Case report

The importance of early detection for postoperative maxillary cyst before dental implantation: A case report

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ABSTRACT

Introduction and importance: It is difficult that doctors other than otorhinolaryngologist/radiologist find early postoperative maxillary cyst (POMC) because it tends to expand gradually with no symptoms over a period of years.

Case presentation: A 60-year-old Japanese male who had previously undergone a bilateral Caldwell-Luc operation for the treatment of chronic sinusitis, experienced maxillary sinus floor elevation and implant placement. Eleven years after the implant placement, we discovered that the left POMC existed close to dental implants. Fortunately, dental implants still displayed proper osseointegration. Thus, the patient has been successfully treated for POMC, which had not been properly diagnosed before the implantation, by a marsupialization using nasal endoscopy and successfully preserved dental implant.

Clinical discussion: Because the expanding POMC might result in dental implant failure after several years, we think that marsupialization is useful as a risk management for possible failure of dental implant close to POMC when it had not been found before maxillary sinus floor elevation and insertion of dental implant.

Conclusion: Doctors should recognize that patients will have the risk of the dental implant failure after several years due to the expanding cyst when early POMC had not been diagnosed and treated properly before the implantation.

1. Introduction

Maxillary sinus floor elevation introduced by Boyne and James in 1980 [1], is a widely recognized dental-surgery to create a mucoperiosteal pocket over the maxillary floor and beneath the Schneider's membrane in which to place the bone graft material or dental implant to rehabilitate the upper dental arch, in the atrophic maxilla. Although maxillary sinus floor elevation is an effective approach, maxillary sinusitis sometimes occurs as a complication after maxillary sinus floor elevation.

Postoperative maxillary cyst (POMC) tends to occur as a delayed complication of maxillary sinus surgery such as Caldwell–Luc surgery, which is a radical technique to remove infection and diseased mucosa from the maxillary sinus. POMC may be caused by the residual mucosa in the maxillary sinus or the obliteration of the sinus ostium when surgeon can't perform the complete removal of the diseased mucosa [2]. Because the existence of POMC might increase the risk of the complication after maxillary sinus floor elevation [3], surgical intervention for POMC using nasal endoscopy is ideally recommended before maxillary sinus floor elevation in order to avoid the complication after maxillary sinus floor elevation [4]. POMC should be preoperatively diagnosed by cone beam computerized tomography (CBCT) or medical CT. However, it is sometimes difficult to discover early POMC because POMC tends to expand gradually with no symptoms over a period of years, and cause swelling and pain in the face, discomfort of the maxilla or maxillary teeth, and exophthalmos. Systematic review indicated that pseudocyst in the maxillary sinus did not increase the risk of implant failure rate [5].

On the other hand, Galzignato et al. reported a case experiencing dental...
implant failure associated with a residual maxillary cyst [6]. Because bone destruction around POMC is thought to result from expanding POMC, POMC might result in dental implant failure after several years. Here, we report that marsupialization for POMC using nasal endoscopy is useful for not only the treatment for POMC, but also for the preservation of dental implant close to POMC in a patient whose POMC had been found after maxillary sinus floor elevation and insertion of dental implant.

This case report has been presented in accordance with the SCARE 2020 criteria [7].

2. Case presentation

A 60-year-old Japanese male patient presented to the Department of Oral Implant of our dental hospital to receive full-mouth rehabilitation of his maxilla with dental implants in October 2008. The patient was a nonsmoker and had no systemic disease that would be a contraindication for implant therapy, such as severe hypertension, diabetes mellitus, osteoporosis, and hemorrhagic diathesis. However, a review of his medical history revealed that the patient had received a bilateral Caldwell–Luc operation for the treatment of chronic sinusitis at the age of 28. The dentist in charge at that time inaccurately diagnosed the finding of the preoperative cone beam computerized tomography (CBCT) scan as not left POMC but chronic left maxillary sinusitis (Fig. 1). As the preoperative CBCT showed inadequate bone volume to support the dental implant, the former dentist had inserted three implants (POI EX® System, FINATITE, Kyocera, Kyoto, Japan), with a diameter of 3.7 mm and a length of 12 mm at #25, 10 mm at #26 and 10 mm at #27, with trancrestal sinus elevation in the area of POMC. The surgeon did not notice the implant at #27 close to the POMC (Fig. 2). Postoperatively, all of the implants achieved proper osseointegration, and then the final prosthesis was attached. The patient was closely monitored annually.

In April 2019, 11 years after the implant, the patient complained of swelling in his left cheek. Because oral findings did not show any obvious abnormalities, the dentist (TF) consulted an otorhinolaryngologist (YB) at our dental hospital. Medical CT examination indicated that the left POMC had expanded and the previously inserted implant was still present close to left POMC; however, all of the implants continued to show proper osseointegration (Fig. 3). Because the patient hoped both the disappearance of his chief complaint and the preservation of dental implants, YB treated the POMC via marsupialization using nasal endoscopy to prevent implant failure resulting from possible bone destruction around dental implant following the further expansion of the left POMC (Fig. 4A). After the marsupialization, the swelling in his left cheek disappeared, and all of the inserted implants maintained proper osseointegration (Fig. 4B).

3. Discussion

Caldwell–Luc surgery is a radical technique for chronic sinusitis to remove infection and diseased mucosa from the maxillary sinus. This radical procedure can cause various complications after the operation which are transient swelling and pain in the face as early complication and POMC as delayed complication, respectively. POMC may be caused by the residual mucosa in the maxillary sinus or the obliteration of the sinus ostium when surgeon can’t perform the complete removal of the diseased mucosa [2]. Thus, otorhinolaryngologists have tendency to select functional endoscopic sinus surgery (FESS) rather than Caldwell–Luc surgery as the treatment of chronic sinusitis. FESS is minimally invasive surgery using nasal endoscopy in order to preserve ventilation and drainage, and is not radical unlike Caldwell–Luc surgery. Thus, transient swelling and pain in the face as early complication and POMC as delayed complication can’t be caused by FESS unlike Caldwell–Luc surgery.

As we retrospectively identified the left POMC via CT imaging before the insertion of the oral implants, we assume that the POMC is not related to the implant placement, but rather to the Caldwell–Luc operation performed for the treatment of chronic sinusitis when the patient was 28 years old. Otherwise, we would suspect that a residual odontogenic cyst owing to incomplete removal during tooth extraction might migrate into the maxillary sinus. Some reports have described patients with POMC whose dental implant was successfully preserved via the enucleation of the POMC [8–11], while in others, the preservation of the dental implant by the enucleation of both the POMC and the implant close to the POMC was impossible [12,13]. Thus, debate still exists as to whether the preservation of the dental implant close to the POMC is possible via enucleation. On the other hand, otorhinolaryngologists have favored treating POMC with nasal endoscopy as well as the treatment of chronic sinusitis [4]. It is the marsupialization with drainage of POMC via nasal endoscopy, and is the method that the cyst wall is opened to the nasal cavity via nasal endoscopy. Major advantage of the endonasal method is the fact that it is minimally invasive surgery, and thus it warrants the preservation of the dental implant even if the implant exists close to POMC. Postoperative course is generally eventless after this operation method when fenestrated parts are kept open. The endonasal method has been used in patients with unicocular cyst located near the nasal cavity. However, enucleation is still needed for multilocular cysts or cysts located far from the nasal cavity. Because the POMC was unicocular cyst located near the nasal cavity in this case and the patient hoped both the disappearance of swelling in his left cheek and the preservation of his dental implant close to the POMC, we chose the marsupialization with drainage of POMC via nasal endoscopy for the treatment of the left POMC as alternative method to enucleation. Ideally, we think that the marsupialization with drainage of POMC should be performed before the insertion of an implant, even if the bone volume is adequate to support the dental implant.

Fig. 1. The dentist in charge at that time inaccurately diagnosed the finding of the preoperative cone beam computerized tomography (CBCT) scan as not left POMC but chronic left maxillary sinusitis. (A) Axial view, (B) coronal view.
The patient in this case had been inaccurately diagnosed by former dentists as having chronic sinusitis before implant placement when he was 60 years old. Due to radiographic misinterpretation, transcrestal sinus elevation in the area of POMC was performed with subsequent implant placement. From both the patient’s operation history of Caldwell-Luc operation and CT findings, we can retrospectively see the existence of left POMC. However, it was difficult to discover early POMC before maxillary sinus floor elevation because POMC tends to expand gradually with no symptoms over a period of years, and causes swelling and pain in the face, discomfort of the maxilla or maxillary teeth, and exophthalmos. Thus, we hope that dentists perform consultation to otorhinolaryngologists before maxillary sinus floor elevation when patients had experienced sinus surgery. Otorhinolaryngologist/(dental) radiologist can see the existence of small POMC on CBCT or medical CT. We think that medical CT is more suitable for the detection of POMC when the cyst is multilocular because filming coverage of medical CT is wider.

In conclusion, doctors should recognize that patients will have the risk of the dental implant failure after several years due to the expanding cyst when early POMC had not been diagnosed and treated properly before the implantation.

Consent
Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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Yuh Baba, Keiso Takahashi, and Yasumasa Kato contributed to data and writing. Tatsuo Funakawa, Hitoshi Kawanabe, and Akinobu Usami contributed to data collections.

Declaration of competing interest

None.

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