

# Analysis of the Factors Affecting Outcome of Therapeutic Penetrating Keratoplasty

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**Abstract-** This prospective study aims to determine the Factors affecting outcome 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.<sup>(1)</sup>

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. And it was found that the patients with pseudomonas infection had high failure rates and patients with smaller graft size had better outcomes.

**Index Terms-** FC- Finger counting, Graft clarity, Microbial Keratitis, PL- Perception of light, Therapeutic penetrating keratoplasty,

## I. 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</sup>. Depending on the size and location of the ulcer, vision may be impaired.

The primary purpose of therapeutic penetrating keratoplasty is to restore the structural integrity of the eye and<sup>1</sup> to resolve infectious or inflammatory keratitis that is refractory to conventional medical therapy, and often both these indications are present.<sup>2</sup>

With the improvement of surgical techniques in penetrating keratoplasty in recent years, therapeutic PKP has

become an increasingly successful method for managing corneal perforation and refractory corneal inflammation.<sup>3,4</sup>

This study was an analysis done at Karwar institute of medical sciences and hospital-Karwar to determine the factors that affect the success or failure of therapeutic keratoplasty.

## II. RESEARCH ELABORATIONS

### Methods :

Our study is a prospective analysis of 42 cases who have undergone therapeutic keratoplasty at Karwar institute of medical sciences and hospital- Karwar from February 2018 to January 2019. The age of the patients varied between 11 - 70yrs and included both males and females. The study was approved by local ethics committee and written informed consent was obtained from all subjects prior to participation.

The patients suffering from infective keratitis were selected and treated medically. For the cases which did not improve by medical treatment, surgical treatment using therapeutic penetrating keratoplasty was done and the patients were followed up and assessed at the end of one month and one year and the outcome was analysed considering the following factors.

- Graft size and post operative Graft clarity.
- Aetiology and clarity of the graft.
- Post operative visual acuity.

### Observations :

Following observations were made after the clinical evaluation of the cases.

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

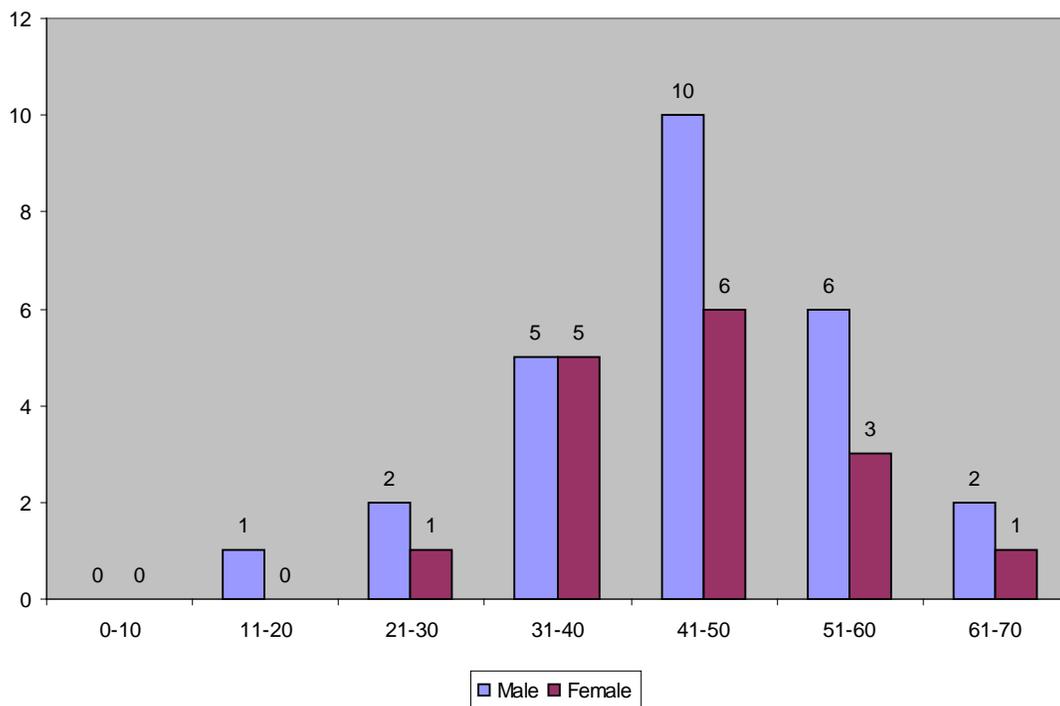
AGE IN YEARS	MALE		FEMALE		TOTAL	
	NO.	%	NO.	%	NO.	%
0-10	0	0.0	0	0.0	0	0.0
11-20	1	3.8	0	0.0	1	2.3
21-30	2	7.7	1	6.2	3	7.1

<b>31-40</b>	<b>5</b>	<b>19.2</b>	<b>5</b>	<b>31.3</b>	<b>10</b>	<b>23.8</b>
<b>41-50</b>	<b>10</b>	<b>38.4</b>	<b>6</b>	<b>37.5</b>	<b>16</b>	<b>38.1</b>
<b>51-60</b>	<b>6</b>	<b>23.0</b>	<b>3</b>	<b>18.8</b>	<b>9</b>	<b>21.4</b>
<b>61-70</b>	<b>2</b>	<b>7.7</b>	<b>1</b>	<b>6.2</b>	<b>3</b>	<b>7.1</b>
<b>TOTAL</b>	<b>26</b>	<b>100.0</b>	<b>16</b>	<b>100.0</b>	<b>42</b>	<b>100.0</b>

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 a group between 31-60 years (83%).

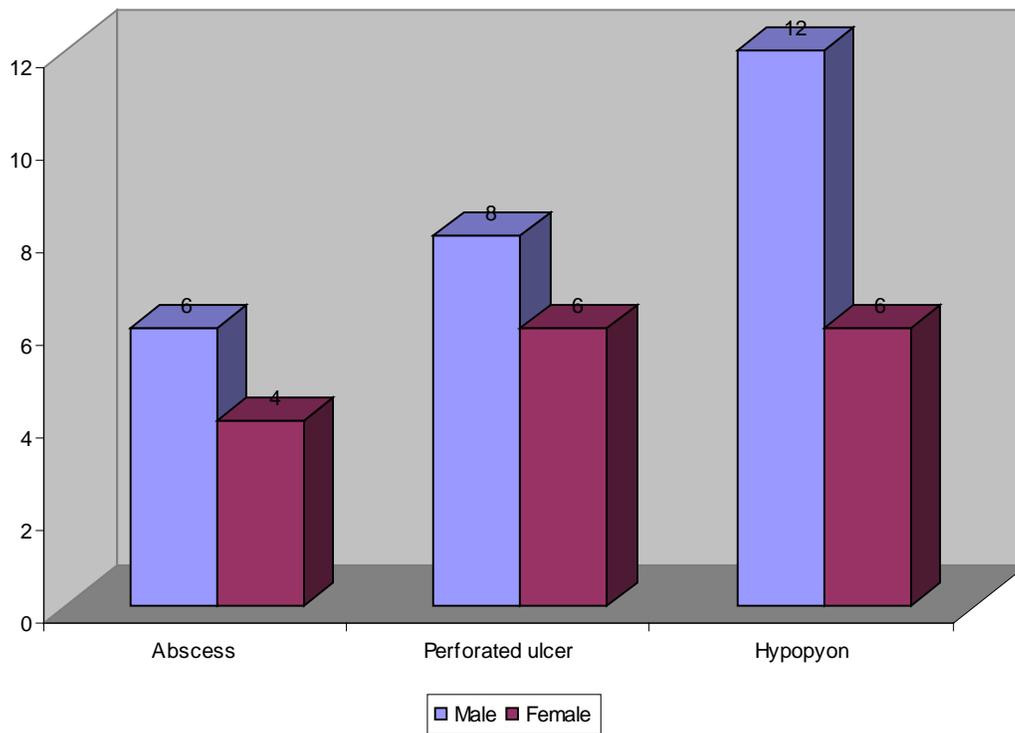
**Age and Gender Distribution of Patients**



**Table 2: Indications for Therapeutic Penetrating Keratoplasty:**

<b>CAUSE</b>	<b>MALE</b>	<b>FEMALE</b>	<b>TOTAL</b>
<b>Corneal Abscess</b>	6	4	10
<b>Perforated ulcer</b>	8	6	14
<b>Corneal Ulcer with Hypopyon</b>	12	6	18
<b>Total</b>	26	16	42

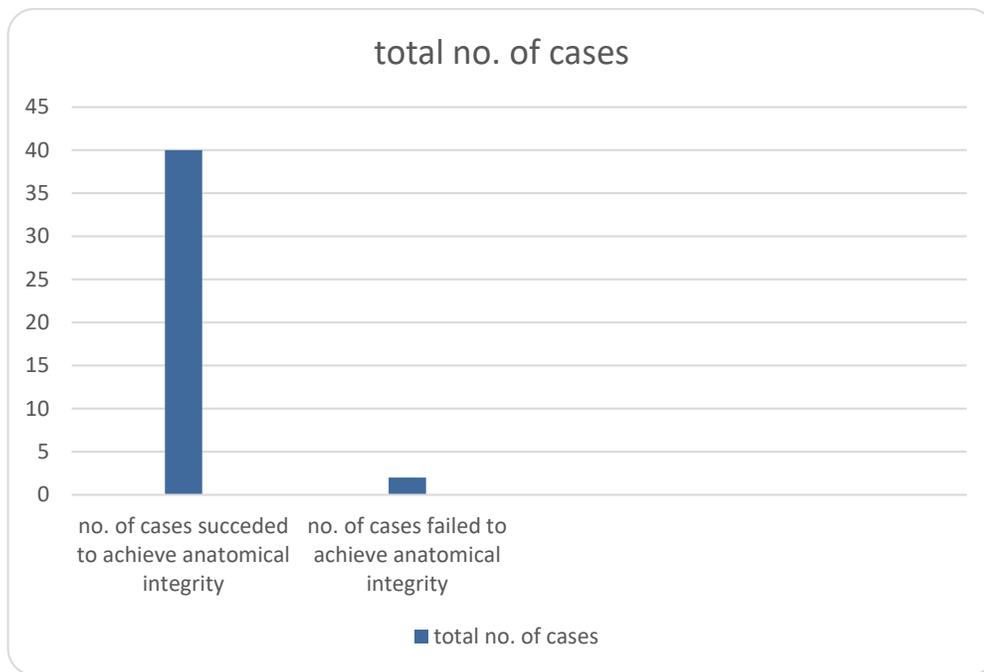
**Causes of Keratitis**



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

**Table 3 : Anatomical outcome of the Surgery :**

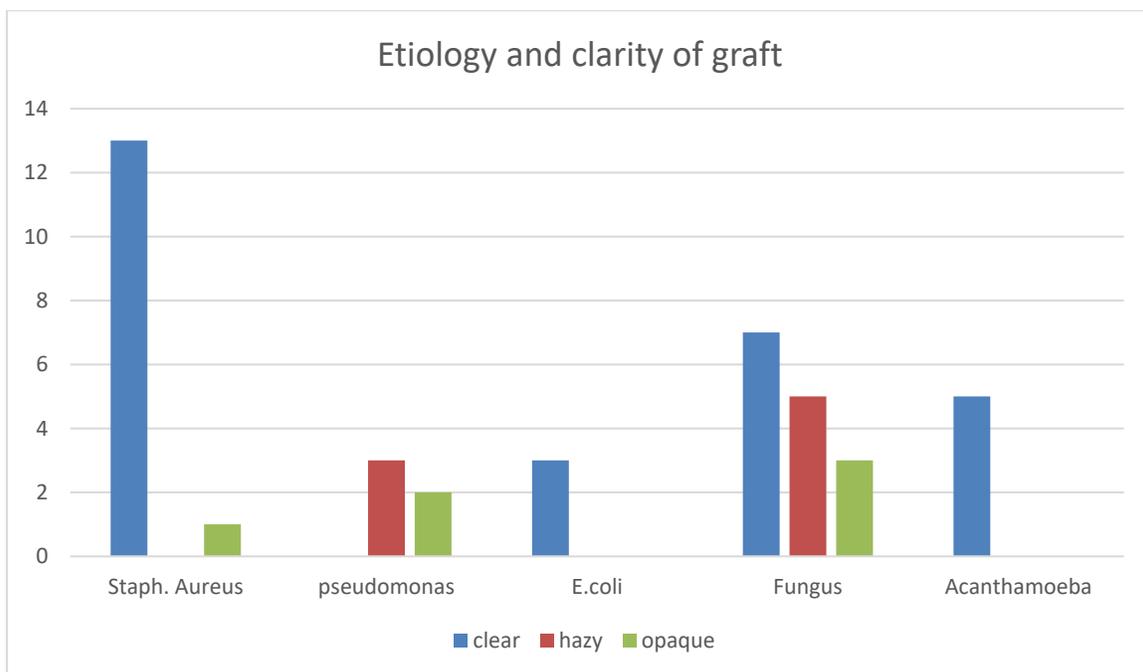
Total No. of cases	No. Of cases succeeded to achieve anatomically integrity	No. Of cases failed to achieve anatomically integrity
42	40	2



95.3% of the cases succeeded in achieving anatomical integrity.

**Table 4: Etiology and clarity of graft:**

Infection	CLEAR	HAZY	OPAQUE
Staph. Aureus	13	0	1
Pseudomonas	0	3	2
E. coli	3	-	-
Fungus	7	5	3
Acanthamoeba	5	-	-

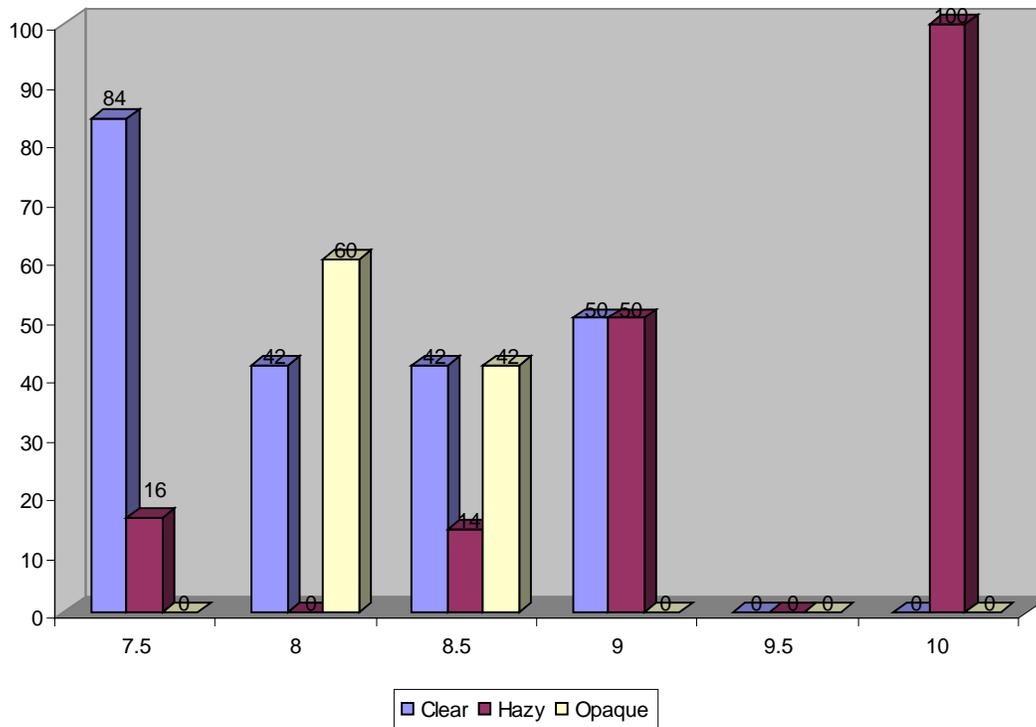


Graft failure rate was high with pseudomonas infection. Out of 5 patients infected with pseudomonas infection, 2 developed phthisis bulbi.

**Table 5: 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

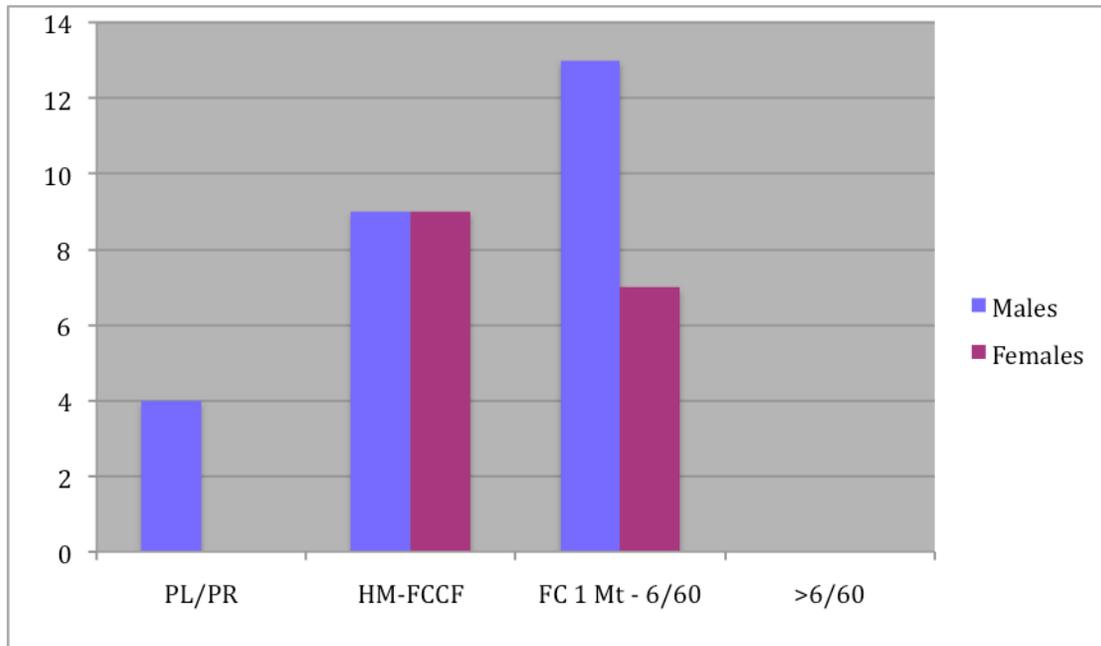
**Outcome of Therapeutic Keratoplasty**



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

**Table 6: 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 undergoing therapeutic keratoplasty is more than seen preoperatively. 48% patients have vision of FC 1m-6/60.

### III. RESULTS

In the present study, 42 cases were subjected for penetrating therapeutic keratoplasty. This study was undertaken to study the results of penetrating keratoplasty with respect to their anatomical and visual improvement. In the present study 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. The age group between 31-60 years seemed to be affected more, i.e. (83%) compared to the older people.

Therapeutic keratoplasty is considered successful when anatomical integrity of eyeball is maintained<sup>7</sup>. In present study 95% eyes were saved anatomically.

Success of the therapeutic graft depends upon several factors:

1. Interval between death and enucleation and the interval between the enucleation and operation.
2. Selection of cases.
3. Virulence of organism
4. Graft size
5. Local and systemic immunity of the host
6. Tissue necrosis
7. Best time to operate
8. Operative technique and postoperative complications.

In this study, postoperative failure of graft was neither related to donor corneo-scleral button quality nor related to the interval between enucleation and keratoplasty surgery, since All buttons used were good to fair quality and there was no time lapse between availability of corneo-scleral donor button and keratoplasty surgery.

Also it was found that out of all the cases having Staphylococcus infection and undergoing therapeutic keratoplasty 99% had clear graft. Out of cases who preoperatively had fungal infection, 46% had clear graft. In cases infected with Pseudomonas, all had failed grafts. Which may be due to difference in the virulence of the organism.

Further we have found that The larger the graft size, the more the chances of graft failure, because of the increased chances of immunological graft rejection, vascularisation, peripheral anterior synechiae as well as secondary glaucoma.

In the cases with graft size 7.5 mm, 84% cases had clear graft while cases with larger size graft had more chances of graft failure. With 9.0 mm graft 50% ,while with 10.0mm 100% graft failure occurred.

### IV. CONCLUSION

In present study, anatomical success was achieved in 95% cases, with visual improvement in 48% cases. Therapeutic PKP is valuable in the management of microbial keratitis, abscess and corneal perforation that does not respond to antimicrobial therapy. 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. According to our study, therapeutic PKP has a satisfactory place in the management of medically unresponsive infectious keratitis. Judicious patient selection before surgery, careful planning of surgical techniques and appropriate follow-up care may all enhance the chances of a successful outcome.

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