Recent Development in Cornea Transplantation (´97-´99)

J. Wulf* J. Bednarz† M. Junge* K. Engelmann† K. Püschel*

Contents

Abstract

Between 1997 and 1999 a steady increase in cornea donation was achieved, but the number of transplantations remained stable because many grafts didn't pass quality controls. Intermediate organ culture of entire bulbi was examined as possible solution to reduce post-mortem times and increase suitability for transplantation.

Keywords

transplantation; cornea; organ culture; intermediate organ culture

*Institut of Legal Medicine, University of Hamburg, Butenfeld 34, 22529 Hamburg, Germany

†Dept. of Ophtalmology, University of Hamburg, Martinistr. 52, 20252 Hamburg, Germany

1 Introduction

Cornea transplantation has been performed at Hamburg University since 1981. A close cooperation between the Institute of forensic medicine and the Dept. of Ophtalmology where the corneae are cultured and transplanted led to a steady increase of donor corneae. Long post-mortem times resulted in a reduction of vital endothelial cells, this being the reason why a relevant number of corneae didn't pass quality control regulations for transplantation ([3], [4]). Improvements in the handling of corneae are evaluated, the emphasis being on an intermediate organ culture.

2 Methods

In order to develop methods to reduce post-mortem times and to increase the quality of the grafts eyes from 80 donors were investigated in the following studies: Bulbi from 60 donors were placed directly after explantation in either organ culture medium based on fetal calf serum (FCS) or in a damp chamber (up to now the regular procedure). Both materials were kept in cold environment until processing the next day.

Another 40 eyes from 20 donors were prosecuted by placing one eye in organ culture medium as above, but removing the second eye the next morning directly before processing. In both groups alternative procedures between left and right eye were carried out. Processing consisted of removing an episcleral ring, then removing the central part of the cornea for long-term cultivation. Thorough ophtalmological investigations were performed before processing, as well as endothelial cell density was evaluated ([3], [4]). Endothealial cell loss and suitability for transplantation after two weeks of cultivation was compared between both eyes of a single donor and between the two donor groups as a whole.

3 Results

No statistically significant difference between intermediate-organ-cultured corneae and corneae regularly explanted was ascertainable. Neither group was more or less suitable for transplantation.

	Before processing	Before transplantation
Intermediate Organ Culture	2450 ($n = 55$)	2100 ($n = 30$)
Damp Chamber	2350 ($n = 60$)	2050 ($n = 25$)

Table 1: Endothelial cell density (cells/mm^2)

Only corneae from donors with a post-mortem time exceeding 48 hours were found to be slightly more often suitable for transplantation after intermediate organ culture. During the study no contamination of grafts or infection occured.

4 Discussion

Intermediate organ culture of entire bulbi appears to be no suitable solution to reduce long post-mortem times and subsequently decrease endothelial cell loss. The marginal increase in vital endothelial cells and a higher number of transplantations in donors with post-mortem times exceeding 48 hours is counteracted by the higher potential risk of contamination and subsequent infection of the graft in the process, although no contamination occured ([2], [4]). Other methods to increase endothelial cell density and thereby suitability for transplantation include the testing of culture mediums of different composition and organizatorial changes to reduce post-mortem time ([1], [4]).

5 Conclusion

Intermediate organ culture of entire bulbi represents no solution to increase the quality of donor corneae, therefore other methods to reduce post-mortem times should be looked for.

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