Original Article

Outcome of Therapeutic Penetrating Keratoplasty In Non Healing Microbial Keratitis

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ABSTRACT

Purpose of Study: To study the outcome of therapeutic penetrating keratoplasty in non healing microbial keratitis. **Materials and Methods:** This prospective, interventional case series was done in Ophthalmology department, Madina Teaching Hospital, Faisalabad. The duration of this study was 3 years, from 1st April 2007 to 31st March 2010. The patients were selected from the out patient department of Madina Teaching Hospital Faisalabad. Penetrating keratoplasty was performed in these patients. In the postoperative period the patients were assessed on the basis of (1) eradication of infection, (2) graft clarity, (3) post-operative visual acuity and (4) complications. **Results:** Out of 32 patients 20 (62.5%) were males and 12(37.5%) were females. Among the etiological agents 16(50%) were bacteria, 8(25%) were fungi, 2(06%) were viral and in 6(19%) of the patients no growth was found. The pre-operative visual acuity in 22(68.75%) patients was less than 6/60, in 07(21.87%) was 6/60-6/18 and in 3(9.37%) patients it was more than 6/18. The post-operative visual acuity in 7(21.87%) patients was less than 6/60, in 20(62.50%) was 6/60-6/18 and in 5(15.62%) patients it was more than 6/18.Clear grafts were obtained in 20(62.5%) of the patients. Therapeutic success was achieved in 29(91%) patients while recurrence of infection occurred in 03(9%) of the patients. **Conclusion:** This study confirmed that therapeutic penetrating keratoplasty is an effective procedure for the management of microbial keratitis not responding to the medical therapy.

INTRODUCTION

Microbial keratitis is a common vision threatening disease which occurs in all parts of the world[1]. The disease can cause a lot of pain, discomfort and can progress to sight threatening complications if not managed properly. The different risk factors for causing microbial keratitis include exogenous factors, altered host tissues and host response. The exogenous factors include bacteria, fungi, viruses and acanthamoeba. Trauma, which results in breakdown of epithelial integrity usually, precedes the microbial invasion of the cornea. The trauma may be mild as produced by contact lenses[2]. For proper management a definite diagnosis is important. For diagnostic purpose corneal scrapings of the ulcer is taken and inoculated on multiple culture media. Recently polymerase chain reaction has become an important diagnostic tool[3]. Grams staining is also beneficial. The results of the Grams stain can be used to select the initial therapy[4]. Mainstay of treatment of microbial keratitis is antibiotics and antifungals. Other supplementary therapy includes non-steroidal anti-inflammatory drugs, steroids, atropine and anti-collagenase[5]. The real challenge are the the cases of microbial keratitis which do not respond to the medical treatment. The treatment of these corneal ulcers usually requires some surgical intervention like, corneal debridement, conjunctival flap, tarsorrhaphy and penetrating keratoplasty[6]. The type of keratoplasty which is performed to manage non healing microbial keratitis is termed as therapeutic keratoplasty. Therapeutic keratoplasty can therefore help in saving many eyes structurally and functionally which, otherwise, may be lost[7].

PURPOSE OF STUDY

The purpose of this study was to assess the outcome of therapeutic penetrating keratoplasty in non healing microbial keratitis

MATRIAL AND METHODS

This prospective, interventional case series was done in Ophthalmology department, Madina Teaching Hospital, Faisalabad. The duration of the study was 3year from 1st April 2007 to 31st March 2010. The patients were selected from the out patient department of Madina Teaching Hospital Faisalabad. Inclusion criteria**:** The patients who were included in the study were those having non healing infectious corneal ulcers, perforated corneal ulcers and infected corneal grafts. Exclusion criteria**:** Corneal ulcers with associated endophthalmitis were not included in the study. According to the above criteria 32 eyes of 32 patients were selected for the study. Written consent was taken from all the patients after explaining the procedure to the patients. Preoperatively patients were assessed on the slit lamp. Pre-operative visual acuity was taken in all the patients. Gram's staining, Giemsa's staining and culture was done in all the patients. Penetrating keratoplasty was performed in these patients. Surgeries in patients under 20 years of age were performed under general anesthesia while patients above 20 years were operated under local anesthesia. Trephination of recipient cornea was performed with a manual trephine. The corneal button was excised with a corneal scissors. The button was sent for microbiology to confirm the diagnosis. All infective exudates were cleared from the anterior chamber. The anterior chamber was irrigated with parenteral antibiotics. Donor button was oversized by 0.5mm and trephined from endothelial side-up by a manual trephine. The donor cornea was sutured to the host with interrupted 10.0 nylon monofilament sutures. Post-operatively patients were given oral antibiotics as well as topical fortified antibiotics or antifungal drugs depending on the diagnosis. Regular follow-up was done in the post-operative period on day one, weekly for one month and then monthly for one year. In the postoperative period the patients were assessed on the basis of (1) eradication of infection, (2) graft clarity, (3) post-operative visual acuity and (4) complications.

RESULTS

Out of 32 patients 20 (62.5%) were males and 12(37.5%) were females. Age ranged between 10 and 70 years. Of our patients 23(71.87%) were below the age of 40years and 9(28.12%) were above the age of 40 years. Among the etiological agents 16(50%) were bacteria, 8(25%) were fungi, 2(06%) were viral and in 6(19%) of the patients no growth was found. The pre-operative visual acuity in 22(68.75%) patients was less than 6/60, in 07(21.87%) was between 6/60-6/18 and in 3(9.37%) patients it was better than 6/18. The post-operative visual acuity in 7(21.87%) patients was less than 6/60, in 20(62.50%) was between 6/60-6/18 and in 5(15.62%) patients it was better than 6/18. Clear grafts were obtained in 20(62.5%) of the patients. Mean graft size was 8mm.Theraputic success was achieved in 29(91%) patients while recurrence of infection occurred in 03(9%) of the patients. Of the 3 patients in which recurrences occurred 02 had fungal keratitis and 01 had bacterial keratitis. Infection recurrence time was between 4th day and 6 months. Complications encountered in patients were: persistent epithelial defects in 06(18.75%), primary graft failure in 04(12.5), graft rejection in 03(9.37%), graft infection in 03(9.39%), secondary glaucoma in 01(3.12%) and wound dehiscence in 01(3.12%).

Tables 1:
Gender distribution (n = 32)

Gender	No of patients	Percentage
Male	20	62.50%
Female	12	37.50%

Tables 2:
Age distribution (n = 32)

Age	No of patients	Percentage
10-20 Y	3	9.37 %
21-30 Y	11	34.37 %
31-40 Y	9	28.12 %
41-50 Y	5	15.62 %
51-60 Y	3	9.37 %
61-70 Y	1	3.12 %

Tables 3:
Distribution of etiological agents

Isolates	No of patients	Percentage
Bacteria	16	50%
Fungi	08	25%
Viruses	02	6%
No growth	06	19%

Table 4:
Pre-operative visual acuity

Visual acuity	No of patients	Percentage
Less than 6/60	22	68.75%
6/60 – 6/18	07	21.87%
Better than 6/18	03	9.37%

Table 5:
Post-operative visual acuity

Visual acuity	No of patients	Percentage
Less than 6/60	07	21.87%
6/60 – 6/18	20	62.50%
Better than 6/18	05	15.62%

Table 6:
Post-operative complications

complication	No of patients	Percentage
Persistent epithelial defects	6	18.75%
Primary graft failure	4	12.50%
Graft infection	3	9.37%
Graft rejection	3	9.37%
Secondary glaucoma	1	3.12%
Wound dehiscence	1	3.12%

Figure-1
Distribution of different etiological agents

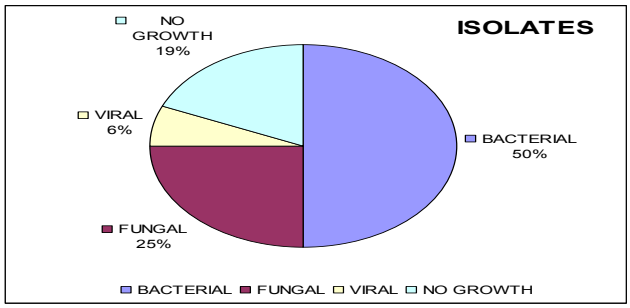


FIGURE-2
Comparison of pre-operative and post-operative visual acuity

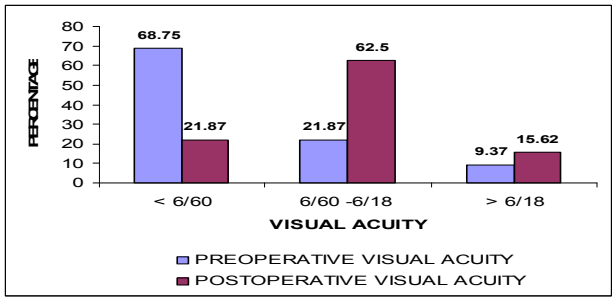


Figure-3
Therapeutic outcome of the procedure

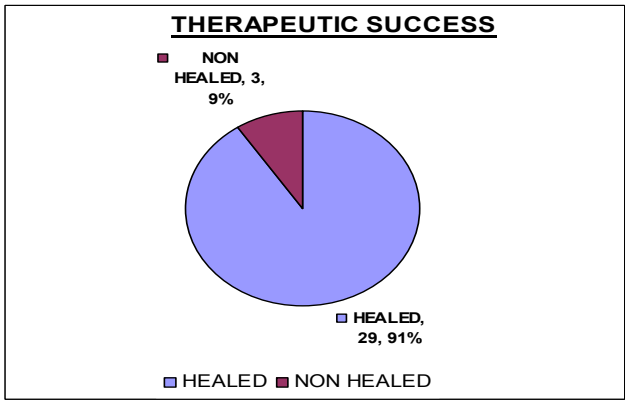


Figure-4
Pre-operative picture of bacterial keratitis

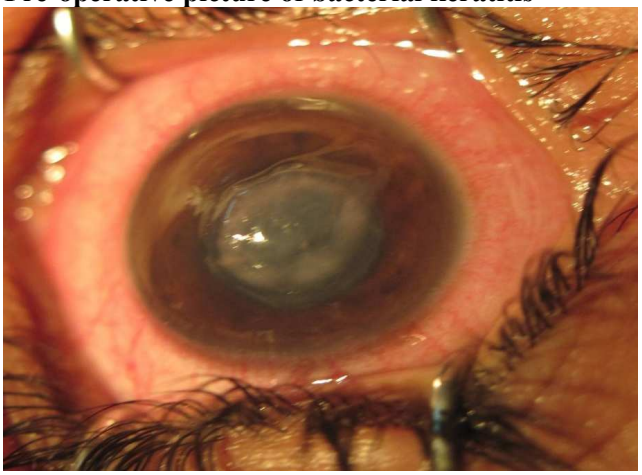


Figure-5
Post-operative picture of the patient after keratoplasty

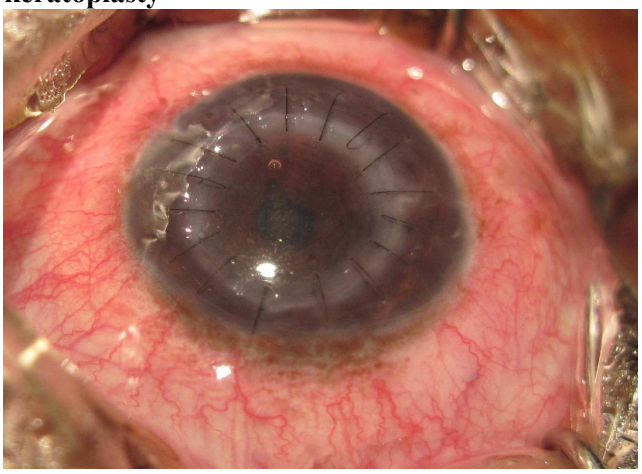


Figure-6
An infected corneal graft

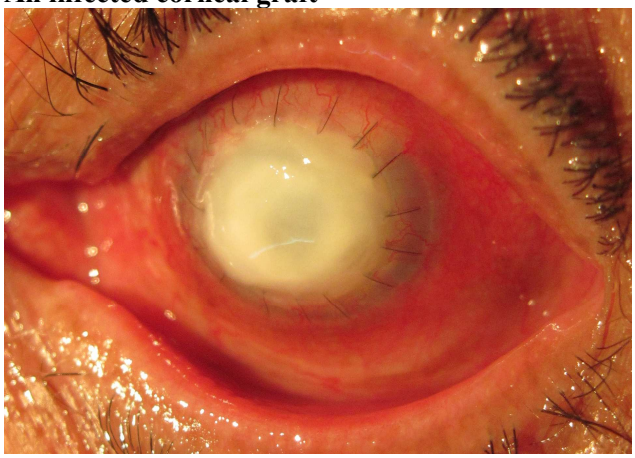
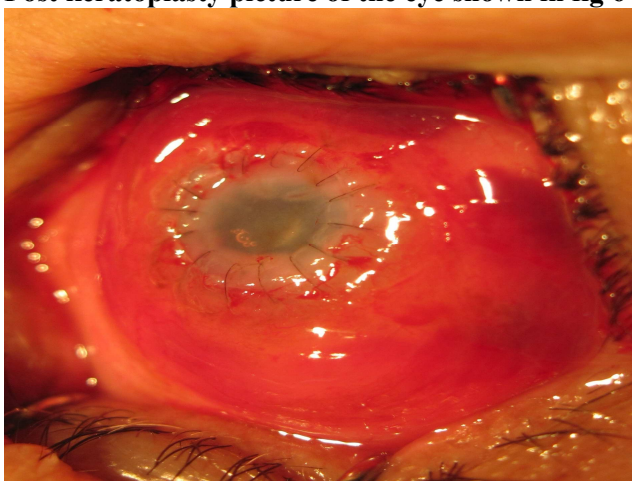


Figure-7
Post keratoplasty picture of the eye shown in fig 6



DISCUSSION

Penetrating keratoplasty can preserve eye integrity and eradicate the infectious process in infectious corneal ulcers[8]. Visual rehabilitation is often a secondary objective. After restoring of structural integrity of the globe, a subsequent smaller optical penetrating keratoplasty is an option in some of the eyes with graft rejection[9, 10, 11]. In our study out of 32 patients 20(62.5%) patients were males and 12(37.5%) were females. There were more males than females and this trend is seen in most of the hospitals in the developing world due to various socioeconomic factors and comparatively easy accessibility of the males to health care facilities. The males are also more prone to develop trauma and corneal ulcers as compare to the females. In our study at the end of one year the therapeutic success was achieved in 29(91%) of the patients. When we compare these results with other studies we find that, this was in line with the study done at Department of Ophthalmology, Post Graduate Institute of Medical Education and Research, Chandigarh, India where the therapeutic success was achieved in 90% of the patients[12]. In another study done in New Delhi India the therapeutic success achieved was 97% of the patients [15]. But in a study done at Singapore National Eye Centre 80.4% of the patients achieved therapeutic success after therapeutic keratoplasty[13]. In another study done at Japan the therapeutic outcome was 80 %[14]. In our study recurrence of infection occurred in 3 patients. Out of these, 2 patients had fungal keratitis and 1 patient had bacterial keratitis. From this result we concluded that bacterial keratitis have better prognosis for therapeutic keratoplasty than the fungal keratitis. In our study at the end of one year clear grafts were obtained in 62.5% of the patients. In other studies from Japan[14] and Singapore[13], clear grafts were obtained in 67% and 72% of the eyes respectively. In our study the most common complication was persistent epithelial defects which were present in 18.75% of the patients. But in a study done by Hanada K, Igarashi S, Muramatsu O, Yoshida A, the most common complication was cataract (30%) [14]. In another study done at India the most common complication was glaucoma (22%) [12]. In our study the patients having a visual acuity between 6/60 and 6/18 were only 21.87% pre-operatively which increased to 62.5% after keratoplasty. Therefore there was a significant increase in the visual acuity of the the patients after surgery. In one study post-operative visual acuity equal to or better than the preoperative level was achieved in 85% of the eyes [14].From the above results it is obvious that therapeutic keratoplasty has a definitive role in the management of progressive bacterial, fungal and viral keratitis refractory to medical treatment. Management of bacterial keratitis has higher functional success rate as compared with

fungal keratitis. The primary aim of the procedure is to reestablish the integrity of the globe and to eliminate the infectious disease process. Visual rehabilitation is a secondary outcome.

CONCLUSION

Our study confirms that therapeutic penetrating keratoplasty is an effective tool for the management of microbial keratitis refractory to medical therapy. It not only eliminates infection as a primary outcome but also improves the vision as a secondary outcome

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