

KERATOPLASTY WITH PRIMARY AND SECONDARY LENS IMPLANTATION

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ABSTRACT: 28 patients who had cataract and corneal scarring were operated with combined penetrating graft, cataract extraction and lens implantation; 20 patients who had aphakic corneal dystrophy or dystrophy caused by intraocular lens received simultaneous penetrating graft, vitrectomy, and lens implantation or revision of the intraocular lens. Soft eye, the use of scleral expanders, the utilization of a small limbal incision for maintenance of anterior chamber and intracameral manipulations, the replacement of the recipient cornea over the implant until the donor cornea sutured in place with 4 cardinal sutures, and a .50 mm. larger donor graft than recipient opening are very important. Because Group B had more severe pathology and more complicated surgery, the visual results were worse than in Group A.

In a paper in the OPTHALMIC SURGERY¹, we have discussed our experiences with combined cataract, graft and lens implant and graft, vitrectomy and lens implants. We have described the technique employed in detail. The most significant points are:

- A. The importance of a soft eye.
- B. The use of scleral expanders.
- C. The utilization of a limbal Ziegler knife incision for the maintenance of chamber and for intracameral manipulation, once the graft is in place⁵.

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- D. The replacement of the trephined recipient cornea over the implanted lens while the donor cornea is sutured at the 4 cardinal points, permitting the maintenance of deep chamber and preventing contact between the artificial lens and the donor endothelium.
- E. .50 mm. larger donor graft than recipient opening 6-10.
- F. The indication for combined operation is present only if all 3 of the components are indicated.

Since the submission of that paper (July 4, 1977) several more cases have been added to our series and the observation period of the published cases lengthened.

At the 2nd World Congress of Microsurgery in August of 1978, we presented data that described results with 48 cases (28 graft, cataract and lens implant cases in Group A; 20 graft, vitrectomy and lens implant cases in Group B).

In this paper, we are presenting statistical tables not discussed in previous articles and lectures concerning our experiences with 28 patients who underwent simultaneous penetrating keratoplasty, cataract extraction and intraocular lens implantation (Group A) as well as 17 patients who had penetrating keratoplasty combined with vitrectomy and lens implantation in cases of aphakia and 3 patients where penetrating keratoplasty, repositioning of the intraocular lens and vitrectomy had been done (Group B).

It should be noted that:

- A. None of the Fuchs' corneal dystrophy patients in our series had glaucoma because we felt that those Fuchs' patients who have glaucoma should not have simultaneous graft, cataract and lens implantation.
- B. None of the patients we operated had active vascularization of the cornea. Even in the eyes with parenchymatous keratopathy, only obliterated vessels were present.

The majority of the patients in Group A (28) were over 60 years of age (71%); 5 patients were between 50 and 60 (18%); 2 between 40 and 50 (7%) and 1 between 30 and 40 (4%). The follow-up ranged from 24 to 71 months with an average follow-up of 37 months. 8 patients suffered trauma, 4 had parenchymatous keratopathy, 2 diffused scarring and 8 Fuchs' corneal dystrophy. All the trauma patients were male and the Fuchs' dystrophy female, but there was no significant difference between male and female in

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the total cases. The preoperative vision, with the exception of a 40 year old patient who was a pilot and whose 20/40 vision excluded him from commercial flying was uniformly bad: finger counting up to 11 ft. - 16; 20/200 to 20/40 - 11. Thus, combined operation in our series was limited to people with really bad vision.

The conditions of the fellow eye often reflected that of the operated eye. The fellow eyes had Fuchs' corneal dystrophy, parenchymatous keratopathy, scarring, cataract, and usually the vision in the fellow eye, too, was decreased as demonstrated on the table.

The lens chosen depended upon the operation: 13 patients had ICCE where Binkhorst 4-loop (3), Worst 2-loop (6), Fyodorov II (4); 9 had planned ECCE operation where Binkhorst 2-loop (7), Worst 2-loop and Fyodorov II lenses; and 6 had KPE where Binkhorst 2-loop (5) and Choyce Mark VIII lens were used. For the extracapsular cases (ECCE KPE) the Binkhorst 2-loop lens (13); for the intracapsular cases, the Worst 2-loop (7) were preferred. Fixation suture² had been used in all but the Choyce Mark VIII lens.

Our second series consists of 20 patients with a follow-up of 24 to 54 months with an average follow-up of 33 months; 11 male and 9 female.

The average age of the Group B was higher than the previous one - 70.4, since the majority of the patients were between 60 and 70 (12) and older than 70 (7).

This is so because most patients had their senile cataracts removed years ago before their corneal dystrophy developed. Also, many had KPE although they had very hard cataracts as inferred by information gathered from the surgeons who performed the KPE. One young patient (61 years of age) had membranous traumatic cataract following lens absorption.

Two patients had Binkhorst's Barrier Deprivation Syndrome - 1 with and 1 without intraocular lens. One had traumatic corneal scars, 2 had intraocular lenses which caused pseudophakal corneal touch dystrophy; the rest had vitreous touch corneal dystrophy. The age distribution is shown on the table.

Ten patients had preoperative CME or macular changes, probably with some CME. All patients who had KPE (6) had CME diagnosed; 1 with a macular hole. Three patients of the intracapsular group had CME prior to grafting.

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The preoperative vision was much worse than in the first group previously reported. Only 2 of our patients had 20/400; the rest less than that. That is explainable by the severe preoperative problems. Many patients had CME and macular scarring and the tables are self-explanatory.

The condition of the fellow eye shows that only 2 patients had normal eyes; the rest had cataract and or macular scarring. Our series includes 2 patients who had bilateral surgery graft after intraocular lens implantation. The table describes our findings.

Although anterior vitrectomy with sponges and scissors gave satisfactory results, sharp instrument such as vitrophage were preferred for added safety to prevent retinal detachment and reduction of postoperative vitritis.

Our lens preference was for Worst Medallion® 2-loop or single-loop lenses and the Fyodorov II lens, which was sutured to the iris.

In both groups preoperative lens power determination was done in the usual manner; i.e. with A-scan, keratometry and average A-C depth measurement supplemented with the refractive history, although such measurements were less valuable in these cases (especially in Group B) than in the routine cataract extraction because of the irregularity of the damaged cornea and the variable predictability of postoperative corneal curvature and anterior chamber depth. The majority of the preoperative dioptic powers fell between 16 and 20 diopters. The majority of the lenses chosen were + 19 diopters, yet even the uncertainty of the measurement gave an acceptable visual result.

None of the donors were under 65 years of age. The eyes not in MK solution were used within 36 hours after death; those in solution within 63 hours, but the majority were used within 24 and 48 hours respectively. The corneal button from the whole eye was cut out with trephine or trephine and scissors, whereas the MK solution preserved corneas were cut with trephine punch from the endothelial side.

It should be noted that if we, ourself, processed the cornea after enucleation, we double filtered the MK solution. If the cornea arrived already in the solution, we immediately transferred in into double filtered MK solution. The MK solution was cultured after the cornea was removed from it.

Following Troutman's recommendation, donor grafts were .50 mm. larger than the recipient opening in the last 14 of Group A and last 10 of Group B patients. The majority of the recipient openings were 8 mm.

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The medical treatment routinely included subtenon injections of antibiotics at the beginning and steroid injection at the end of the surgery, CAI and anti-prostaglandin therapy if systemic problems did not contraindicate such treatment. Locally, we used steroid and antibiotic drops and 5% sodium chloride eyedrops. Cycloplegics were used in postoperative uveitis and/or if lens type warranted such therapy. We preferred short acting cycloplegics such as 0.25 to 0.50% homatropine, which seemed to be helpful to control mild uveitis without dilating the pupil to a degree where dislocation of the intraocular lens could occur. In more severe uveitis, or in the presence of rigid iris as some of these patients had, especially in the group of parenchymatous and trachomatous, as well as in postherpetic cases, probably due to the uveitis the patient had at the time of the original disease and even in some of our Fuchs' dystrophy cases (possibly because of some relationship between the Fuch's corneal dystrophy and iris rigidity) strong cycloplegics such as Hyoscine was used.

We used both running and interrupted 10-0 nylon suture, occasionally 9-0 nylon interrupted sutures. If reactions along the interrupted sutures developed, we removed the suture as soon as the blood vessels bridged the wound.

In Group A 3 patients had bilateral macular scarring of some degree. One patient suffered postoperative hemorrhage from iris with loss of graft, necessitating regrafting.

The visual acuity improved postoperatively in all cases. In 2 months, 21 of the 28 had vision of 20/100 or better. At the time of the last visit (about August of 1979) all patients had better than 20/100 vision and 22 patients had 20/40 or better.

Nineteen patients had myope cylindrical error before the sutures were cut. The cylindrical error underwent large change upon cutting the sutures, as documented in the table. The sutures were not cut for at least 9 months. If there was no reaction and the cylinder was not high, we left the sutures in indefinitely. There was some shifting axis after the sutures were cut, but no significance could be perceived from our figures 3, 4.

In Group A complications included 1 hemorrhage which needed irrigation on the second postoperative day; 5 CME and 14 IOP, as seen on the tables.

Our postoperative cylinders corresponded with those of the other group. Our visual results, however, were far worse than in Group A. This is natural because the operation itself was much more traumatic with vi-

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trexotomy, although there were only 5 fresh postoperative CME's. This confirms Eichenbaum's and other reports that vitrectomy performed with sharp instruments causes much less postoperative damage than the ones performed with aspiration needles.

The enclosed tables show our results.

TABLE I. Graft, Cataract Extraction,

Lens Implantation - Group A
28 Cases - all patients had
1 eye operated

Graft, Vitrectomy, Lens Implantation,
Exchange or Revision of IOL

Group B
20 Cases - 2 patients had
bilateral operations 1 year apart

TABLE II. Follow-up

Group A	Group B
24 to 71 months	24 to 54 months
Average - 37 months	Average - 33 months

TABLE III. Sex

Group A	Group B
Male - 15	Male - 11
Female - 13	Female - 9

TABLE IV. Age distribution

Group A: 35-75 years; average 62

30 - 40	-	1
40 - 50	-	2
50 - 60	-	5
60 - 70	-	12
70 +	-	8

Group B: 58-83 years; average 70

50 - 60	-	1
60 - 70	-	12
70 +	-	7

TABLE V. Age Distribution of Preoperative Diagnosis

Group A		Group B	
30-40	40-50	50-60	70 +
Trauma - 1	Trauma - 1	Trauma - 3	Old trauma - 1
	Parenchymatous keratitis - 1	Postherpetic corneal scarring - 2	Trachoma - 1
60-70			Postherpetic corneal scarring - 2
Old trauma - 2			Diffused corneal scarring; undetermined origin - 1
Parenchymatous keratopathy - 3			Fuchs' dystrophy - 3
Postherpetic corneal scarring - 1			
Diffused corneal scarring; undetermined origin - 1			
Fuchs' dystrophy - 5			
Group B		70 +	
50-60	60-70	Corneal dystrophy w/vitreous touch - 4	
Trauma, membranous cataract after lens absorption - 1	Corneal dystrophy w/vitreous touch - 5	Corneal dystrophy w/lens touch - 1	
	Old trauma - 1	Corneal dystrophy after KPE - 4	
	Fuchs' dystrophy - 1		
	Corneal dystrophy w/ lens touch - 1		
	Barrier Deprivation Syndrome - 2		

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TABLE VI. Preoperative Diagnosis

Group A				Group B			
		Sex	Age			Sex	Age
Trauma	- 8	M	35	Trauma	- 1	M	61
		M	45				
		M	51	Barrier Deprivation			
		M	54	Syndrome (Copeland			
		M	54	Lens)	- 1	M	65
		M	61				
		M	61	Barrier Deprivation			
		M	74	Syndrome after			
				ICCE 9 years			
Parenchymatous				previous	- 1	M	69
Keratopathy	- 4	M	42				
		M	64	Corneal dystrophy			
		M	68	after ICCE	- 7	M	65
		F	63			M	66
						M	68
						M	71
Diffused scarring.						F	66
undetermined						F	67
origin	- 2	M	72			F	70
		F	66				
Old trachoma	- 1	M	75	Corneal dystrophy			
				after ECCE	- 2	M	58
Postherpetic						M	70
scarring	- 5	M	54				
		M	61	Corneal dystrophy			
		F	51	from IOL			
		F	71	touch	- 2	M	58
		F	74			F	70
Fuchs' corneal				Corneal dystrophy			
dystrophy	- 8	F	63	after KPE	- 6	M	81
		F	64			F	72
		F	64			F	82
		F	65			F	82
		F	68			F	83
		F	71			F	86
		F	72				
		F	73				
				CME			
				Barrier deprivation			
				syndrome	- 2	M	65
						M	69
				Macular changes,			
				probably from			
				CME	- 8	M	68
						M	71
						F	66
						F	81
						F	82
						F	82
						F	83
						F	86
				CME after			
				ICCE	- 3	M	65
						M	68
						M	71

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CME after ECCE and aphakic glaucoma	- 1	M	58
CME after KPE	- 5	F	66
		F	81
		F	82
		F	82
		F	83
Macular hole after KPE	- 1	M	72

TABLE VII. Preoperative vision - Age distribution

Group A									
30-40		40-50		50-60		60-70		70 +	
FC 6 ft.	- 1	FC 9 ft.	- 1	FC 3-6 ft.	- 3	FC 1-6 ft.	- 2	FC 6-8 ft.	- 5
		20/40	- 1	FC 11 ft.	- 1	FC 9-10 ft.	- 3	20/400	- 3
				20/300	- 1	20/400	- 4		
						20/300	- 1		
						20/200	- 2		

Group B				
50-60		60-70		70 +
HM	- 1	HM		- 1 FC 2-8 ft.
		FC 2-8 ft.		- 10 20/400
		20/400		- 1

TABLE VIII. Preoperative vision

Group A					
Trauma	Parenchymatous keratopathy		Diffused corneal scarring of undetermined origin		Old trachoma
FC 3-11 ft.	- 5	FC 9-10 ft.	- 2		20/400 - 1
20/300	- 2	20/400	- 1	FC 6 ft.	- 1
20/40-3	- 1	20/200	- 1	20/200	1

(above commercial pilot, pre-traumatic bad contact lens experience)

Postherpetic corneal scarring		Fuchs' corneal dystrophy	
FC 3-8 ft.	- 5	HM	- 1
		FC 6-10 ft.	- 2
		20/400	- 5

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Group B				
Trauma	Fuchs' corneal dystrophy	Barrier deprivation syndrome	Corneal dystrophy from lens touch	
FC 5 ft. - 1	FC 3 ft. - 1	HM, good light perception - 1	FC 6 ft. 20/400	- 1
		FC 2 ft. - 1		- 1
	Corneal dystrophy from vitreous touch			
	After ICCE - FC 2-6 ft. - 6			
	After ECCE - FC 2-6 ft. - 2			
	After-KPE - FC 3-8 ft. - 5			
		20/400 - 1		- 1

TABLE IX. Age distribution of vision and condition of fellow eye

Group A				
30-40	40-50	50-60		
20/20 normal - 1	20/100 parenchymatous keratitis	20/60 cataract		- 1
	20/20 normal	20/20 normal		- 3
				- 2
60-70		70 +		
20/100 parenchymatous keratopathy	- 1	20/200 old trachoma, cataract		- 1
20/100 Fuchs' dystrophy	- 1	20/100 cataract		- 1
20/80 parenchymatous keratitis	- 2	20/80 Fuchs' dystrophy, macular degeneration, cataract		- 1
20/80 Fuchs' dystrophy, cataract	- 2	20/80 macular scarring		- 1
20/40 Fuchs' dystrophy, cataract	- 1	20/80 cataract		- 1
20/30 diffused corneal scarring, origin undetermined	- 1	20/60 Fuchs' dystrophy, cataract		- 1
20/25 normal	- 3	20/30 Fuchs' dystrophy		- 1
20/20 cataract, early	- 1	20/30 cataract		- 1
Group B				
50-60	60-70	70 +		
20/20 normal - 1	20/300 cataract	- 1	20/400 corneal dystrophy	
	20/80 cataract	- 1	after KPE	- 1
	20/60 cataract	- 2	20/300 corneal dystrophy	
	20/60 macular scarring	- 1	after KPE	- 1
	20/40 macular scarring	- 1	20/200 aphakic glaucoma, macular hole	- 1
	20/40 cataract	- 1	20/100 cataract, macular changes	- 1
	20/30 cataract	- 2	20/80 cataract	- 3
	20/25 normal	- 1	20/60 graft after IOL	- 1
			20/40 graft after IOL	- 1

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TABLE X. Condition of fellow eye and diagnosis of involved eye

Group A		
Fellow eye		Involved eye
20/20 nuclear sclerosis (age 74)	- 1	Trauma
20/25 normal	- 1	"
20/15-20/20 normal	- 6	"
20/100 parenchymatous keratopathy	- 2	Parenchymatous keratopathy
20/80 parenchymatous keratopathy, cataract	- 2	"
20/200 old trachoma	- 1	Old trachoma
20/80 cataract	- 1	Diffused corneal scar of undetermined origin
20/30 corneal scars	- 1	"
20/100 cataract	- 1	Postherpetic corneal scarring
20/80 macular scarring	- 1	" "
20/60 cataract	- 1	" "
20/20 early cataract	- 1	" "
20/20 normal	- 1	" "
20/100 + Fuchs', cataract	- 1	Fuchs' corneal dystrophy
20/80 Fuchs', cataract	- 2	" "
20/80 cornea normal, cataract, macular degeneration	- 1	" " "
20/60 Fuchs', cataract	- 1	" " "
20/40 Fuchs', early cataract	- 1	" " "
20/30 Fuchs', early macular degeneration	- 1	" " "
20/25 early Fuchs'	- 1	" " "
GROUP B		
Fellow eye		Involved eye
20/400 CED + CME	- 1	Corneal dystrophy after KPE
20/300 cataract	- 1	Barrier deprivation syndrome with Copeland lens
20/300 CED + CME	- 1	Corneal dystrophy after KPE
20/200 aphakic glaucoma, macular hole	- 1	Vitreous touch, corneal dystrophy after ECCE, macular scarring
20/100 cataract, macular scarring	- 1	Corneal dystrophy from IOL touch
20/80 Fuchs' dystrophy	- 2	Corneal dystrophy after ICCE
20/80 cataract	- 1	Vitreous touch, corneal dystrophy after, KPE, Platinum clip lens
20/80 cataract	- 2	CED after ICCE
20/60 Its eye of bilateral case	- 1	CED after KPE
20/60 Fuchs' dystrophy, cataract	- 1	Fuchs' dystrophy, ICCE 2 years previous
20/60 cataract	- 1	CED, vitreous touch after KPE
20/40 cataract	- 2	Corneal dystrophy, vitreous touch after ICCE, Corneal dystrophy, vitreous touch, macular scarring (Barrier Deprivation Syndrome)
20/40 Its eye of bilateral case	- 1	CED after KPE
20/30 peripheral cataract	- 1	Corneal dystrophy, vitreous touch after ICCE
20/30 cataract	- 1	Corneal dystrophy from Platinum clip touch
20/25 normal	- 1	Trauma, membranous cataract, absorption of lens
20/20 normal	- 1	Aphakic glaucoma, vitreous touch, corneal dystrophy after ECCE

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TABLE XI. Age distribution, type of cataract extraction or surgery, and type of lens used

Group A		Group B	
	30-40		50-60
KPE - Binkhorst 2-loop	- 1	Choyce Mark VIII	- 1
	40-50		60-70
ECCE - Binkhorst 2-loop	- 1	Binkhorst 4-loop	- 1
KPE - Binkhorst 2-loop	- 1	Fyodorov II	- 4
	50-60	Worst 2-loop Medallion® (1 replaced w/Copeland lens)	- 3
ECCE - Binkhorst 2-loop	- 2	Worst single loop clip	- 1
ECCE - Worst 2-loop	- 1	Choyce Mark VIII	- 2
KPE - Binkhorst 2-loop	- 2		
	60-70		70 +
ICCE - Binkhorst 4-loop	- 1	Worst 2-loop	
ICCE - Fyodorov II	- 2	Medallion®	- 1
ICCE - Worst 2-loop	- 3	Worst single loop clip	- 4
ECCE - Binkhorst 2-loop	- 3		
ECCE - Fyodorov II	- 1		
KPE - Binkhorst 2-loop	- 1	(in 3 patients, existing IOL	
KPE - Choyce Mark VIII	- 1	implant corrected)	
	70 +		
ICCE - Binkhorst 4-loop	- 2		
ICCE - Fyodorov II	- 2		
ICCE - Worst 2-loop	- 3		
ECCE - Binkhorst 2-loop	- 1		

TABLE XII. Type of cataract extraction

Group A	
ICCE	13
ECCE	9
KPE	6

TABLE XIII. Type of surgery

Group B	
Anterior vitrectomy w/scissors	- 7
Pars plana (Feyman) vitrectomy and Lensectomy (trauma)	- 1
Replacement of Copeland lens w/ Medallion 2-loop, anterior vitrectomy w/scissors (included in above)	- 1
Anterior vitrectomy w/Peyman vitrophage	- 4
Anterior vitrectomy w/Kaufman vitrophage	- 5
Amputation of IOL haptic	- 1
Adjustment of clip of IOL (w/1 Peyman vitrectomy)	- 2
Resuturing of IOL (included in above)	- 2
Closing of sector iridectomy (included in above)	- 4

TABLE XIV. Type of cataract extraction
and lens used

Group A	
ICCE	
Binkhorst 4-loop	- 3
Worst Medallion 2-loop	- 7
Fyodorov II	- 3
ECCE	
Binkhorst 2-loop	- 8
Fyodorov II	- 1
(All Binkhorst 2-loop lenses sutured with Alpar suture)	
KPE	
Binkhorst 2-loop	- 5
Choyce Mark VIII	- 1
(All Binkhorst 2-loop lenses sutured with Alpar suture 10)	

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TABLE XV. Lenses used

Group A		Group B	
Binkhorst 2-loop	- 13	Binkhorst 4-loop	- 1
Binkhorst 4-loop	- 3	Worst 2-loop Medallion®	- 4
Worst Medallion® 2-loop	- 7	Worst single loop clip	- 5
Fyodorov II	- 4	Fyodorov II	- 4
Choyce Mark VIII	- 1	(All Fyodorov II lenses sutured with Alpar suture)	
		Choyce Mark VIII	- 3

TABLE XVI. Preoperative lens power with Medical Workshop A-scan and refractive history

Group A		Group B	
16-18 diopter	- 12	16-18 diopter	- 7
18-20 diopter	- 11	18-20 diopter	- 7
20-22 diopter	- 5	20-21 diopter	- 2
		22 diopter	- 1

TABLE XVII. Power of lenses implanted

Group A		Group B	
19.0 diopter	- 13	19.0 diopter	- 8
19.5 diopter	- 7	19.5 diopter	- 1
20.0 diopter	- 6	20.0 diopter	- 6
21.0 diopter	- 2	21.0 diopter	- 2

TABLE XVIII. Grafts (All donors under age 65)

Group A		Group B	
Whole eyes	- 8	Whole eyes	- 2
Used after death within:		Used after death within:	
6-10 hours	- 2	6-10 hours	- 2
10-24 hours	- 4		
24-36 hours	- 2		
Corneal buttons in MK solution	- 20	Corneal buttons in MK solution	- 18
Used after death within:		Used after death within:	
12-24 hours	- 8	12-24 hours	- 8
24-48 hours	- 9	24-48 hours	- 10
48-63 hours	- 3		
Instruments used in whole eyes		Instruments used in whole eyes	
Trephine	- 5	Trephine	- 2
Trephine + scissors	- 3		
Instrument used in corneal buttons in MK solution		Instruments used in corneal buttons in MK solution	
Punch w/trephine from endothelial side	- 20	Punch w/trephine from endothelial side	- 18

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TABLE XIX. Sizes of recipients corneal excision and graft

Group A				Group B			
Size of recipients corneal excisión		Size of graft		Size of recipients corneal excisión		Size of graft	
7.5 mm.	- 5	8.0 mm	- 19	8.0 mm	- 20	8.0 mm	- 10
8.0 mm.	- 23	8.5 mm	- 9			8.5 mm.	- 10
(In the last 14 grafts, donor cornea 0.50 mm larger than recipient)				(In the last 10 grafts, donor cornea 0.50 mm larger than recipient)			

TABLE XX. Postoperative treatment - Group A and Group B

1. Subtenon injection of antibiotics at the beginning and steroids at the end of surgery.
2. Postoperative CAI therapy for 3 days if no systemic contraindications.
3. Pre-and postoperative anti-prostaglandin therapy.

TABLE XXI. Pre-existing retinal conditions and intraoperative complications

Group A			Group B		
Bilateral macular scarring	- 3	Hemorrhage absorbed in 3 days - 1	CME w/macular scarring	- 11	Hemorrhage - 1 Irrigation of anterior chamber on 2nd PO day

TABLE XXII. Vision without correction 2 months postoperatively

Group A		Group B	
20/400	- 2	20/400	- 5
20/300	- 3	20/300	- 7
20/200	- 2	20/200	- 6
20/100	- 10	20/100	- 1
20/80	- 8	20/80	- 1
20/60	- 3		

TABLE XXIII. Vision at last visit (minimal follow-up 24 months)

Group A		Group B	
20/100	- 1	20/100	- 3 (2 CME, 1 macular hole)
20/80	- 1	20/80	- 5 (3 CME, 1 corneal scarring, 1 macular scarring)
20/60	- 1		
20/40	- 7	20/60	- 5
20/30	- 12	20/40	- 4
20/25	- 6	20/30	- 3

TABLE XXIV. Spherical correction before sutures cut

Group A		Group B	
- 4 to - 3 diopter	- 3	- 4 to - 3 diopter	- 6
- 3 to - 2 diopter	- 6	- 3 to - 2 diopter	- 7
- 2 to - 1 diopter	- 6	- 2 to - 1 diopter	- 2
- 1 to - 0 diopter	- 4	0 to - 1 diopter	- 1
0 to + 1 diopter	- 2	+ 1 to + 2 diopter	- 3
+ 1 to + 2 diopter	- 3	+ 2 to + 3 diopter	- 1
+ 2 to + 3 diopter	- 2		
+ 3 to + 4 diopter	- 2		

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TABLE XXV. Spherical correction after sutures cut

Group A		Group B	
- 4 to - 3 diopter	- 3	- 4 to - 3 diopter	- 4
- 3 to - 2 diopter	- 7	- 3 to - 2 diopter	- 8
- 2 to - 1 diopter	- 9	- 2 to - 1 diopter	- 5
- 1 to - 0 diopter	- 4	- 0 to + 2 diopter	- 2
0 to + 1 diopter	- 2	+ 1 to + 1 diopter	- 1
+ 2 to + 3 diopter	- 3		

TABLE XXVI. Cylinder correction before sutures cut

Group A		Group B	
- 7 diopter	- 2	- 7 to - 5 diopter	- 4
- 5 to - 4 diopter	- 6	- 3 to - 2 diopter	- 8
- 3 to - 2 diopter	- 12	- 2 to - 1 diopter	- 4
- 2 to - 1 diopter	- 4	+ 1 to + 3 diopter	- 2
0 to + 1 diopter	- 1	+ 3 to + 4 diopter	- 2
+ 1 to + 2 diopter	- 3		

TABLE XXVII. Cylinder correction after sutures cut

Group A		Group B	
- 3 to - 2 diopter	- 6	- 3 to - 2 diopter	- 9
- 2 to - 1 diopter	- 7	- 2 to - 1 diopter	- 6
- 1 to - 0 diopter	- 4	+ 1 to + 2 diopter	- 4
0 to - 1 diopter	- 5	+ 2 to + 3 diopter	- 1
+ 1 to + 2 diopter	- 4		
+ 2 to + 3 diopter	- 2		

TABLE XXVIII. Cylinder axis before and after sutures cut

Group A				Group B			
Before sutures cut	After sutures cut						
180 ± 15	- 12	180 ± 15	- 9	180 ± 15	- 8	180 ± 15	- 6
45 ± 15	- 6	45 ± 15	- 7	45 ± 15	- 4	45 ± 15	- 4
90 ± 15	- 6	90 ± 15	- 8	90 ± 15	- 5	90 ± 15	- 5
135 ± 15	- 4	135 ± 15	- 4	135 ± 15	- 3	135 ± 15	- 5

TABLE XXIX. Postoperative complications

Group A		Group B	
Lost graft	- 1	Cystoid macular edema	
Successful regrafting w/IOL retained	- 1		
Successful regrafting w/IOL removed; severe hemorrhage 3rd PO day, graft lost, lens removed	- 1	6-22 weeks PO	- 1
(Gradual shallowing of anterior chamber 3 months; graft lost)		8-28 weeks PO	- 2
		8-32 weeks PO	- 1
		12-26 weeks PO	- 1
Cystoid macular edema		Hemorrhage requiring irrigation of anterior chamber	- 1
ICCE 6-18 weeks PO	- 1	Increased IOP for 3 days	- 3
KPE 8-20 weeks PO	- 1	Increased IOP for 6 days	- 3

KERATOPLASTY WITH PRIMARY AND SECONDARY IMPLANTATION

TABLE XXX. Age distribution of postoperative complications

Group A				
	40-50	50-60	60-70	70 +
PO hemorrhage absorbed in 3 days	0	1	0	1
Increased IO pressure for 2 days	1	1	3	1
Increased IO pressure for 1 week	0	0	1	0
Increased IO pressure for 3 weeks	0	0	0	1
Group B				
	60-70	70+		
PO hemorrhage, irrigation on 2nd PO day	1	0		
Increased IOP (over 25 mm hg) for 1 week	0	2		
Increased IOP for 2 days	2	1		

TABLE XXXI. Age distribution of postoperative cystoid macular edema

	Group A		Group B		
	40-50	60-70		60-70	70 +
Lasting 3 mo.	1	1	Lasting 3 mo.	1	0
			Lasting 4 mo.	0	1
			Lasting 5 mo.	2	0
			Lasting 6 mo.	0	1

TABLE XXXII. Age distribution of cystoid macular edema, type of cataract extraction and lens used

	Group A		
	40-50	60-70	60-70
ICCE - Fyodorov II	1	0	1
KPE - Binkhorst 2-loop	1	1	0

TABLE XXXIII. Age distribution of cystoid macular edema, type of vitrectomy and lens used

Group B			
60-70		70 +	
Scissors and weck cell, Worst single loop		Scissors and weck cell, Worst single loop	- 2
Kaufman - Fyodorov II	- 1		
Kaufman - Choyce			
Mark VIII	- 1		

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TABLE XXXIV . Postoperative IOP (Perkins-Clarke Applanation)

Group A		
1st PO day	3rd PO day	7th PO day
32 hg mm - 2	32 hg mm - 2	30 hg mm - 1
30 hg mm - 1	28 hg mm - 2	22 hg mm - 6
27 hg mm - 3	23 hg mm - 9	18 hg mm - 12
25 hg mm - 2	22 hg mm - 4	16 hg mm - 6
20 hg mm - 14	17 hg mm - 5	14 hg mm - 3
18 hg mm - 3	15 hg mm - 6	
16 hg mm - 3		

At last visit, all patients' pressure was under 18 hg mm (minimal follow-up 24 months).

Group B		
1st PO day	3rd PO day	7th PO day
29 hg mm - 3	34 hg mm - 1	30 hg mm - 1
25 hg mm - 4	30 hg mm - 3	28 hg mm - 8
20 hg mm - 6	25 hg mm - 7	25 hg mm - 6
18 hg mm - 3	20 hg mm - 4	20 hg mm - 5
15 hg mm - 4	18 hg mm - 5	

At last visit, all patients' pressure was under 18 hg mm (minimal follow-up 24 months)

TABLE XXXV. Age distribution of postoperative vision at last visit

Group A				
30-40	40-50	50-60	60-70	70 +
20/30 - 1	20/25 - 1	20/25 - 2	20/25 - 3	20/30 - 2
	20/30 - 1	20/30 - 2	20/30 - 6	20/40 - 4
		20/40 - 1	20/80 - 1	20/60 - 1
			20/90 - 2	20/100 - 1

Group B		
50-60	60-70	70 +
20/60 - 1	20/30 - 3	20/60 - 3
	20/40 - 4	20/80 - 2
	20/60 - 1	20/100 - 2
	20/80 - 3	
	20/100 - 1	

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