

A Minimally Invasive Approach for the Management of Multiple Chronic Oro-Antral communications after multiple failed sinus lifts attempts: A case report

Mohamed Hamdy Mahmoud Ismail ^{1,*}, Ahmed Mohamed Hussien Farahat ²

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Abstract

The aim of this study was to provide a successful minimally invasive approach for the management of multiple large chronic oro-antral fistulas (OAFs). A 43 years old Egyptian male was complaining of two large OAFs at the maxillary right posterior region after multiple failed sinus lifting procedure. The OAFs were at the edentulous ridge of first and second molars and above the second premolar and were approximately 2*2cm and 0.9*1.5cm respectively. The OAFs were previously closed four times but failed after 1 week or less after each attempt. After consultation with the Otorhinolaryngology department, the patient was admitted for the operation room to correct a severely deviated nasal septum and to widen the sinus ostium. The oro-antral communications (OACs) were closed by two collagen membranes fixed with tissue tags and sling sutures over titanium screws. The OACs were successfully closed, tissues showed full maturation with six months follow up and the patient restored his normal life activities. This minimally invasive approach has proven to be successful for the management of two large chronic OACs.

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* Corresponding author.

E-mail address: dr.hamdy88@gmail.com

¹ Lecturer, Department of Oral Surgery & Anesthesia, MSA University, 6 October City, Giza, Egypt

² Associate professor. Department of Otorhinolaryngology, Kasr Alainy, Faculty of Medicine, Cairo University, Egypt

1 Introduction

Maxillary sinus membrane lifting is an important surgical technique done for the rehabilitation of posterior maxilla before or during implant placement.

Oroantral communication (OAC) is a pathological communication between the oral cavity and the maxillary sinus. It is considered one of the most common complications facing oral and maxillofacial surgeons. OAC occur most frequently after extraction of maxillary posterior teeth due to their close proximity to the maxillary sinus. Other common causes include fractured tuberosity after maxillary wisdom tooth extractions, dislodgement of posterior implant, dehiscence after posterior implant failure, pathologic lesions within the maxillary antrum, maxillary tumor or cyst removal, and a Caldwell-Luc procedure complication ¹.

The recent literature reported frequent occurrence of OAC in male than in female populations likely due to a higher frequency of traumatic extraction in men ².

Diagnosis of OAC is usually based on both clinical signs and symptoms. Patients with an OAC or oroantral fistula (OAF) could be asymptomatic, but most commonly complain of altered nasal resonance, nasal regurgitation of liquids, foul

intraoral odor, and symptoms associated with sinusitis. A fistula at posterior maxilla can easily be visualized by clinical diagnosis³.

Treatment plan on how to treat an OAF/OAC is based on many variables as defect size, time of diagnosis, the presence of sinusitis, amount and condition of soft tissue available for repair, and the future restorative treatment plan at the defect site⁴.

According to the literature, OACs are best closed within 24 hours, as the longer the communication persists, the more complications are likely to occur². Before OAC repair, any underlying medical condition, and any nasal problems must be managed to provide successful outcomes⁵.

Most OACs could close spontaneously if their diameter is less than 2 mm in medically free patients with healthy maxillary sinuses. When the diameter of the defect is between 2 and 5 mm, other techniques could be used as gel foam which could be placed and secured with figure-of-8 sutures over the defect⁶.

Regular follow-ups are very important to ensure that the communications did not persist. Surgical repair of OACs/OAFs are indicated when the diameter of OAC is more than 5 mm, as a defect of this size will not close spontaneously. Multiple closure techniques have been described throughout the literature⁷.

According to the classification of Visscher and colleagues, treatment modalities of OAF/OAC have been categorized into autogenous soft tissue grafts, autogenous bone grafts, allogeneic materials, xenografts, synthetic closure, and other techniques⁸. Aim of the study to provide a successful minimally invasive approach for the management of multiple large chronic oro-antral fistulas (OAFs).

2 Case presentation

This case report has been described according to the 2013 CARE checklist for case report writing and publishing guidelines⁹. This study was approved by the research ethical committee of faculty of Dentistry, October University for Modern Sciences and Arts with record number REC_D 385_3.

2.1 Patient information:

A 43 years old Egyptian medically free male was admitted to the outpatient clinic of oral and maxillofacial surgery at MSA University, Egypt. The patient reported that he went to a dentist for a sinus lift operation before implant placement at the site of maxillary right first and second molars.

The dentist attempted to lift the sinus membrane through crestal approach at the site of

first and second molars but the membrane got perforated then he/she made a second attempt by lateral approach above the upper second premolar yet the membrane perforated again.

The dentist did not pay attention for the formed OAC and dismissed the patient. After few days the patient came back to the dentist with signs and symptoms of OAF, the dentist made three consecutive attempts to close the OAFs by buccal advancement flap and each one failed in seven days or less.

The patient was referred to oral and maxillofacial surgeon who made a fourth attempt to close the OAFs by Buccal advancement flap with a Buccal pad of fat pedicle flap but also failed within ten days.

The patient reported significant affection of normal daily activities and quality of life, he also reported at the seventh day after each previous surgical procedure there was a large edematous mass bulging from the edentulous area then ruptures with subsequent pus discharge.

2.2 Clinical findings:

After clinical examination, there was marked scar tissue at the site of the previous four operations with marked OAF at the edentulous ridge of maxillary right first and second molars. **Figure 1**



Figure 1. pre-operative intra-oral image

There was marked offensive odor with significant discharge orally and nasally. After detailed history, the patient reported having previous problems in nasal breathing. The patient was referred to the Otorhinolaryngology department for consultation.

2.3 Radiographic findings:

After nasal examination by cone beam computed tomography CBCT (Newtom Giono Imola, Italy), there was marked deviation of the nasal septum and affection of normal maxillary sinus drainage. **Figure 2**

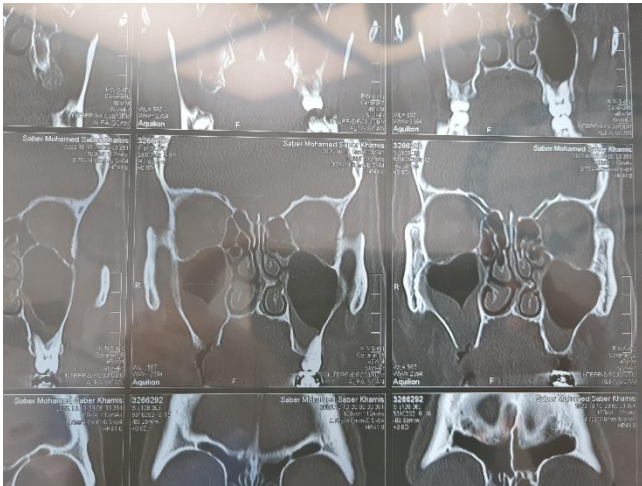


Figure 2. pre-operative radiographic image of the deviated nasal septum

There were two OACs at the edentulous ridge of maxillary right first & second molars measuring 2*1.8cm in width, and above the second premolar measuring 1.5*0.9cm. **Figure 3**



Figure 3. Pre-operative radiographic image showing defect size

2.4 Therapeutic intervention:

The treatment plan was aimed to correct the deviated nasal septum, widen the sinus ostium, removal of all the infected granulation tissues, and to provide sufficient soft tissue support to allow healing and re-epithelialization. After explaining the treatment plan to the patient, the consent was signed. Antibiotics (Dalacin C 150 mg Capsules Pfizer Limited Pharmaceuticals Co., USA) were prescribed 5 days before surgery to manage the standing infection.

Nasal septum correction and ostium widening were done first through nasal endoscopy. **Figure 4**

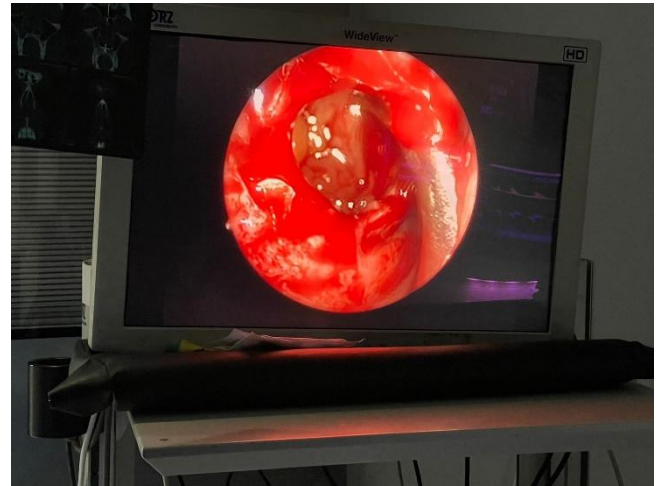


Figure 4. Endoscopic image during osteium widening

A wide three incision line pyramidal flap was made away from the existing scars to expose the two OAFs. After successful debridement, the buccal mucoperiosteum was lacking its normal flexibility and mobility due to the previous surgeries. Two collagen membranes (Botiss Biomaterials, Germany) were placed over the OACs and fixed by multiple tissue tags. **Figure 5**



Figure 5. Intra-oral image showing membranes fixation

Two micro titanium screws were placed buccally at the zygomatic buttress, and sling sutures were made to provide extra support to the collagen membrane. **Figure 6**

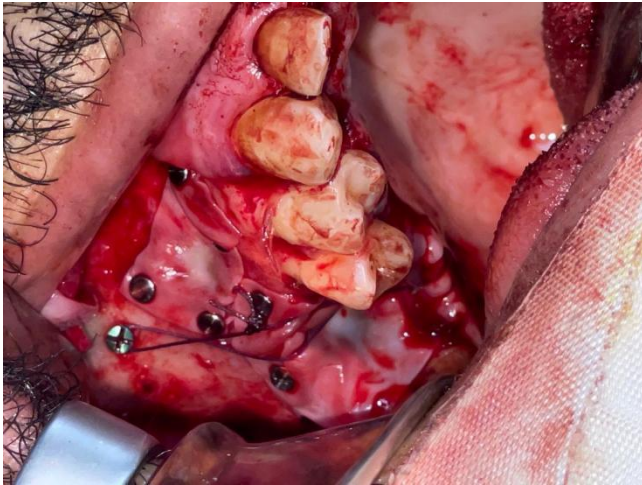


Figure 6. Intra-oral image after sling sutures



Figure 8. Post-operative radiographic image

Tension free closure was achieved by resorbable sutures (Ethicon, coated vicryl (polyglactin 910), Johnson & Johnson, USA), after periosteal scoring and decreasing the height of the palatal alveolar bone.

2.5 Follow up:

- Systemic antibiotics (Augmentin 1gm. tablets, Smithkline Beecham Pharmaceuticals Co., Brentford, England) were prescribed for 10 days
- Systemic analgesics (Cataflam 50mg. tablets, Novartis Pharma AG, Basle, Switzerland) were prescribed for 4 days
- Nasal decongestant was prescribed for 3 days (Afrin nasal drop: Oxymetazoline HCl. Novarts, Egypt)
- Nasal irrigation (Physiomer®) was prescribed for 10 days.

2.6 Outcomes:

- Successful closure of the two OACs was achieved.
- The signs and symptoms improved significantly within one week.
- Six months post-operative there was evidence of new bone formation and full maturation of soft tissue was achieved. **Figure 7, 8, and 9**

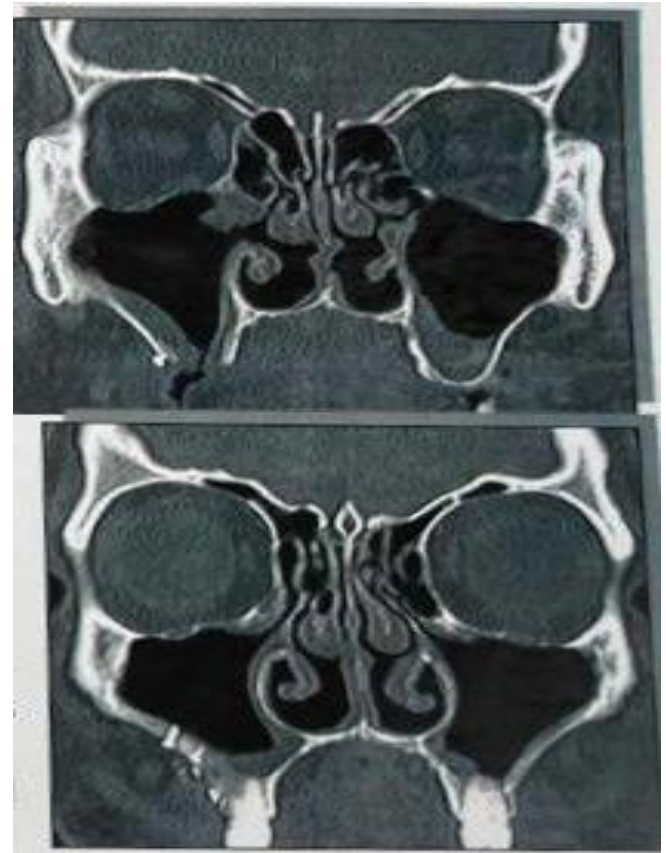


Figure 9. Post-operative CT image



Figure 7. Post-operative clinical image showing full soft tissue maturation

3 Discussion

Dental implants are now considered one of the most reliable techniques for the rehabilitation of missing teeth. Lifting of the maxillary sinus floor is a treatment modality for the management of deficient height in posterior maxilla. Despite being relatively simple surgical procedure, yet it has some serious complications that could occur intra-operative and post-operative¹⁰.

For successful sinus lift, a patent drainage of the maxillary sinus is one of the most critical pre-requisites for successful outcomes among others as avoiding perforation of the sinus floor during the lifting

procedure. Pre-operative assessment of the maxillary sinus, ostium drainage, and nasal septum is very important¹⁰.

Pre-operative radiographic assessment before sinus lifting is crucial. Panoramic x-rays doesn't provide sufficient information. Cone beam computed tomography or a multislice computed tomography are very important and provide reliable data before the surgical procedure¹¹.

Oro-antral communication is one of the complications that could occur during implant related sinus lifting. In most cases it is simple complication that is managed directly. However, failure to do so, may affect the quality of life of the individual significantly¹¹.

Collagen membrane is a simple non-invasive treatment modality for the management of OAC. It provides a sufficient time for clot stabilization, re-epithelialization, and new bone formation. Despite it is used for small to moderate OAC, yet in this case it was a perfect choice for the management of large OAC which was supported by the results of Markovic et al. (2009)¹².

Cameron Y. S. Lee (2016) similarly used non-resorbable high-density polytetrafluoroethylene membrane successfully for the closure of OAC after tooth extraction which showed improved healing after two weeks¹³.

Otolaryngeal consultation is crucial for the management of chronic OAC. Endoscopic sinus surgery is very important for accurate visualization and debridement of the antrum before surgical closure of the OAC¹⁴.

Posteriorly based tongue flap is well known for its high vascularity, it is used for the management of large (>15mm) OAC. Despite its high prognosis, yet it has some major disadvantages as the need for temporary inter-maxillary fixation which proves that our approach is effective¹⁵.

Markovic et al. (2009) and Ogunsalu (2005) have reported the successful use of resorbable membrane for the closure of moderately large OAC where the membrane showed after 24 weeks evidence of new bone formation and complete soft tissue maturation^{16, 17}.

4 Conclusion

Pre-operative assessment before maxillary sinus lifting is very crucial. Doctors must deal strictly with every OAC. Our technique is proved to be minimally invasive reliable method for the management of large OAC with predictable outcomes.

Patient Perspective

The patient was very satisfied from the final result. He has become more confident during his daily activities and improved his quality of life.

Authors' Contributions

Dr. Mohamed Hamdy, manuscript writing, design, concept and investigation.

Assoc. Prof. Ahmed Farahat, manuscript design and concepts

All authors have read and approved the manuscript.

Informed consent

The patient accepted and signed an informed consent for the proposed treatment plan.

Conflict of interest

The authors declare no conflicts of interest.

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