Successful penetrating keratoplasty in an infant after extended storage of infantile donor cornea.

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COMMENT

We describe two patients who presented with mild uveitis and an area of retinal atrophy consistent with inactive CMV retinitis despite never having received specific anti-CMV therapy. Both patients had persistently CD4+ cell counts below 50 cells x 10^3/μl, and each experienced an elevation to above 50 cells x 10^3/μl in response to combination antiretroviral therapy concurrent with the onset of their symptoms.

We hypothesise that these patients developed subclinical CMV retinitis in the setting of severely suppressed CD4+ T cell counts, but became symptomatic when HAART-induced elevations of their CD4+ cell counts enhanced the immune response to CMV. This led to the development of a significant and symptomatic uveitis, a finding uncommon in patients with CMV retinitis before the use of HAART. These observations support the notion that HAART-induced restoration in immune function can lead to spontaneous and sustained resolution of CMV retinitis. The fact that patient no 1 developed reactivation of CMV retinitis soon after his CD4+ T lymphocyte count fell below 50 cells x 10^3/μl supports the initial diagnosis of CMV retinitis. Additionally, CD4+ cell counts may continue to provide valuable information regarding the risk of reactivation of opportunistic infections in patients receiving HAART. These findings are in accordance with recent publications addressing the relation between protease inhibitors and sustained inactivity of CMV retinitis. Additional studies are required to further delineate the role of HAART and CD4+ cell counts in the natural history of CMV retinitis.

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Successful penetrating keratoplasty in an infant after extended storage of infantile donor cornea

EDITOR—Despite the fact that infantile corneas are such a rare and valuable material in our eye banks they are not always properly used.

Infantile corneas, because of their characteristics (steepness, flexibility, elasticity), are not preferred for transplantation in emmetropic adults if other tissue is available. On the other hand it has been suggested that for infants undergoing penetrating keratoplasty, donor and recipient age should be matched as closely as possible. Such age matching however is not always possible in the existing corneal storage system.

According to the United Kingdom Transplant Support Services Authority (UKTSSA) statistics, in 1996 there were 15 recipients in the 0–5 age group. Forty four infantile corneas were retrieved in the same period. Only five infantile recipients, however, received corneas from the same age group, while the other 10 received corneas from older donors, in some cases the age difference exceeded 50 years (Fig 1A). Of the available infantile corneas, apart from the five transplanted into infants, 47 were transplanted to recipients of various ages (11–40), and 22 were not used at all because they could not be allocated to suitable recipients within the required time (which for most eye banks is 4 weeks) or for other reasons such as inadequate endothelial cell density (Fig 1B).

CASE REPORT

Keracare Eye Bank recently obtained donor tissue from a child aged 13 months. After 22 days in culture one cornea was transplanted into a recipient aged 5 years. For the second cornea, however, no suitable recipient could be found, either through UKTSSA or Bio Implant Services (BIS, Eurotransplant). Rather than discard the tissue after the standard 4 weeks in culture we placed it into 75 ml of fresh medium in the hope of extending the preservation period until a suitable recipient could be found.

Within a few weeks a male infant aged 3 months with bilateral Peters' anomaly (Fig 2A,B) was referred to St George's Hospital for penetrating keratoplasty. The left penetrating keratoplasty was carried out with the infantile cornea which at that time, had been...
maintained in culture for 68 days (over 9 weeks), the final endothelial assessment, by vital staining and light microscopy, having confirmed its suitability for use. The right eye was operated on 1 week later using a cornea from a 25 year old donor as no infantile cornea was available.

At 2 months postoperatively at examination under anaesthesia both corneal grafts were clear (Fig 2c,d). Examination under anaesthesia was repeated 1 year later. Again both grafts were clear, and specular microscopy of the graft endothelium revealed a cell density of 2235 cells/mm² in the graft from the infantile donor, and 1410 cells/mm² in the graft from the older donor (Fig 2e,f). Retinoscopy showed high myopia in both eyes, but both fundi appeared normal.

COMMENT

In most eye banks organ cultured corneas that are not transplanted within 4–5 weeks of retrieval are discarded. This is based on the finding that the rate of decline of endothelial cell density increases after 35 days of culture in a single aliquot of culture medium.

Pels et al reported that storage of corneas in culture for 3–7 weeks induced a mean cell loss of about 11%, while preservation for 9–17 weeks (medium changed after 6 weeks), resulted in a mean cell loss of about 43%. The actual cell loss, however, varied significantly among examined corneas and therefore it has been suggested that the suitability of an individual cornea for transplantation should be based on the quality of the endothelium during final assessment rather than the length of storage. It has also been suggested that the increased cell loss after 40 days of culture might be caused by the depletion of nutrients and accumulation of waste products in the culture medium. A larger volume of medium, or the renewal of the medium, may postpone or prevent this process. However, with prolonged organ culture endothelial survival is not the only factor in determining the suitability of tissue for transplantation. If there is epithelial overgrowth onto the posterior corneal surface this can potentially lead to problems of implantation of epithelial cells into the anterior chamber.

There has been a report of corneas safely retrieved for less than 9 weeks (Fig 3a), but we have found that an infantile cornea preserved for 9 weeks in organ culture can be transplanted successfully.

There is usually no need to extend the storage time of adult corneas, but it may be appropriate to extend the preservation time of some infantile corneas in order to maximise the chance of their most appropriate utilisation, and further research is needed to optimise storage methods and evaluate the cost/benefit of longer storage times.


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