Original Research Paper

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A PROSPECTIVE STUDY TO EVALUATE LONG-TERM OUTCOMES OF TENON PATCH GRAFT IN CORNEAL FISTULA

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ABSTRACT **Purpose:** To treat corneal fistula and make cornea amenable for future corneal transplantation by Tenon patch graft **Method:** This is a prospective interventional analytical study conducted on all men and women with a diagnosis of corneal fistula ≤2mm size attended our institute for period of 6 months. All patients were treated with Tenon patch graft and were followed for 6 months postoperatively. **Results:** We included a total of 25 cases. There were 15 female and 10 male patients. The mean age (±SD) was 52.93±17.57 years. On final follow-up, 80%patients successfully achieved globe integrity, normal IOP ,improved visual acuity and anterior chamber was formed. Anterior chamber formation was observed on day 1(postoperative)of grafting in which 20 patients showed no leak on seidel test. During follow-up Between 2-3 months 18 patients showed intraocular pressure within normal limits(digitally) and with improved BCVA. On the last follow-up at 6 months the globe integrity was maintained with the graft well apposed and no evidence of leak on seidel test was noted. No globe integrity was achieved in the remaining(20%) patients. There was no statistically significant difference to age groups and gender when compared to outcome. Baseline BCVA (Best Corrected Visual Acuity) did not show statistically significant difference between the different subgroups (p-value=0.668) and the difference was statistically highly significant postoperatively(<0.0001). **Conclusion:** In this study, we observed that TPG has good success rate and is a cost-effective, easily available, minimal rejection, simple surgical technique in the treatment of most cases of various aetiologies of small corneal fistula and it make cornea amenable for future corneal transplantation.

KEYWORDS : TPG, BCVA, PK

INTRODUCTION

Corneal fistula, is a breach between the anterior chamber (AC) and the corneal surface, typically stemming from traumatic incidents or ulcer perforations; that does not heal spontaneously due to poor tissue apposition and persistent aqueous flow. Usually, these cases either heal by the formation of a corneo-iridic scar. Rarely, corneal fistulisation can occur that often goes unrecognised if not examined carefully. If not treated urgently, it can lead to complications. corneal blindness is the second most common cause of preventable blindness in developing countries like India.1,2 Globally, the commonest causes for corneal blindness in adults include corneal ulcerations and corneal trauma. The current armamentarium of management strategies, comprising tissue adhesives, amniotic membrane grafts(AMG), and penetrating keratoplasty, presents significant challenges, ranging from donor availability issues to cost-effectiveness concerns.

Within this context, we present a compelling case that underscores the efficacy of Tenons Patch grafts (TPG) in addressing such intricate corneal pathologies. A tenon's graft is harvested from the same eye of the patient and thus obviates the need for procurement or storage3,4. The autologous nature of TPG, harvested from the patient's own eye, not only streamlines the surgical process but also minimizes the risk of immunogenic reactions. Tenon fascia is composed of thick, white fascia with smooth muscle fibers anterior to the equator and extends posteriorly as a thin and translucent layer extending to the optic nerve.[5] The ubiquitous nature of this tissue provides an opportunity to mobilize it for patching defects. Its fibroblasts allow for a robust wound healing response.[6] Its utilization represents a paradigm shift in the management of corneal perforations, offering a reliable and efficient alternative to conventional modalities. Tenons patch grafts (TPGs) have been also described in the repair of leaking trabeculectomy blebs, in the management of scleromalacia after pterygium excision, and in the repair of a traumatic scleral perforation. 7-9

This review aims to provide a comprehensive understanding of the process of case selection for this procedure, the surgical technique, the natural course of healing and the outcomes of TPG.

MATERIALAND METHOD

Study Type: This is a prospective interventional analytical study.
Study Group: The study included all men and women with a diagnosis of cornea fistula ≤2mm attended the Upgraded Department of Ophthalmology, SMS Medical College and Hospital, Jaipur, Rajasthan as per the inclusion and exclusion criteria.

Study Period-
After IEC approval the study was conducted at SMS Medical College and Hospital, Jaipur from to or till the sample size is attained.

Sample Size-
The sample size calculated 25 eyes (cases) as per previous studies which showed, On final follow-up, 80%patients successfully achieved globe integrity and the anterior chamber was formed After TPG(tenon patch graft) 0.05 α error and 10%absolute error.

Inclusion Criteria
1. Patient with corneal perforation ≤2mm in diameter as assessed by BQ 900 slit-lamp examination with a positive Seidel sign, traumatic or non-traumatic cause who attended the ophthalmic casualty or OPD.
2. Patients who give well-informed written consent.

Exclusion Criteria
1. Non cooperative patients.
2. Other ocular or systemic disorders that could compromise vision and time of reepithelization.
3. Corneal perforation size >2mm.

METHODOLOGY

Twenty five patients with corneal perforations smaller than 2 mm were included in this study. The same experienced ophthalmic surgeon performed all surgical procedures to ensure consistency and minimize variability. The surgical intervention consisted of a tenon patch graft (TPG) procedure, accompanied by anterior chamber formation, performed under peribulbar block anesthesia.

Preoperatively, careful measurements of the corneal perforation size and extent of thinning were conducted using a caliper. The surgical approach began with the marking of the conjunctiva in the superotemporal quadrant, extending 1 mm beyond the measured area of thinning. A linear peritomy was then meticulously performed, followed by gentle separation of the conjunctiva from the underlying tenon tissue using blunt dissection techniques.

Subsequently, the tenon tissue corresponding to the marked area was excised using Vanna's scissors, and the graft was delicately transferred to the site of perforation. Adequate adhesion of the graft to the conjunctival cut edges was ensured by applying firm pressure. A 360-degree stromal pocket was meticulously created around the edge of the perforation using a crescent knife, into which the graft was securely tucked.

The graft was then anchored in place using multiple interrupted 10-0 monofilament nylon sutures, which were buried within the host corneal tissue to minimize postoperative discomfort and promote healing. Following completion of the surgical procedure, anterior chamber formation was achieved using air, and the eye was appropriately patched after the instillation of antibiotic eye drops (moxifloxacin hydrochloride 0.5%).

Postoperatively, patients received a comprehensive regimen of eye drops, including moxifloxacin hydrochloride 0.5% four times daily, homatropine hydrobromide 2% four times a day, prednisolone phosphate 0.5% four times a day, and carboxymethyl cellulose 0.5% six times a day to promote healing and prevent infection.

Follow-up examinations were conducted on postoperative day 1, weekly (for 2months) until complete epithelization occurred, and monthly thereafter for 4 more months to assess visual acuity and maintain globe integrity. (Figure 1)

Statistical Analysis

Statistical analysis was performed by entering collected data into a Microsoft Excel Worksheet. Qualitative data were presented as percentages and proportions, while quantitative data were analyzed for mean and standard deviation. Statistical significance was determined using appropriate statistical tests, with a p-value of less than 0.05 considered significant.

RESULTS

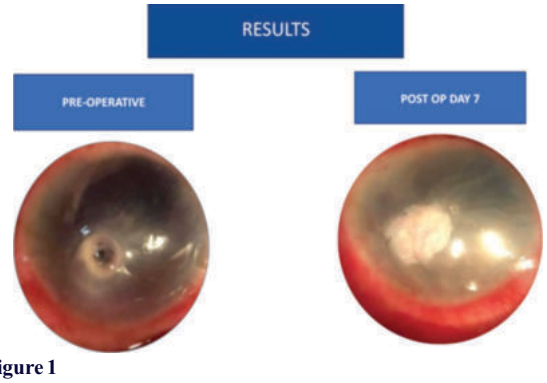

Figure 1

We included a total of 10 cases. There were 6 female and 4 male patients. The mean age (±SD) was 52.93±17.57 years.

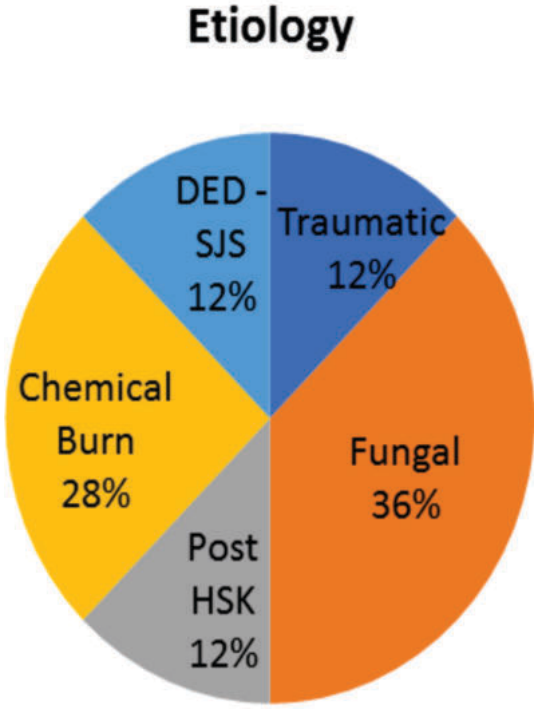

Figure 2

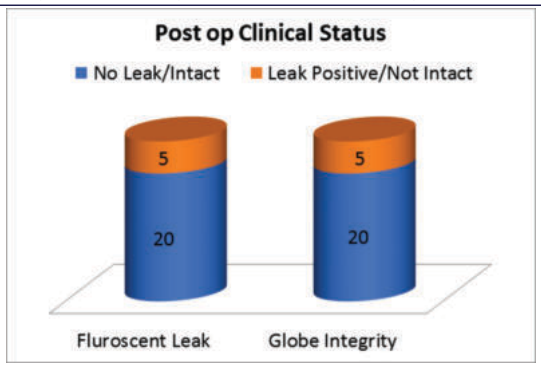

Figure 3

	MEAN	SD	MEDIAN	P VALUE
BCVA PRE OP	0.311	0.202	0.300	-
POST OP BCVA (3MONTH)	0.118	0.127	0.100	P<0.001 (S)

On final follow-up, 80% patients successfully achieved globe integrity and anterior chamber was formed.

Anterior chamber formation was observed on day 1(postoperative) of grafting in which 20 patients showed no leak on seidel test. (Figure 3)

Baseline BCVA: NO statistically significant difference (p-value=0.668) and the difference was statistically highly significant postoperatively (p<0.0001).

TABLE 1. Baseline Characteristics of Cases Undergoing
Tenon Patch Graft
Number Parameters Values
1. No. eyes (patients) – 25
2. Mean age (yr)- 52.93±17.57
3. Sex (M:F)- 10:15
4. Etiology: (number, percentage of eyes)
Fungal infection -36%
Chemical burn-28%
Trauma -12%
Dry eye disease SJS -12%
Post HSK-12%
5. Site of perforation (number, percentage of eyes)
Central 15, 60%
Paracentral 10,40%
6. Mean size of perforation (mm) <2mm
7. Mean baseline BCVA (logMAR) 0.311

DISCUSSION

Corneal fistulas, characterized by abnormal communications between the anterior chamber and corneal surface, pose significant challenges when left untreated. Complications including prolonged hypotony, synechiae formation, infections, and even the loss of the eye can occur. So the primary goal of treating such conditions is to restore eye integrity and pave the way for potential future corneal transplantation.

In resource-limited settings, where issues like cost limitations and scarcity of donor corneas prevail, addressing such complications becomes even more daunting. However, emerging solutions like Tenon patch grafts offer a glimmer of hope in restoring eye integrity and promoting healing, especially where access to traditional treatments is constrained.

Tenon patch grafts have emerged as a promising solution, particularly for small to medium-sized corneal perforations. These grafts offer a range of advantages, including improved best-corrected visual acuity (BCVA) and intraocular pressure (IOP) maintenance, minimal postoperative inflammation, reduced risk of rejection, cost-effectiveness, and a relatively simple surgical approach. Their autologous nature makes them readily available, further enhancing their appeal in resource-limited settings.

Key Benefits of TPG:

- A high success rate in promoting healing and restoring eye integrity.
- Cost-effectiveness compared to traditional treatment modalities.
- Improved BCVA and IOP postoperatively, enhancing patients' visual outcomes and intraocular pressure regulation.

- Easy availability due to the autologous nature of the tissue, mitigating reliance on external donor sources.
- Minimal postoperative inflammation, reducing patient discomfort and facilitating a smoother recovery process.
- The simplicity of the surgical technique, making it accessible to a wider range of healthcare providers and patients alike.

CONCLUSION

In resource-limited settings, the burden of corneal complications can be particularly challenging to address. However, Tenon patch grafts offer a beacon of hope, providing a cost-effective, accessible, and effective solution for corneal perforations. Their ability to improve visual outcomes, reduce complications, and simplify the surgical process makes them a valuable addition to the armamentarium of ophthalmic interventions. By harnessing the potential of these innovative approaches, we can advance corneal care and alleviate the burden of sight-threatening conditions, even in the most resource-constrained environments.

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