

Aspergillus Keratitis after Deep Anterior Lamellar Keratoplasty

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A 17-year-old female with a several-year history of bilateral keratoconus was visited about 1 year prior to deep anterior lamellar keratoplasty (DALK) in her right eye (OD).

History-wise, she was intolerant to glasses and contact lenses and her past medical history and family history were unremarkable.

On ocular examination, she had visual acuity (VA) of 2 meters counting fingers (CF) in each eye without correction and 4 meters CF after best spectacle correction of $-17.50-5.0 \times 10^\circ$ and $-12.50-5.0 \times 165^\circ$ in the right and left eyes, respectively.

Slit lamp biomicroscopy showed normal ocular adnexa but bulged clear corneas with typical signs of keratoconus in both eyes. Remaining ocular examinations in both eyes were unremarkable.

The patient underwent DALK in her right eye; a recipient corneal bed size of 7.50 mm received a 7.75 mm graft, which was preserved in optisol solution and had been obtained from a 39-year-old male donor died from trauma. Death to preservation time was about 27 h and the time interval between graft preservation and DALK was 3 days. After removing its endothelium, the donor cornea was sutured to the recipient bed using 10-0 nylon double running torque-antitorque method. At the end of the surgery, subconjunctival injection of betamethasone-cephazolin was given without placing a bandage contact lens on the cornea. Postoperatively, the patient received betamethasone eye drops (every 4 hours), chloramphenicol eye drops (every 6 hours) and preservative-free artificial tears (every 2 hours).

One week post operatively, the patient was found to have moderately red right eye and on examination, mild melting of the graft was observed at 12-1.50

o'clock position. The double running sutures seemed a little tight; however, no gross infiltration was noted and the anterior chamber did not show apparent cellular reaction. Subsequently, frequency of the lubricant eye drops was increased, however her ocular findings did not improve much after 3 days. In order to prevent corneal drying and provide better lubrication, lateral blepharorrhaphy was done for the right eye. One week later, she was found to have interface infiltration and increased graft melting at the same site described above. The patient was soon admitted to the hospital and after taking routine cultures, was started on fortified vancomycin and ceftazidime drops. One week later, patient's eye condition got worse and melting involved the whole graft [Figure 1]. Meanwhile, the first culture was reported negative for bacteria and fungi.

Three weeks after surgery, the patient underwent a second surgery, therapeutic penetrating keratoplasty, during which routine cultures were repeated and the excised graft tissue was sent for histopathologic and microbiologic exams. The culture was reported positive for aspergillus on the 2nd postoperative day when amphotericin B 0.2% drops every hour and oral itraconazole 100 mg twice daily were started for the patient. One week after initiation of antifungal therapy, the improvement was so drastic that the patient was discharged from the hospital [Figure 2], with maintenance dosage of systemic and local antifungal agents which was gradually tapered over the following 2 months. Three months after DALK [Figure 3], the patient

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had a quiet eye with uncorrected VA of 3/10 and signs of cataract development; intraocular pressure of the eye was 16 mmHg at this visit.

DISCUSSION

Fungal keratitis is one of the most difficult forms of microbial keratitis for the ophthalmologist to diagnose and treat successfully.^[1]

Corneal transplantation is one of the risk factors for fungal (Candida) keratitis and concurrent administration of topical steroids increases the risk of infection.^[2-4] It is an uncommon event after penetrating keratoplasty.^[2-6]

There are several reports indicating that the risk of donor-to-host transmission is 12-22 times greater when a donor cornea with a positive rim culture is transplanted.^[5,7] The odds of fungal endophthalmitis with a fungal culture-positive donor rim are 247 times greater than with fungal culture-negative donor rim.^[4,7]

Kitzmann et al, have adopted a new practice of empirically treating all patients who have fungal positive donor corneoscleral rims with topical 0.15% amphotericin B, 4 times/day and oral fluconazole 200 mg twice a day, for 4 weeks.^[7] They routinely take donor corneoscleral rim cultures in all keratoplasty cases

whereas this routine is not practiced by many corneal surgeons including us.

The reported cases of fungal keratitis in the setting of DALK and Descemet's stripping automated endothelial keratoplasty surgeries are confined to about 10 articles (PubMed search on March 2013) and interestingly all of them were due to *Candida* species^[3-11] except for one that was due to *aspergillus*.^[12] Our case may be the second one.

In all reported cases, documentation of the infection was made by culture. Likewise, our case had positive culture for *aspergillus*, in addition to histopathologic report [Figure 4] from the removed infected graft tissue. This shows the importance of microbiologic and histopathologic examination of the tissues excised by ophthalmologist even if the clinical picture of the patient is not in favor of fungal infection.

In six articles, which reported DALK cases with fungal infection,^[3,5,8,10-12] all but two, had the clinical findings of infection at least 4 weeks postoperatively with gradual progression.^[3,5,8,10] In the remaining two articles, the clinical findings were in the early postoperative period,^[11,12] implicating the aggressive behavior of the fungal agent. One of them was documented to be due to *aspergillus*^[12] and the other due to *Candida*.^[11] Similarly, our case showed abnormal findings in the early postoperative period. This short period of time for onset and progression of a fungal infection may be attributed to the aggressive behavior



Figure 1. Right eye of the patient 3 weeks after deep anterior lamellar keratoplasty.

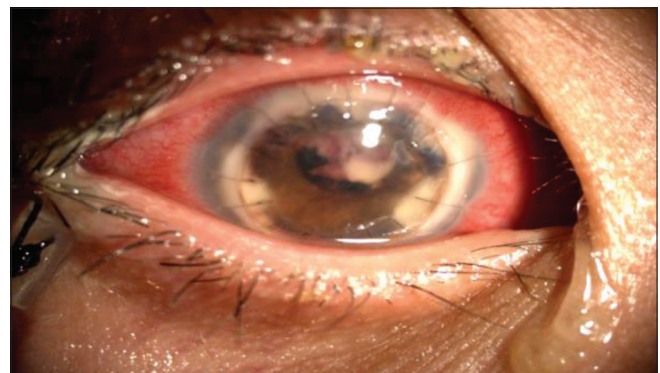


Figure 2. Right eye of the patient 1 week after therapeutic penetrating keratoplasty and antifungal therapy.

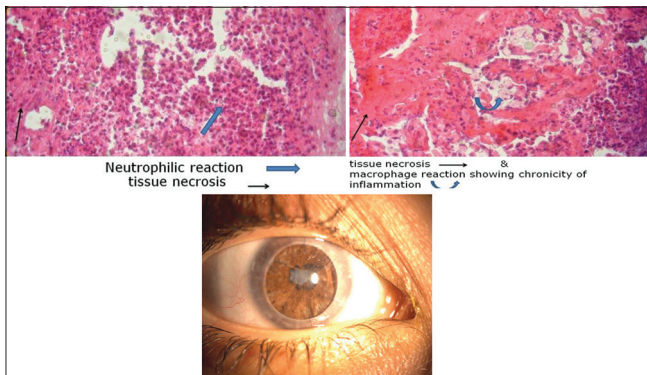


Figure 3. Histopathologic report of the excised graft was positive for *aspergillus*.

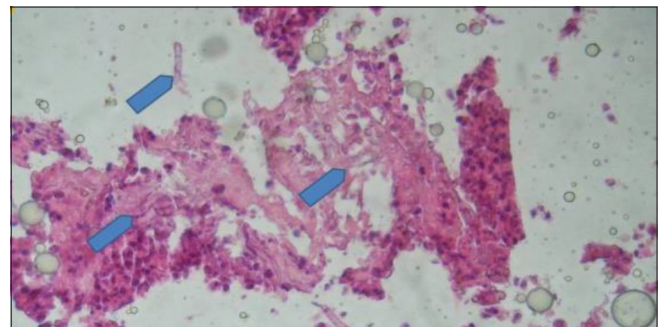


Figure 4. Fungal mycelium (septate type) in the infected cornea.

of fungal agents when they occur in a setting which provides a potential space for their rapid growth (the DALK interface potential space).

In summary, fungal infection after DALK surgery should be considered among the differential diagnosis in patients who present with interface infiltrate and corneal melting even in the early postoperative period. The practice of taking donor corneoscleral rim culture as Kitmann et al^[7] routinely perform in keratoplasty cases at the time of surgery, is greatly appreciated and logical, and may be a necessity as new cases of misleading fungal infections arise in the setting of new techniques of modern keratoplasty.

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