The impact of a corneal graft in one eye on graft outcome in the other eye

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Background

A number of patients receive a corneal graft in one eye, followed some time later by a graft in the second eye. In such patients, a factor of considerable interest is the impact of the time period between the two grafts on the outcome of each.

This analysis is based on data from 1571 patients who received a graft in the first eye between January 1994 and December 2001, and who subsequently received a graft in the second eye before March 2004. The time period between the two grafts ranged from 7 to 3520 days, with a mean of 940 days.

Effect of time lag between the two grafts

An initial analysis examined the impact of the time period between the two consecutive grafts within a patient on the outcome of the graft in the first eye, using Cox regression modelling. Of the explanatory factors considered, it was found that the hazard of the graft in the first eye failing was mainly dependent upon the primary diagnosis. Once this factor was allowed for, the variable associated with the time lag between the two grafts was highly significant ($p<0.001$). The greater the time period between the two grafts, the lower the risk of the initial graft failing.

Effect of a graft in one eye on the outcome in the other eye

Further analyses explored the impact of the time of the graft in the second eye on the hazard of failure of the graft in the first eye. Specifically, a time dependent variable was defined for each individual, whose value changed from 0 to 1 at the time of the second graft. A Cox regression model that incorporated this time dependent variable, in addition to other explanatory factors, was then fitted. The hazard of the graft failing was again found to depend on the indication for the graft. After allowing for this, there is a highly significant increase ($p<0.001$) in the hazard of the first graft failing after the graft has been performed in the second eye.

In a similar manner, the effect of the first graft failing in a period after the second transplant can be studied. The indication for the second graft is the most important factor that affects outcome, but in this case recipient age, the time from death to enucleation, the eye bank, and the sex match of the donor and recipient are also relevant. After allowing for the effects of these variables, the data suggest that the failure of the first graft is significantly detrimental ($p<0.001$) to the second graft.