CASE REPORT

Tenon patch graft for corneal fistula: a rare entity treated by a simple technique

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SUMMARY

A 50-year-old patient presented with dull aching pain with some discomfort in his right eye for the past 2 weeks. History revealed the patient had a past episode of infective keratitis managed medically in a local hospital. The last follow-up record suggested a diagnosis of healed keratitis with corneoid scar. On examination, the patient had visual acuity of hand movement and a corneoid scar of 7×7 mm with an inferotemporal translucent cystic area measuring 3×4 mm in size with underlying uveal tissue visible. Seidel test was found to be positive confirming leakage. For this, a tenon patch over the area of defect along with anterior chamber formation was done. On postoperative day 1, the graft was well attached and anterior chamber was formed with no leak on Seidel test. Intraocular pressure was 16 mm Hg.

with corneoid scar. On examination, the patient had a visual acuity of hand movement close to face (HMCF) with a low digital tension, and a central leucomatous scar 7×7 mm with stromal vascularisation with an inferotemporal translucent cystic area measuring 3×4 mm in size with underlying uveal tissue adherent to the fistula margin. Seidel test was positive with an area of corneal fistula measuring 1.5×2 mm in size. The posterior segment assessment was done using ultrasonography and was found to be normal. The fistula could have been managed with cyanoacrylate glue with bandaged contact lens; however, it was not available at that moment and the patient could not have afforded it. Moreover, as the photograph suggests, iris tissue could have come directly in contact with glue resulting in severe iritis and intraocular inflammation.³ Also, a donor corneal tissue was not available, so we decided to go ahead with tenon patch graft.

BACKGROUND

Corneal perforations may result from a variety of inflammatory or infectious causes. Usually, these cases heal by formation of a corneoid scar or need surgical intervention. Rarely, corneal fistulisation can occur that often goes unrecognised if not examined carefully. Corneal fistula is a chronic communication between the anterior chamber and the corneal surface. If not treated urgently, it can lead to complications such as phthisis bulbi, prolonged or recurrent hypotony, peripheral anterior synechiae formation, endophthalmitis or panophthalmitis.¹

The various management options for corneal perforation described so far include tissue adhesives with bandage contact lenses, multilayered amniotic membrane graft (AMG), corneal patch graft and penetrating keratoplasty. However, these modalities are associated with issues such as availability, cost-effectiveness and surgeon's experience.^{1 2} Herein, we report a case of corneal fistula that was managed successfully by tenon patch graft.

CASE PRESENTATION

A 50-year-old patient complained of dull aching pain with some discomfort in his right eye for a few weeks. History revealed that the patient had a past episode of pain, redness and photophobia following trauma with a wooden stick 3 months back and was treated for infective keratitis with medical management in a local hospital. The episode resolved within 2 months. The last follow-up record suggested a diagnosis of healed keratitis

INVESTIGATIONS

No posterior segment abnormality was detected on ultrasound of the right eye.

TREATMENT

A tenon patch graft over the area of defect along with anterior chamber formation was done (figure 1). The surgery was performed under peribulbar block. The size of the corneal perforation as well as the area of thinning was measured using a calliper. The conjunctiva in the superotemporal quadrant was marked 1 mm more than the measured size of the area of thinning. A linear peritomy was done and the conjunctiva was separated from the underlying tenon tissue using blunt dissection with the help of conjunctival scissors. The tenon tissue was separated from the underlying episcleral tissue using blunt dissection with the help of scissors. The tenon tissue corresponding to the size of conjunctival marking was excised with the help of Vannas scissors (Appasamy Associates, Chennai, Tamil Nadu, India), and the graft was then transferred to the site of perforation. Firm pressure was applied over the approximated conjunctival cut edges, with the help of serrated forceps for a few seconds to achieve firm adhesion. A 360-degree stromal pocket, around the edge of perforation, was created using a crescent knife (Alcon Surgical, Fort Worth, Texas, USA). The procured graft was then placed over the defect and the edges were tucked into the stromal pocket. The graft was then sutured with the help of multiple (4–5) interrupted 10-0

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Figure 1 Technique of tenon patch graft. (A) Size of the corneal perforation and the area of thinning is measured using calipers. (B & C) Conjunctiva in supero-temporal quadrant is marked 1 mm more than the measured size of the thinning. (D) A linear peritomy is done over the marked area. (E) Separated tenon tissue is marked and measured using calipers. (F) A linear incision is made over the tenon tissue extending to the underlying episcleral tissue using a curved vanna's scissors. (G) The tenon tissue corresponding to the size of conjunctival marking is excised with the help of vanna's scissors. (H) The cut edges of conjunctiva are approximated, by applying firm pressure with the help of serrated forceps, for a few seconds to achieve firm adhesion. (I) The procured graft is trimmed to match the size and shape of the defect. (J) The graft is then sutured with the help of multiple interrupted 10-0 monofilament nylon sutures. (K) The suture is first passed through the edge of the graft then through the stromal pocket and then taken out from the host cornea. (L) At the end of the procedure, anterior chamber is formed with air.

monofilament nylon sutures and buried over the host cornea side. At the end of the procedure, anterior chamber was formed with air. The eye was patched after putting antibiotic eye drops (moxifloxacin hydrochloride 0.5%).

Postoperatively, the patient was prescribed eye drop moxifloxacin hydrochloride 0.5% four times daily, homatropine hydrobromide 2% four times a day, prednisolone phosphate 0.5% four times a day and carboxymethyl cellulose 0.5% six times a day.

OUTCOME AND FOLLOW-UP

On postoperative day 1, the graft was well attached with formed anterior chamber and no leak on Seidel test [figure 2 (before surgery) and figure 3 (after surgery)]. Intraocular pressure was digitally normal with a visual acuity of HMCF. On last follow-up (at 4 weeks), the globe integrity was maintained with the graft well apposed and no evidence of leak on Seidel test was noted. Figure 4 summarises the outcome in another case of corneal fistula, in a 32-year-old patient managed with tenon graft.

DISCUSSION

A fistula is defined as an abnormal communication between an internal organ and the body surface. An open corneal fistula is a chronic communication between the anterior chamber and the corneal surface from which aqueous humour has free access to

Figure 2 Pre-op clinical picture showing leucomatous scar with stromal vascularisation with an inferotemporal translucent cystic area measuring 3×4 mm in size with underlying uveal tissue adherent to the fistula margin.

the corneal surface and tear film.¹ It is known to occur after trauma or corneal ulceration with perforation. If untreated, they may be associated with various complications like prolonged hypotony, peripheral anterior synechiae formation, endophthalmitis, panophthalmitis and phthisis bulbi.¹

Open corneal fistulas require early intervention and can be managed by tissue adhesives, AMG or keratoplasty. However, in developing countries, there are various issues that need to be addressed like cost limitation, paucity of donor corneas, and the cost of establishment and maintenance of an eye bank or a stem cell laboratory, which is required for all the above procedures. The goal of treatment in a case of corneal perforations is to restore the globe integrity and allow healing of the defect to make the cornea amenable for future corneal transplantation. In our case, the use of tenon patch graft fulfilled all these goals.

Tenon patch graft has been described previously for the management of scleromalacia after pterygium excision, scleral perforation and leaking trabeculectomy blebs.³⁻⁵ Vajpayee

Figure 3 Well-attached tenon graft on postoperative day 1.

Figure 4 Tenon graft in another case of corneal fistula showing pre-op (A), immediate post-op day 1 (B) and 2-month post-op picture.

described this technique for small to medium-sized corneal perforations. Our technique is similar to this technique.⁶ Korah *et al* described this technique in conjunction with the use of cyanoacrylate glue in 27 cases of corneal perforation of size 3–6 mm. A total of 20/27 patients healed completely with the formation of an adherent leucoma.³ In our case, tenon patch

graft was used exclusively to avoid the complications associated with use of tissue adhesives like increased postoperative inflammation, vascularisation and surface irregularity causing ocular discomfort.³ In addition, it has other advantages like autologous nature of the tissue, minimal postoperative inflammation and rejection, easy availability, cost-effectiveness and a simple surgical technique.

Contributors PKM has performed the surgery and was involved in conceptualisation, preparation of manuscript and final editing. DS has prepared the manuscript and was involved in keeping patient record and photographs. PS was involved in the final editing of the manuscript. JST was involved in proofreading and finalising the manuscript.

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Learning points

- ▶ Corneal fistula can be a complication of infective keratitis that is often missed if not examined carefully.
- ▶ Open corneal fistulas require early intervention and can be managed by tissue adhesives, amniotic membrane grafting or keratoplasty.
- ▶ These procedures may not be feasible in all scenarios due to lack of availability or financial constraints.
- ▶ Tenon patch graft is an invaluable technique under such circumstances.
- ▶ Tenon patch graft has the advantage of autologous graft, minimal tissue reaction, cost-effectiveness and an easy learning curve.

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