

# Delayed-Onset Methicillin-Resistant *Staphylococcus aureus* Infection at 18 Months after Absorbable Plate Fixation for Zygomaticomaxillary Complex Fracture

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None of the reports of delayed infection mentioned a latent period exceeding 13 months. We report an infection that developed 18 months after implantation of an absorbable plate. A 16-year-old adolescent girl had undergone reduction and fixation with an absorbable plate for Lefort I and zygomaticomaxillary complex fractures 18 months prior at our hospital. In her most recent hospital visit as an outpatient, abscess was observed in periocular area. Computed tomography revealed sinusitis with an abscess above the infraorbital rim. Wound culture yielded methicillin-resistant *Staphylococcus aureus*. Despite conservative treatments, wound state did not improve. Therefore, our department decided to perform surgery. Absorbable plate had been mostly absorbed but remained a bit. Bony depression of infraorbital rim and mucosal exposure of maxillary sinus anterior wall were observed. After the surgery, the patient recovered. We believe that the reason the wound infection and sinusitis manifested at the same time is because of several factors such as alcohol abuse, smoking, and mucosal exposure of maxillary sinus anterior wall. Absorbable plate takes 9 months to 3 years to be completely absorbed, thus we suggest studies with a follow-up of at least 3 years be undertaken to determine the outcomes of patients with many risk factors.

**Keywords:** Absorbable implant / Prosthesis-related infections / Maxillofacial injuries

## INTRODUCTION

Absorbable plates are frequently used for treating facial bone fractures when performing open reduction and internal fixation.

The strengths of absorbable plates are that they are absorbed and do not cause growth restriction in the pediatric craniofacial region. However, their major weakness is that they can cause foreign-body reaction or infection [1].

Most infections associated with absorbable plates occur within several months after implantation and no reports of delayed infection with a latency exceeding 13 months has been issued [2-5].

Here, we report an infection that developed 18 months after implantation of an absorbable plate for a Le Fort I fracture, fractures of both zygomaticomaxillary complex, and nasorbithomoid (NOE) fracture.

## CASE REPORT

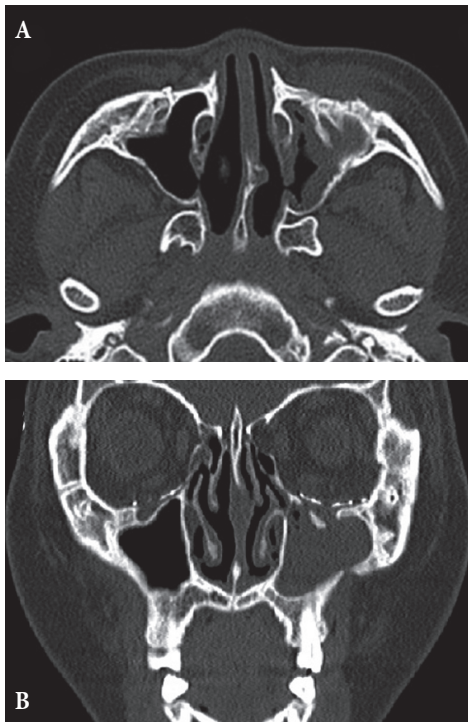
A 16-year-old adolescent girl presented at our outpatient clinic with swelling and redness of the left lower eyelid. She was a heavy smoker, and an alcoholic. She had undergone reduction and fixation with an absorbable plate (Biosorb Fx 1.5 system) for a Le Fort I fracture, fractures of both zygomaticomaxillary complex, and NOE fracture 18 months previously at our hospital.

At this presentation, swelling and redness were observed in surrounding area of the subciliary incision. Computed tomogra-

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phy revealed sinusitis with an abscess above the infraorbital rim (Fig. 1). While performing incision and drainage, a culture specimen was obtained before administering second-generation cephalosporin. Culture showed positivity for methicillin-resistant *Staphylococcus aureus* (MRSA). We were unable to use vancomycin, teicoplanin, or tigecyclin because of allergic reactions. Therefore, intravenous linezolid 600 mg was administered and the wound was dressed for 10 days. Nevertheless, the state of the

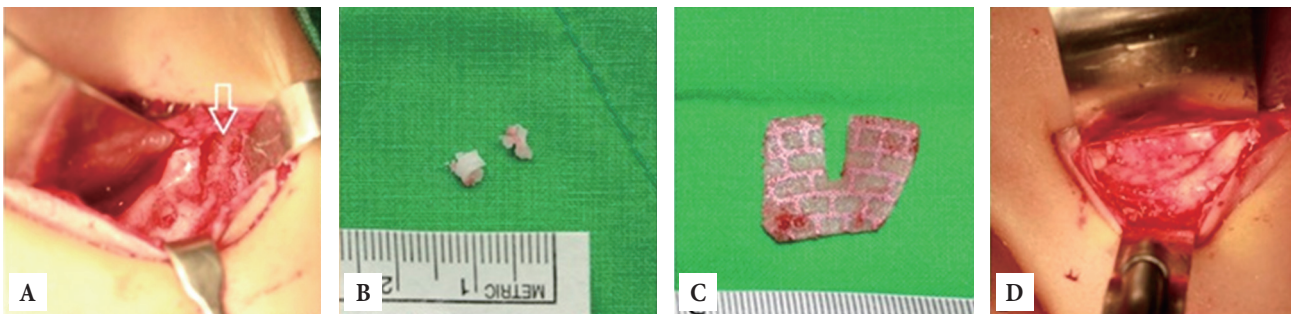


**Fig. 1.** (A, B) Preoperative computed tomographic image showing abscess formation on the maxillary sinus antrum and maxillary sinusitis.

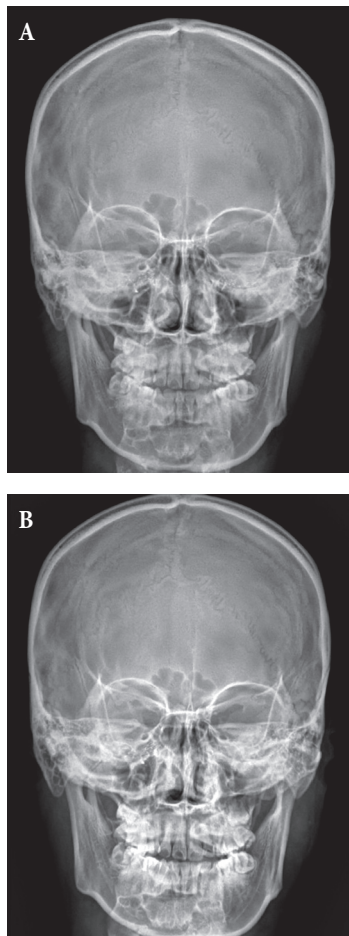
wound did not improve, and therefore, we decided to perform surgery. At 18 days after presentation, approach was made where the previous operation had been performed through the subciliary area. Intraoperative findings showed that most of the absorbable plate in the orbital rim and zygoma area had been absorbed but that a portion remained in soft tissue. In addition, a bony depression and granulation tissue were observed at the site of the absorbable plate. However, no signs of inflammation were evident around synPOR of the orbital floor. No absorbable plate was observed in the maxillary sinus anterior wall, but herniated mucosa was detected through the previous bone defect. Finally, synPOR and the plate remained in soft tissue were removed, surgical site was irrigated, a drain was placed, and the site was sutured (Figs. 2, 3). After the operation, the patient's symptoms improved rapidly. The drain was maintained until postoperative day 6, and antibiotic treatment was continued. Because of rapidly improved symptoms, department of internal medicine recommended changing the intravenous Linezolid to oral thing, and that enabled the patient to get a discharge. At 9 days after surgery, the patient was discharged from hospital. The patient visited our outpatient clinic for follow-up after 2 weeks. Oral Linezolid was effective to the patient, and it caused no other complication.

## DISCUSSION

The risk of delayed infection increases when patients are an alcoholics or smoker [1,3]. And if wound contains any foreign body, such as an absorbable plate or absorbable suture material, only 102



**Fig. 2.** Intraoperative finding. (A) A bony depression was observed in the infraorbital rim. (B) The removed absorbable plate. (C, D) No evidence of inflammation was observed around the orbital floor or implant.



**Fig. 3.** (A) Preoperative X-ray. (B) Immediate postoperative X-ray. Implant of left orbital floor was removed.

pathogens can cause a wound infection [6]. In addition, because of thin soft tissue coverage, orbital area can exhibit rapid degradation and slower absorption occurs, which is considered to increase infection risk [7]. Park et al. [8] reported that sinusitis can also cause infections when the incision line and the position of the inserted plate are proximal. Kwon et al. [2] reported that infraorbital rim fractures associated with a mucosal tear can cause sinusitis because of maxillary sinus exposure. According to Choi et al. [9], for delayed-onset infections caused by absorbable plates inserted in the infraorbital rim, it is important to undertake a differential diagnosis to using wound culture to determine whether the infection originates from the wound or sinusitis. If a culture is positive for MRSA, the infection is likely to have stemmed from the

wound. Overall, in this patient with high infection risk due to alcohol abuse and heavy smoking, imbalance between degradation and absorption of the absorbable plate in the orbital area, probably result in orbital cellulitis of the operation wound due to MRSA. In addition, because of mucosal tearing and the proximity of the incision line and plate, orbital cellulitis was considered to have been easily disseminated to the maxillary sinus.

When conducted surgery in the orbital area in patients with risk factors, operators should carefully consider the use of an absorbable plate. If such a plate is used, surgery should be performed meticulously and patient followed attentively. Kwon et al. [2], if a screw penetrates the maxillary sinus wall, bacterial flora will migrate into the sinus. Therefore, during fixation of the maxillary sinus anterior wall, the use of screws shorter than 4 mm is recommended to reduce the risks of abscess formation and cellulitis. Wittwer et al. [1] conducted a 24-month follow-up study on 49 patients that received absorbable plate implants for zygoma fracture fixation. Of these patients, 10 (20%) developed complications (implant-related tissue reaction, infection, or soft tissue dehiscence). Two of 5 underwent conservative treatment for wound dehiscence, and 3 underwent surgery for absorbable plate remove. These previous reports caution that, regular follow-up is important in patients that have undergone absorbable plate implantation. Because absorbable plates take 9 months to 3 years to be completely absorbed [1,8], we suggest studies with a follow-up of at least 3years be undertaken to determine the outcomes of patients with many risk factors.

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