Infectious crystalline keratopathy post-Descemet stripping endothelial keratoplasty

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We report a case of a 46-year-old female who developed infectious crystalline keratopathy (ICK) after Descemet’s stripping endothelial keratoplasty (DSEK). She underwent DSEK for pseudophakic corneal edema in her left eye. Ten weeks after the procedure, the patient presented with complaints of blurred vision, redness in eye, and ocular pain. Slit lamp examination revealed white nonsuppurative branching deep stromal infiltrate. Microscopic examination of the Gram-stained smear showed gram-positive cocci. *Streptococcus viridans* was isolated on cultures. Isolated organism was sensitive to linezolid. Based on antibiotic sensitivity report, fortified linezolid (0.2%) eye drop was started on hourly basis. After 10 weeks of topical fortified linezolid (0.2%) therapy, complete resolution of infiltrate with significant corneal scarring and vascularization was seen. Infectious crystalline keratopathy can occur after DSEK.

Key words: Corneal infiltrate, Descemet’s stripping endothelial keratoplasty, endothelial keratoplasty, infective crystalline keratopathy, *Streptococcus viridans*

Infectious crystalline keratopathy (ICK) was first reported by Gorovoy *et al.* in 1983.[1] ICK is a rare clinical manifestation of the cornea that results in gray-white, branching stromal opacities in the cornea with little surrounding inflammation.[3] It has been associated with long-term topical steroid therapy and is most commonly found in patients who have had previous penetrating keratoplasty.[3] The presence of an immunocompromized corneal state is a known risk factor for the development of ICK.[4,5] Other risk factors associated with ICK are recent suture manipulations, persistent epithelial defects, loose sutures, contact lenses, and topical anesthetic abuse.[4,5] In addition to penetrating keratoplasty, ICK has been reported following lamellar keratoplasty, corneal relaxation incisions, laser-assisted in situ keratomileusis (LASIK), and cataract extraction. This case report illustrates the development of ICK after 10 weeks of Descemet’s stripping endothelial keratoplasty (DESK) procedure.

**Case Report**

A 46-year-old female underwent DSEK for pseudophakic corneal edema in her left eye. The treatment was performed under sterile conditions using preoperative topical anesthesia. On postoperative day one, slit lamp examination revealed well attached lenticule. Topical steroids (prednisolone acetate 1%) was prescribed for six times daily for 1 week and then tapered. The patient’s immediate postoperative course was uneventful.

Ten weeks after the procedure, the patient presented with complaints of watering, blurred vision, redness, and pain in the treated eye. On examination, the best corrected visual acuity was 20/400. Slit lamp examination revealed white, nonsuppurative, crystalline corneal infiltrates that exhibited branching needle-like opacities. Size of corneal infiltrate was 1.3 × 1 mm (slit lamp scale was used to measure the infiltrate’s size) located in anterior corneal stroma [Fig. 1]. Fluorescein staining revealed a corneal epithelial defect. Size of corneal epithelial defect was 1.3 × 1 mm.

Corneal scrapings were obtained from the base and edge of the ulcer using a sterile surgical blade (+ 15 on a Bard Parker handle) under topical anesthesia (0.5% proparacaine hydrochloride) and slit lamp magnification. Gram stain and 10% potassium hydroxide mount were included as a part of the standard protocol for microscopic evaluation of corneal smears. Gram-stained smears were examined at ×400 and ×1000 magnification and the potassium hydroxide preparations were examined at ×200 and ×400 magnification under light microscope. Scrapings for smears were collected prior to those for culture. Gram-positive cocci was identified on Gram stain. Fortified cefazolin (5%) with ciprofloxacin (0.3%) was started as a standard empirical therapy on half-hourly basis.

The culture was inoculated on sheep blood agar, chocolate agar, brain heart infusion broth, Sabouraud dextrose agar, and thioglycolate media. The samples were inoculated directly onto the solid culture media by making a row of ‘C’ marks. For inoculation into the liquid media, the blades were swirled directly in the culture fluid. *Streptococcus viridans* was isolated on blood agar, chocolate agar, brain heart infusion, and thioglycolate media.

Isolated *S. viridans* was sensitive to co-trimoxazole, linezolid, and netilin. Based on antibiotic sensitivity report, the patient was treated with hourly topical linezolid (0.2%) fortified eye drops. The antibiotic was reduced to five times daily for 3 days after presentation and slowly tapered after the infiltrates began to resolve and the epithelial defect healed. The patient...
responded well to the treatment. Ten weeks after presentation, slit lamp examination revealed deep corneal scarring with neovascularization [Fig. 2]. Complete resolution of corneal infiltrate was seen at 10 weeks. Best corrected visual acuity at 10 weeks follow up was counting fingers at 1 meter with accurate projection of rays.

Discussion

ICK develops mostly in postkeratoplasty procedures. The immunosuppression due to long-term use of steroids to prevent the graft failure is one of the main causes for ICK. The noninflammatory, intrastromal bacterial colonization of a corneal graft. In addition to penetrating keratoplasty, ICK has been reported following corneal relaxing incisions, topical anesthetic abuse, Acanthamoeba infection, epikeratophakia, epithelial defect, LASIK, cataract extraction, and presumed herpes simplex virus keratitis.

The most commonly associated organism with ICK is S. viridans. Other causative organisms are: Streptococcus pneumoniae, coagulase-negative Streptococcus spp., Peptostreptococcus spp., Haemophilus aphrophilus, Mycobacterium spp., Pseudomonas aeruginosa, Enterococcus spp., Candida spp., Alternaria spp., and Serratia marcescens. The unique growth of microorganism has been related to their intrinsic property. The antibiotics should be started on the basis of sensitivity report.

The mechanism for ICK is not well understood. It occurs most commonly in postpenetrating keratoplasty cases and in immunocompromized patients. James et al. suggested that the break in Bowman’s membrane may play a role in mode of bacterial entry into the stroma, and suture tracks being the most probable mode in the case of penetrating keratoplasty.

The diagnosis of ICK can be made on its clinical appearance, history of keratoplasty, use of steroid, and so on. However, management includes corneal scraping for smears and cultures. For deep ulcers, corneal biopsy can be done. Lamellar flap can be made for specimen and then reposition the flap and suture applied. Polymerase chain reaction and DNA assay have an adjunctive tool to diagnose it.

In this case, the pathogen identified was S. viridans sensitive to linezolid. The patient responded well to the antibiotic therapy. This therapy minimized the risk of recurrence, mitigated further sequelae, and maintained vision at 10-week follow-up. There was only one report of developing ICK after DSEK, which was reported by Porter et al.

Conclusion

ICK after DSEK is a rare complication. This can affect the visual outcome and graft survival. Discontinuation of topical steroids and aggressive use of topical antibiotic resulted in resolution of infection. Appropriate laboratory investigation is necessary to detect the microorganism and specific targeted therapy. After complete resolution of infection, repeat penetrating keratoplasty can be done for good visual recovery.

Declaration of patient consent

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

Acknowledgement

Authors would like to thank Mr. Lokesh Chauhan for his technical support.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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A rare case of Accessory iris membrane, persistent pupillary membrane: Case-based approach and management.

Persistent pupillary membranes (PPMs) are a common congenital anomaly seen in 95% of neonates and 20% of the adult population. They are typically fine iris strands along the visual axis and can present as a total dense membrane and remnants of the anterior tunica vasculosa lentis. PPMs are relatively uncommon and can be a total dense membrane. In the presented case, a 36-year-old female presented with complaints of blurred vision in both eyes since childhood. On examination, there was a dense membrane covering the pupillary area continuous with the collarette, suggestive of PPM. Lens irrigation and aspiration was done, and hydration of the superior corneal wound was done with sterile balanced salt solution. A viscoelastic material (viscoat) was removed completely by irrigation and aspiration, after which hydration of the superior corneal wound was done with sterile balanced salt solution. A keratome was then used to separate the membrane from the anterior lens capsule. After which the strands were separated into the anterior chamber and behind the iris to separate the membrane and the iris collarette. Histopathological examination of the excised tissue revealed typical features of normal iris tissue in the excised membranes. The patient was made aware of the surgical removal and the need of wearing glasses after any intervention to remove the membrane. Furthermore, the risk of loss of the pinhole effect was explained to the patient. A clinical diagnosis of PPM was made, and it was planned to excise the membrane. The patient was given appropriate credit and the new creations are licensed under the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License. This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.