

Outcome of therapeutic penetrating keratoplasty in nonresponsive microbial keratitis cases

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Abstract

Background: Microbial keratitis is a common vision threatening disease. Cases of microbial keratitis refractory to the medical treatment are difficult to treat. The treatment of these corneal ulcers usually requires penetrating keratoplasty. **Aim:** To evaluate outcome of therapeutic penetrating keratoplasty in nonresponsive microbial keratitis cases. **Material and Methods:** A total of 25 eyes of 25 patients who had undergone therapeutic PK due to non-resolving infectious keratitis despite optimum antimicrobial therapy were reviewed. **Results:** Out of 25 cases, 18 (72%) cases were male. Majority of the patients were agricultural workers 13 (52%) and 07 (28%) were daily laborers. History of corneal trauma was obtained in 22(88%) of cases. Perforated corneal ulcer of fungal origin 19 (76%) was the most common indication of TPK in our study. The post-operative visual acuity improved to <6/60 in 7 (28%) patients, >6/60 in 13 (52%) patients. Clear grafts were obtained in 13 (52%) patients **Conclusion:** Therapeutic keratoplasty confirmed the role in the management of progressive corneal ulcers refractory to medical treatment. It helps in achieving anatomical integrity and improves the patients vision also.

Key Words: Microbial keratitis, fungal keratitis, therapeutic keratoplasty, visual acuity.

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INTRODUCTION

Microbial keratitis is an infection of the cornea that can be caused by a range of non-viral pathogens. The causative organisms include bacteria, protists (e.g. *acanthamoeba*), and fungi (yeasts, moulds and microsporidia). It is characterized by an acute or sub-acute onset of pain, conjunctival injection, and corneal ulceration.¹ Cases with a history or signs suggestive of bacterial or fungus infection should have smears and

cultures, and preferably be referred to a unit where confocal microscopy is available. Appropriate treatment for these pathogens should be started immediately.² Microbial keratitis may pose a significant therapeutic challenge, particularly if initial cultures are negative.

Emergence of drug resistance, concurrent ocular diseases, improper and delayed diagnosis and management may compromise the effectiveness of antimicrobial therapy. Such resistant cases can be managed by tissue adhesive, conjunctival flap, tarsorrhaphy, patch graft and lamellar keratoplasty.^{1,2} To arrest infectious progress, avoid disastrous complications, and preserve the globe integrity, therapeutic penetrating keratoplasty has been advocated for severe fungal keratitis.^{3,4} With the advancement of eye banking and improved micro surgical techniques, full thickness therapeutic keratoplasty has emerged as a viable option in management of refractory corneal infections. This study was undertaken to assess results of therapeutic PK in non responsive microbial keratitis cases.

MATERIAL AND METHODS

In this Retrospective interventional study analytic study, a total of 25 eyes of 25 patients who had undergone therapeutic PK due to non-resolving infectious keratitis despite optimum antimicrobial therapy were reviewed. Demographic data obtained from the record included patient's age, gender, duration, type of infection, history of ocular trauma and vision at presentation.

Inclusion Criteria

1. Non healing infectious corneal ulcers.
2. Perforated corneal ulcers.

Exclusion Criteria

1. Patients who were treated previously with Amniotic Membrane graft or conjunctival flap.
2. Patients with follow-up period of less than 2 months.
3. Corneal ulcers with associated endophthalmitis.

In cases of infectious keratitis, sampling of ulcer was made by scraping. Appropriate medical management was given. Patients who were refractory to the medical treatment or patient with perforated ulcers or impending perforations were taken as candidate for therapeutic penetrating keratoplasty. 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. Donor cornea were provided by the eye bank. The eye bank supports the preservative quality control, control of sterility of the graft, and manages the implementation of serological testing of donor. All surgeries were performed under local anaesthesia.

Surgical Procedure

1. Donor button was oversized by 0.5 mm and trephined from endothelial side-up by a manual trephine.
2. Trephination of recipient cornea was performed with a manual trephine. The corneal button was excised with a corneal scissors. The button was sent to microbiology to confirm the diagnosis.
3. Thorough washing of anterior chamber with removal of infective exudates was achieved by irrigation and dissection with forceps.
4. The iridocorneal angle was reformed with viscoelastic agent to release the peripheral anterior synechiae.
5. The donor graft was then sutured to the host with interrupted 10-0 nylon monofilament sutures at 16 points.

Post-operatively patients were given topical antibiotics, antifungal drugs depending on the diagnosis. Topical mydriatic/cycloplegic was given. Regular follow-up was done in the post-operative period weekly for 1 month and

then monthly later till last follow-up. In the post-operative period the patients were assessed on the basis of :-

1. Eradication of infection.
2. Graft clarity.
3. Post-operative visual acuity.
4. Complications.

Outcome parameters considered were restoration of structural integrity of eye ball, eradication of infection, prevention of complication and visual outcome. Infection was considered eradicated if there was no evidence of corneal infiltration and in anterior chamber for 1-month post surgery. Anatomical success was considered if the integrity of the eye was restored in perforated or non-perforated corneas for at least 1 month after surgery.

RESULTS

Out of total 25 eyes that underwent therapeutic PK, 18 (72%) cases were male and 07(28%) cases were female. Age of the patients ranged between 18-60 years. Majority of the patients were agricultural workers 13 (52%) and 07 (28%) were daily laborers. The mean follow up period was 6.0 ± 2.0 months.

Table 1: Patient demographic characteristics

Patient demographics		Values
Age range		18-60 years
Sex	Male	18
	Female	07
Occupation	Farmer	13
	Daily Labor	07
	Housewife	04
	Indoor worker	01
History	Trauma	22
	Unknown	03
Follow up Mean \pm SD		6.0 ± 2.0 months

A history of corneal trauma was obtained in 22 (88%) of cases. Some rare causes of ocular trauma included injury due to insect, cow's tail and pen tip. Among the etiological agents 19 (76%) were fungi, 4 (16%) were bacteria and in 2 (12%) patient no growth was found. Perforated corneal ulcer of fungal origin was the most common indication of TPK in our study. Persistent epithelial defect was observed in 4 (16%) patients. Primary graft failure in 2 (8%) patients. Four (16%) patients developed graft infection. Secondary glaucoma developed in 1 (4%) patient. Wound dehiscence was seen in 2 (8%) patient with fungal keratitis. Both required re-suturing. In one (4%) case re-graft was done. The pre-operative visual acuity ranged from PL+ to 3/60. The post-operative visual acuity in 5 patients (20%) remained same, improved to $<6/60$ in 7 (28%) patients, $>6/60$ in 13 (52%) patients of which in 3 patients it was between 6/36 to 6/9. Clear graft were obtained in 13 (52%) patients on their last follow-up. Mean graft size was 8 mm. Therapeutic success was achieved in all eyes (100%).

DISCUSSION

Microbial keratitis is a common vision threatening disease. In order to promote the vision, corneal transplant is carried out. The real challenge are 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 penetrating keratoplasty.² 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.⁵ Penetrating keratoplasty can preserve eye integrity and eradicate the infectious corneal ulcers. Visual rehabilitation is often a secondary objective. In our study out of 25 patients, 18 (72%) cases were male and 07(28%) cases were female. The males are more prone to developed trauma and corneal ulcers due to their occupation as compared to females. There were more males and this trend is seen in most of developing world due to various socioeconomic factors and comparatively easy accessibility of the males to health care facilities. Majority of the patients were agricultural workers 13 (52%) and 07 (28%) were daily laborers. History of corneal trauma was obtained in (88%) cases. Basak SK *et al* found 82.9% cases with history of trauma in their study.⁶ Agricultural workers constituted 52% in our study. Ray *et al* also found 51.6% agricultural workers in their study.⁷ In our study the therapeutic success was achieved in all cases (100%). A study done at Chandigarh, India, the therapeutic success was achieved in 90% of the patients.⁸ In another study done in New Delhi, India, the therapeutic success achieved was 97% of the patients.⁹ In our study, the most common complication was persistent epithelial defects which were present in 4 (16%) patients. In a study by Prakash *et al* persistent epithelial defects were seen in 23% cases.¹⁰ Hanada *et al* observed cataract as the most common complication (30%).¹¹ In another study done at India, the most common complication was glaucoma (22%).⁸ In our study, the post-operative visual acuity in 5 patients (20%) remained same, improved to <6/60 in 7 (28%) patients, >6/60 in 13

(52%) patients of which in 3 patients it was between 6/36 to 6/9. Clear grafts were obtained in 13 (52%) patients on their last follow-up. In conclusion, therapeutic keratoplasty confirmed the role in the management of progressive corneal ulcers refractory to medical treatment. It helps in achieving anatomical integrity and improves the patients vision also.

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