

Case Report

Management of idiopathic alveolar bone necrosis associated with oroantral fistula after upper left first molar extraction

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ABSTRACT

Background: Complications such as alveolar osteonecrosis and oroantral fistula can occur in maxillary molar extraction. The management of such complication is done by treating to treat any persisting maxillary sinusitis if present, prevent further antral contamination, wound bed preparation, and oroantral fistula closure with appropriate method. **Purpose:** This case report presents a treatment stage of an idiopathic upper alveolar bone necrosis and oroantral fistula that occurred 4 months after left upper first molar extraction. **Case:** A case of an idiopathic upper alveolar bone necrosis associated with oroantral fistula that occurred 4 months after left upper first molar extraction is presented. Patient suffered from pain and swelling at left upper jaw since 2 month before admission. There was a history of complicated tooth extraction 4 months earlier. Patient also complained pus and blood discharge from post extraction socket. Patient occasionally choked when drinking and fluids escaped through the nostril. There was a diffuse swelling in the left maxillary region; there was no hyperemia, with soft consistency and no pain on palpation. In the 26, 27 region there was a defect in the post extraction area, fragile bone exposed, granulation tissue, there was pain and pus occasionally escaped on palpation. Patient had already taken antibiotics. **Case management:** The treatment performed was treatment of persisting maxillary sinusitis with saline irrigation through fistula, surgical acrylic splint to reduce further contamination to the wound bed and antral cavity, and also inflammation reduction. Necrotomy on the necrotic bone and residual tooth roots extraction were done to prepare the wound bed. After there was no sign of infection in the wound bed, two stages of surgical closure were performed. Closure with buccal fat pad flap and buccal advancement flap was done after there was small wound dehiscence. **Conclusion:** Management of bone necrosis and oroantral fistula is to treat persisting maxillary sinusitis, preparation of wound bed using, necrotomy, infection source removal, and closure of the fistula with appropriate method. The best and the easiest way to manage such complication is to prevent it from happening through a thorough pre operative assessment.

Key words: Alveolar bone necrosis, oroantral fistula, oroantral fistula closure

ABSTRAK

Latar belakang: Beberapa komplikasi seperti osteonekrosis alveolar dan oroantral fistula dapat timbul pada ekstraksi gigi molar atas. Penatalaksanaan komplikasi tersebut adalah merawat sinusitis maksilaris bila ada, mencegah kontaminasi pada antrum, mempersiapkan bed luka, dan penutupan fistula oronatal dengan metode yang tepat. **Tujuan:** Untuk melaporkan tahapan perawatan pada kasus nekrosis tulang alveolar rahang atas idiopatik yang menyebabkan fistula oroantral yang terjadi 4 bulan setelah ekstraksi gigi molar pertama rahang atas kiri. **Kasus:** Nekrosis tulang alveolar rahang atas yang menyebabkan fistula oroantral, yang timbul 4 bulan setelah ekstraksi gigi molar rahang atas kiri. Pasien mengeluh nyeri dan bengkak pada rahang atas kiri sejak 2 bulan sebelum datang ke klinik Bedah Mulut dan Maksilofasial Fakultas Kedokteran Gigi Universitas Airlangga. Didapatkan riwayat pencabutan gigi atas kiri yang sulit dan lama. Pasien juga mengeluh keluarnya nanah dan darah dari bekas ekstraksi gigi, pasien kadang-kadang merasa tersedak dan cairan keluar melalui lubang hidung pasien bila minum. Terdapat pembengkakan dengan batas difus pada regio maksila kiri, tidak terdapat hiperemia, pada palpasi didapatkan konsistensi lunak. Pada regio 26, 27 terdapat defek post ekstraksi gigi, tulang yang terekspos dan rapuh, terdapat jaringan granulasi, pada palpasi didapatkan rasa nyeri dan pus. Pasien sudah minum antibiotika yang diresepkan dari klinik sebelumnya. **Tatalaksana kasus:** Penatalaksanaan pada kasus ini terdiri dari perawatan sinusitis maksilaris yang terjadi dengan irigasi dengan larutan salin melalui fistula, splint akrilik untuk mencegah kontaminasi kembali

pada bed luka dan rongga sinus, sehingga menurunkan inflamasi. Nekrotomi tulang nekrotik dan ekstraksi sisa-sisa akar dilakukan untuk mempersiapkan bed luka. Setelah bed luka tidak lagi menunjukkan tanda-tanda infeksi, dilakukan 2 tahap penutupan dengan pembedahan, yaitu penutupan dengan buccal fat pad flap dan buccal advancement flap yang dilakukan setelah didapatkan wound dehiscence kecil. **Kesimpulan:** Penatalaksanaan osteonekrosis dan fistula oroantral adalah perawatan pada sinusitis maksilaris yang ada, mempersiapkan bed luka, nekrotomi, dan menghilangkan sumber infeksi, serta nekrotomi pada tulang nekrotik dan menghilangkan sumber infeksi seperti sisa akar yang lain, serta penutupan fistula dengan metode yang sesuai. Cara terbaik dan termudah untuk mengatasi komplikasi seperti ini adalah dengan pencegahan agar tidak terjadi melalui pemeriksaan preoperatif yang menyeluruh.

Kata kunci: Nekrosis tulang alveol, fistula oroantral, penutupan fistula oroantral

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INTRODUCTION

Necrosis of the jaw bones or osteonecrosis of the jaw refers to exposure of dead bone, regardless of the cause. The necrosis may result from ischemia, regardless of its cause that can be divided into. The use of systemic medications, radiation, infection, direct chemical toxicity, trauma, idiopathy, and other etiologies.¹ Clinically; it appear as an exposed yellow-white, hard bone in mandible or maxilla. The patient may or may not be symptomatic.²

Oroantral fistula can be defined as a fistular canal covered with epithelia which may or may not be filled with granulation tissue or polyposis of the signal mucous membrane that communicate maxillary sinus and oral cavity.^{3,4} Frequently occur because of iatrogenic oroantral communication after tooth extraction, infection, inflammation, cyst, neoplasma, and trauma.⁴⁻⁶ The most common cause of oroantral fistula is tooth extraction, mostly from extraction of upper lateral teeth or teeth posterior to the maxillary canines.^{3,7} Oroantral fistula formed from communication between oral cavity and maxillary sinus, which do not healed by means of blood clot, and there is granulation tissue formation and migration

of gingival epithelial cells that partially grow into the canal. During expiration there is air current passes the alveoli into the oral cavity facilitating a fistular canal formation. The presence of a fistula makes the sinus permanently open, which enable micro flora passage from oral cavity into the maxillary sinus causing sinusitis. Symptoms of oroantral fistula are similar to the symptoms of oroantral communication. When drinking, patient feels a part of liquid entering the nose and runs into the nostril on the same side and when the patient is asked to blow through the nose while the nostrils are closed with fingers, air hisses from the fistula into the mouth.³

The study conducted by Güven from 1983 to 1997 demonstrated that oroantral fistula usually occurs after third decade of life, the frequency of oroantral fistula was nearly the same in both sexes.⁶ The incidence of oro-maxillary perforation after maxillary tooth extraction was 3.8%.⁸

The purpose of this case report is to present a case and proper treatment stages of alveolar bone necrosis and oroantral fistula, and also closure of the oroantral fistula. Thus general practioner can perform management before refering the patient to oral and maxillofacial surgeon.



Figure 1. Clinical appearance, a) diffuse swelling on the left maxilla; b) post extraction defect and oroantral fistula.

CASE

Sixty five years old woman was referred to Oral and Maxillofacial Surgery Clinic Faculty of Dentistry Airlangga University with a diagnosis of a sinus perforation after tooth extraction, complaining of pain and swelling at left upper jaw since 2 months before admission. There was a history of complicated tooth extraction 4 months earlier. Patient still suffer from pain after tooth extraction, followed by pus and blood discharge from post extraction socket, patient occasionally choked when drinking and fluids escaped through the nostril. Patient had already taken antibiotics (oral clindamycin 3×300 mg) prescribed from the previous clinic. Patient had no history of underlying systemic disease.

Patient presented with a good general condition and normal vital signs. Extraorally there was a diffuse swelling with no hyperemia on the left maxillary region (Figure

1-a), which was soft and nontender on palpation. From intra oral examination in the left molar region there was a post extraction defect, measuring 1.5 cm with a yellowish exposed bone covered with debris (Figure 1b) and there was a mass measuring 1 cm which was soft and pain on palpation and hyperemia surrounding the exposed bone. There was no pus discharged on palpation. From clinical examination, the patient was diagnosed with alveolar bone necrosis and oroantral fistula after left upper first molar extraction.

Panoramic radiograph showed alveolar defect at upper left first molar region with radiopaque margin, there appeared retained roots appearance in mesial and distal side of the defect (Figure 2-a). Water's view showed radiopaque thickening on basal area of the left antrum (Figure 2-b).

Management performed in this patient was the treatment of persisting left maxillary sinusitis with saline irrigation through the fistula until clear fluid were obtained along



Figure 2. a) Panoramic view showing alveolar defect; b) water's view showing radioopaque mass on basal area of the left antrum.



Figure 3. Obturator placement.

with oral antibiotic administration (oral clindamycin 3×300 mg), acrylic surgical splint that entirely covered edentulous area and the fistula were worn by the patient to eliminate further contamination to the wound bed and antral cavity and to reduce inflammation (Figure 3). Necrotomy and residual tooth roots extraction were performed to prepare the wound bed, after the obturator was continuously worn

by the patient. Two weeks after necrotomy, wound bed was good and there was no sign of infection. Then two stages of surgical closure were performed. Closure with buccal fat pad flap was performed first (Figure 4a), nine days after closure patient complaining of fluid escape from nostril when dinking and there was a small wound dehiscence on the flap 2 months later, second closure with buccal



Figure 4. Clinical examination (a) day 1 post necrotomy; (b) tooth roots remnants showing anomaly; (c) resolution of swelling in the left maxillary region 2 weeks after; (d) intraoral view showing a good wound bed without signs of infection.



Figure 5. First oroantral fistula closure with buccal fat pad flap. a) immediate view post closure; b) wound dehiscence 9 days post closure; c) wound dehiscence 2 months post closure.



Figure 6. Intra oral view showing healing after second oroantral fistula closure with buccal advancement flap.

advancement flap were performed. After second closure patient did not complain of escaped fluid from nostril when drinking and healing occurred.

DISCUSSION

Osteonecrosis of the jaw can be caused by various etiologies such as use of systemic medications primarily bisphosphonate, systemic steroids, antiangiogenic agents; radiation; infections like noma, necrotizing ulcerative periodontitis, herpes zoster, deep fungal infection; direct chemical toxicity; trauma such as tooth extraction, direct chemical toxicity from agents used in dental treatment that was a caustic chemicals such as arsenic paste and formocresol that are still in use as root canals obturator in some developing countries; idiopathic benign sequestration of the lingual plate of the mandible consists of spontaneous sequestration on the lingual mandibular bone usually in the mylohyoid ridge in patients with no significant underlying systemic condition. Other etiologies such as avascular necrosis which includes aseptic necrosis, ischemic necrosis, osteochondritis dissecans which maybe caused by compromise of the blood supply leading to ischemia and necrosis; osteomyelitis associated with sclerotic disease and malignancies, and also other trauma such as difficult intubation causing exposure of the mylohyoid ridge, orthognathic surgery, temporomandibular joint puncture. Non-traumatic causes such as hemoglobinopathies, fat embolism, alcoholism, and systemic lupus erythematosus.¹ Alveolar bone necrosis in this patient may be caused by buccal plate fracture occurred after complicated left first molar extraction that can be observed from intra oral loss of buccal plate (Figure 1-b, c). From the extracted retained root remnant we can see that there was dilacerated root (Figure 4-b), this correlate with literature review that odontogenic anomalies can make oral surgery complicated, such as maxillary sinus exposures, tuberosity fractures, and buccal plate fractures.⁹ Dilacerated root also may be easily fractured during tooth extraction.^{10,11} Clinically the

lesion appear as exposed bone which is painful in 60 to 69 percent of cases.¹ This patient complained of swelling and pain at post extraction site for 2 months before escaping fluid when drinking, showing that oroantral fistula develop after the presence of osteonecrosis. The maxillary sinus reaches its greatest dimension during third decade of life, so the incidence of oroantral communications should be higher after that age,^{4,12} Study conducted by Hernando et al¹² showed that the average age incidence of oroantral communications is 47.5. Oroantral communication commonly caused by: close anatomic relationship between root apices of the premolar and molar tooth and maxillary sinus base (80%), maxillary cyst (10–15%), benign or malignant tumor (5–10%), trauma (2–5%), and other causes.^{4,6,12} If the oroantral communication is maintained open to the oral cavity for more than 48 hours or if there is infection, chronic inflammation of the sinus membrane and permanent epithelization of the fistula will increase the risk of sinusitis.⁵

Management of oroantral fistula closure consists of non-surgical and surgical management. If fistulas are small (less than 5 mm) and sinusitis is absent or eliminated, spontaneous healing may occur. It is also important to remove epithelial lining of the fistula in order to facilitate healing. Acrylic surgical splint were used to cover the entire edentulous area to prevent further contamination to the antrum. Patient must wear the acrylic splint continuously, removing it only when cleaning after meal. Patient also instructed to avoid or minimize any activity increasing intraoral or intranasal pressure, such as smoking, drinking through straws and blowing nose. Various surgical techniques for oroantral fistula closure have been reported, including local flaps (palatal rotation advancement flaps, buccal advancement flaps, buccal fat pad flaps), distant flaps (tongue flaps), and grafts (bone, fascia lata, dura, hydroxiapatite blocks).^{2,4,7}

It is important to establish whether or not infection of sinus had occurred during the existence of the fistula, duration and width of the fistular canal lumen contributes to the sinus infection.² This patient presented with signs of sinus infection, and was treated with acrylic surgical splint and maxillary sinus irrigation with saline until clear fluid were obtained combined with oral clyndamycin administration 3×300 mg to treat maxillary sinus pathology. This was coherent with literature review which stated that the correction of maxillary sinus pathology is essential to get a successful therapy with drainage, adequate aeration and antibiotic administration.^{4,7} Two weeks after, clear fluid were obtained, then necrotomy and retained tooth root extraction were done. Acrylic surgical splint was maintained for 2 weeks until good wound bed were obtained. First closure with buccal fat pad flap 9 days after closure, patient complained about escaped fluid through nostril when drinking, second closure with buccal advancement flap. There is no superior method for oroantral fistula closure. When choosing surgical method for oroantral closure, location, size, height of the alveolar ridge, its relation to neighbouring teeth, existence and

duration of sinus inflammation, and patient's general health should be taken into consideration.² Alveolar bone necrosis in this case caused alveolar vertical height reducing, wider buccal-palatal dimension, and loss of buccal plate of the alveolar bone that complicate surgical closure, causing wound dehiscence after closure with buccal fat pad flap and there was still an oroantral fistula. The patient need a longer treatment time because she need second closure of the oroantral fistula that was done with buccal advancement flap. Dehiscence after closure with buccal fat pad flap occurred also maybe because of a large and deep defect, a little fat pedicle obtained during closure, and the patient was a 65 years old woman. Healing after second closure with buccal advancement flap occurred with shallowing of the buccal vestibulum which was a disadvantage of this method.²

It is concluded that oroantral fistula most commonly caused by communication after tooth extraction on maxillary posterior teeth. In this case maybe caused by alveolar necrosis after complicated extraction of first molar with a dilacerated root. Alveolar necrosis caused loss of alveolar vertical height, wider buccal-palatal dimension, and loss of buccal plate of the alveolar bone that caused difficulty in oroantral fistula closure. Management of oroantral fistula consist of non-surgical and surgical management.

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