CASE REPORT

Migratory dental implant in the maxillary antrum: a case report

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Abstract

Dental implants offer a predictable solution for the replacement of missing dentition. This report describes the case of a patient who underwent dental implant surgery several years ago but due to negligence on the part of previous dentist, her implant pushed into the maxillary sinus. The patient presented with vague pain and swelling in the right maxillary region. Orthopantomogram (OPG) showed that the implant was lying in the right maxillary sinus which the patient had no clue of. It was decided to retrieve the implant and later restore the missing teeth for definitive function and aesthetics. However, at the time of surgery, the implant in question was missing from the anticipated position as it had migrated to the most posterior-superior compartment of the antrum making its retrieval difficult in the first attempt. Later, a maxillofacial surgeon carried out the retrieval. Fortunately, the implant moved back to a more favourable position at the time of second surgery.

Keywords: Implant; maxillary sinus; complication.

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Introduction

Over the course of last three decades, it has become a common practice to rehabilitate edentulous arches with Osseo integrated implant-supported prosthesis.[1] After tooth extraction, the residual bone, if not preserved, leads to progressive resorption. In posterior maxilla, there is an even greater bone loss due to sinus pneumatisation, which leaves a compromised state when planning for implants.[2] In contemporary era, simultaneous implant placement with sinus elevation and bone grafting has gained popularity. However, this requires meticulous planning and careful execution. Inability to achieve this would increase the probability of the implant slipping into the sinus cavity.[3] Excessive axial force during implant placement or too deep an osteotomy that perforates the sinus membrane may facilitate the entry of the implant into the sinus.[4] Displacement of implant into the maxillary sinus has been documented in a number of case reports but due to lack of any cohort studies the prevalence of this complication is unknown.[5] However, whenever, an implant is displaced into the maxillary sinus space, a serious question on the experience of the operator is raised.[6] Such migration of implant can occur either during the implant surgery or during the prosthetic phase.[7] Moreover, heavy occlusal loads on an immediately loaded implant in limited bone volume of the posterior maxilla can have a similar adverse outcome. These potential problems can be avoided by placement of either short implants or sinus floor elevation procedure before implantation. These approaches are predictable and evidence based.[8] Another contributing factor in implant displacement can be the air pressure difference between the antrum and the nasal cavity or an auto immune reaction to the implant fixture which leads to progressive bone resorption secondary to peri-implantitis.[9] Other factors that can influence implant displacement in the sinus space include poor primary stability of the implant, lack of operator's skill or experience, over-drilling during implant surgery, and inappropriate force exertion during implant surgery or prosthetic phases.[10]

The present case report describes the retrieval of a free-floating implant from the right maxillary sinus

Case Report

A 65-year-old lady, known case of depression, diabetes, and osteoarthritis, presented to the dental clinics at the Aga Khan University Hospital, Karachi, Pakistan, in May 2019. Her primary complaint was vague pain in the right upper jaw. She reported low grade pain in the gums for the last 30 years and recently had a dislodged bridge in the maxillary arch. She was allergic to Tetracycline. She had been a regular visitor at her general dentist and according to her, the last dental visit was six months back for fabrication of maxillary prosthesis.

Intraoral examination revealed that multiple dental procedures had been carried out in the oral cavity over the years. Hence, an OPG was advised to evaluate the dentition and to rule out the cause of pain in her upper right quadrant. The OPG scan showed an unusual picture

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Figure-1: OPG radiograph of the patient at the presentation

of a dental implant lying in the maxillary sinus (Figure 1).

It further revealed the presence of mandibular implant-supported bridge and multiple retained roots in the maxilla. Extraction of the retained roots followed by implant retrieval was planned before moving towards a definitive rehabilitation strategy.

Surgical procedure: It was decided to adopt an intraoral approach for the removal of the dislodged implant by raising a full thickness mucoperiosteal flap and creation of a bony window on the lateral wall of the sinus where the implant was expected to be present.

After obtaining informed consent for the procedure, a lateral window osteotomy was created through the intraoral approach on the right posterior maxilla under local anaesthesia. Abscess from the cavity was drained intraorally but the implant was not visible at the surgical site. This was an unusual presentation, as preoperative OPG had confirmed the location of the implant which guided the osteotomy. An intra-operative periapical radiograph failed to show any sign of the implant. An intra-operative OPG was then requested, which revealed that the implant had migrated to the posterior-superior wall of the sinus towards the right orbital site. (Figure 2).

Figure-2: OPG exhibiting migration of implant towards the right orbital site

The procedure was abandoned, flap was sutured back, haemostasis achieved, and the patient was referred to the maxillofacial surgeon in a tertiary care setting and sinus precautions were advised.

In the tertiary care setup, after 24 hours of the first intervention, preoperative Cone Bean Computed Tomography scan was taken. It revealed that the implant position had changed again and it was now near the floor of the maxillary antrum. Under local anaesthesia, sutures were removed, flap was elevated and the lateral window was accessed again. Care was taken to keep the patient in a more sitting (semi-reclined) position during the procedure to prevent further displacement of the implant. The implant was visualised in the surgical site and thus was easily retrieved using artery forceps.

A bioresorbable collagen membrane (Biomend Extend, Zimmer BioMet, USA) was placed on the external wall of the bony defect and the flap was sutured back without tension. Haemostasis was achieved and sinus precautions (such as avoiding dust, avoiding blowing air through the nose, avoiding sneezing, avoiding strenuous activities, such as running, jogging, cycling, weight-lifting, or aerobic exercises), for at least one week, were reinforced. Appropriate antibiotics and analgesics were prescribed for one week (Co-amoxiclav + Metronidazole + Paracetamol).

The patient was given option of sinus elevation and bone grafting for an all-on-six type dental implant bridge for maxilla, but she did not agree and instead opted for an all-on-four type implant prosthesis for the upper arch. For the mandible, she was not interested in any major corrective work except placement of a single implant in her fourth quadrant. With the patient's consent, the maxilla was restored with all-on-four implants restored with cement-retained metal ceramic fixed partial denture and a single implant with cement-retained metal ceramic crown replacing tooth #45. With this management, the

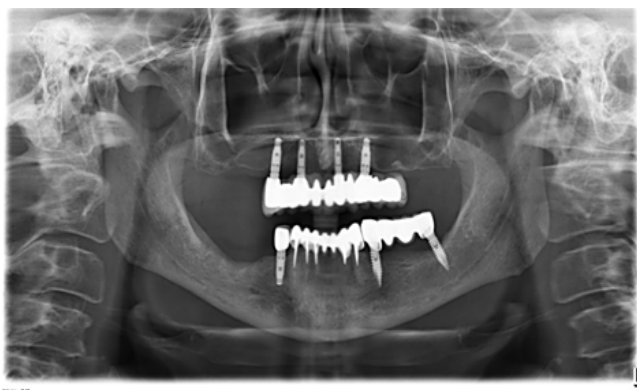

Figure-3: Postoperative OPG radiograph

Figure-4: Postoperative clinical image (frontal view)

patient was satisfied and at three-month follow-up was doing well with the definitive prosthesis. The postoperative radiograph is shown as figure 3 and clinical image as figure 4. Permission was obtained from the patient for using her radiographs and dental images for publication purposes.

Discussion

Migration of dental implant into the sinus is an unusual but serious complication. With increasing numbers of dental implants being placed globally, the prevalence of implants displacing into the maxillary antrum is on the rise. As per the available data, maxillary first molar followed by second premolar are the most common sites associated with displacement of the implant into the antrum.[5] The earlier case reports showed that the implants that got displaced into the sinus space were > 10 mm in length and cylindrical in shape. The displacement of such implants into the maxillary sinus was independent of the implant diameter. The frequency of shorter implants being displaced in the maxilla is relatively low.[5] The use of wider implants is, therefore, suggested as a step to prevent possible migration due to poor bone quality in the posterior part of the maxilla.[11, 12] However, displaced implants in the sinus may remain stationary or may migrate to secondary locations, causing life threatening obstruction of the airway.[13] A displaced implant in the sinus may initially remain asymptomatic, however, if left un-addressed for longer duration, symptoms may develop. One must consider that if any foreign body is left in the sinus for extended period, the body will react against this chronic irritation. The most common reaction is sinusitis.[5,12,14] Colonisation of microbes on the displaced implant surface can cause cellulitis and even damage to the optic nerve.[10,15] More serious consequences include the initiation and development of carcinoma in the maxillary sinus as reported by Brinmeyer in a patient having metal foreign body lying in the sinus for 48 years.[16] Therefore, immediate removal of displaced foreign body from the maxillary sinus is recommended before any adverse reaction takes place.

Different modalities have been proposed to carry out this foreign body removal from the sinus space, including endoscopic trans-nasal or trans-oral approach, intraoral approach via lateral window access to maxillary sinus, and direct access through the oro-antral communication.[17] The Caldwell-Luc approach is a simple and easy to execute technique in gaining access to maxillary antrum for the removal of foreign body. This can be employed by any experienced practitioner under local as well as general anaesthesia. Even clinicians who do not have any endoscopic equipment in their practices or possess any specialised training can undertake that procedure. Gonzalez-Garcia et al.[18] have reccomended that Caldwell-Luc approach should be reserved for cases where the foreign body (implant in the present scenario) is of large size. They favour endoscopic techniques (trans-oral or trans-nasal) for such retrieval for their clear advantage of being less invasive.

The choice between trans-oral or trans-nasal is based on the involvement of ostium. The trans-nasal approach is selected in cases where nasal ostium is involved, or other related structures are affected, the patient can be subjected to general anaesthesia or deep sedation, and the position of the implant is favourable. Otherwise, trans-oral approach is preferred, whose obvious benefit is that it can be done under local anaesthesia. Comparing the three approaches, it's abundantly clear that the best technique is still the prevention of this accident.

Interestingly, literature search revealed no Pakistani, Indian or Bangladeshi paper on this topic. This could be due to a cultural practice of sharing the successful cases in the literature and shying away from the untoward and undesirable outcomes. The maximum number of sinus displaced implants (n=27) are reported by Chiapasco et al.[19] They have retrospectively analysed sinus complications following the displacement of dental implants into the maxillary sinus treated according to clinical situation by functional endoscopic sinus surgery (FESS), an intraoral approach, or a combination of both and later developed protocols for the treatment of the same.

The displacement and migration of dental implants could be simply avoided by meticulous planning prior to the placement of the implant, using 3D radiographs, cone beam computed tomography, ridge mapping, and employing virtual placement exercises before embarking upon the actual surgery.

Conclusion

The unexpected displacement of the implant into the maxillary sinus can cause infection if left unaddressed. An immediate removal is indicated by a choice of technique that the operator is well versed with. Since implants may migrate inside the sinus and can lodge into difficult to reach areas as happened in the present case, therefore, CBCT should ideally be done immediately before surgical removal is attempted.

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