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Original article

Complications after endothelial keratoplasty: three years of experience[☆]

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ABSTRACT

Objective: To study the complications after Descemet's stripping automated endothelial keratoplasty (DSAEK).

Methods: Retrospective study of 75 eyes in 67 patients with Fuchs' endothelial dystrophy or bullous keratopathy operated on in the Instituto de Oftalmología La Arruzafa from March 2007 until March 2010. Phacoemulsification and IOL implantation was involved in 30 cases. All surgical and post-surgical complications, as well as the endothelial cell density were recorded.

Results: Graft detachment was the most common complication: 17 cases (22.5%); 16 of them resolved with reintroduction of air in the anterior chamber. The rate of detachment in cases without capsular support (8 eyes) increased up to 50%. Five cases had primary graft failure and, in 2 cases, a medium term failure was observed. Only one case of endothelial rejection was observed (1.3%). Five eyes (6.5%) developed a pupillary block, but of them were solved with the aspiration of the air. In one eye (1.3%), a posterior capsule rupture was observed during the phacoemulsification. This case ended with a retinal detachment. The endothelial cell loss was 42.75%.

Conclusions: DSAEK is an effective surgical technique to resolve the corneal edema due to endothelial failure; however, complications are not uncommon. Graft detachment is the most common complication, but is usually resolved with *re-bubbling*. There is an evident learning curve and the surgical trauma to the endothelium is the most important factor that influences the endothelial cell loss.

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Complicaciones tras queratoplastia endotelial: tres años de experiencia

RESUMEN

Objetivo: Examinar las complicaciones tras queratoplastia endotelial automatizada con disección de la membrana de Descemet (DSAEK).

Palabras clave:

Queratoplastia

Distrofia de Fuchs

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Queratopatía bullosa
Queratoplastia endotelial
automatizada con disección de la
membrana de Descemet

Métodos: Revisión retrospectiva de 75 cirugías de DSAEK en 67 pacientes con distrofia endotelial de Fuchs o queratopatía bullosa realizadas en el Instituto de Oftalmología La Arruzafa desde marzo de 2007 hasta marzo de 2010. En 30 casos se asoció facoemulsificación e implante de LIO. Todas las complicaciones intraoperatorias y postoperatorias fueron registradas, además de la densidad celular endotelial.

Resultados: La dislocación del disco fue la complicación más frecuente: 17 casos (22,5%); 16 se resolvieron con la reintroducción de aire en cámara anterior. La tasa de desprendimiento del injerto fue del 50% en los 8 ojos sin soporte capsular. En 5 casos se produjo un fracaso primario del injerto y en 2 (2,6%) el injerto ha fracasado a medio plazo; solo tenemos un caso de rechazo endotelial (1,3%). Cinco ojos (6,5%) desarrollaron un bloqueo pupilar postquirúrgico que se resolvió tras la extracción del aire. Un ojo (1,3%) con rotura capsular posterior durante la cirugía desarrolló al año un desprendimiento de retina. La pérdida celular media fue del 42,75%.

Conclusiones: DSAEK ha demostrado ser un tratamiento efectivo para la disfunción endotelial; sin embargo no está exenta de complicaciones. La dislocación del disco es la complicación más frecuente siendo resuelta tras la reintroducción de aire en la mayoría de los casos. Existe una curva de aprendizaje y el traumatismo intraoperatorio es un factor relacionado con la pérdida endotelial.

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Introduction

Automated endothelial keratoplasty with Descemet's membrane stripping (DSAEK: *Descemet's stripping with automated endothelial keratoplasty*) is gaining popularity as the surgical treatment for corneal endothelial alterations, in contrast with penetrating keratoplasty (PK) due to the fact that the latter procedure is not free from drawbacks (prolonged visual rehabilitation, high astigmatism, complications related to stitching, infectious keratitis, incision dehiscence, endothelial rejection and even eventually expulsive hemorrhages).¹⁻⁴ In order to achieve a highly reproducible technique such as DSAEK, endothelial keratoplasty has evolved since in 1998 Gerrit Melles published the first successful case of corneal transparency restoration by changing the posterior corneal layers in a patient with bullous keratoplasty. A few years later, Mark Terry modified the instruments and began publishing important series of patients. Executing a descemetorhexis and obtaining a donor disc by means of a keratotomy performed with a microkeratome over an artificial anterior chamber has allowed the technique to be much more reproducible and both the donor and receiver substrates to be utilized in a more homogeneous manner. As this is a relatively new procedure, associated complications are still being described, with the donor graft dislocation being the most frequent one.⁵ In our center, DSAEK has been carried out 3 years ago. The objective of this paper is to illustrate the complications that have arisen and compare them with previously published studies.

Subjects, material and method

The clinical records of patients intervened from March 2007 to March 2010 with the DSAEK technique were retrospectively analyzed. In all cases, the surgical indication was due to a corneal edema caused by Fuchs' endothelial dystrophy or bullous keratopathy. After surgery, the patients were assessed the

following day, the third day, 1 week, 1 month, and after 3, 6, 12, 24 and 36 months (in the case with the longest follow-up), except when a complication made additional assessments advisable.

In each assessment, uncorrected visual acuity, refraction and corrected visual acuity were measured. Endothelial cell density with Topcon mirror microscope was measured after 1 week, 3, 12, 24 and 36 months; the data corresponding to this variable shown in this study are those of the last assessment of each patient. The donor disc central thickness was measured by optic coherence tomography (Visante, Carl Zeiss, Jena, Germany) 1 month after surgery. The data were included in an Excel table and subsequently processed with the SPSS statistical program (SPSS v. 17. Inc. v. 17.0. Chicago, IL, USA). The analysis included mean contrast (to determine the existence of significant differences before and after the surgical intervention) utilizing the following parametric methods: T test at 95% ($\alpha=0.95$) for independent samples (this analysis was utilized as pre-test), T test at 95% ($\alpha=0.95$) for related samples (as the variables were measured before and after the intervention) and single factor ANOVA variance analysis ($\alpha=0.95$) (to confirm or discard the results obtained in the previous test). The nonparametric tests of Wilcoxon, Friedman and Kendall ($\alpha=0.95$) were utilized to verify the homogeneity of the variables before and after the treatment.

Surgical technique

The surgical technique has been extensively described in many papers.¹⁻⁵ It is necessary to operate over a button with scleral roller adapting to the artificial anterior chamber with an overall diameter of 16 mm. The cornea must have a white to white distance of at least 11 mm. The donor tissue is located over the artificial anterior chamber developed by Ziemer Ophthalmic Systems AG (Switzerland) for the Amadeus II microkeratome. No pachymetry was performed prior to the incision. In all cases a 450 μm head was utilized for obtaining

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