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Original Article

Visual outcome in patients undergoing penetrating keratoplasty

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ABSTRACT:
Background: Corneal blindness is one of the most challenging public health problems all over the world. The present study was conducted to assess visual outcome in patients undergoing penetrating keratoplasty. **Materials & Methods:** 102 patients selected for penetrating keratoplasty of both genders underwent visual acuity test taken in Snellen's chart and converted to log MAR units to provide a common scale for analysis. Full thickness PK was done by corneal surgeons. All patients were examined and treated postoperatively and complications were recorded. **Results:** Visual acuity 1-0.5 had 0 pre-operatively and 4 post- operatively, 0.3-0.16 had 0 pre-operatively and 45 post- operatively, 0.1-0.016 had 50 pre-operatively and 26 post- operatively and CT to PL had 52 pre-operatively and 27 post- operatively. Common pathologies were optical PK such as leucomatous opacity in 24, chemical injury in 10, graft rejection in 5, adherant leucoma in 6 and bullous keratopathy in 7 cases. Therapeutic PK had corneal ulcer in 26, keratomalacia in 14 and anterior staphyloma in 10 cases. The common complications were epithelial defect in 4, wound leak in 1, raised OP in 6, mild AC reaction in 2 and rejection in 5 cases. The difference was significant (P< 0.05). **Conclusion:** Penetrating keratoplasty found to be better treatment options for patients with corneal blindness.
Key words: Corneal blindness, Leucomatous opacity, Penetrating keratoplasty

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INTRODUCTION:

Corneal blindness is one of the most challenging public health problems all over the world, especially in developing countries like India, where it is one of the leading causes of visual disability.[1] According to WHO, corneal blindness is the 4th leading cause of blindness globally (5.1%). It is expected that the number of individuals with unilateral corneal blindness in India will increase to 10.6 million by 2020. The aetiology encompasses ocular trauma, infectious keratitis, bullous keratopathy, corneal degenerations, dystrophies, xerophthalmia, and trachoma.[2] Penetrating keratoplasty (PKP) involves surgical removal of diseased or damaged cornea from the host and replacement with a full-thickness donor cornea. The major goals of PKP are to improve visual acuity, to maintain the integrity of the eye, and to treat various infections. The role of corneal transplantation has grown steadily and the procedure is practised more widely than all other forms of clinical allotransplantation.[3] Corneal transplantation has the potential to reverse visual loss in millions of people. Unfortunately, the potential of the procedure is limited by shortage of corneas, particularly in places where corneal disease is common, such as in many rural communities in developing countries.[4]

A successful outcome of penetrating keratoplasty depends on various donor and host factors, surgical technique and post operative care. A major challenge pertaining to success of PK in India lie in the fact that majority of patients undergoing PK come from low socioeconomic status and are illiterate, which renders it difficult to maintain post operative follow up and care.[5] The present study was conducted to assess visual outcome in patients undergoing penetrating keratoplasty.

MATERIALS & METHODS:

The present study comprised of 102 patients selected for penetrating keratoplasty of both genders. All were enrolled in the study with their written consent.

Demographic details including name, age, sex, address and occupation were noted. Visual acuity in all cases was taken in Snellen's chart and converted to log MAR units to provide a common scale for analysis. A detailed ocular examination was carried out in torch light and slit lamp and findings were recorded. Donor cornea was assessed under diffuse illumination aided with slit lamp, and graded as per the standards of EBAI. Full thickness PK was done by corneal surgeons. All patients were examined and treated postoperatively and complications were recorded. Outcome was noted as good visual

outcome, moderate outcome and no improvement. Results were analysed statistically.

RESULTS:

Table I Comparison of visual acuity

Visual acuity	Pre-operative	Post- operative	P value
1-0.5	0	4	0.01
0.3-0.16	0	45	
0.1-0.016	50	26	
CF to PL	52	27	

Table I shows that visual acuity 1-0.5 had 0 pre-operatively and 4 post- operatively, 0.3-0.16 had 0 pre-operatively and 45 post- operatively, 0.1-0.016 had 50 pre-operatively and 26 post- operatively and CT to PL had 52 pre-operatively and 27 post- operatively. The difference was significant (P<0.05).

Table II Distribution of corneal pathologies

Pathologies	Parameters	Number	P value
Optical PK	Leucomatous opacity	24	0.05
	Chemical injury	10	
	Graft rejection	5	
	Adherant leucoma	6	
	Bullous keratopathy	7	
Therapeutic PK	Corneal ulcer	26	
	Keratomalacia	14	
	Anterior staphyloma	10	

Table II, graph I shows that common pathologies were optical PK such as Leucomatous opacity in 24, chemical injury in 10, graft rejection in 5, adherant leucoma in 6 and bullous keratopathy in 7 cases. Therapeutic PK had corneal ulcer in 26, keratomalacia in 14 and anterior staphyloma in 10 cases. The difference was significant (P< 0.05).

Graph I Distribution of corneal pathologies

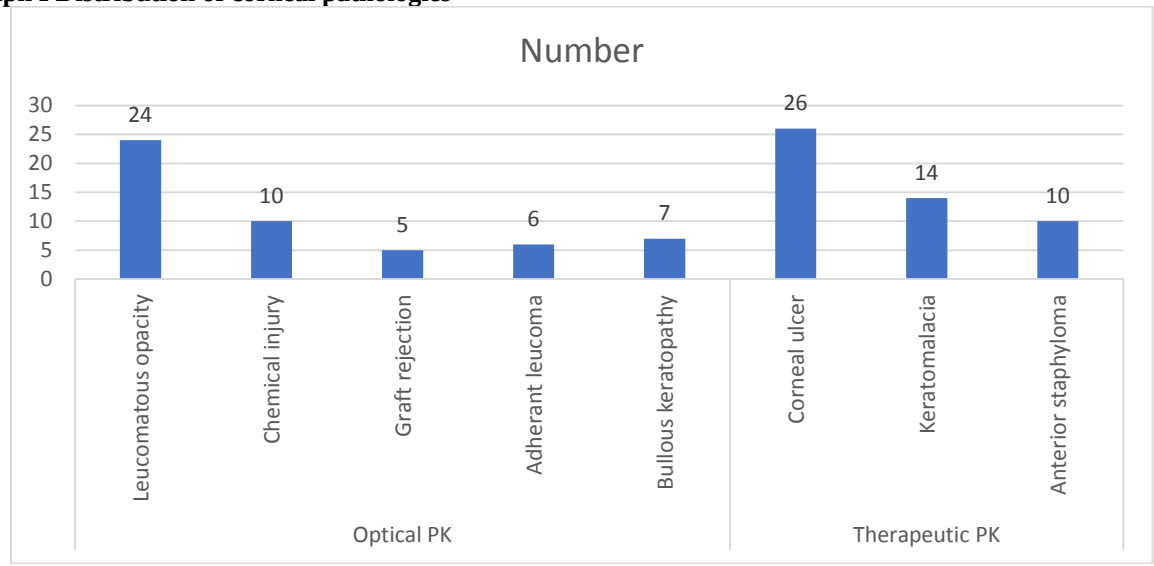

Table III Distribution of complications

Complications	Number	P value
Epithelial defect	4	0.03
Wound leak	1	
Raised IOP	6	
Mild AC reaction	2	
Rejection	5	

Table III shows that common complications were epithelial defect in 4, wound leak in 1, raised OP in 6, mild AC reaction in 2 and rejection in 5 cases. The difference was significant (P< 0.05).

DISCUSSION:

The cornea is the most important refractive surface of the eye. Its refractive index is 1.38 (1.376) and the anterior surface is the main refractive surface. The tear film is important in maintaining a healthy normal environment for the corneal epithelial cells. The tear film consists of an inner mucin layer which lines the hydrophobic epithelium and makes it wettable, an aqueous layer and a superficial lipid layer which decreases evaporation.[6] The transparency of the cornea is due to its relatively dehydrated state, absence of blood vessels and pigment, uniform refractive index of all the layers and uniform spacing of the collagen fibrils in the stroma. The main role of the endothelium cells is to limit the fluid intake of the cornea from the aqueous.[7] The function of the cornea include: (i) allowing transmission of light by its transmission, (ii) helping the eye to focus light by refraction, (iii) maintaining the structural integrity of the globe, (iv) protecting the eye from infective organisms, noxious substances and UV radiation. Corneal transplant surgery is the most commonly performed allograft and is said to be the most successful solid organ transplants, with short-term survival rates (1 year) as high as 90%. Reports from various graft registries of the developed countries show the indications for surgery being mainly keratoconus, other corneal dystrophies, followed by aphakic and pseudophakic bullous keratopathies. However, the scenario in developing world is quite different. Firstly, the patient profile and indications for surgery differ.[8] The present study was conducted to assess visual outcome in patients undergoing penetrating keratoplasty.

In present study we found that visual acuity 1-0.5 had 0 pre-operatively and 4 post- operatively, 0.3-0.16 had 0 pre-operatively and 45 post- operatively, 0.1-0.016 had 50 pre-operatively and 26 post- operatively and CT to PL had 52 pre-operatively and 27 post- operatively. Joshi et al[9] studied the indications, risk factors, postoperative course, and long-term survival of corneal transplants done for optical purposes. Median survival of the cohort was 27 months (95% confidence interval: 20.47-33.52). One- and two-year survival rates were 65% and 52.5%, respectively. Median survival was significantly lower in poor prognosis cases (14 months) than good prognosis cases (27 months, P = 0.0405). Graft survival was lower in vascularized corneas (18.55 months, P = 0.030) and in post-perforation corneal scars (17.96 months, P = 0.09, borderline significance). Multivariate analysis showed that the same factors were predictive of graft failure.

We observed that common pathologies were optical PK such as leucomatous opacity in 24, chemical injury in 10, graft rejection in 5, adherant leucoma in 6 and bullous keratopathy in 7 cases. Therapeutic PK had corneal ulcer in 26, keratomalacia in 14 and anterior staphyloma in 10 cases. Williams et al[10] applied multivariate logistic regression analysis in their study which showed a significant relationship between ocular hypertension, ocular inflammation, and corneal neovascularisation with graft failure at 1year. In the collaborative corneal transplant study (CCTS) (1992), it was concluded that the degree and depth of preoperative vascularization determine onset and severity of rejection.[11]

According to a study done in Nepal, corneal scars following infectious keratitis, adherent leucomas, and corneal perforations were the major indications for surgery. A study done in India to analyze survival rate of corneal transplants in a large series shows survival rates at 1, 2, and 5 years for first-time grafts to be 79.6%, 68.7%, and 46.5%, respectively.[12] They are different from the western studies essentially due to differences in patient profile, different indications for surgery, differences in methods of storage of corneas, and socioeconomic factors affecting healthcare provision.[13]

CONCLUSION:

Authors found that penetrating keratoplasty found to be better treatment options for patients with corneal blindness.

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