Indications and Outcomes of Corneal Transplantation in Geriatric Patients

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• PURPOSE: To identify the most common corneal transplant procedures, indications, coexisting ocular diseases, and outcomes in elderly patients, and to compare younger geriatric patients with super-geriatric patients.
• DESIGN: Retrospective case series.
• METHODS: Data of all patients 65 years old and older who underwent corneal transplantation at Wills Eye Institute from April 2007 to January 2013, and were followed up for at least 1 year, were collected. Two hundred seventy-one eyes of 253 patients were divided into 2 groups according to the age of the patient.
• RESULTS: Group I (65-79 years old) included 181 eyes and Group II (80 years and older) included 90 eyes. The most common indication was Fuchs endothelial dystrophy, with 78 eyes (43%) in Group I and 34 eyes (38%) in Group II. In Group I, 93 Descemet stripping endothelial keratoplasty (DSEK) (51%), 84 penetrating keratoplasty (PK) (46%), and 4 keratoprosthesis procedures(2%) were performed; in Group II, 37 DSEK (41%), 51 PK (57%), and 2 keratoprosthesis procedures (2%) were performed. Graft survival rate at last visit was 90% for Group I and 88% for Group II. Rejection occurred in 18 Group I eyes (10%) and 7 Group II eyes (8%) ($P = .562$).
• CONCLUSION: Endothelial abnormalities were more common indications and keratoconus was a less common indication for surgery in the elderly. Fuchs dystrophy was the leading indication for surgery in both super-geriatric and younger geriatric patients. Graft survival rate was slightly higher in the younger geriatric age group but was not statistically significant. In the elderly, there is an increased prevalence of both glaucoma and retinal diseases that can affect the visual outcomes after corneal transplantation. (Am J Ophthalmol 2013;156:600–607. © 2013 by Elsevier Inc. All rights reserved.)

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CORNEAL TRANSPLANTATION IS A SUCCESSFUL procedure that has been performed for decades. The conventional procedure is penetrating keratoplasty (PK), which is a full-thickness transplant of the cornea, but other corneal transplantation techniques are becoming increasingly popular. Interest in endothelial keratoplasty, most commonly Descemet stripping endothelial keratoplasty (DSEK), has grown in recent years because of the significant advantages over PK procedures for eyes with corneal edema. The decision regarding the specific type of procedure for a particular patient depends primarily on the indication and other coexisting ocular diseases.

The geriatric population represents a distinct clinical group in the context of corneal transplantation. Indications for surgery differ compared to younger cohorts and these older patients are more likely to have had previous or coexisting ocular disease or surgery, and the visual prognosis may be significantly worse because of these conditions. A greater likelihood and severity of systemic diseases and use of numerous systemic medications may also influence the follow-up and compliance of geriatric patients. Cooperation and compliance with postoperative medications affect the success of corneal transplantation and may be lower in geriatric patients. Also, age may potentially influence wound healing, immunologic response, and the incidence of intraoperative and postoperative complications. In numerous published series, young recipient age is associated with a higher rate of failure from rejection.[1–3] The risk of rejection is increased in regrafts and in eyes with several pre-existing conditions such as uveitis, keratitis, anterior iris synechiae, vitreous adhesions, previous anterior segment surgery other than penetrating keratoplasty, and multiple surgeries at the same time.[4–6] Although glaucoma does not necessarily predispose to rejection, it is an important risk factor for graft failure.[4,6,7]

Geriatric patients are a rapidly growing population throughout the world. The United States census of 2010 showed that there were more than 40 million people aged 65 years or older, constituting 13% of the population.[8] As a result, there has been a significant increase in a subgroup of these patients: those older than the age of 80 years, often termed the "super geriatric." With

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TABLE 1. Classification of Corticosteroid Drops in Corneal Grafts According to Dose and Strength

High	Medium	Low
Prednisolone acetate/phosphate 1% 4 times a day	Prednisolone acetate 1% 1 time every other day	Loteprednol etabonate 0.5% 1 time per week or less
Prednisolone acetate/phosphate 1% 3 times a day	Loteprednol etabonate 0.5% 1 time a day	Fluorometholone alcohol 0.1% 1 time a day or less
Prednisolone acetate/phosphate 1% 2 times a day	Fluorometholone alcohol 0.25% 1 time a day	Prednisolone acetate 0.12% 2 times a day or less
Prednisolone acetate/phosphate 1% 1 times a day		Loteprednol etabonate 0.2% 1 time a day or less

TABLE 2. Characteristics of Geriatric Patients Having Corneal Transplantation

	65-79 Age Group	≥80 Age Group	Total	*P* Value
Number of patients	165 (65%)	88 (35%)	253	-
Sex				
Female	105 (64%)	54 (61%)	159 (63%)	.722
Male	60 (36%)	34 (39%)	94 (37%)	
Age at surgery, y (± SD)	65-79 (72.33 ± 4.25)	80-93 (84.63 ± 3.53)	65-93 (76.61 ± 7.10)	-
Bilateral surgery	16	2	18	.029
≥3 systemic diseases	74 (45%)	46 (52%)	120 (47%)	.497
≥3 systemic medications	116 (70%)	73 (83%)	189 (75%)	.027
Mean (± SD)follow-up time (mo)	36.7 ± 13.3	34.1 ± 15.6	35.8 ± 14.1	.111

increasing numbers of those of retirement age, the demand this group places on healthcare systems worldwide will continue to rise. Over the years, there have been many published reports regarding the clinical and demographic aspects of patients who have corneal transplantations, but there are limited data on the geriatric population.[7,9–12]

The purpose of this study is to identify, in those patients who are 65 years old and over, the most common corneal transplant procedures and indications, coexisting ocular and systemic diseases, and the visual and tectonic outcomes, and to compare younger geriatric with super-geriatric patients for a 4-year period at Wills Eye Institute.

METHODS

AFTER WILLS EYE INSTITUTE INSTITUTIONAL REVIEW Board approval, the charts of all patients who underwent corneal transplantation in our practice at Wills Eye Institute from April 6, 2007 to January 2, 2013 were identified through a computerized search of our electronic health records system and retrospectively reviewed. Included were all patients who underwent a corneal transplantation at age 65 years and over who had at least 1 year of follow-up. If an eye had more than 1 corneal transplantation at the age of 65 or older, only the first procedure was included in the study. Patients were divided into 2 groups based on the age at the time of corneal procedure; Group I consisted of the patients aged 65-79 years and Group II comprised patients 80 years and over (super-geriatric patients). Patients with less than 1 year of follow-up were excluded from the study.

Data reviewed included the chief complaint before the surgery, ophthalmologic examination at each office visit, indications for the graft, coexisting ocular diseases before the surgery, history of all systemic diseases and prescription medications, complications during surgery, best-corrected visual acuity (BCVA), and graft survival. Visual acuity was measured using a Snellen chart. Visual acuities were divided into 4 groups (≥20/30, 20/40-20/100, 20/200-20/400, and <20/400). The dose and frequency of the steroids administered at last visit were also reviewed. The use of steroid at last visit was categorized and placed into 4 "potency groups" (ie, high, medium, low, and no steroids) according to the dose and strength of the particular steroid (Table 1).[13]

The corneal transplant procedures were DSEK, PK, and keratoprosthesis. Depending on the indication, cataract surgery; intraocular lens placement, removal, or exchange; anterior vitrectomy; or tarsorrhaphy were also performed. All corneal transplants were performed under monitored anesthesia care with lid and retrobulbar block or general anesthesia. Donor corneas were obtained through the Lions Eye Bank of Delaware Valley. The