Kocuria kristinae interface keratitis following deep anterior lamellar keratoplasty

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A 21-year-old boy underwent deep anterior lamellar keratoplasty (DALK) for advanced keratoconus. Postoperatively, slit lamp examination revealed multiple foci of interface infiltrates. Medical therapy was non-responsive, and therefore, a repeat lamellar transplantation was done. Scrapings were taken from host stroma and under the surface of the initial graft. Microbiological examination, aided by VITEK-2, revealed the causative organism as *Kocuria kristinae*. The postoperative course was uneventful and at a 1-year follow-up, the graft was clear with no recurrence of infection. This case highlights the pathogenic potential of Kocuria species, which has previously been disregarded as a commensal or contaminant.

Key words: Interface keratitis, *Kocuria kristinae,* VITEK-2

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Interface keratitis following deep anterior lamellar keratoplasty (DALK), is an uncommon complication with several microbes being implicated of which Candida spp. is the most common organism.[1] In this report, we present the first case of interface keratitis due to *Kocuria kristinae*. Kocuria

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spp. are commensals of the skin and oral mucosa, which are difficult to identify because of their phenotypical similarity to coagulase-negative staphylococci (CoNS) spp.[2] Advanced identification systems (VITEK-2) have enabled their easier identification and differentiation as a result of which there is a growing awareness of the pathogenic potential of this organism.[3]

Case Report

A 21-year-old male with bilateral keratoconus had undergone DALK in the right eye in 2007 and had a clear graft and unaided vision of 20/20. He presented to our clinic with advanced keratoconus in the left eye (K max value: 85.4D, thinnest pachymetry: 234 μ) for which he underwent DALK. Manual dissection of the host stroma was carried out leaving some residual stroma at the periphery and the donor graft was sutured with 16 interrupted 10-0 nylon sutures. On the first postoperative day, the patient had an uncorrected visual acuity of 20/100 and a clear interface. Topical prednisolone acetate 1% eye drops hourly, moxifloxacin 0.5% four times, and homatropine hydrobromide 2% three times a day were started.

On the 8th postoperative day, the visual acuity decreased to 20/200 and the slit-lamp examination revealed three foci of yellowish-white infiltrates (yellow arrow) with indistinct margins measuring around 1 mm by 1.5 mm [Fig. 1a], located in the interface, which was confirmed by anterior segment optical coherence tomography (RTVue Avanti, Optovue Inc., Fremont, CA, USA) [Fig. 1b]. The location of the infiltrate precluded a diagnostic scraping and so hourly topical antibiotic therapy (fortified vancomycin 5% and ciprofloxacin 0.3%) was initiated after discontinuing steroids. However, there was an increase in the size of infiltrate after 4 days, [Fig. 2] and, therefore, corneal scraping of the infiltrate from the interface was planned.

On lifting the donor graft, scrapings were taken from the host and donor cornea and sent for routine microbiological investigations. Intraoperatively, in view of the extensive involvement, further lamellar dissection of residual stroma was done to a deeper plane and the donor graft was replaced with another lamellar corneal graft. The stromal bed was irrigated with moxifloxacin 0.5% after the removal of the corneal lamellar graft. Both the residual stroma and corneal graft were sent for histopathological and microbiological examination.

The direct microscopy of the corneal scrapings showed the presence of gram-positive cocci in pairs, groups, and chains [Fig. 3a] under Gram stain and the presence of Kocuria spp. was confirmed by growth of large, cream colored colonies [Fig. 3b] on blood agar and chocolate agar, and by using the GP cards of VITEK -2 (BioMe × rieux Inc., Durham, NC, USA) system**.** All of these isolates were catalase-positive and coagulase-negative in our series. The organism was found to be susceptible to vancomycin, ofloxacin, and linezolid. The storage media and the donor scleral rim of the current graft and the other eye of the donor were traced, and no microbial contamination was noted. Based on this sensitivity report, topical vancomycin 5% was continued every 2 hours. On follow-up [Fig. 4], there was no recurrence of infection observed and topical steroid (prednisolone acetate 1%) was added four times a day along with topical vancomycin, which was continued for another two weeks. The patient was kept under close follow-up and at the 1-year visit, the patient had an uncorrected visual acuity of 20/40, and a clear graft with no evidence of recurrence of infection [Fig. 4].

Discussion

Although a few cases of bacterial infection in post DALK interface keratitis have been reported, this is the first case of interface infection with *Kocuria kristinae*.[1] Kocuria spps. are gram-positive cocci arranged in pairs or tetrads and are commensals of the normal skin and oral mucosa.[3,4] They were previously misdiagnosed as coagulase-negative Staphylococci species because of their phenotypical similarity or disregarded as a contaminant.[3,5]

Identification of Kocuria spp remains elusive because most clinical microbiology laboratories have limited or no access to advanced molecular techniques. Laboratory identification of *Kocuria* spp can be made conventionally only after high laboratory suspicion. Properties such as morphological variability between these bacteria and other similar gram-positive cocci, as well as biochemical properties including the antimicrobial susceptibility patterns against selective antibiotics could be used to presumptively identify Kocuria spp. Susceptibility towards bacitracin and lysozyme and resistance to nitrofurantoin, furazolidone, and lysostaphin can be used to separate this bacterium from Staphylococci. This, however, is not commonly done in routine work-ups. An increase in time-dependant pigmentation of the colonies can also lead to the diagnosis of Kocuria as the typical pigmentation of these colonies increase with time especially after a culture period of 48 hours.[4] With the advent of sophisticated microbiological identification systems such as VITEK -2 (BioMe'rieux Inc., Durham, NC, USA) the pickup rate of this organism has increased.[3] Several systemic and ocular infections, in the form of keratitis, dacryocystitis, and endophthalmitis have been reported.[2,6-8] Studies have shown this organism to be susceptible to a wide range of antibiotics, but the strain isolated from our patient was multidrug-resistant with sensitivity only to vancomycin, ofloxacin, and linezolid suggesting a variable pattern of susceptibility.[4] A compromised ocular surface or underlying systemic immunosuppression has been attributed to the pathogenesis of the organism, however, both were absent in our patient including any form of ocular allergy.

The microbiological diagnosis of interface keratitis post lamellar grafts is difficult because of the inaccessibility of the sample.[1,9] The concurrent use of steroids poses yet another challenge as they alter the clinical presentation.[10] In addition, the rarity of post DALK interface keratitis in literature has resulted in a lack of protocols for the management of the same with a few cases being managed medically and with interface wash while others needed full-thickness grafts.[1] In our patient, repeat DALK was done as there was adequate residual host tissue after excising the infected cornea.

Conclusion

This report highlights the potential pathogenic nature of Kocuria spp. This organism should not be disregarded when isolated from a clinical sample. Moreover, scraping of the stromal bed in cases of infections following lamellar

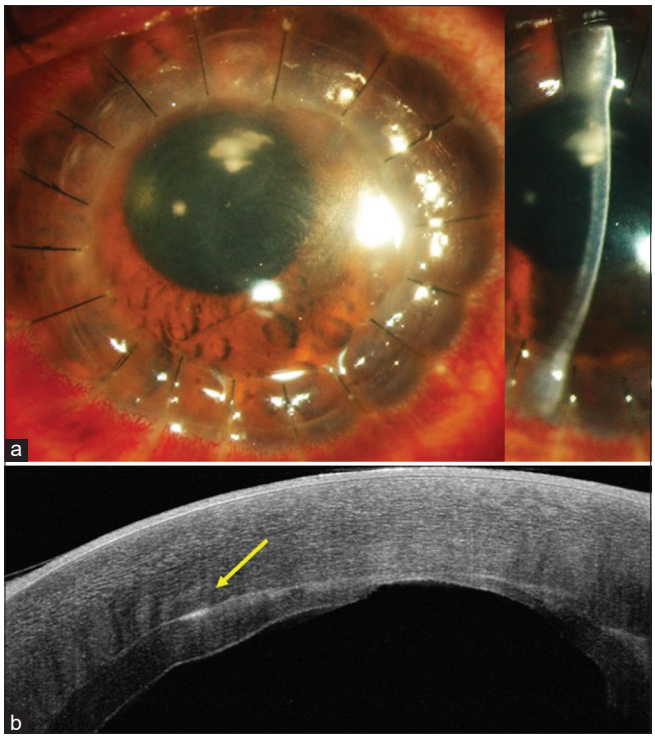

Figure 1: (a) Diffuse and slit images of the left eye showing greyish white infiltrate located at the level of the interface. (b) Line scan of OCT showing the infiltrate to be at the level of the interface (yellow arrow)

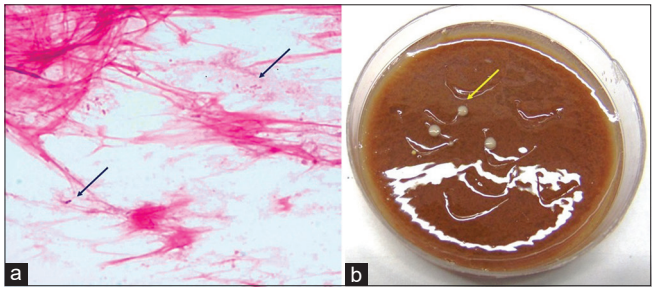

Figure 3: (a) 100x magnification of Grams stain showing gram positive cocci in pair (black arrows). (b) showing cream coloured colonies on blood agar (yellow arrow)

keratoplasty is mandatory to establish the diagnosis, as the clinical presentation of interface keratitis may be atypical because of concurrent use of steroids. Furthermore, while the management of post DALK interface keratitis needs to be tailored based on various factors, with some cases amenable to medical management, surgical intervention remains the mainstay of treatment.

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.

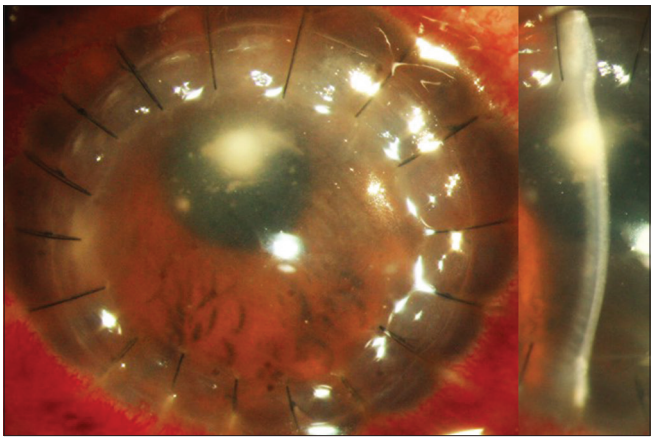

Figure 2: Diffuse and slit images of the left eye showing increase in the density of the infiltrates three days after the initial presentation

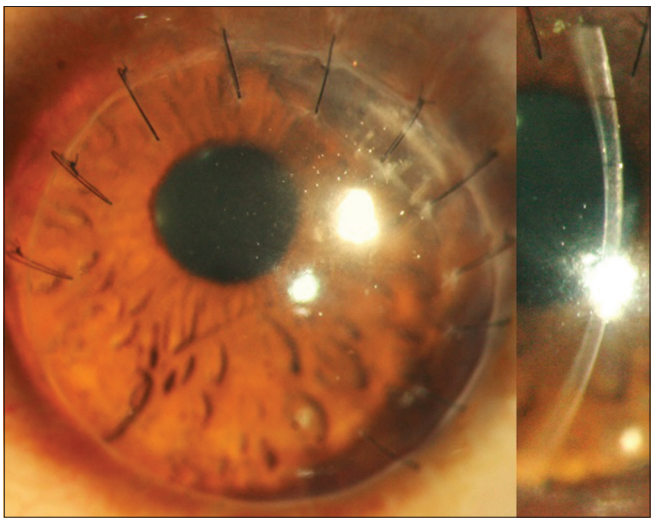

Figure 4: Diffuse and slit images of the left eye 1 year after the repeat DALK showing a clear graft with no evidence of recurrence of infection

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Nil.

Conflicts of interest

There are no conflicts of interest.

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