Can Donor Cornea Transmit Microsporidial Infection?

Dear Editor,

The infection of the corneal graft is one of the most serious complications following keratoplasty. We have earlier reported a unique case of microsporidial epithelial keratoconjunctivitis occurring in the corneal graft of an individual who was locally immunocompromised. Following that report we had another case in a 20-year-old male who came to us with similar lesions following keratoplasty and microsporidia was detected on direct microscopic examination of the lesions. The only possible associated risk in both these cases was the use of topical steroids, leading to a localized immunosuppressed state resulting in secondary infection by microsporidia. The use of immunosuppression as a therapeutic goal following keratoplasty, therefore, may increase the risk for acquiring microsporidia infections in these patients. We thus speculate the possible presence of these organisms in the donor corneas and subsequent infection in these patients. Our objective was to determine the potential infectivity of donor corneas leading to microsporidial keratitis following keratoplasty.

Postmortem donor corneas were harvested with the consent of families from 53 subjects by in situ excision by the Ramayamma International Eye Bank at the L.V. Prasad Eye Institute, Hyderabad, India. These tissues were considered unsuitable for use as donor tissue by the eye bank as they were of poor quality or were from patients who had died of causes contraindicated as suitable donors (sepsisemia, multiple myeloma) by the eye bank association of India guidelines. Thirty seven out of 53 donors were male and sixteen were female. The mean age of the donors was 65.5 ± 18.9 (range 25-104) years.

DNA was isolated from the corneal tissue using the ‘UNSET procedure’. Polymerase chain reaction (PCR) was performed using pan-microsporidia primers that is capable of amplifying a conserved region of the small-subunit rRNA gene of V. corneae, E. cuniculi, E. hellem and E. intestinalis. The PCR conditions included one minute denaturation at 94°C, two minute annealing at 55°C and three minute extension at 72°C for 35 cycles. The DNA from all these corneal tissue samples were additionally spiked with 1 µl of Encephalitozoon hellem (reference strain) to rule out the presence of PCR inhibitors in the samples. Microsporidial DNA was not detected in any of the samples tested. On the other hand none of the samples in our study showed presence of any inhibitors and an expected amplification corresponding to ~270 bp was observed in all cases after spiking them.

Corneas have transmitted rabies, hepatitis B, cytomegalovirus, herpes simplex virus, bacteria and fungi. Over the past several years, improvements in donor screening criteria, such as excluding potential donors with infection for HIV-1 and hepatitis B and syphilis have greatly reduced the risk of such infections. There have been few reports of additional danger of transplanting active HCV and HSV if critical assessment of the graft prior to surgery is not carried out. Therefore we wished to know if donor screening for microsporidia would help in elimination of graft associated microsporidial keratitis. Traditional methods for the diagnosis of microsporidia in clinical laboratories are still reliant on light microscopy. PCR-based diagnostic methods have become increasingly popular for pathogen identification and are particularly suitable for those microbial organisms that present in low infectious doses. Consistent with the low prevalence, there was no case of microsporidial infection in any of the...
donor corneas that were screened in our study. In conjunction with the established quality control for corneal storage in eye banks, there is potential for these PCR assays to aid in rapid screening of clinical specimens for microsporidial contamination and in the diagnosis of ocular infections. Possible causes of primary graft failure could include poor surgical technique, poor donor material and poor eye banking technique, inadequate storage in organ culture or infection of the donor material. A qualitative and quantitative assessment of the donor endothelium in those cases indicated good quality and microbiology of the medium during culture and at issue was sterile. We are however not sure if microsporidia can establish latent infection in the cornea and therefore be transmissible by corneal transplantation as they are known to be commonly associated with immunocompromised patients. Given that immunosuppression probably is the major predisposing factor for prolonged microsporidiosis in patients after organ transplantation, patients with systemic immunosuppression and AIDS may be at higher risk of acquiring unusual infections, especially in situations with hygiene deficiencies.

Considering the fact that the prevalence of microsporidial keratitis in our institute is around 0.4%, the number of donor corneas examined in our study is too small for any conclusive results. However, the absence of microsporidial DNA in all the donor corneal tissues tested rules out the risk for transmission of microsporidia by corneal transplantation. At this point of time we believe that screening of donor corneas for presence of microsporidia is not warranted.

References