Case Report

Deep Keratomycosis Following Ahmed Glaucoma Valve Implantation

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Abstract

Purpose: To report an unusual case of deep keratomycosis after Ahmed glaucoma valve (AGV) implantation.

Methods: A 70-year-old male presented with a deep corneal stromal infiltrate, without epithelial involvement, 3 weeks after a successful AGV implantation for neovascular glaucoma. Microscopic examination of the anterior chamber exudates revealed fungal filaments on smear, and white fungal colonies were observed on the Blood agar and Sabouraud dextrose agar. The fungus was identified as *Aspergillus flavus*.

Results: The patient was treated with oral and topical 1% voriconazole. Ten weeks after the treatment, the corneal infiltrate resolved, resulting in a vascularized scar.

Conclusion: As recalcitrant keratomycosis of the deep corneal layers may occur after AGV implantation, early identification and prompt treatment may help to achieve complete resolution of the infection and salvage the eye.

Keywords: Ahmed glaucoma valve implantation, Corneal endoexudates, Deep keratomycosis, Voriconazole

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Introduction

Ahmed glaucoma valve (AGV) implantation is performed for intraocular pressure (IOP) control in the cases of refractory glaucoma. Eye rubbing and conjunctival dehiscence over the AGV tube are the risk factors for endophthalmitis, as the normal ocular flora gains intraocular access from the eroded conjunctiva.[1-3]

We report a case of deep keratomycosis following AGV implantation, where prompt diagnosis and appropriate treatment contributed to a favorable outcome.

Case Report

A 70-year-old male, known diabetic underwent an uneventful AGV implantation (FP 7 model, New World Medical Inc., Rancho Cucamonga, USA) in the superotemporal quadrant of the left eye. Postoperatively, his best corrected visual acuity was 20/40; conjunctiva was well apposed; there were a diffuse bleb over the AGV plate, a clear cornea, and a well-positioned AGV tube, away from the corneal endothelium and iris; and IOP was 6 mmHg.

Two weeks later, he presented with the complaints of sudden decrease in the vision and pain and redness in the left eye, of 1-day duration. He denied any history of trauma. The best corrected visual acuity in the left eye was 20/200; slit-lamp examination showed edematous lids, an intact conjunctiva over the donor sclera and AGV plate, and Seidel's test was negative. There was a peripheral, yellowish color, corneal infiltrate at 12.30–1.30 o'clock

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position, which was 4 mm × 2 mm in size, involving the deep stroma and endothelium, without any overlying epithelial defect, and with a hypopyon [Figure 1]. IOP was 28 mmHg, and the vitreous cavity was clear. Nasolacrimal duct was patent in both the eyes. Aqueous tap and corneal endothelial exudate aspirate were sent for microbiological assay, which revealed fungal filaments in 10% potassium hydroxide mount and Gram stain [Figure 2]. White fungal colonies were observed after a 48 h of incubation on blood agar and Sabouraud dextrose agar. The white colonies on Sabouraud dextrose agar plates turned powdery and green after 4 days of incubation [Figure 3]. Lactophenol cotton blue stain of the colony showed a variable length, rough conidiophores, ending with a round vesicle. A single row of phialides (uniseriate) covering the entire vesicle was noted. The fungus was identified as *Aspergillus flavus*.

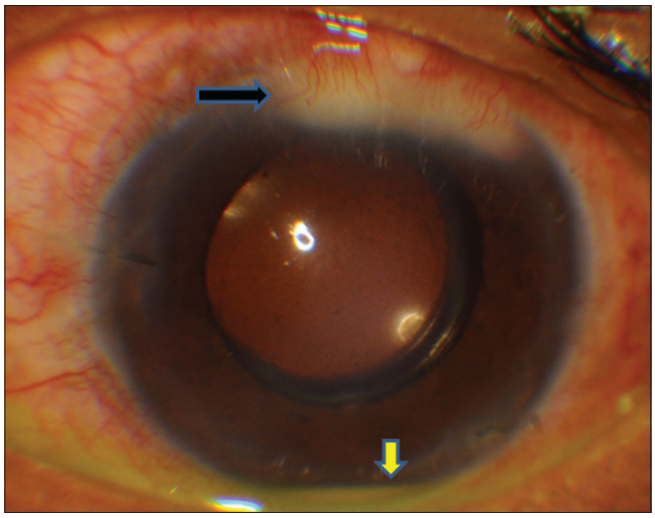

Figure 1: Slit-lamp photograph of the left eye at presentation, showing a congested conjunctiva, yellowish peripheral corneal infiltrate involving the deep corneal stroma as an endothelial plaque (black arrow) with an intact superficial epithelium and hypopyon (yellow arrow)

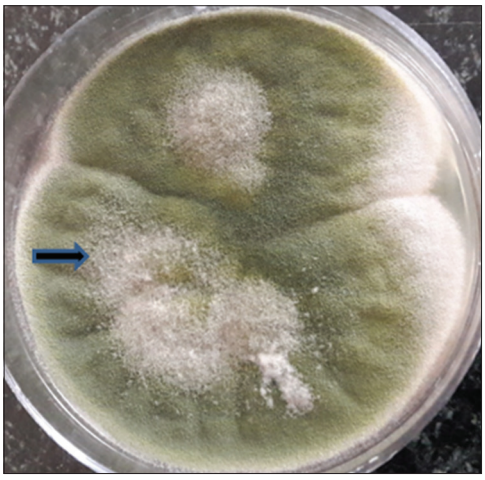

Figure 3: Photomicrograph of a 4-day-old growth of corneal exudates, showing white powdery surface colonies (arrow) of *Aspergillus flavus* inoculated on the Sabouraud dextrose agar culture plate

The patient was started on 2 hourly topical 5% natamycin, topical brimonidine 0.2% thrice daily, and oral ketoconazole 200 mg twice daily. During the follow-up visit, his best corrected visual acuity improved to 20/100 and the hypopyon resolved. However, the exudates on corneal endothelium continued to increase in size and density. He was started on oral voriconazole 200 mg twice daily and hourly topical 1% voriconazole, which was prepared in the hospital pharmacy under aseptic condition, from pure powder form (Vorier injection, Zydus Pharmaceuticals, Pennington, NJ, USA).

During each follow-up visit, the extent of endothelial infiltrate was documented. After 10 weeks, his best corrected visual acuity improved to 20/30, and the infiltrate resolved with resultant endothelial plaque and opaque vascularized opacity [Figure 4]. Oral and topical antifungal medications were discontinued and till the last follow-up visit at 3 years

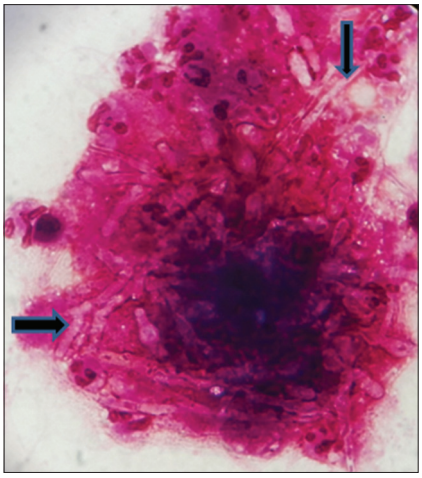

Figure 2: Photomicrograph of Gram stain showing the presence of septate, fungal branching hyphae (arrow) in the corneal scrapings

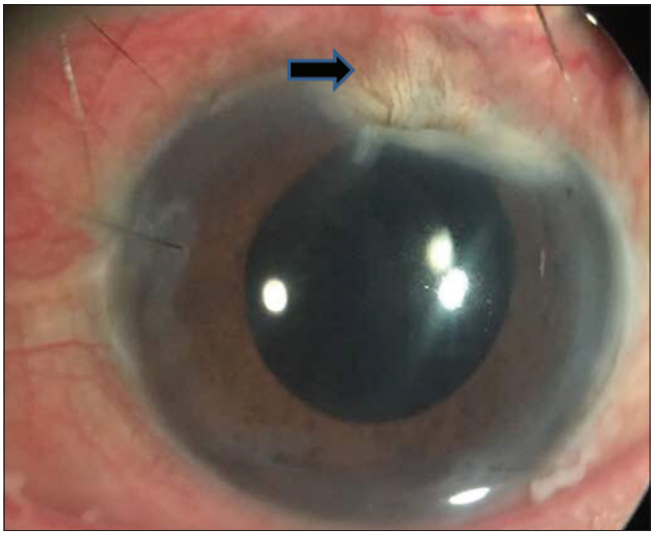

Figure 4: Slit-lamp photograph of the left eye, 10 weeks after voriconazole therapy, showing a quiet eye, resolution of hypopyon, and vascularized peripheral corneal scar (arrow)

after the initial presentation, no signs of recurrence were noted.

Discussion

Predisposing factors for the postoperative mycotic infection are ocular trauma, especially with organic matter, ocular surface disease, contact lens wear, use of topical corticosteroids, diabetes mellitus, and loose or broken suture.[4,5]

A. flavus is a filamentous, ubiquitous fungus, isolated from the soil, plant debris, and indoor air environment, known to cause opportunistic infection in the immunocompromised individuals, accounting for 80% of *Aspergillus* keratitis.[6] Voriconazole is a broad-spectrum triazole antifungal agent which causes inhibition of cytochrome P-450-mediated 14-α-lanosterol demethylation, resulting in ergosterol depletion and fungal cell wall destruction. It has demonstrated its efficacy in the management of refractory fungal filamentous keratitis.[7,8]

Risk factors for the keratomycosis in this patient could be diabetes and the use of topical steroids. The corneal traction suture track may serve as a nidus for localized infection due to the epithelial breakdown, but in this case, the site of corneal traction suture had healed and was away from the site of keratitis. The source of infection in this case was exogenous, most probably from the patient's surroundings. The early manifestation could have been in the form of superficial keratitis, which partially resolved after the corneal scraping due to the debulking of the organism. The fungal filaments possibly remained dormant in the deep corneal layers from the contiguous spread from the surface, and continued to grow, with the overlying intact epithelium, especially with the continued use of topical steroids.

A non-resolving corneal infection could also lead to endophthalmitis, if not treated on time. Postoperative fungal endophthalmitis after AGV implant is rare but has been reported in 0.8–6.3% of eyes after the implantation of a glaucoma drainage device, with the onset usually delayed by more than 6 weeks, secondary to the conjunctival erosion or tube exposure.[3,9,10] In this case, the deep seated infiltrate progressed, but showed resolution once the patient was started on topical and oral voriconazole and fortunately did not progress to endophthalmitis.

To the best of our knowledge, deep seated keratomycosis after AGV implantation has not been reported in literature. The deep corneal infiltrate seen in this case illustrates another potential complication after AGV and emphasizes the significance of regular follow-up and the need to educate patients to seek medical help at earliest, if they notice any of the mentioned symptoms, to avoid ocular morbidity.

Declaration of patient consent

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

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Conflicts of interest

There are no conflicts of interest.

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