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## Research Article

### PROSPECTIVE STUDY OF ANATOMICAL AND VISUAL OUTCOMES OF THERAPEUTIC PENETRATING KERATOPLASTY IN A TERTIARY HOSPITAL KARWAR

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##### Key Words:

FC- finger counting, PL- perception of light, TPK- therapeutic penetrating keratoplasty

#### ABSTRACT

This prospective study aims to determine the anatomical and visual results of Therapeutic Penetrating Keratoplasty and its role in the management of corneal diseases. Penetrating keratoplasty is the final therapeutic option in the management of refractory corneal disease after conventional medical therapy fails to prevent corneal perforation.(1)

Out of the 42 cases that underwent Penetrating keratoplasty in Karwar Institute of Medical Sciences and Hospital, Karwar from February 2018 to January 2019, 62% of cases were males and 38% were females. Male to Female ratio was 1.63:1. 95% of the cases were anatomically successful while 48% cases showed visual improvement. Post-operatively vision improved to FC 1mt - 6/60 in 20 (48%), while 18 (42%) patients remained between hand movements and counting fingers close to face. In 4 (10%) patients visual acuity was only perception of light (PL). Careful planning and selection of the patients and surgical techniques also influences the final outcome of the procedure.

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#### INTRODUCTION

Microbial keratitis is infection of the cornea that can be caused by a range of non-viral pathogens like bacteria, protozoa and fungi.<sup>(2,3,4)</sup> Depending on the size and location of the ulcer, vision may be impaired.<sup>(2)</sup> The primary purpose of therapeutic penetrating keratoplasty is to restore the structural integrity of the eye or to resolve infectious or inflammatory keratitis that is refractory to conventional medical therapy, and often both these indications are present.<sup>(5)</sup>

With the improvement of surgical techniques in penetrating keratoplasty in recent years, Therapeutic Penetrating Keratoplasty has become an increasingly successful method for managing corneal perforation and refractory corneal inflammation.<sup>(1)</sup> This prospective study aims to determine the anatomical and visual results of therapeutic penetrating keratoplasty and its role in the management of corneal diseases.

##### Aims and Objectives

To determine anatomical and visual results of Therapeutic Penetrating Keratoplasty

#### MATERIALS AND METHODS

**Study Population:** This is a prospective study conducted in Department of Ophthalmology in Karwar Institute of Medical Sciences and Hospital, Karwar from February 2018 to January 2019 for a period of 1 year. The study was approved by the Institutional Ethics Committee and written informed consent was obtained from all subjects prior to participation. Some of the consents were in local language to ensure validity. Patients were free to withdraw from the study at any time and were assured that the study would not compromise the quality of their eye care.

During the duration of one year 68 therapeutic PKPs were performed at the tertiary hospital, of which 42 therapeutic PKPs met the criteria set for this study. All cases received unilateral surgeries. The 42 cases were subjected to penetrating keratoplasty. The age of the patients varied between 11 - 70yrs. Of these cases, 26 were males and 16 were females.

**Patients were divided into one of the three diagnostic groups for data analysis**

1. Bacterial keratitis;
2. Fungal keratitis; and
3. Acanthamoebic keratitis.

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**Keratoplasties were Evaluated for Three Major Criteria of Success**

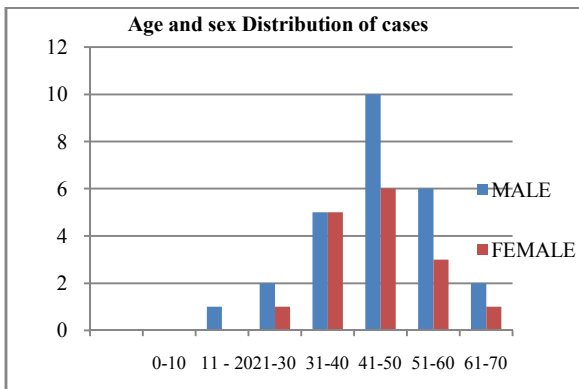
1. Graft clarity rate at 1 month and 1 year postoperative;
2. Cure of the infectious disease after surgery; and
3. Anatomical success rate.

Anatomical success was considered if the integrity of the eye was restored in perforated or non perforated corneas for at least 1 month after corneal transplantation. The anatomically unsuccessful patients included those who had undergone enucleation because of uncontrollable endophthalmitis or medically uncontrollable recurrent infection after surgery.<sup>(6)</sup>

**OBSERVATIONS AND RESULTS**

**Table 1** Age and Sex distribution of cases:

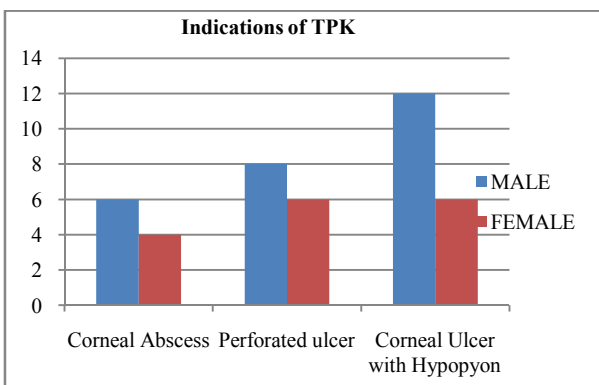
Age in years	Male	Female	Total
0-10	0	0	0
11-20	1	0	1
21-30	2	1	3
31-40	5	5	10
41-50	10	6	16
51-60	6	3	9
61-70	2	1	3
TOTAL	26	16	42



In the present series, out of 42 patients who had undergone therapeutic Keratoplasty, 26 were males and 16 were females. The most common age group affected was the group between 31-60 years (83%).

**Table 2** Indications of Therapeutic Penetrating Keratoplasty

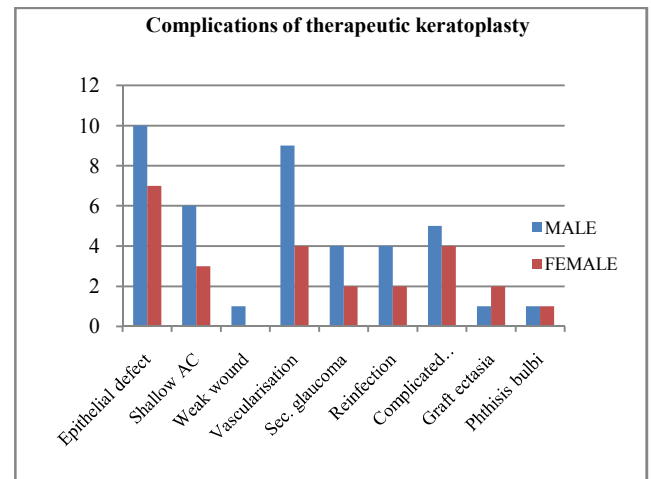
Cause	Male	Female	Total
Corneal Abscess	6	4	10
Perforated ulcer	8	6	14
Corneal Ulcer with Hypopyon	12	6	18
Total	26	16	42



Most common presentation was hypopyon ulcer not responding to medical treatment (43%).

**Table 3** Complications of Therapeutic Penetrating Keratoplasty at one year

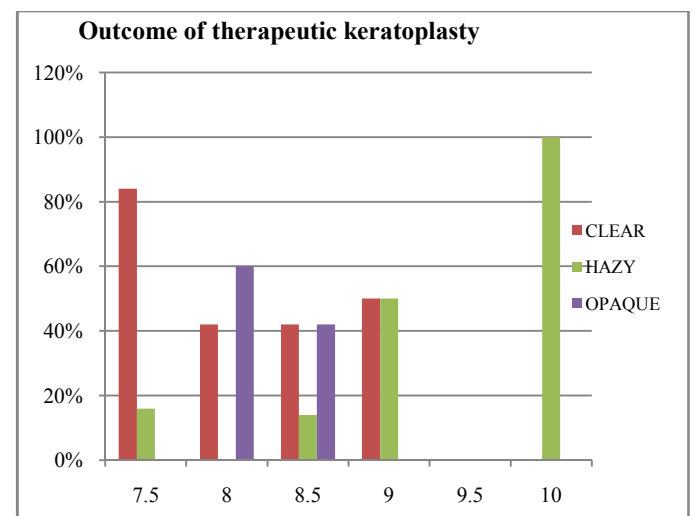
Complications	Male	Female	Total
Epithelial defect	10	7	17
Shallow AC	6	3	9
Weak wound	1	-	1
Vascularisation	9	4	13
Sec. glaucoma	4	2	6
Reinfection	4	2	6
Complicated cataract	5	4	9
Graft ectasia	1	2	3
Phthisis bulbi	1	1	2



Most common complications at the end of one year seen are epithelial defect (40%) and corneal vascularisation (31%).

**Table 4** Graft Size and Post Operative Graft Clarity

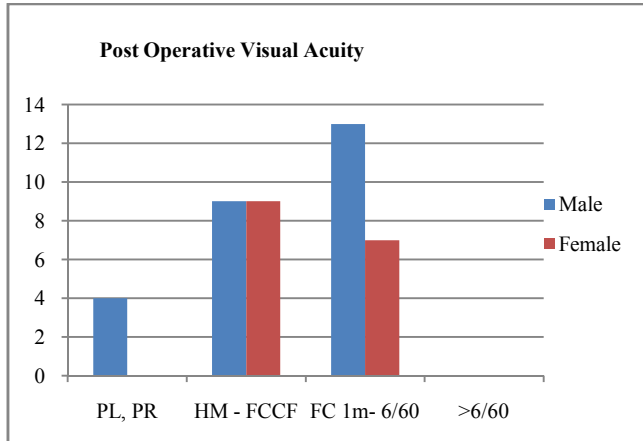
Graft size	Clear	Hazy	Opaque	Total
7.5	21(84%)	4(16%)	0	25
8	2(42%)	0	3(60%)	5
8.5	3(42%)	1(14%)	3(42%)	7
9	2(50%)	2(50%)	0	4
9.5	0	0	0	0
10	0	1(100%)	0	1



60% patients had graft size of 7.5 mm. In this Graft size, 84% patients have clear graft and 16% have hazy graft.

**Table 5** Post Operative Visual Acuity

Post Op Vision	Male	Female	Total
PL, PR	4	-	4
HM - FCCF	9	9	18
FC 1m- 6/60	13	7	20
>6/60	0	0	0
Total	26	16	42



Restoring anatomical integrity was the main aim of therapeutic keratoplasty. Graft clarity and vision improvement were secondary considerations. Postoperative vision in patients who underwent therapeutic keratoplasty was more than seen preoperatively. 48% patients have vision of FC 1m-6/60.

## DISCUSSION

With the evolution of improved surgical techniques and eye banking, the results of therapeutic penetrating keratoplasty in the management of perforated corneal ulcer and other refractory corneal ulcer have improved tremendously.<sup>(7)</sup> Early surgery (penetrating therapeutic keratoplasty) has shown to improve the ultimate outcome of the procedures, as well as decrease the hospital stay and morbidity of the patient.<sup>(8)</sup>

In the present prospective study, during the period 68 therapeutic PKPs were performed at the tertiary hospital, of which 42 therapeutic PKPs met the criteria set for this study. All cases received unilateral surgeries. The 42 cases were subjected to penetrating keratoplasty in order to evaluate the anatomical and visual improvement post surgery. 62% of cases were males and 38% were females. Male to Female ratio was 1.63:1. Among these 42 PKPs, 22(52%) PKPs were diagnosed as bacterial keratitis, 15(36%) suffered from fungal keratitis, and 5 (12%) suffered from acanthamoebic keratitis. Most common cause for which patients underwent therapeutic keratoplasty was non-healing ulcer with hypopyon 18 (43%). The age group between 31-60 years seemed to be affected more, i.e. (83%) compared to the older people.

The main aim of therapeutic keratoplasty is to restore the anatomical integrity of eyeball.<sup>(9)</sup> Acquiring useful visual acuity is the secondary goal.<sup>(10)</sup> In our study 38 (90%) patients had postoperative vision better than preoperative vision. At the end of one yr following surgery 18 (42%) had vision HM, 20 (48%) had vision FC 1m-6/60. 4 (9%) had vision PL, PR because of postoperative re-infection and cataract.

Therapeutic keratoplasty is considered successful when anatomical integrity of eyeball is maintained.<sup>(11)</sup> 95% of eyes were saved anatomically.

## SUMMARY AND CONCLUSION

In this study, anatomical success was achieved in 95% cases, with visual improvement in 48% of cases. Therapeutic PKP is valuable in the management of microbial keratitis, abscess and corneal perforation that does not respond to antimicrobial therapy.<sup>(12)</sup> Bacterial keratitis was the leading indication for therapeutic PKP at our hospital but fungal keratitis had the worst postoperative results. However, therapeutic PKP eradicates more than 75% of bacterial and acanthamoebic keratitis.

Therapeutic PKP has a satisfactory place in the management of medically unresponsive infectious keratitis.<sup>(13)</sup> Judicious patient selection before surgery, careful planning of surgical techniques and appropriate follow-up care may all enhance the chances of a successful outcome.<sup>(10)</sup>

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