

LATE POSTOPERATIVE RESULTS OF PENETRATING KERATOPLASTY: A 10 -YEAR RETROSPECTIVE STUDY

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SUMMARY – The purpose of this study is to analyse the results of penetrating keratoplasty 5 to 10 years after operation, i.e. long term results. Patients operated in the University Department of Ophthalmology of Sestre milosrdnice University Hospital from January 1991 to January 1996 are included in this retrospective study. The enrolment consists of 95 operated eyes in 86 patients. The most common reason for keratoplasty was bullous keratopathy, corneal dystrophy and keratoconus. Graft failure was noticed in 17 eyes or 18%. In the group with keratoconus there was no graft failure. More than 80% of operated eyes 5 to 10 years after operation still have visual acuity of over 0.1 – 5 to 10 years after operation..

Introduction

The idea of penetrating keratoplasty existed for over 200 years, but it plays an important role in ophthalmology since 1970s. In these years microscopy started to be used regularly in clinical practice and it was possible to achieve better results after operation. Those were also the years when immunology was introduced in ophthalmology: There is lot of published articles which analysed postoperative results of penetrating keratoplasty, but mostly with short follow up – up to 2 years.

The idea of this study is to analyse results of penetrating keratoplasty 5 to 10 years postoperatively.

Methods

We have reviewed the hospital and out-patient department data of perforating keratoplasty performed on our Clinic in the period from January 1991 to January 1996. In this period 119 eyes were operated in 110 patients: 7 patients have died and with 17 patients the contact was lost.

Data that were reviewed included patient gender and age, clinical indications were divided in 16 categories, vi-

sual acuity before the operation and visual acuity 5 to 10 years after the operation, the type of performed keratoplasty, postoperative complications in the first 5 years and complications 5 to 10 years postoperatively.²⁻⁴ The number of failed keratoplasty was analysed. Graft failure was defined as an irreversible loss of central graft clarity. Graft clarity was listed as either clear or opaque. Any graft that was not clear in central visual axis was classified as opaque.

The patients were invited to clinical examination on biomicroscopy with photo documentation. Intraocular pressure was measured by aplanation and visual acuity was determined according to Snellen charts.

Results

The enrolment consists of 95 operated eyes (Figure 1.). In 9 patients both eyes were operated and in 77 patients only one eye was operated. Follow-up examinations were scheduled for 5 to 10 years after grafting. There were 50 females and 22 males; the mean age at keratoplasty was 63 ± 13 years (mean \pm standard deviation). The distribution of preoperative diagnosis is listed in Table 1. The most common reason for performing the penetrating keratoplasty was corneal dystrophy (mostly Fuchs'), keratoconus and bullous keratopathy in aphakic eyes. Table 2. shows the surgery type and changes in lens status that

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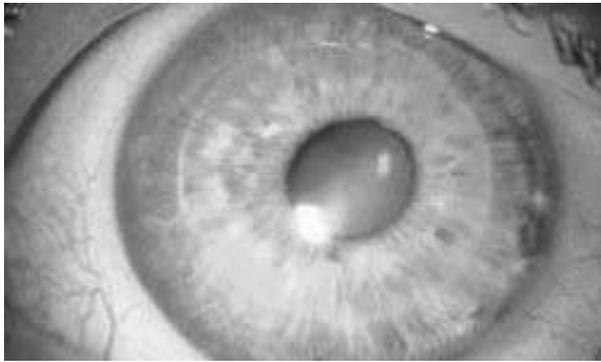


Fig. 1. Eye 7 years after penetrating keratoplasty

occurred at time of grafting. Most of the operated eyes had a natural lens, but in 13 cases the cataract was also extracted during the keratoplasty and an artificial intraocular lens was implanted.

Glaucoma was preoperatively detected in 17 eyes. After the keratoplasty, glaucoma has developed in 3 eyes in the first 5 years and in 1 eye in the postoperative period longer than 5 years.

In the Table 3. the reasons for graft failure are pointed out. The most common reasons were irreversible rejection of graft or decompensation of graft without apparent cause (Figure 2.) The total number of failed grafts was 17 or 18%. Graft failure was noticed in 4 eyes with glaucoma - graft failure in only glaucoma eyes was 19%.

Visual acuity was generally better than preoperatively and after 5 to 10 years more than a half of operated eyes (51%) had visual acuity better than 0.4 (Table 4).

Discussion

Several studies have been published in the past decade about the indications for the penetrating keratoplasty.³⁻¹⁰ The most common reason for performing the penetrat-

Table 1. Preoperative recipient diagnosis (No.-number, %-percentage KC-keratoconus, PBK-pseudophakic bullous keratopathy, ABK-aphakic bullous keratopathy, MR-multiple regrant, HSV-herpes simplex virus, HZV-herpes zoster virus, IK-interstitial keratitis CB-chemical burns, DEG-degeneration)

diagnosis	No.	%
KC	21	22
dystrophy	26	27,4
PBK	9	9,5
ABK	19	20
MR	0	0
HSV	7	7,4
HZV	0	0
ulcer	1	1
IK	0	0
scarring	2	2,1
edema	0	0
trauma	3	3,2
CB	2	2,1
DEG	5	5,3
others	0	0
total	95	100

ing keratoplasty was bullous keratopathy in pseudophakic or aphakic eyes and Fuchs' dystrophy and keratoconus in phakic eyes. The similar results are reported in our collected data - not identical - because the main reason for keratoplasty in our Clinic was corneal dystrophy and keratoconus. Bullous keratopathy as a reason for keratoplasty is in the third place in our study. Most of the operated eyes were phakic in the moment of operation, because the most common indication was keratoconus and patients with this disease are younger people. One of the leading indication for grafting was bullous keratopathy in aphakic eyes, on the

Table 2. Types of penetrating keratoplasty (No.-number, %-percentage, IOL- intraocular lens, ACIOL - anterior chamber intraocular lens)

surgery type	Preoperative	postoperative	No.	%
phakic	phakic	phakic	41	43
apakic	aphakic	aphakic	21	22
triple	phakic	pseudophakic	13	14
secodary IOL	aphakic	pseudophakic	3	3
IOL retained	Pseudophakic	pseudophakic	15	16
IOL removed	ACIOL	aphakic	2	2
total			95	100

Table 3. Reasons for graft failure

	<5 year (No.)	5 -10year (No.)	total (No.)
irreversible rejection	5	0	5
endothelial failure	1	2	3
donor failure	2	0	2
infection-ulcera	2	1	3
epithelial ingrowth	1	0	1
herpes simplex virus	2	0	2
Endophthalmitis	0	1	1

second place were eyes after intracapsular or extracapsular lens extraction. There is a difference according to other studies in the number of operated aphakic eyes, but it is because in our country some ophthalmologists still performed cataract operations without implantation until a few years ago.

According to the literature the most graft rejections episodes occur within first few years after keratoplasty.¹¹ In our group total number of rejection episodes was noted in the first five years after operation. The total failure rate after 5 to 10 years follow up was 18 %. There is a small number of published articles reporting about 5 to 10 years of graft survival. Price et al and Bishop et al reported 5-year estimates for graft failure of 9% and 35%.^{12,13} Williams and al reported a 3-year failure rate of 21%.¹⁴ Ing et al reported failure rate of 21% at 10 years postoperatively.¹⁵

In our study most of the failures were the result of irreversible rejections and they were noticed in the first five years period . Other studies have also shown that irreversible rejection is a leading cause of graft failure.¹⁶⁻¹⁸ If we analyze graft failure according to the preoperative diagnosis the eyes with herpes simplex keratitis have the highest quote of failure. It is well known that eyes with keratoconus have the best rate of survival¹⁹ In our study we haven't noticed any irreversible rejection in the group of patients with keratoconus. All 21 operated eyes with

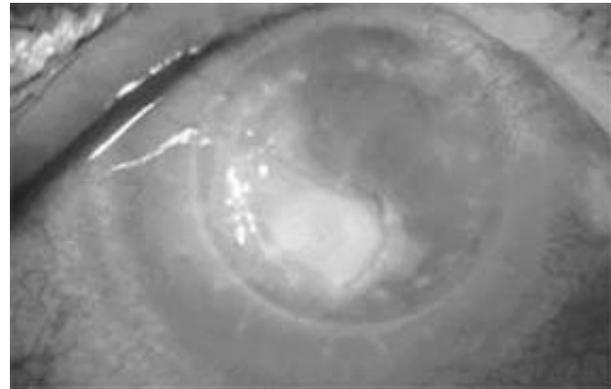


Fig. 2. Graft failure after irreversible rejection

keratoconus have transparent graft and good visual acuity. Only in one operated eye in the group with keratoconus midriasis is still present even after 8 years.

Published failure rates of grafts for keratoconus are ranging from 0% to 9%.^{12,13,20,21} Yamagami et al report of 2% failure rate at 10 years after keratoplasty.¹⁶

The best results are achieved if we compare visual acuity pre- and postoperatively. More than 80% of eyes have visual acuity better than 0.1 even 5 to 10 years after operation. This means good functional success of operation for those patients. This findings reinforce our optimistic belief that corneal grafts continue to provide good visual acuity and better quality of life for patients with corneal opacity. Penetrating keratoplasty - despite some complications - have a definitive place in modern ophthalmology to help the patients with corneal diseases.

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Table 4. Visual acuity in operated eyes preoperatively and postoperatively after 5 to 10 year follow-up

visual acuity	amaurosis	L+P+	0.01-0.09	0.1-0.3	≥0.4
preoperatively(No.)	0	35	37	23	0
postoperatively 5-10years(No.)	2	13	4	27	49

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Sažetak

PENETRIRAJUĆA KERATOPLASTIKA: DESETGODIŠNJA RETROSPEKTIVNA STUDIJA

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Cilj studije je analiza rezultata keratoplastike 5 do 10 godina nakon operacije - dugogodišnji rezultati. U ovu retrospektivnu studiju uključeni su bolesnici operirani na Klinici za očne bolesti KB "Sestre milosrdnice" od siječnja 1991. do siječnja 1996. godine. Uključeno je 95 operiranih očiju kod 86 bolesnika. Najčešća indikacija za keratoplastiku bila je bulozna keratopatija, distrofija rožnice i keratokonus. Zamućenje transplantata zabilježeno je kod 17 očiju ili 18%. U grupi bolesnika s keratokonusom nije bilo odbacivanja transplantata. Više od 80% operiranih očiju i 5 do 10 godina nakon operacije imaju vidnu oštrinu bolju od 0.1.