



Two cases of nasolacrimal duct obstruction operated by endoscopic dacryocystorhinostomy after orbital fracture reconstruction with an implant

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ABSTRACT

Purpose: To report two cases of nasolacrimal duct obstruction (NLDO) caused by orbital fracture reconstruction with an implant successfully treated with endoscopic dacryocystorhinostomy (EnDCR).

Observations: Two patients presented with NLDO after orbital fracture reconstruction with an implant. Case 1 was a 67-year-old female. She became aware of epiphora in her left eye after undergoing orbital fracture reconstruction with an implant for a left orbital floor fracture 14 years previously. Dacryocystitis was diagnosed based on a lacrimal syringing test because of pus reflux. Computed tomography (CT) showed that the implant was inserted on the left orbital floor, crossing into the lacrimal sac; dacryoendoscopy showed that the implant blocked the nasolacrimal duct. EnDCR was performed without implant removal. The symptoms resolved postoperatively. Case 2 involved a 6-year-old male who had been aware of epiphora in his left eye since undergoing orbital fracture reconstruction with an implant for a left orbital floor fracture one month prior. Dacryocystitis was diagnosed based on a lacrimal syringing test because of pus reflux. CT showed an unclear implant location, but dacryoendoscopy showed that the implant blocked the nasolacrimal duct. The implant was removed. However, EnDCR was performed because there was no improvement in NLDO. The symptoms resolved after EnDCR.

Conclusions and importance: One previous report of NLDO after orbital floor fracture reconstruction was performed with external dacryocystorhinostomy with implant removal. Dacryoendoscopy and CT are useful for confirming the location of the implant and obstruction. Depending on the implant's location, it may be possible to perform EnDCR without removing the implant.

1. Introduction

There are many causes of nasolacrimal duct obstruction (NLDO), all of which cause chronic inflammation that results in the symptoms such as dacryocystitis epiphora and discharge.^{1,2} It has also been reported that NLDO can occur as a result of facial trauma.²⁻⁴ Rare cases of NLDO after orbital floor fracture reconstruction have been reported, and the reason for these cases is thought to be inflammation associated with trauma or mechanical obstruction due to the implant.⁵⁻⁷ There are reports of treatment strategies for this problem, such as removal of the inserted implant, external dacryocystorhinostomy, or transconjunctival dacryocystorhinostomy.^{5,6,8} However, the optimal treatment strategy remains controversial. Herein, we report two cases of NLDO after orbital floor fracture reconstruction, which were treated with endoscopic dacryocystorhinostomy (EnDCR).

2. Case report

2.1. Case 1

A 67-year-old female with a history of hypertension presented to our clinic with epiphora and discharge in the left eye. The patient had undergone orbital fracture reconstruction with a titanium mesh implant for a left orbital floor fracture 14 years previously. At the first visit, tear meniscus height (TMH) was measured using a slit lamp by a single experienced doctor (HM), and TMH was qualitatively considered to be high. The patient could not undergo lacrimal irrigation and was diagnosed with dacryocystitis secondary to pus reflux in the left eye. We performed computed tomography (CT), in which the implant was inserted on the left orbital floor crossing into the lacrimal sac. Based on these results, we suspected that the implant was the cause of the NLDO (Fig. 1). The patient underwent dacryoendoscopy, which showed that the implant caused obstruction at the lacrimal sac-duct junction (Fig. 2). Based on the CT and dacryoendoscopy results, we performed an EnDCR without implant removal.

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The upper edge of the rhinostomy was created at the level of the internal common puncta. A polyurethane tube (PF catheter; NIDEK, Gamagori, Japan) was inserted after rhinostomy was created.⁹ The implant site was visualized with a rigid endoscope via the nose (Fig. 3). Two months postoperatively, the tube was removed. At 1 year postoperatively, the rhinostomy was moderately opened, and the patient was doing well and the symptoms had disappeared.

2.2. Case 2

A 6-year-old male presented to our clinic with complaints of epiphora and discharge in the left eye. The patient had undergone orbital fracture reconstruction with an absorbable implant for a left orbital floor fracture 3 months previously. The patient had no the symptoms soon after surgery; however, the symptoms appeared 1 month after surgery. At the first visit, the patient had no eye movement disturbance on the Hess examination. The TMH was qualitatively considered to be high. The patient could not undergo lacrimal irrigation and was diagnosed with dacryocystitis secondary to pus reflux in the left eye. CT was performed, but the positional relationship between the implant and the lacrimal sac was unclear (Fig. 4). Since it was unclear whether the implant was the direct cause of NLDO, dacryoendoscopy was performed to assess the condition of the lacrimal sac. The patient underwent dacryoendoscopy under general anesthesia, which showed obstruction at the lacrimal sac-duct junction (Fig. 5). After discussion with the plastic surgeon, it was decided that the implant should be removed. The removed implant was approximately 2.5 cm × 1.5 cm in size. EnDCR was subsequently performed because the NLDO could not be corrected despite implant removal and attempts to reconstruct the lacrimal duct by intubation using a dacryoendoscope. As in case 1, the upper edge of the rhinostomy was created at a level similar to that of the internal common punctum, and the tube was inserted. These procedures were only performed under general anesthesia once. The inserted tube had fallen out 1 month postoperatively, but the rhinostomy was in good condition. The patient was doing well, and the TMH improved.

3. Discussion

Herein, we report two cases of NLDO caused by orbital floor fracture reconstruction. Kang et al. reported that external dacryocystorhinostomy (ExDCR) was performed in 420 cases with NLDO following maxillofacial reconstruction, and 6 cases of NLDO were implant-related.⁶ Therefore, this report suggests that NLDO caused by orbital floor fracture reconstruction with implant is rare. The cause of NLDO after orbital floor fracture reconstruction may be attributed to improper implant positioning or chronic inflammation caused by the implant.⁵⁻⁷ The most commonly reported treatment strategy is a combination of ExDCR and implant removal.^{5,6,8} In case 1, we only performed EnDCR

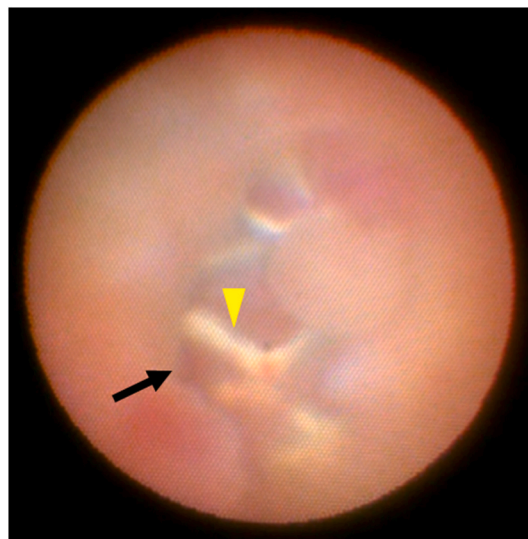


Fig. 2. Dacryoendoscopy. The titanium mesh implant (arrow head) was located at the lacrimal sac-duct junction (arrow).

without implant removal. Using CT and dacryoendoscopy, we were able to assess the position of the implant at the lacrimal sac-duct junction. From these examinations, we hypothesized that the distance between the implant and rhinostomy, which can be made by EnDCR, was a specific distance, and we could treat EnDCR without implant removal. To the best of our knowledge, no case has been treated with EnDCR without implant removal. However, if the implant which may obstruct rhinostomy was present on the orbital medial wall, we consider that EnDCR could not have been performed without removing the implant. If the implant was fixed with screws to the nasal side of the orbit, it would also be more difficult to address with EnDCR. As in previous reports, ExDCR with implant removal may allow treatment no matter where the implant is located. We consider that there is a limitation whether the EnDCR can be treated alone depending on the location of the implant and where it is fixed to the orbital wall with screws. Therefore, CT is important to confirm the location of the implant, and dacryoendoscopy can show that there is no implant obstructing the planned rhinostomy. In the past, EnDCR was reported to have a lower success rate than ExDCR,¹⁰ but it has been reported that the results of both EnDCR and ExDCR are currently equivalent.^{11,12,13} If patients who underwent orbital floor fracture reconstruction with the implant can undergo only EnDCR, that is, avoiding incisions in the face, patients also may be pleased with the aesthetic results.^{14,15} In the two cases, we used a polyurethane tube to prevent stenosis of rhinostomy. However, these reports suggest that intubation may be a risk of stenosis.^{16,17} Therefore,

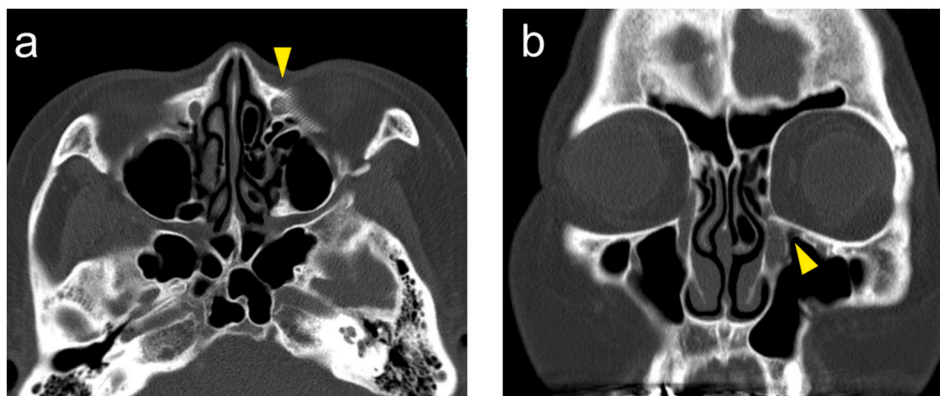


Fig. 1. Computed tomography. (a) Axial scan; (b) coronal scan. The porous implant can be seen crossing the nasolacrimal duct (arrow heads).

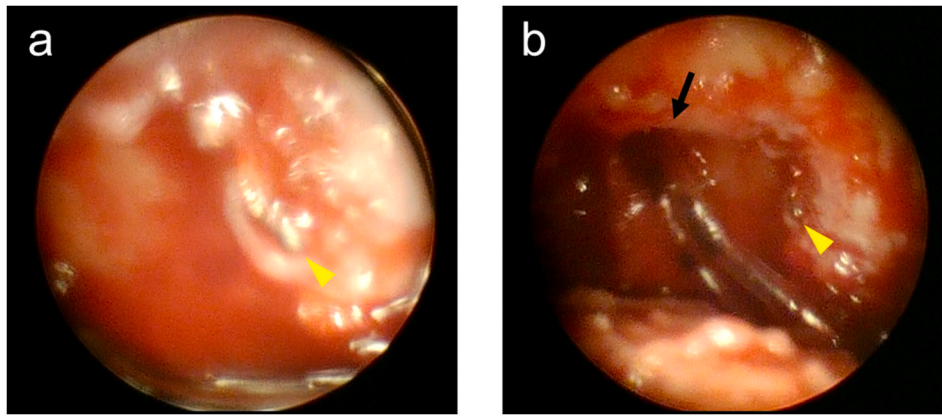


Fig. 3. Rigid endoscope. (a) Implant was observed using a rigid endoscope via the nose (arrow head); (b) there was a certain distance between rhinostomy (arrow) and implant (arrow head).

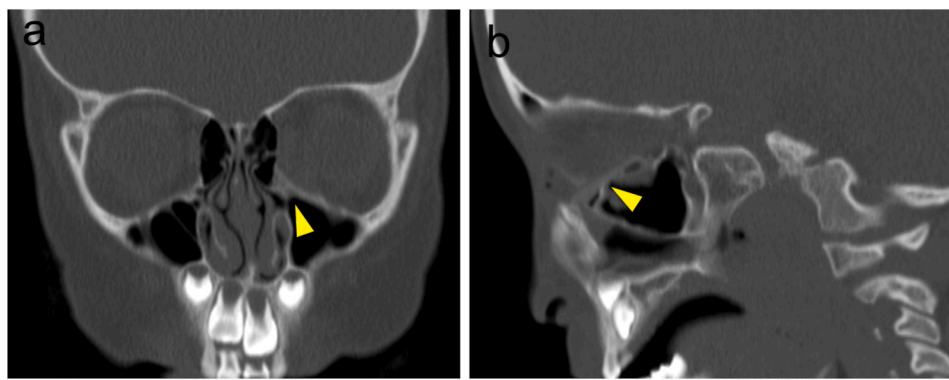


Fig. 4. Computed tomography. (a) Coronal Scan; (b) Sagittal scan. The relationship between the nasolacrimal duct and implant location was unclear (arrow heads).

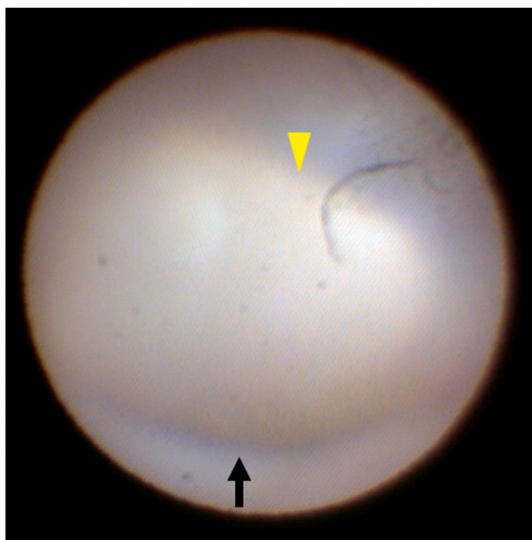


Fig. 5. Dacryoendoscopy. The absorbable implant (arrow head) was located at the lacrimal sac-duct junction (arrow).

it is controversial whether tube insertion was necessary in our cases.

In a previous report, a patient who experienced epiphora after facial fracture treatment reported that removal of the implant alone caused the symptoms to improve.⁷ However, in our case (case 2) we needed to perform EnDCR because implant removal did not improve the NLDO. If the lacrimal sac was only compressed, removal of the implant alone may

have improved the NLDO; however, if the lacrimal sac was damaged, we suspected that it would be difficult to improve the drainage system due to chronic inflammation. Because the implant was removed, ExDCR could have been performed at the same wound site. However, the wound would have to be enlarged, and we were hesitant to enlarge the wound on the face of a six-year-old boy. Although the anatomy of the nose in young patients is more complex and narrower than that in adults, we believe that EnDCR should not be a difficult problem in the treatment of children, as previously reported.¹⁸

4. Conclusions

We suggest that EnDCR may be used to treat NLDO after orbital floor fracture reconstruction with implants. To achieve this, it may be helpful to use dacryoendoscopy and CT.

Author contributions

KT wrote the manuscript; HM performed surgeries. KT, HM, and MA discussed the procedure, assisted with the surgery, and examined the patients.

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Declaration of competing interest

M. Akimoto is a consultant at Kowa Co. Ltd. No conflicting relationships exist for any other authors.

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