However, panoramic radiographic examination showed a radiopaque foreign body located in the right maxillary sinus (Figure 1). Cone Beam Computed tomography (CBCT) was obtained for further investigation and the exact location of the hyperdense foreign body in the right maxillary sinus was detected. No evidence of bone destruction was seen on the sinus walls on CBCT (Figure 2). Because of the history of occasional pain from the right maxillary sinus region excision of the foreign body under local anesthesia was planned.

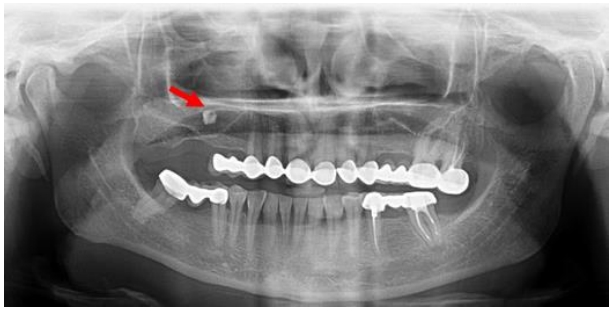

Figure 1. Panoramic radiograph showing the radiopaque mass in the right maxillary sinus.

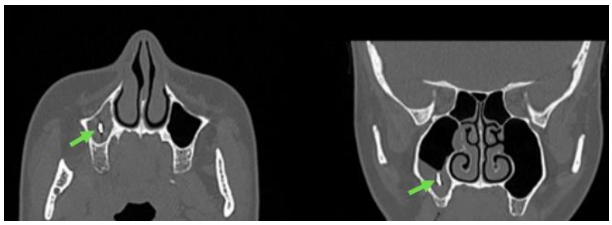

Figure 2. Axial and coronal CBCT images shows iron-like opacity.

After informed consent was obtained, local anesthesia was administered to the region and the full thickness flap was raised. The foreign body was removed with the Caldwell-Luc procedure (Figure 3). After the removal of foreign the body 9 ml blood harvested from the patient. Concentrated Growth Factor (CGF) was obtained by placing the blood into the centrifuge. CGF was placed into the sinus and the bony window in the lateral wall. Primary closure was performed subsequently (Figure 4). After operation antibiotic, analgesic, mouthwash and decongestant drugs were prescribed to the patient. Excised specimen was sent to histopathological examination (Figure 5). The histopathology report revealed the diagnosis as Aspergillus (Figure 6). Six months after surgery, she had no clinical and radiographic evidence of infection (Figure 7).

Figure 3. Removal of the foreign body.

Figure 4. Placement of CGF.

Figure 5. Excised specimen.

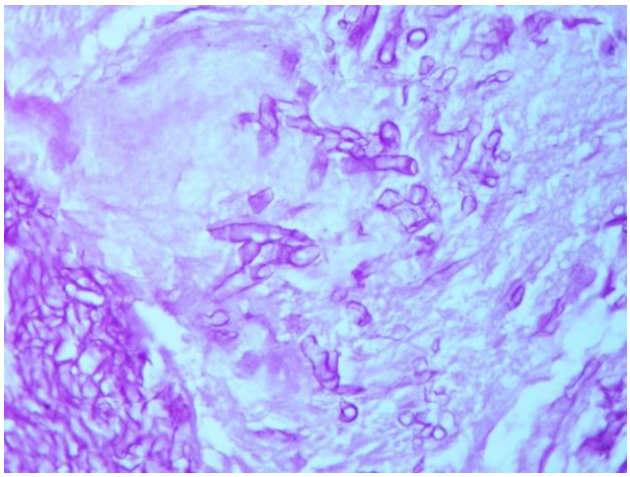

Figure 6. Histopathological finding shows fungus hyphae (PASX1000).

Figure 7. Postoperative panoramic radiograph at 6th months.

Discussion

Aspergillosis mainly affects the nasal cavity and paranasal sinuses in maxillofacial region (Urs et al., 2015). It is accepted that aspergillus infection in these regions occurs as a result of inoculation of aspergillus spores to paranasal sinuses by inhalation, and become pathogenic in hypoxic cases where sinus drainage is deteriorated (Sohn et al., 2009; Shin et al., 2016). Some researchers have suggested that the higher incidence of aspergilloma in the maxillary sinus is caused by the dental factors in addition to other etiological factors that contribute to the occurrence of the infection. According to these authors, the perforation of the maxillary sinus membrane with the dental procedures leads Aspergillus spores which are lack of lytic enzymes, to reach the sinus and cause the infection here (Guivarc'h et al., 2015; Urs et al., 2015; Harada et al., 2017). Different cases of aspergilloma associated with dental procedures such as dental implants, tooth extraction, root canal treatment and alveolar grafting have published in the literature previously (Sohn et al., 2009; Sato et al., 2010; Urs et al., 2015; Harada et al., 2017;). Harada et al. (Harada et al., 2017) reported a case of aspergilloma associated with the migrated dental implant. In another case aspergilloma associated with dental material was reported by Giardino et al. (Giardino et al., 2006). In our case, we think that Aspergillus inoculate to the sinus as a result of the perforation of the sinus membrane by tooth extraction. Also, the root canal filling material which is pushed into the sinus during extraction has provided available conditions to Aspergillus spores can be pathogenic.

Aspergillus, which is usually present in the sinus without symptoms, has been reported to cause chronic pain, swelling and nasal obstruction in some cases (Sohn et al., 2009). Urs et al. (Urs et al., 2015) reported swelling and pain in nasomaxillary area after endodontic treatment. In another case Martins

and Ribeiro Rosa (Martins and Ribeiro Rosa, 2004) reported recurrent swelling and purulent discharge after root canal treatment of right upper maxillary molar. In our case, chronic pain was present in the right facial region.

Plain radiographs are used in the diagnosis of fungal infection of the sinuses. A radiopaque appearance similar to that of metal in the maxillary sinus is diagnostic in panoramic radiography (Falworth and Herold, 1996). However, CBCT can also be used to assess the exact size of the fungus ball, bone involvement and erosion (Harada et al., 2017; Torul et al., 2018). In addition, magnetic resonance imaging can show the changes in soft tissues and help the differential diagnosis of aspergilloma (Falworth and Herold, 1996; Harada et al., 2017). In our case, in addition to panoramic radiography, CBCT examination was performed to determine the exact location of aspergilloma.

Caldwell-Luc procedure and endoscopic sinus surgery techniques are used in the treatment of aspergilloma. The removal of the foreign body from the area and re-orientation of natural sinus drainage is sufficient in the treatment of aspergilloma (Khongkhunthian and Reichart, 2001; Burnham and Bridle, 2009). After successful surgery, anti-fungal therapy is usually not necessary. If the opacities in the maxillary sinus persist or the patient is symptomatic for a long time after surgical treatment, an adjuvant antimycotic drug seems to be required (Sohn et al., 2009; Sato et al., 2010; Harada et al., 2017). In this case, the Caldwell-Luc procedure was preferred to remove aspergilloma. CGF was applied to the sinus to support and accelerate postoperative recovery. An uneventful period was observed after the operation.

Conclusion

Maxillary sinus aspergilloma is usually asymptomatic and can be overlooked. Also, in symptomatic cases, the symptoms may be confused with other infectious conditions affecting the maxillary sinus and unnecessary treatments may be performed as a result of underestimation of the fungal etiology. Therefore, clinicians should follow up patients after dental procedures affecting the maxillary sinus to prevent such conditions; and should be considered the fungal etiology in the case of a maxillary sinus infection.

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