Maxillary sinus perforation with presence of an antral pseudocyst, repaired with platelet rich fibrin

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ABSTRACT

The maxillary sinus lifting procedure is an important preprosthetic surgical procedure for the creation of adequate bone volume in the edentulous posterior maxilla for the placement of dental implants. The presence of a maxillary sinus cyst has been considered a contraindication for this operation. Perforation of the membrane and hence the elongation of the healing time for implant placement is the most common complication in this type of procedure. The purpose of the case is to show the safely repair of the large sinus perforation during the sinus lifting with presence of the antral pseudocyst. In this case, we present a patient who had a maxillary sinus lifting procedure in the presence of antral pseudocysts. No complications were seen during follow-up periods and all implants are functioning successfully. Platelet-rich fibrin may be used safely when large perforation occurs during the sinus lifting with the presence of an antral pseudocyst.

Keywords: Antral cyst, platelet rich fibrin, sinus lifting

INTRODUCTION

An antral pseudocyst is seen as a dome-shaped, faintly radiopaque lesion arising from the floor of the maxillary sinus on a panoramic radiograph. Presence of such cystic lesions or an antral septum in the maxillary sinus, the thickness of the maxillary lateral wall and previous allergy involving the maxillary sinus have been reported as factors increasing the risk for perforation during the sinus lifting operations. Sinus lifting is a procedure that is commonly performed in maxillary posterior areas with insufficient bone volume, and it shows good clinical outcomes. The incidence of perforation of the maxillary sinus membrane has been reported with various rates ranging from 14% to 56%. The indications for sinus augmentation in patients with sinus cysts are not clearly defined in the literature. Some authors suggested that the sinus augmentation should be done without aspirating or removing the sinus pseudocyst. On the other hand, the others concluded that presence of maxillary (antral) cysts is an absolute contraindication for sinus grafting, and they suggested that sinus lifting could be made at least 6 months later after removing the cyst. In this case report, we presented a large maxillary sinus membrane perforation, which occurred during the maxillary sinus membrane elevation with the presence of an antral pseudocysts and we enucleated the cyst, also repaired the perforation with platelet-rich fibrin (PRF) at the same time before the sinus grafting for reducing the healing time for inserting the dental implants.

CASE REPORT

A 38-year-old, male was referred to the Oral and Maxillofacial Surgery Department at the Faculty of Dentistry, University of Süleyman Demirel, for placement of dental implants in the edentulous area of the maxillary left molar area. Present and past medical histories were unremarkable, and specifically, the patient did not report any sinus pathologies. The clinical evaluation revealed an edentulous area with adequate buccopalatal dimension to allow the placement of a dental implant. The panoramic radiography revealed insufficient alveolar bone height for the placement of dental implants with adequate length on the posterior maxilla, and a dome-shaped, radiopaque lesion, compatible with an antral pseudocyst [Figure 1]. Sinus lifting operation without aspirating or enucleated the pseudocyst was
planned. The surgery was performed under local anaesthesia, and a lateral maxillary sinus approach was used. After the lateral maxillary wall had been exposed, a round bur was used with saline irrigation to create a hole in the lateral wall of the left maxillary sinus. After removing the oval-shaped bone from the lateral wall of the maxillary sinus, a sinus membrane was started to elevate. We decided to perform a maxillary sinus augmentation without enucleating the pseudocyst. As the sinus membrane was elevated, a large perforation occurred. We decided to repair the membrane with platelet-rich fibrin because of its advantages such as easy application, manipulation, economical and good biological properties. The patient’s venous blood sample was taken for preparing PRF. The blood is placed in a 10 ml glass test tubes, without anticoagulant, and immediately centrifuged at 2700 rpm for 12 min. At the end of this stage, PRF membranes were placed to the large perforated area and then the Valsalva maneuver was used to test for any perforations of the sinus membrane. After particulate bone graft (Geistlich Bio-Oss®, 0.5 g small granules) was inserted into the sinus, the bone window was closed by PRF membranes, the flap was replaced and then the mucosal areas were sutured through a non-resorbable material (silk suture). After 6 months later from the sinus lifting operation, ideal bone volume was achieved, and dental implants were inserted with no complication. Final prosthetic restorations were reconstructed at least 3 months after the surgery. There were no problems with the implants nor the superstructures. The patient did not have any other symptoms and was satisfied with the implant restorations.

**DISCUSSION**

Several treatment options were discussed with the patient for the treatment of the edentulous area, a partial fixed dental prosthesis, orthodontic treatment, maxillary sinus augmentation with delayed implant placement, and maxillary sinus augmentation with concomitant implant placement. Grafting of the maxillary sinus is a method for reaching sufficient bone height for posterior maxillary implant placement and has proven to be a highly successful method and to give predictable results. The most commonly reported intraoperative complication of sinus augmentation is membrane perforation. On the other hand, some risks such as antral cyst, may increase the complication rate. The presence of a maxillary sinus cyst has been considered a contraindication for this operation. The indications for sinus augmentation in patients with sinus cysts are not clearly defined in the literature. Some authors speculated that, pseudocyst of the maxillary sinus is a relative contraindication for sinus augmentation. They suggest that the cyst should be removed or aspirated prior to sinus augmentation and the presence of maxillary sinus cysts is an absolute contraindication for sinus grafting. And, at least 6 months later after removed the cyst, sinus lifting could be done. But this approach increases the healing time for inserted the dental implants in edentulous areas and this reduces the patient comfort. Concurrently, some authors suggested that sinus lifting operation with the presence of a pseudocyst, could be done without aspirating or removing the maxillary sinus pseudocysts for shortening the healing
time.\textsuperscript{8,9} The authors suggested that it may not be necessary to remove a sinus cyst before sinus augmentation or during the sinus augmentation operation if the patient does not have any evidence of a maxillary sinus pathology.\textsuperscript{10} However, in one study, Wang et al. reported that 29.4\% of the maxillary sinus cysts were found to increase in size after follow-up with Waters view films for 38-102 months, indicating increasing obstruction of the ostium and thus possibly an increased risk of bone graft and implant failure in the future.\textsuperscript{11} This increases potential risks because other sinus pathologies may have a similar appearance to a pseudocyst, including benign and malignant neoplasms, which require a different treatment procedure. On the view of these signs and different from the literature, when we elevated the membrane with pseudocyst, a large perforation was occurred accidentally and perforated sinus membrane was repaired with PRF safely at the same time for reducing the time for healing of the sinus membrane.

Platelet-rich fibrin has advantages for oral surgery operations, such as no chemical additives, reduced production time, easy application procedure and also good adaptation to the operation areas. Choukroun PRF has been used clinically for soft tissue augmentation and for a membrane after sinus augmentation. Due to these advantages, we used PRF membrane for closing the large sinus membrane perforation and sinus grafting.

**CONCLUSION**

Sinus lifting procedure may be performed in the presence of an antral pseudocyst. If large membrane perforation occurs while lifting the sinus membrane, it may be repaired with PRF after aspiration of the cyst and sinus lifting may be completed with simultaneous bone grafting procedure successfully as in the reported case.