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Case Report

Treatment of sinusitis associate with filling material of the maxillary sinus by endonasal endoscopic sinus surgery simultaneous sinus-lifting and dental implantation

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Abstract

Objectives: Optimization of the sinus-lifting in patients with filling material in maxillary sinus cavity by a one-stage endonasal endoscopic elimination of the sinus pathology and carrying out a sinus-lifting.

Materials and methods: A total of 14 patients (8 males and 6 females, the age was 31 to 64 years, from 2016 to 2020) with ridge defects in age group were selected for the study. All patients had a partially or totally edentulous atrophied posterior maxilla. All patients underwent a thorough clinical examination according to a generally accepted scheme.

For sinus surgery, used endoscope is 4.0 mm diameter rigid endoscope (Karl Storz). The fungal material, and hypertrophic mucosa within the maxillary sinus were removed and sent for pathological analysis.Sinus lifting procedures were performed using a lateral window approach.

A total of 23 sinus lifting procedures were performed, using a mixture of bovine bone, autogenous bone and PRP. According to our surgical procedure we performed in our patients 1 a 2 stage sinus lifting, 46 implants were inserted.Dental prosthetic rehabilitation was undertaken 5 months after implants insertion and submerged healing. Implant success was assessed clinically and radiographically. The height of the graft and bone density was measured 6th and 9th month after surgery using serial CT. The following parameters were assessed: failure of the augmentation procedure, implant failure, and vertical bone height.

Results: Any intraoperative and postoperative complications, such asbleeding, membrane perforation, swelling, ecchymosis, pain, nasal bleeding, and infection, were recorded clinically and radiographically. Of the 46 implants placed in these 12 patients, 2 failed to osseointegrate. The CT examination showed the presence of dense

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bone around and above the implants. The implants appeared to be well integrated with no peri-implant bone loss. At 5 years follow up, excellent integration of grafted tissue, steady levels of bone around the implants and healthy peri-implant tissues were reported. Implants placed in the reconstructed areas were demonstrated to integrate normally, postoperative occlusal function and esthetics have been favorable.

Conclusion: The method of simultaneous endonasal sanitation of the maxillary sinus, sinus-lifting, dental implantation, allows to reduce the probability of perforation of the membrane, significantly shortening the rehabilitation period of patients with insufficient bone tissue in the maxillary sinus. These methods led to simpler, more comfortable, lower risks of morbidity, more predictable compared to more invasive maxillary sinus augmentation.

Introduction

At present, dental implants are the best solution for the rehabilitation of patients with various forms of toothless [1]. However, atrophy of the edentulous ridges make difficult for implant placement difficult.

Numerous procedures and materials are used to repair bone defects. The bone graft procedures used in oral implantology include autograft reconstruction, GBR, maxillary sinus floor elevation, and alveolar distraction osteogenesis [2-8]. The decision to choose any option depends on clinical factors and ultimately on the skill of the clinician.

The sinus lift procedure is one of the primary surgical options allowing placement of dental implants in the posterior maxilla. The traditional technique consists in a modified Caldwell–Luc approach, where access to maxillary sinus is obtained by drilling abone window in lateral sinus wall; then, Schneiderian membrane is carefully detached and elevated from sinus floor in order to insert grafting materials, including autogenous bone, allografts, xenografts, or alloplasts. Implants can be inserted simultaneously, or in a second stage if residual bone is not sufficient to obtain an adequate primary stability [9-13].

If the residual bone is 6-7 mm, use the closed sinus lift method with access from the chewing surface of edentulous ridges using osteomas [14].

Sinus floor augmentation with autogenus bone grafts or with biomaterials has since long been the predominant, well-documented procedure in the literature [15,16]. However, the procedure may be complicated in patients with chronic maxillary sinusitis [17,18]. Sinus membrane pathology can potentially complicate the post procedural course of sinus lift. In clinical practice, chronic maxillary sinusitis is often observed due to the hit of filling material from the tooth canal into the sinus cavity [19]. To remove the filling material from the sinus cavity, the traditional Caldwell-Luc method was used. Modern tendencies of oral surgery are aimed at minimizing surgical trauma and reducing the time for rehabilitation of patients. In this connection, new technologies without perforation violating the vestibular sinus wall which allow to reduce the volume surgical intervention and shorten the time of treatment. Revision sinus surgery for inflammatory diseases of maxillary sinus has been revolutionized by endoscopic techniques used in maxillary sinus surgery [20,21].

Recent technological advances in the field of endoscopy have resulted in substantial improvements in endoscope-controlled surgery of paranasal sinuses. Endoscopically technique involves endonasal approach by endoscop and is a minimally invasive procedure[22-26].

The most important factor in sinus lift surgery is atraumatic detachment of the periosteum of the maxillary sinus membrane from the bony antrum-floor to the preparation of a mucoperiosteal flap to provide a reliable osseointegration of and bone regeneration around the grafting material, which can only take place with a fully intact periosteum

Treating maxillary sinus pathology by endoscopic approaches, prior to implant insertion and/or sinus augmentation, is crucial for a better outcome of the dental procedure. In patients with pathologies sinus due to hit of filling material from the tooth canal into the sinus cavity needing a sinus lift procedures, optimal solution using endoscopic technology [26,27].

Objectives

Optimization of the sinus-lifting in patients with filling material in maxillary sinus cavity by a one-stage endonasal endoscopic elimination of the sinus pathology and carrying out a sinus-lifting.

Materials and methods

A total of 14 patients (8 males and 6 females, the age was 31 to 64 years, from 2016 to 2020) with ridge defects in age group were selected for the study. All patients had a partially or totally edentulous atrophied posterior maxilla. All patients underwent a thorough clinical examination according to a generally accepted scheme.

Preoperative planning includes a careful history and physical exam, in addition to preoperative radiologic investigation, which include computed tomography scan to to determine the existing osseos structure and to evaluate any pathology of the sinuses (Figure 1). Treatment initiates with the administration of a single preoperative dose of systemic antibiotic (Amoxicillin, clindamycin or levaquin) and Chlorhexidine 0.12 percent rinse.

A total of 18 sinus lifting procedures were performed, using a mixture of bovine bone, autogenous bone and PRP.

Surgical technique

For sinus surgery, used endoscope is 4.0 mm diameter rigid endoscope (Karl Storz). It provides different angles of vision in maxillary sinus from 0/30/45/70/90/ 2.7-mm/4.0-mm endoscopes (Karl Storz, Tuttlingen, Germany) and a monitor were used for inspection and treatment of the and a monitor were used for inspection and treatment of the maxillary sinus.

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The first procedure was always the endoscopic endonasal sinus surgery. This was performed in all the patients through an enlarged natural sinus ostium in the middle nasal meatus. All operations were carried out under general anesthesia. The ostium was enlarged to a size that allowed access to the sinus with appropriate instruments. The fungal material, and hypertrophic mucosa within the maxillary sinus were removed and sent for pathological analysis. Sinus lifting procedures were performed using a lateral window approach. Osteotomy was performed on the lateral surface of the sinus wall using a round drill. After the elevation of the sinus membrane, the dental implant sites were prepared using low-speed calibrated burrs, specific to the implant system used. The cavity between the sinus membrane and the sinus floor was filled in with a mixture of particulate bovine bone graft (Bio-Osss, Geistlich Pharma, Wolhusen, Switzerland), autologous bone, and plateletrich plasma (PRP), and the dental implants were inserted with a good primary stability. According to our surgical procedure we performed in our patients 1 a 2 stage sinus lifting, 46 implants were inserted.

The delayed establishment of dental implants was carried out in 4 patients after 5 months after operation. Immediate implant placement (one-stage sinus lifting protocol) was performed when a mean bone height of at least 4 mm was present on CT examination. For the one-stage protocol the implant site was prepared and the implant inserted in the residual subantral bone. The osteotomy window was covered with the PRP membrane before flap closure. The muco-periostal flap was sutured using 3.0 silk suture. Hospitalization after surgery varied from 1 to 2 days. The sutures were removed 10e14 days postoperatively.

The height of the graft and bone density was measured 6th and 9th month after surgery using serial CT scan (Figure 2).

Dental prosthetic rehabilitation was undertaken 5 months after implants insertion and submerged healing. Implant success was assessed clinically and radiographically.

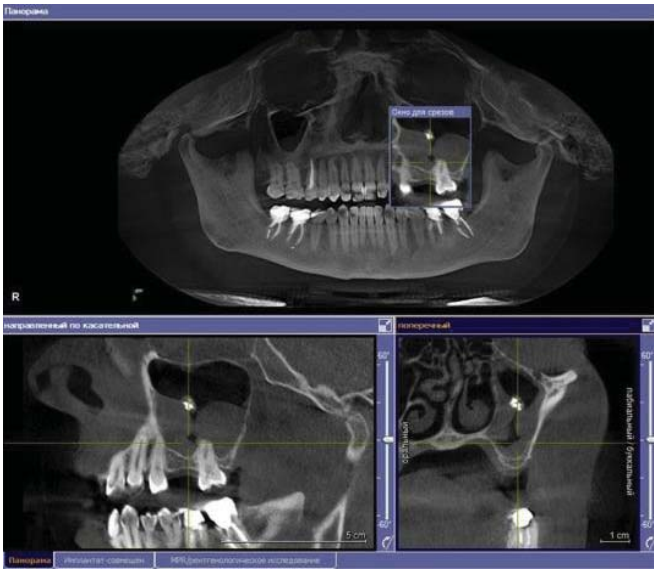

Figure 1: Preoperative CT scan of a patient with polyposive sinusitis, showing foreign bodies in the maxillary sinus (filling material).

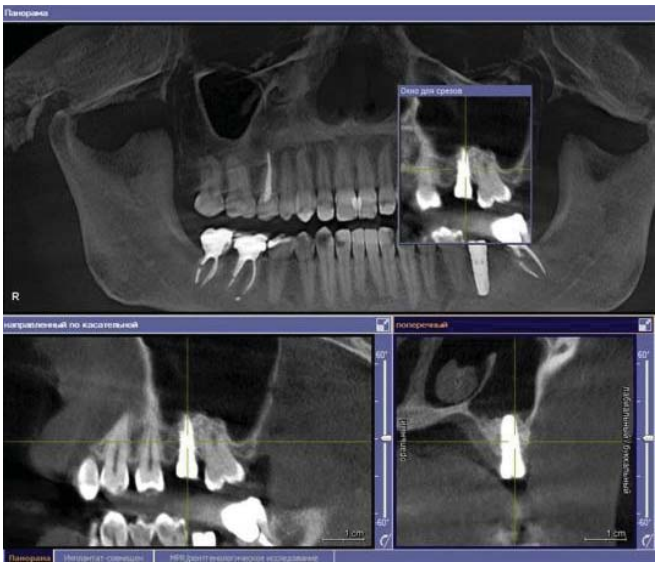

Figure 2: Postoperative CT scan of a patient with foreign body of the maxillary sinus (filling material) with polyposive sinusitis following simultaneous endonasal sanitation of the maxillary sinus, sinus-lifting, and dental implantation.

Results

Any intraoperative and postoperative complications, such asbleeding, membrane perforation, swelling, ecchymosis, pain, nasal bleeding, and infection, were recorded clinically and radiographically. The following parameters were assessed: failure of the augmentation procedure, implant failure, and vertical bone height.

Of the 46 implants placed in these 12 patients, 2 failed to osseointegrate. The CT examination showed the presence of dense bone around and above the implants. The implants appeared to be well integrated with no peri-implant bone loss. At 5 years follow up, excellent integration of grafted tissue, steady levels of bone around the implants and healthy peri-implant tissues were reported. Satisfactory facial symmetry, chewing and speech functions of the patients were restored. Implants placed in the reconstructed areas were demonstrated to integrate normally, postoperative occlusal function and esthetics have been favorable.

The method of simultaneous endonasal sanitation of the maxillary sinus and dental implantation, allows to reduce the probability of perforation of the membrane, significantly shortening the rehabilitation time of patients with insufficient bone tissue in the area of the maxillary sinus.

As a result of the introduction of these innovative technologies, surgical technologies for managing patients with sinus pathology have been optimized, using minimally invasive endoscopic technique, simultaneous endonasal sanation of the maxillary sinus with endoscopic assisted sinus lifting before dental implantation.

Conclusion

The method of simultaneous endonasal sanitation of the maxillary sinus, sinus-lifting, dental implantation, allows

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to reduce the probability of perforation of the membrane, significantly shortening the rehabilitation period of patients with insufficient bone tissue in the maxillary sinus. These methods led to simpler, more comfortable, lower risks of morbidity, more predictable compared to more invasive maxillary sinus augmentation.

Consent statement

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Ethical approval

The study was reviewed and approved by the Ethics Committee of the of the Yerevan State Medical University after M. Heratsi (protocol N16, 5.10.17) and in accordance with those of the World Medical Association and the Helsinki Declaration. Informed consent Patients were informed verbally and in writing about the study and gave written informed consent.

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