

Indications of Penetrating Keratoplasty in Southern India

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ABSTRACT

Aim: To study the indications of penetrating keratoplasty in Southern India.

Settings and Design: Retrospective study.

Material and Methods: Retrospective evaluation of eye bank records from December, 2002 to December, 2012 with respect to indications for penetrating keratoplasty.

Results: During the period considered for study, 102 penetrating keratoplasties were performed. The leading indications for penetrating keratoplasty were corneal scarring (60.7%),

followed by re-grafting (12.7%), spheroidal degeneration (9.8%), aphakic bullous keratopathy (5.88%), pseudophakic bullous keratopathy (2.94%), acute infectious keratitis (2.94%), corneal dystrophy and keratoconus (4.9%). Healed infectious keratitis (72.88%) was the most common subcategory among the eyes with corneal scarring followed by traumatic corneal scars (16.12%).

Conclusion: Corneal scarring from healed infectious keratitis are the most common indication for keratoplasty in Southern India.

Keywords: Indications, Penetrating keratoplasty, Corneal scarring, India

INTRODUCTION

In India, there are 15 million blind people, among those 6.8 million suffer corneal blindness with vision 6/60 in at least one eye [1]. Penetrating keratoplasty (PK) is the procedure of choice to rehabilitate the patients with corneal blindness.

There are various indications for penetrating keratoplasty. Literature review suggests, common indications of PK are pseudophakic bullous keratopathy [2-6], aphakic bullous keratopathy [2-4], keratoconus [3,7], Fuch's dystrophy [3,6], corneal scarring [8-10], graft failure [2]. There are various studies regarding the indications of PK all over the world but very few reports are available from developing countries. These indications for PK vary between developed and developing countries. We did a retrospective study utilizing the eye bank records of BVVEB (Basaveshwar Veerashaiv Vidyavardhaka Eye bank) and Corneal grafting centre, SN Medical College, Bagalkot, North Karnataka, Southern India.

SUBJECTS AND METHODS

We reviewed the eye bank records of all the patients who underwent PK from December, 2002 to December, 2012 (10 years). We analysed the data with respect to demographic profile of all the patients and the indications for keratoplasty.

RESULTS

A total of 102 patients underwent PK during the 10 year study period. Out of 102 patients, 59 were males and 43 females. The age ranged from 7 years to 81 years, with a mean of 47.9 ± 5.09 years with median age 50 years. There were 92 rural patients and 10 urban patients.

The most common indication of PK is corneal scarring, seen in 62 (60.7%) of the eyes, followed by failed graft 13 (12.7%), spheroidal corneal degeneration 10 (9.8%), aphakic and pseudophakic bullous keratopathy 9 (8.82%), active infectious keratitis 3 (2.94%), corneal dystrophy 3 (2.94%) and keratoconus 2 (1.96 %).

Common cause among 62 eyes with corneal scarring were healed infectious keratitis in 72.88% (45) of the eyes, traumatic corneal

scars in 16.12% (10) of the eyes, vitamin A deficiency scars in 4.83% (3) and miscellaneous aetiologies in 6.45% (4) eyes. The mean age group of the patients who had traumatic corneal scar was 30.2 ± 6.2 years, there were 7 males and 3 females. The presentation of corneal scarring eyes were vascularized leucomatous corneal opacity in 42 eyes (67.7%), adherent leucoma 12 eyes (19.3%), leucomatous opacity in 5 eyes (8.06%) and anterior staphyloma in 3 eyes (4.83%) [Table/Fig-1].

Spheroidal degeneration of cornea with significant visual deterioration was there in 9.80% eyes (10) who underwent PK. Another common indication of KP is failed graft eyes in 12.7% (13) patients, bullous keratopathy was present in 8.82% (9) eyes. Aphakic bullous keratopathy 66.7% (6) was slightly more than pseudophakic bullous keratopathy 33.3% (3). There were 2.94% (3) corneal dystrophy eyes in which 66.7% (2) eyes had macular dystrophy and 33.3% (1) eye had granular dystrophy and 1.96% (2) had keratoconus.

Corneal Scarring	No	%	Subcategory	No	%
	62	60.7	Healed keratitis	45	72.58
			Trauma	10	16.12
			Vitamin A deficiency	3	4.83
			Others	4	6.45
Failed graft	13	12.7			
Spheroidal degeneration	10	9.80			
Bullous keratopathy	9	8.82	ABK	6	66.7
			PBK	3	33.3
Acute infectious keratitis	3	2.94			
Corneal dystrophy	3	2.84	Macular	2	66.7
			Granular	1	33.3
Keratoconus	2	1.96			

[Table/Fig-1]: Indications for penetrating keratoplasty in Southern India
ABK, aphakic bullous keratopathy, PBK, pseudophakic keratopathy

Indications	Cesar et al., [2]	Chaidaroon et al., [6]	Chen et al., [9]	Mkanganwi et al., [10]	Dandona et al., [12]	Sony et al., [11]	Present study
Region	U.S (1996-2000)	Thailand (1996-1999)	Taiwan (1987-1999)	Zimbabwe (1992-1998)	Southern India	India (1996-2003)	India (2002-2012)
PBK + ABK	30.9	28.9	17.6	12.5	22.4	13.45	8.82
Keratoconus	15.4		2.5	26.8	6	2.37	1.96
Fuchs dystrophy	15.2	20.0	4.5		8.4	3.85	
Failed graft	18.1	8.9	21.0		17.1	11.5	12.7
Corneal scarring		22.2	27.9	28.5	28.1	38.03	60.7
Active keratitis		17.8	17.9		12.2	28.38	2.94
Trauma		2.2		10.7	2.1	16.71	

[Table/Fig-2]: Comparison of Indications of Penetrating Keratoplasty in Different Regions

Includes healed infectious Keratitis and traumatic scars, PBK, pseudophakic bullous keratopathy, ABK, aphakic bullous keratopathy

DISCUSSION

PK is a commonly performed surgical procedure in corneal blindness. The prognosis and the outcome, however, are dependent on the pathology responsible for causing corneal blindness. The purpose of our study is to document the indications for PK in Southern India.

In our study we found that the most common indication for PK was corneal scarring (60.7%) which is slightly higher to studies performed in Southern India (28.1%) [12] and Northern India (38.03%) [11]. Corneal scarring is one of the leading indications of corneal transplantation in developing countries accounting for 22.2% to 39.2% keratoplasties [Table/Fig-2]. Reports of western literature reports PBK, keratoconus and Fuch's dystrophy are the leading indications for PK but in our study the high proportion of corneal scarring is due to healed infectious keratitis. This could be due to our eye bank is in medical college acts as tertiary referral centre in North Karnataka. The improper management of corneal ulcer as delayed diagnosis, inadequate treatment from the quacks in rural areas is one more cause for increase in incidence of corneal scarring. So, proper awareness about the corneal infectious ulcer and management among the public is essential.

In our study trauma is the second leading common cause for the corneal scarring. This account for 16.12% in our study in contrary to the western studies which have lower range (2.2%- 5.5%) but similar to studies of Northern India (16.71%) [12]. Most of the traumatic corneal scars in our study were related to agriculture work as our 90.19% of patients were from rural areas.

Regrafting (12.7%) is the second common indication for PK in our study which is similar to Northern India study (11.5%). Graft failure is due to poor maintenance of graft after PK by the patients. The frequent visit of patients to the hospital for graft failure management is the cause of increase incidence of re-graft as they get registered and motivated for PK. Regrafting is the most common indication for PK in Canada (18%) [13]. Different studies proportion varies from 6.6% to 18.2% [2,6-9,13].

Third common indication for PK in our study is spheroidal degeneration of cornea 9.8% (10). This trend is not seen in any other study, in contrast, in western studies Fuch's corneal dystrophy is one of the common indication for PK varying from 4.4% to 19.5% [2,3]. Spheroidal degeneration is more common in outdoor workers who are exposed to dust, wind and hot sun which is prevalent in our area and 90.19% of our patients are from rural area who are involved in agricultural activities, is the reason for high proportion of spheroidal degeneration.

In our study aphakic bullous keratopathy and pseudophakic bullous keratopathy accounted for 8.82% (9), in which aphakic bullous keratopathy 66.7% (6) was found to be slightly more common than pseudophakic bullous keratopathy 33.3% (3) contrary to the western studies where pseudophakic bullous keratopathy to be the leading indication for PK (18.9% to 40.9%) [2-6]. This trend

in our study is due to cataract surgeries performed in outreach mass camps and PBK is due to recent increase in intraocular implantation in camp surgeries.

Active acute infectious keratitis who underwent therapeutic penetrating keratoplasty were 2.94% (3) in contrary to Southern India study (12.2%) which is because we have considered only patients who underwent therapeutic PK and rest of the healed infectious keratitis in to the corneal scarring group.

Corneal dystrophies accounts for 2.94% in which granular and macular corneal dystrophies are included. Keratoconus 1.96% was also the indication for PK which is similar to Indian studies, Dandona et al. 6% and Northern studies 2.37% which is in contrary to western literature, where Pseudophakic bullous keratopathy, keratoconus are the common indications.

BVWEB situated in Northern Karnataka, Southern India, which is having developing rural areas with rural population getting benefited from the Eye bank. This study reveals actual indications of PK in rural areas of Northern part of Karnataka from Southern India.

CONCLUSION

Corneal scarring is the most common indication for corneal transplantation. Healed infectious keratitis and trauma accounts for the corneal scarring requiring keratoplasty followed by regrafting. Awareness and preventive measures are required to decrease the incidence of infectious keratitis.

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