Case Report

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Dermis-fat graft as treatment of early implant exposure in a postpenetrating keratoplasty patient with nontraumatic eyeball rupture

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Abstract:

Orbital implant exposure may be the most common complication after evisceration surgery with orbital implantation. Management of implant exposure is a vital issue for oculoplastic surgeons. We present the case of a patient with nontraumatic eyeball rupture receiving dermis-fat graft after early implant exposure. The present case with multiple penetrating keratoplasty history underwent emergent evisceration and silicon sphere implantation due to nontraumatic eyeball rupture with severe uvea prolapse. The surrounding corneal tissue of the rupture aperture was almost unidentified before the operation. Deep superior sulcus syndrome and orbital implant exposure developed 2 months after the operation; hence, orbital reconstruction and dermis-fat graft transplantation were performed. Orbital reconstruction and orbital implant exposure management are discussed in the content.

Keywords:

Deep superior sulcus syndrome, dermis-fat graft, evisceration, orbital implant exposure

Introduction

Evisceration is performed for many ocular conditions. According to Lin and Liao, painful blind eyes (66.2%) and trauma (19.9%) are the main indications for evisceration in Taiwan.[1] The use of orbital implants after evisceration surgeries has many advantages.[2] However, complications such as exposure of the implant may develop. Management of implant exposure is thus a vital issue, including the use of retroauricular myoperiosteal grafts, hard palate, temporalis fascia, extraocular muscle flaps, and dermis-fat grafts.[1,3-5]

We present a postpenetrating keratoplasty (PKP) case receiving evisceration and orbital implantation due to nontraumatic eyeball rupture and also discuss the management of orbital implant exposure.

Case Report

In April 2018, a 78-year-old woman presented with spontaneous painful bleeding in her right eye. She had a history of PKP (twice 30 years earlier) due to a leukoma cornea in her right eye and had visited our outpatient department (OPD) for help in 2014 when her right eye revealed graft failure with limbal insufficiency, refractory secondary glaucoma, and pseudophakia. In 2014, she received amniotic membrane transplantation in her right eye because of a persistent large epithelial defect with graft thinning. Corneal graft failure with thinning, limbal deficiency, and intraocular pressure of approximately 30–55 mmHg in her right eye were noted during OPD follow-up. At that time, severely prolapsed uvea with active bleeding over the corneal perforation aperture of her right eye was observed, and the surrounding corneal tissue was almost

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unidentified [Figure 1a]. The patient reported no history of trauma, lifting of heavy things, or corneal infection, but a recent severe cough was noted. The patient subsequently underwent emergent evisceration with silicon sphere implantation in her right eye [Figure 1b]. When deep superior sulcus syndrome and orbital implant exposure developed 2 months later [Figures 2a, b, and 3], she received orbital reconstruction with a dermis-fat graft.

We harvested and trimmed a dermis-fat graft from the periumbilical area. The size of the graft was approximately 25 mm horizontally and 20 mm vertically. After removing the silicon sphere, we trimmed and pushed back the sclera. The dermis-fat graft was then placed in the orbital socket with the dermis layer anteriorly. The dermis-fat margin was secured to the recipient's Tenon's capsule and conjunctiva layer by layer using 6-0 vicryl. The socket was dressed with antibiotic ointment, and a conformer was placed within the cul-de-sac to maintain the fornices. We then performed tarsorrhaphy using 4-0 silk. A pressure dressing was kept in place until 36 h after surgery [Figure 4]. One month later, the postoperative cosmetic result in our patient was satisfactory [Figure 5].

Discussion

Evisceration has been performed for many ocular conditions, such as severe eye trauma, endophthalmitis irresponsive to treatment, and painful blind eyes. Ababneh *et al*. found that severe trauma was the leading reason for evisceration, representing 33.3% of all cases, whereas endophthalmitis was the cause in 28.6% of cases.[6] Lin and Liao reported that painful blind eyes (66.2%) and trauma (19.2%) were the main indications for evisceration.[1] However, no history of trauma was reported in our case.

Our patient had received PKP twice due to corneal graft failure. Despite favorable PKP outcomes, complications may sometimes occur. Ozdemir *et al*. reviewed 16 cases of post-PKP evisceration and found that the most common cause was endophthalmitis (56.25%), followed by corneal melting (25%) and trauma (18.75%).[7] We suspected that the causes of severe orbital content prolapse in our case were multiple PKP surgeries, graft failure with marked cornea thinning, and sudden increase of abdominal pressure due to a severe cough.

The advantages of orbital implantation after enucleation and evisceration include replacement of lost orbital volume, preserved orbital structure, better cosmetic appearance, and improved motility of the ocular prosthesis.[2] However, this procedure is not free of complications, such as extrusion, infection, inflammation, and exposure of the implant. Yousuf *et al*. indicated that the most common complication in both enucleation and evisceration was implant exposure.[8] Factors that contribute to implant exposure include surgical technique, implant infection, previous trauma or ocular

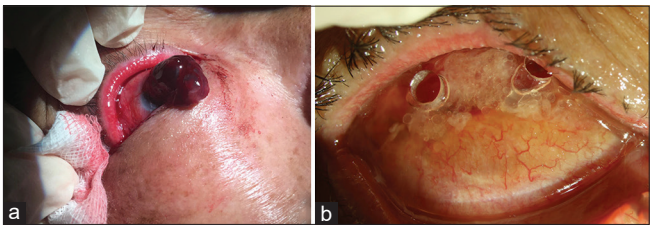

Figure 1: (a) Severely prolapsed uvea with active bleeding over corneal perforation aperture of the right eye before evisceration.(b) Postevisceration with a silicon sphere implant and conformer *in situ*

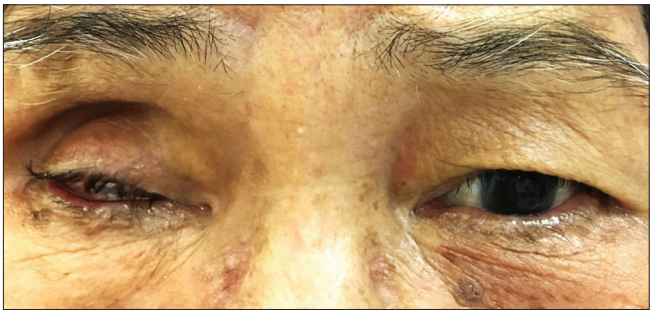

Figure 3: Deep superior sulcus syndrome developed 2 months later

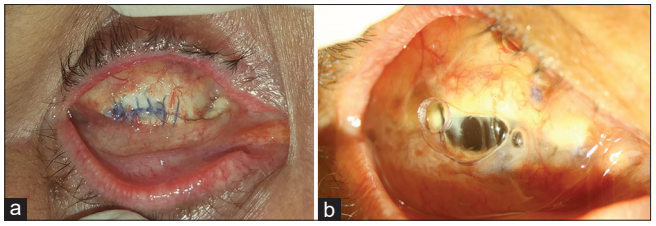

Figure 2: (a and b) Conjunctiva and sclera erosion with orbital implant exposure were noted 1 month after surgery

Figure 4: A dermis fat graft reformed the orbital contour and contributed to an adequate prosthetic cavity

Figure 5: The surface of dermis-fat graft was fully epithelialized. The fitting of a cosmetic prosthesis will be scheduled

procedures, and types of implants.[9] Two categories of materials are used for implants, namely, manufactured inert materials (glass, silicone, or methyl methacrylate) and bio-integrated materials (hydroxyapatite, porous polyethylene, or aluminum oxide). Although porous implants have better integration than other alloplastic implants, they are expensive.[10,11] We used a silicon sphere due to economic reasons and the emergent situation. Although studies have noted that insertion of a larger implant could prevent enophthalmos and superior sulcus deformity, this may be associated with increased risk of implant extrusion.[12] We, therefore, chose a smaller (16 mm) implant because keratectomy was necessary. Nonetheless, deep superior sulcus syndrome and orbital implant exposure developed 2 months after the surgery. History of multiple ocular operations may be a key factor in our case.

We hypothesized the potential risk factors for the early implant exposure in this case as follows: first, we performed keratectomy to trim the necrotic cornea. As a consequence, less viable tissue left which might lead to early exposure. Although we chose a 16-mm silicon sphere for implantation, the shallower fornix still limited our restoration of the orbital volume. Some previous studies mentioned wrapping implants with the use of sclerotomy to act as an additional layer of barrier and to facilitate implant insertion.[1,3] We may adjust the surgical technique in future.

Management of implant exposure is a vital issue for oculoplastic surgery. For cases with large-area implant exposure (>2 cm in diameter), Lin and Liao. reported that a dermis-fat graft is an effective option.[1] Chu *et al*. also published their experience that correcting orbital implant exposure using extraocular muscle flaps is a suitable strategy.[3] The vascularization between conjunctival flaps and autogenous or donor tissue grafts plays an important role in the management of exposed orbital implants. The dermis-fat grafts are easily obtained and induce less immunological reaction. The advantages of dermis-fat grafts are the accessibility and low donor-site morbidity.[1] However, the dermis-fat grafts may be reabsorbed by themselves, which can cause enophthalmos and cosmetic problems. Fornix loss and superior sulcus deformity have been reported.[1,4] Therefore, lifelong follow-up after orbital implantation may be necessary. Our experience with the dermis-fat graft technique has indicated friendly accessibility, low donor-site morbidity, and a satisfactory cosmetic outcome for superior sulcus deformity. A customized prosthesis will be fitted for better appearance, and follow-up on the orbital condition will be performed.

Conclusion

The risk of severe eyeball rupture in a cornea with tectonic vulnerability, such as the post-PKP graft failure and thinning in this case, should be noted. Orbital implant exposure may be the most common complication after evisceration surgery. Several methods for its management have been described. The dermis-fat grafts are easily obtained which induce less immunological reaction. Thus, they can be a favorable option for the management of exposed orbital implants. Our experience using the dermis-fat graft for implant exposure and orbital reconstruction revealed satisfactory cosmetic outcomes.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has/have given her consent for her images and other clinical information to be reported in the journal. The patient understands that her name and initials will not be published, and due efforts will be made to conceal her identity, but anonymity cannot be guaranteed.

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Conflicts of interest

The authors declare that there are no conflicts of interests of this paper.

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