Adverse effect of blood group ABO mismatching on corneal epithelial cells

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Harminder S. Dua, J. Chan, José Alvaro P. Gomes, Augusto Azuara-Blanco

Introduction: Despite the presence of blood group ABO antigens in the corneal epithelium and endothelium, blood group matching is not usually considered necessary in corneal transplantation. We examined the effect of ABO mismatching on cultured human epithelial cells.

Methods: 15 primary human corneal epithelial cultures were established from 15 donor rims remaining after corneal transplantation. At confluence (3 weeks), the cells were harvested and suspended in buffered saline ($1x10^6$ cells per mL). Cells from each culture were stained for blood group A, B, and H(O) antigens with immunoperoxidase, and tested for agglutination with anti-A, B, and H(O) antibodies. Trypan blue dye exclusion was used to asses cell viability.

Results: Of the 15 cell cultures, 3 were agglutinated with anti-A, 10 with anti-H, and 2 with anti-B. None of the cell cultures agglutinated with both anti-A and anti-B. After this study, donor blood groups were tracked from eye-bank records and were found to correspond with the blood groups determined by agglutination of corneal epithelial cells. Trypan blue dye exclusion showed a high proportion of dead cells in the agglutinated chumps of epithelial cells. Determination of ABO groups by agglutination and immunoperoxidase staining also corresponded in all samples.

Conclusions: This study shows a definite harmful effect of bllood group ABO mismatching on corneal epithelial cells. It is therefore possible for ABO mismatching to adversely affect corneal transplants, particularly in high-risk situations with vascularised recipient beds.

Pseudoaccommodation: BioComFold versus a foldable silicone intraocular lens

J Cataract Refract Surg 1999;25:262-7

Jean-Marc Legeais, Liliana Werner, Leonardo Werner, Alain Abenhaim, Gilles Renard

Purpose: To assess the degree of pseudoaccommodation amplitude correlated with shifts along the anteroposterior axis of the BioComFold foldable intraocular lens (IOL).

Setting: Department of Ophthalmology, Hôtel-Dieu Hospital, Paris, France.

Methods: This prospective study comprised 30 eyes of 30 patients operated on consecutively for cataract by phacoemulsification and in-the-bag implantation of a BioComFold (15 patients) or a foldable control (15 patients) IOL. The BioComFold IOL has a peripheral bulging ring that pushes the optic forward during the effort to accommodate, creating a zoom effect. Pseudoaccommodation amplitude was evaluated using the blurring of controlled vision by adding spheres, with the best correction for distance vision in place. Pupil diameter was measured with a Goldmann campimeter under constant ilumination. Anterior chamber depth was determined by A-scan (Paxial, Biophysic Medical) 30 minutes after cyclopentolate 1% was instilled and again 30 minutes after pilocarpine 2% was instilled.

Results: The difference in pseudoaccommodation amplitude and pupil diameter between the 2 groups was not statistically significant ($p = .6737$ and $p = .4014$, respectively). The IOL's forward shifts from maximal ciliary relaxation to maximal ciliary contraction were significantly greater in the BioComFold group ($p = .0215$).

Conclusion: The design of the BioComFold IOL allowed greater forward optic shifts along the anteroposterior axis during the effort to accommodate. Nevertheless, this shift was not correlated with a significantly greater pseudoaccommodation amplitude.

In vivo study of a fluorocarbon polymer-coated intraocular lens in a rabbit model

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Jean-Marc Legeais, Liliana Pacini Werner, Gilbert Legeay, Benoît Briat, Gilles Renard

Purpose: To evaluate the biocompatibility in rabbit eyes of poly(methyl methacrylate) (PMMA) intraocular lenses (IOLs) that were surface modified using Teflon AF.

Setting: Hôtel-Dieu Hospital, Paris Cedex, France.

Methods: The IOLs were coated with Teflon AF, an amorphous, transparent, and highly hydrophobic fluorocarbon polymer, by immersing them in Teflon AF.5% and evaporating the solvent (C_8F_{18}). The surface quality of the Teflon-coated IOLs was evaluated by scanning electron microscopy (SEM). Teflon-coated (n = 20) and control PMMA (n = 10) IOLs were implanted in rabbit eyes. The presence of iris-IOLs synechias and the number of deposits on the IOL surfaces were clinically evaluated in both groups to assess the antiadhesive effect of Teflon AF, The Teflon-coated IOLs, were removed, their surfaces were evaluated by SEM, and their elemental composition was checked by EDXA and Reman spectrometry.

Results: The PMMA IOLs were completely coated with Teflon AF. The Teflon group had no iris-IOL synechias and the control group, two extensive synechias. There were significantly fewer deposits on the surfaces of Teflon-coated IOLs than on the control IOLs 30 and 60 days postoperatively ($p < .0001$). Scanning electron microscopy showed lens epithelium proliferation and spindle-shaped cells on the surfaces of the PMMA IOLs and cell deposits on the irregular regions of the Teflon - coated IOLs: White-yellow spots were present on the surfaces of both IOL types. The elemental composition of Teflon-coated IOLs was stable.

Conclusion: Teflon AF had an antiadhesive effect that increased the biocompatibility of PMMA IOLs in vivo.

AF fluoropolymer for optical use: spectroscopic and surface energy studies: comparison with other fluoropolymers

Eur Polym J 1998;34(10):1457-65

Gilbert Legeay, Arnaud Coudreuse, Jean-Marc Legeais, Liliana Werner, Alain Bulou, Jean-Yves Buzaré, Joël Emery and Gilles Silly

Four fluoropolymers are studied by Infra-Red, Raman and solid state NMR: one of them (Teflon AF) is optically transparent thanks to the presence of large ether cycles which prevent crystallization. Detailed investigations of the different spectra lead to the interpretation of the different lines characteristic of the constitutive fluoro-based sites.

Endothelial damage caused by uncoated and fluorocarbon-coated poly(methyl methacrylate) intraocular lenses

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Liliana Pacini Werner, Jean-Marc Legeais, Jaques Durand, Michèle Savoldelli, Gilbert Legeay, Gilles Renard

Purpose: To asses endothelial damage induced by poly (methyl methacrylate) (PMMA) intraocular lenses (IOLs) coated with a fluorocarbon polymer, Teflon™ AF, to make them highly hydrophobic.

Setting: Department of Ophthalmology, Hôtel-Dieu Hospital, Paris, France.

Methods: Ten Teflon-coated and 10 uncoated PMMA IOLs were used in an in vitro static touch model. The corneal endothelium was placed in direct contact with the IOL for 15 seconds and then stained with trypan blue and alizarin red. The endothelial damage produced by each IOL in the area of contact was assessed semiquantitatively and quantitatively.

Results: Teflon-coated IOLs procedure significantly less endothelial damage than uncoated PMMA IOLs ($p < .0001$). Endothelial cells in contact with Teflon-coated IOLs did not usually adhere to the IOL surface. In contrast, the uncoated IOLs produced large areas of endothelial cell loss.

Conclusion: Teflon-coated PMMA IOLs have an antiadhesive effect that reduced endothelial damage after IOL insertion in an in vitro model.