·Letter to the Editor·

Recurrent interface abscess secondary to Acanthamoeba keratitis treated by deep anterior lamellar keratoplasty

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Dear Sir,

I am Dr. Yan-Long Bi, from the Department of Ophthalmology of the Tongji Hospital affiliated to Tongji University School of Medicine, Shanghai, China. I write to present a case report of recurrent amoebic corneal abscess which successfully treated by deep anterior lamellar keratoplasty (DALK).

During the years 2003 to 2008, a substantial increase in the incidence of Acanthamoeba keratitis (AK) was noted in the U.S., and then occurred in a number of other countries. The incidence of AK was also thought to be significantly under reported [1]. AK is difficult to treat, with little comparative evidence on which to base treatment decisions. From an investigation of all subscribers of 'The Cornea Society' recently, penetrating keratoplasty (PK) is the preferred surgical method for AK after failure of medical treatment [2]. Although the amoebic proteases helped to penetrate the epithelial basement and Bowman's membrane, with their continuous action leading to corneal melting, the AK seemed mostly located inside the cornea, which should be attributed to the robust neutrophilic reaction in the ocular anterior chamber [3]. For the AK patients, DALK with corneal stroma removal down to diabetes mellitus (DM) is suggested by a few authors as considering its improved graft survival rates and refractive results [4]. But a healthy DM is always a prerequisite when want to be exposed during DALK, this could hardly be performed when infectious disease, such as bacterial or fungal keratitis spread into the pre-DM stroma.

We report a case with long standing recurrent pre-DM amoebic abscess formation, and could also be treated by DALK.

A 21-year-old female reported seeing a 'white dot in her right cornea' for one month. She had a history of 'intractable corneal ulceration' after wearing contact lens and following lamellar keratoplasty in another hospital 5 months previously. Best spectacle-corrected visual acuity (BSCVA) was 20/400. Under slit-lamp examination, the off-center corneal graft was clear but had an obvious interface abscess formation with no ocular congestion (Figure 1A). After treatment with various inefficacious broad-spectrum anti-infective agents, a 10mm diameter glycerin cryopreserved full thickness corneal tissue was regrafted after resection of the pathological corneal tissue and partly exposure of the DM (central 4mm^2) (first DALK). Acanthamoeba cysts were found in the resected stroma (Figure 1B). The BSCVA was 20/40 with a central ECD at 1500/mm^2 two weeks later. Five months later, however, a gradual accumulated interface abscess recurred (Figure 1C). She did not agree to any further surgical interventions. Twenty-five months later, the abscess thickened and enlarged to about 1/4 of the corneal area (Figure 1D). Using laser IVCM, spherical cysts were found inside the recipient residual corneal stroma with a higher reflectivity (Figure 1E). However, repeated scanning did not show any signs of Acanthamoeba infection inside the donor graft. The patient always had no pain and no signs of intra-ocular inflammation. The obvious 'white cornea' appearance and decreasing visual acuity led the patient to agree to surgical intervention again. The initial graft was stripped off carefully and the interface abscess was collected. The partially dissolved peripheralpre-DM stroma was completely resected, and a 10mm diameter DM was fully exposed, which was shiny and elastic and seemed not be affected by the disease, and then regrafted (second DALK). Pathological examination also confirmed an Acanthamoeba cyst in the resected stroma, but no fungi or bacteria found after culture. During the next 38 months, the cornea was stabilized with no signs of Acanthamoeba recurrenceand with a constant ECD at about 1 000/mm^2. The BSCVA was 20/20 at the last follow up (Figure 1F).

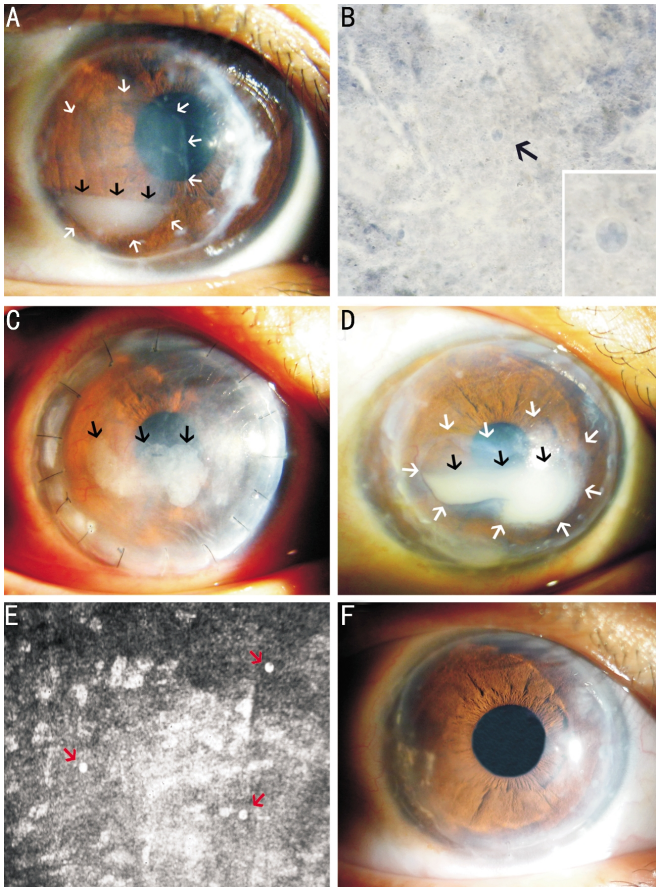

Figure 1 A: Graft detachment and liquid plane after eccentric LK, that lasted for 2 months without interference to the anterior chamber and the donor graft. B: Pathological examination showing an Acanthamoeba cyst in the resected deep corneal stroma. C: The graft detachment interface abscess reoccurred five months after the first DALK. D: Kept progressing with a larger graft detachment area (white arrow) and abscess (black arrow) 25 months after the first DALK, the anterior chamber and the graft was always quiet. E: Acanthamoeba cysts were found inside the recipient residual corneal stroma by IVCM. F: A healthy DM could be fully exposed during the second DALK and the cornea was stable during the next 38 months.

After the first DALK, the recurrent abscess located partly on the surface of DM, and lasted for 25 months. Through IVCM examination, the Acanthamoeba cysts were shown in the recipient remaining pre-DM stroma but not in the graft. These phenomena may illustrate several points:1) As lacking nutrition, compared to the corneal surface, the pre-DM stroma may not be a desirable living environment, and the AK progressed very slowly and even lasted for years. 2) The deep corneal stroma lacks a nerve distribution and AK could further diminish the nerve plexus [5]. This may explain why the signs and symptoms were inconsistent in this patient. 3) Although contact with the amebic abscess for years, the DM still intact and with a certain tension, this permits the second DALK with complete exposing DM feasible.

For the persistent intractable infectious keratopathy, therapeutic PKP was mostly clinically adapted. There were several reasons why we attempted DALK instead of PK in this case: (1)The open eye maneuver of PK may directly interfere with the immuno-microenvironment of the anterior chamber and lead to Acanthamoeba invading the inside of the eye[4]. (2) The disease spread to nearly the whole corneal temporal area (Figure.1A), eccentric or larger diameter PK graft were always combined with high risk immune rejection, and the inevitably chronic endothelial cell loss would also need an additional PK several years later [6]. These were given more attentions in this young patient. By the way, we recently reported that dissection down to the Descemet's membrane also allowed donor tissue to be used for two recipients (DMEK and DALK)[7].

During the first DALK procedure, the left pre-DM stroma was a potential habitat for residual Acanthamoeba, although it looked normal under surgical microscope. This led to the recurrence of the corneal interface abscess. Although the DM and the intra ocular structure were not infected in this case, however, ECD was found at a lower density (1500/mm^2) compared to the healthy eye after the first DALK, this may be attributed to the cytotoxic properties of Acanthamoeba as the ECD was kept stable at 1 000/mm^2 during the follow up period after the second DALK.

In conclusion, we suggest that DALK with stroma removal down to the DM should be advocated for the long standing AK patients, although 'healthy' stroma may have been already exposed after several rounds of lamellar dissection, and in order to prevent Acanthamoeba related corneal endothelium damage, this should be considered immediately after medical treatment failure. To our knowledge, this is the first study reported the treatment of long standing corneal pre-DM abscess using DALK, and also the first study reported the ECD decrease secondary to AK, although these need further evidence in a larger series cases.

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