Unexpected outcome (positive or negative) including adverse drug reactions

Late recovery from foreign body sinusitis after maxillary sinus floor augmentation

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Summary

A 55-year-old male patient was referred to our clinic with signs and symptoms of recurring sinusitis after a right maxillary sinus floor augmentation for implantological purposes. Investigations showed an antibiotic-resistant ethmoidomaxillary sinusitis resulting from bone graft infection and displacement of previously inserted xenograft material into the maxillary sinus. The patient thus underwent a surgical procedure combining nasal endoscopy and oral surgery in order to remove the infected graft and restore sinusal drainage. The procedure was apparently successful but sinusitis relapsed after surgery and persisted despite 2 weeks of antibiotic therapy and local medications. A CT scan showed persistence of grafting fragments in the maxillary sinus. A new surgical procedure was scheduled while a more accurate endoscopic local medication was performed. Six hours after the treatment, the patient spontaneously expelled the fragments and promptly recovered. The patient successfully underwent another maxillary sinus floor augmentation procedure 6 months later.

BACKGROUND

A relevant number of patients undergoing implantological procedures require a preimplantological intervention to secure a successful outcome. With some 1.5 million implants sold every year in Italy alone, treating related complications is becoming increasingly important.

Sinonasal infections resulting from sinus floor augmentation represent, from the surgeon perspective, the most challenging complication of dental procedures. When treating such complications it is mandatory to remove the whole infected graft from the sinus floor. In addition, a wide antrostomy is required to grant a good sinusal drainage. If the surgeon is sure of having performed a sufficiently wide antrostomy and if the patient's condition allows for it, it is possible to delay a second procedure: the maxillary sinus drainage will spontaneously tend to extrude foreign bodies through a patent ostiomeatal complex.

Figure 1 Endoscopic photograph showing the ostiomeatal complex blockade (septal spur) and the purulent discharge.

CASE PRESENTATION

A 55-year-old male patient was referred to our clinic with signs and symptoms of right ethmoidomaxillary sinusitis recurring in the last 3 months. The patient's history revealed a right maxillary sinus floor augmentation with porcine bone grafts for implantological purposes 4 months before. The patient reported purulent discharge from the nose and purulent post-nasal drip. His right cheek was notably swollen and aching. Prior to our evaluation the patient had been treated with oral amoxicillin and clavulanate 1 g three times a day for 10 days followed by oral ciprofloxacin 500 mg twice a day for 14 days unsuccessfully.

Figure 2 Preoperative coronal CT image showing a right ethmoidomaxillary sinusitis with infected bone fragments afloat in the sinus. A right oro-antral fistula can also be observed.

INVESTIGATIONS

We performed an ENT physical examination, which confirmed the purulent discharge from the nose and revealed mucosal swelling around the right maxillary alveolar process. We also performed a nasal endoscopy with a flexible endoscope showing a medialisation of the right uncinate process and purulent discharge in the middle meatus (see figure 1). A maxillofacial CT scan revealed an ethmoido-maxillary sinusitis with infection and displacement of the maxillary bone xenograft, a right oro-antral fistula and a right septal spur (see figures 2 and 3).

The patient subsequently underwent the aforementioned combined procedure in order to treat the sinusitis, restore sinusal drainage and remove the bone grafts.

At 7- and 30 day postoperative endoscopic follow-up, the patient showed no signs of sinusal infection. Nevertheless, 40 days after the surgical procedure, the sinusitis relapsed, persisting in spite of oral antibiotic therapy.

We performed a second maxillofacial CT scan (figure 4), which revealed other infected bone grafts in the maxillary sinus, which acted as a source of infection.

After the spontaneous extrusion of the xenografts, the patient underwent nasal endoscopy confirming complete healing within 10 days. A third CT scan, performed for preimplantological purposes after 6 months, confirmed the absence of sinusitis in the right ethmoid and maxillary sinus (figure 5).

TREATMENT

Once the source of infection was established, the patient underwent a surgical procedure combining functional endoscopic sinus surgery and an oral access to the maxillary sinus through the oroantral fistula. With the aid of nasal endoscopy, we first removed the right septal spur in order to restore the ostiomeatal complex patency. Secondly, we performed a wide right middle antrostomy. The antrostomy allowed an accurate maxillary toilet: we evacuated mucopus and part of the grafts (figure 6). Furthermore, we took advantage of the pre-existing access to the sinus, previously created during the floor augmentation: we enlarged the upper part of the access in order to completely inspect and control the maxillary sinus and

the alveolar recess. After gaining access to the grafting site, we accurately removed any visible bone fragment (figure 7), switching the endoscopic visualisation between the nasal antrostomy and the oral access (figure 8). Lastly, we performed an extensive curettage of the infected bone and tissues and a maxillary sinus wash with a mixture of saline and H₂O₂ (one part in five). In the end, the oroantral fistula was closed with a buccal fat pad flap.

The patient was prescribed an intraoperative (intravenous levofloxacin 500 mg) and postoperative (oral levofloxacin 500 mg four times a day for 14 days) antibiotic therapy.

After the sinusitis relapsed, the patient underwent weekly endoscopic toilet of the right nasal cavity and he was prescribed oral levofloxacin 500 mg four times a day. During the toilet we aspirated secretions and removed the middle meatus crusting, which might have impaired the sinusal drainage and kept a watchful eye on the maintenance of the antrostomy patency.

During the last and decisive toilet, we reached the right alveolar recess with a curved suction tip and performed a thorough aspiration of mucus and crusting inside the maxillary sinus.

OUTCOME AND FOLLOW-UP

After the surgical procedure under general anaesthesia the patient's signs and symptoms of sinusitis relapsed. In hindsight we had not been able to locate and consequentially remove the entire infected xenograft due to the high number of bony fragments embedded in the sinusal floor mucosa. No improvement in 2 weeks of oral antibiotics, and weekly maxillary toilet drove us towards planning a second surgical procedure in order to remove all the fragments shown by the new CT scan. Surprisingly enough, just 6 hours after a more extensive endoscopic toilet, the patient expelled the remaining bony fragments from the nose. After this event, the patient also reported prompt improvement of his symptoms. Nasal endoscopies performed 2 and 10 days later confirmed the resolution of the infective process.

The patient underwent further ENT follow-up at 14, 30 and 60 days after spontaneous expulsion of the bone fragments. No signs of relapsing sinusitis were found.

Figure 3 Preoperative coronal CT image showing also the right septal spur, which blocks the ostiomeatal complex and consequentially the sinusal drainage.

Figure 4 Coronal CT image showing signs of relapsing sinusitis with the persistence of infected bone fragments in the right maxillary sinus floor.

Figure 5 Coronal CT image showing complete sinonasal healing 2 weeks after spontaneous extrusion of the remaining bone fragments.

A third CT scan, performed after 6 months for preimplantological purposes, confirmed normalisation of the mucosal lining and patency of the maxillary ostium. The patient successfully underwent another maxillary sinus floor augmentation procedure 6 months later.

DISCUSSION

Complex but nevertheless common implantological and preimplantological dental procedures can sometimes impact on sinonasal homeostasis and require intervention by an ENT surgeon.^{1 2} The maxillary sinus floor augmentation requires a peculiar evaluation of potential candidates, since the procedure dramatically and permanently modifies the maxillary sinus anatomy.³ Any present or potential obstruction of the sinusal drainage—such as the obstructing right septal spur of this patient—should be adequately treated before or during the augmentation procedure.⁴

Figure 6 Intraoperative nasal endoscopic view showing the wide middle antrostomy through which the xenograft is being removed with a suction tip.

Figure 7 Photograph showing the removed infected porcine xenograft.

Pre-existing ostiomeatal obstructions and sinusal conditions or poorly executed preimplantological procedures (eg rupture of Schneider's membrane) may lead to immediate and long-term infective sinonasal complications, both acute and chronic.^{5–9}

When an infective complication arises, the consensus is that complete removal of the infected graft is necessary along with restoration of ostiomeatal complex patency in order to grant sinusal homeostasis;^{10 11} without a complete removal, the remaining graft can act as a source of infection. A combined endoscopic nasal and oral approach is required to completely inspect the sinusal cavity and remove any bone fragment. Moreover, during the endoscopic procedure it is possible to treat ostiomeatal complex obstructions and ensure the maxillary drainage and ventilation of any other affected sinus.

In complex cases with infections dating back a long time, even the most careful surgical procedure cannot ensure the removal of all bone fragments, since these can be sheathed by mucosa or hidden in 'blind spots' of the sinusal cavity. The ciliary function of the sinus mucosa nevertheless tends to extrude foreign bodies. Therefore, an adequate antrostomy can sometimes allow a complete,

Figure 8 Intraoperative endoscopic view showing the maxillary sinus through the oral access.

though late, healing, provided that local medications and nasal toilet prevent the infective closure of the antrostomy.

Learning points

- ▶ Before performing a maxillary sinus floor augmentation always evaluate the sinonasal status of the patient and patency of the ostiomeatal complex.
- ▶ When facing maxillary sinus floor augmentation complications, it is mandatory to remove all the infected material and grant the patency of the ostiomeatal complex.
- ▶ Maxillary sinus floor augmentation complications cannot be treated by nasal endoscopy alone: a combined oral access is not only advisable but is also required.
- ▶ After restoring the ostiomeatal complex patency and performing a wide middle antrostomy the sinus ciliary function can complete the extrusion of foreign bodies: a first attempt of a more conservative endoscopic approach can therefore be effective, provided that the patient condition allows for this.

Competing interests None.

Patient consent Obtained.

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