

Original Article

OUTCOME OF THE MANAGEMENT OF CORNEAL PERFORATION BY TENON
PATCH GRAFT, MULTI LAYERS AMG AND CORNEO-SCLERAL TISSUE

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Abstract

Purpose: The aim of the study was to make an update in the field of outcome of the impending perforation by Tenon patch graft, multi layers AMG and Corneo-scleral tissue in a tertiary eye hospital in Bangladesh. **Methods:** The study was conducted between January 2018 and January 2020. A total of 100 patients were included in this study. Hospital information systems and the International Classification of Diseases (ICD) were used to retrieve the medical records of the patients. A well-developed questionnaire contains demographic information, patient general health status, and head of compliance, ocular examination, clinical test, procedure, and follow-up information. A study protocol was developed and approved by the ethical committee. **Results:** In this study a large number of corneal perforation patients were adults and a few were younger. The age and place of living of corneal perforation patients were found statistically significant at the .001 ($\chi^2 = 42.87$; Gamma V = .65, df = 18). We found a strong association between patient level of education and types of complications ($\chi^2 = 36.58$; Gamma V = .19, Lambda $\lambda = .21$ DF = 20; Sig; P = < .01, OR 4.6, 95% CI 4.1 to 7.9). Surgical outcome success rate was 92% following the structural integrity maintained and 15% of 2nd intervention in the absence of corneal tissue. Finding suggested that surgery complication is decreasing with increase the level of education of the patient. The majority of the patients did not attend regular follow up and this was one the major cause of poor outcome of the visual acuity. There is a strong association between surgery complication and structural integrity ($\chi^2 = 100$; Gamma V = .53, df = 9, p < .001, OR 5.8, 95% CI 4.8 to 11.5%). **Conclusion:** Patient low level of awareness is associated with the missing of follow up and this increase the chance of complications. The structural integrity-maintained outcome suggest that the scarcity of corneal tissue structure of eye ball in developing countries like Bangladesh can be minimized by using tenons patch with conjunctival hood or multi-layer AMG or Corneo scleral patch graft.

Keywords: BCVA, ISAC, PAS, IOP, Structural Integrity, Bangladesh

1. Introduction

Corneal perforation is to consider one of the leading causes of ocular morbidity and

vision loss [1]. Microbial keratitis, ocular surface disease, and autoimmune disorders are

significantly associated with ocular morbidity and in some cases; immediate interventions are warranted [2]. The primary and secondary epithelial defects may also lead to the development of corneal inflammation with subsequent perforation [3]. Many studies suggest that the prevalence of corneal perforation is high in developing countries compared to the developed world [4]. Evidence suggests that conventional medical therapy does not work properly for most corneal xerosis and collagen vascular diseases and a surgical approach is to consider as the best option for corneal perforations [5]. Although the primary goal of management of corneal perforation is to ensure a watertight globally with the structural integrity to impede intense complications. Proper management

2. Materials and Methods

The study was conducted in a tertiary eye hospital in Dhaka, Bangladesh. Patients were recruited from the cornea department who were attending to receive treatment from the cornea department between January 2018 and January 2020. A total of 100 patients were included in this study. Hospital information systems and the International Classification of Diseases (ICD) were used to retrieve the medical records of the patients. A format was developed to

2.1. Clinical examination

Patient history of trauma, drugs, past ocular surgery, ocular disease, systemic disease, like Hypertension (HTN), Diabetes Mellitus (DM), Rheumatoid Arthritis (RA), Asthma was diagnosed, and current treatment-related history were recorded. Patient Visual

2.2. Slit lamp Bio microscopy examination

Size of ulcer and perforation and Hypopyon was measured using a SLB measurement scale and color coding of another ocular

2.3. Lab Examination

In our laboratory examination; corneal scraping for KOH, CFW, Gm staining &

of corneal perforation is largely depending on understanding the cause of the disease and the type of medical and surgical interventions [6]. Treatment of corneal perforation includes gluing, amniotic membrane transplantation, and corneal transplantation and this management depends on the size and location of corneal perforation. Various management options have been described in the literature, with the multi-stage surgical approach is often required to facilitate visual rehabilitation. The aim of the study is to make an update in the field of outcome of the management of corneal perforation by Tenon patch graft, multi layers AMG and Corneo-scleral tissue in a tertiary eye hospital in Bangladesh.

collect data from patient record files. At first, we diagnosed the outdoor patient in the cornea department and all clinical information were recorded including demographic history of the patient into a structured questionnaire. The constructed questionnaire included demographic information, patient general health status, head of compliance, ocular examination, clinical test, procedure, and follow-up information.

Acuity (VA) measured by Snellen test chart. Intraocular Pressure (IOP) of another eye was measured using a Gold man applanation tonometer and SAC patency test done.

anterior segment structures was also recorded.

CS were done and special cases acanthamoeba were excluded.

2.4. Procedure of surgery

2.4.1. Tenons patch graft and conjunctival hood

Surgery was performed by tenons patch graft with conjunctival hood. A tenons capsule little bit larger than CU. Operation was performed after clean the debris from ulcer area. About 2 mm of epithelium removed around perforation by 26 G needle,

2.4.2. Multi layers AMG

AMG Preparation: Amniotic membrane is collected during caesarian section thoroughly washed with Amphotericin B, 10 mg, Moxifloxacin 200 mg, Streptomycin 200 mg I 4 L water for 1 to 1.30 hours fully [7] cleaned free from any RBC cells

2.5. Surgical process

Under all aseptic conditions appropriate size of AM cut to cover perforation like inner Mm serves as graft and folded 1 to 3 or 2 to 4 time were adhered to the TAG

2.6. Corneo-scleral patch graft

Larger perforation is managed with Corneo-scleral tissue. Corneal scleral tissue was cut according to the size of perforation using markers. Flienga ring was used to provide support. All necrosed tissues excised with 1 mm margin of healthy tissue to ensure

2.7. Follow up

Follow up was confirmed after 1 day, 7 days 14 days and 30 days up to healing.

Inclusion criteria: Patients who had more than 2mm corneal perforation we included those patients with the consideration of at

2.8. Data Collection, Quality Control, Data Processing and Analysis

The interview schedule was filled in by the researcher. There were both open and close-ended questions in the interview schedule. A technical research team headed by the head of the cornea department led the process of the development of research instruments and data collection. A pre-test of the questionnaires was done to confirm the content reliability and validity. We followed standard procedure to ensure the quality of data and content was checked by a

dry the bed with an excellent sponge. Place tenon graft over the perforation apply cyanoacrylate glue or interrupted sutures by 10/0 monofilaments. Anterior chamber reformed with smaller air bubbles in AC and conjunctival hood made.

and stored at -40 degree Celsius with DMEM and glycerol(1:1) media for cry observation for 1 year. Tenon patch and AMG perforation size more than within 4 mm and Sclero corneal tissue size more than 3 mm.

with epithelial side up or sutured with 10/0 MNF then BCL was placed on the graft. After 2 to 4-week integrated with bed and BCL removed/sutures off.

health donor bed free from infection. After excision anterior and posterior synechia was gently released or loosed, and PI done interrupted sutures given as required for AC formation. All patients admitted 1 day before the operation.

least 3 months follow up record. **Exclusion criteria:** We had excluded corneal ulcer patient with the ulcer size more than 2 mm.

cornea expert to maintain the consistency of data. Finally, the expert team reviews the content, and their opinion was incorporated into the final version of the interview schedule. The team leader checked all data after the interview of the patients and fill up the patients' clinical examination and other diagnoses. Data were cleaned before analysis. Univariate and bivariate analysis and logistic regression were performed. The level of significance used was at 0.05.

2.9. Ethical Consideration

There is an ethical review committee for reviewing the proposal and ensuring that the study will not negatively affect any person participating in the research. A meeting of the committee was held at the

Ispahani Islamia Institute & Hospital. After a long discussion on different ethical aspects of the study the committee unanimously approved the proposal.

3. Results (Socio-demographics Characteristics)

The study revealed that apparently a large number (82%) of corneal perforation patients aged between 5 to 60 years with a mean age of 45.30 ± 17.24 years. This means a large number of corneal perforation patients were adults and a few were younger. A total of 100 corneal perforation patients were included in this study. About 72% were males (n=72) and 28% were females (n=28). In our study majority (80%) of the patients were adults and older and ages ranging from 32 years to 71 years. About 26% of the patients were coming from Dhaka and 74% were from outside of Dhaka. The age and place of living of corneal perforation patients were found statistically significant at .001 ($\chi^2 = 42.87$; Gamma V = .65, df = 18). About 36% of respondents had 5 years of schooling, 38% had 10 years of schooling, 16% had 12 years of schooling, 3% had 14 years of schooling and 7% of the respondents had no education. The data indicate that cornea unit corneal perforation patients on average come from 134 km (± 95.15) distance. The vast majority (61%) of the respondents were poor (65\$), 33% were middle class (320\$) and 6% were upper class (630\$). We found a strong association between patient level of education types of complication ($\chi^2 = 36.58$; Gamma V = .19, Lamda $\lambda = .21$ DF = 20; Sig; P = < .01, OR 4.6, 95% CI 4.1 to 7.9). We observed that surgery complication is decreases with increase the level of education of the patients, tab. (1). In our study the majority of the patient came from low-socio-economic group and this group patient has some

limitations including lack of awareness, irregular follow up, did not attend the surgery timely, poor compliance of maintaining regular medication dose, poor attention to counseling and poor post-operative caring. The complication rate was high for recurrence among the complicated eyes. About 78% complicated eyes were recurrence. About 15% of complicated eye needed second surgical intervention. About 8% of structural integrity was failed while 92% maintained very well. About 50% corneal perforation patient had 4-6 months follow up record, 14% had visited between 1-3 months to follow up their surgery issue, 14% had visited hospital between 7-9 months to follow up the surgery, 13% did it between 10-12 months and 9% patient had attended follow up between 13-24 months, fig. (1). About 26% patients pre-visual acuity had 6/6-6/12, 6% had 6/18-6/24 pre-visual acuity, 31% pre-visual acuity had 3/36-3/60, 19% pre-visual acuity had CF, 5% had HM and 13% pre-visual acuity had PL (figure-2). Our synthesis data show that about 44% patient had 3/36-3/60 post-operative BCVA, 11% had 6/18-6/24 BCVA, 8% had 6/6-6/12 BCVA, 11% had CF, 13% had HM and 13% had PL, fig. (2). About 38.6% patient had recurrence, 10.5% had Evisceration complication, 21.1% had ISAC complication, 19.3% had PAS complication, and 10.6% had cornea scleral tissue complication after corneal patch graft surgery, fig. (3). Our multi-variate regression analysis show that there is a strong association between surgery complication and structural

integrity ($\chi^2 = 100$; Gamma V = .53, df = 9, $p < 0.001$, OR 5.8, 95% CI 4.8 to 11.5). The possible reason of the complication is the structural integrity of eye ball remain good but visual outcome is poor, irregular anterior chamber and uncontrolled IOP led to evisceration, fig. (4). The complication rate was

high for recurrence among the complicated eyes. About 78% complicated eyes were recurrence. About 15% of complicated eye needed second surgical intervention. About 8% of structural integrity was failed while 92% maintained very well, figs. (5 & 6).

Table 1: Percentage distribution of types of complications by patient level of education

Level of education	Evisceration n= 05 %	ISACn=1 3 %	PAS n= 12 %	Recurrence n= 22 %	Corneo-Scleral Tissue n= 05 %	Total n= 57 %
Up to primary	-	12.28	-	21.05	5.56	38.89
Up to secondary	3.50	7.01	12.28	3.90	3.50	30.20
Higher Secondary	7.01	-	5.26	8.77	-	21.04
Under graduate	1.75	-	-	1.75	-	3.50
Illiterate	-	1.75	1.75	3.50	-	7.00
$\chi^2 = 36.58$; Gamma V = .19, Lamda $\lambda = .21$ df = 20; Sig; P = < .01						100.0

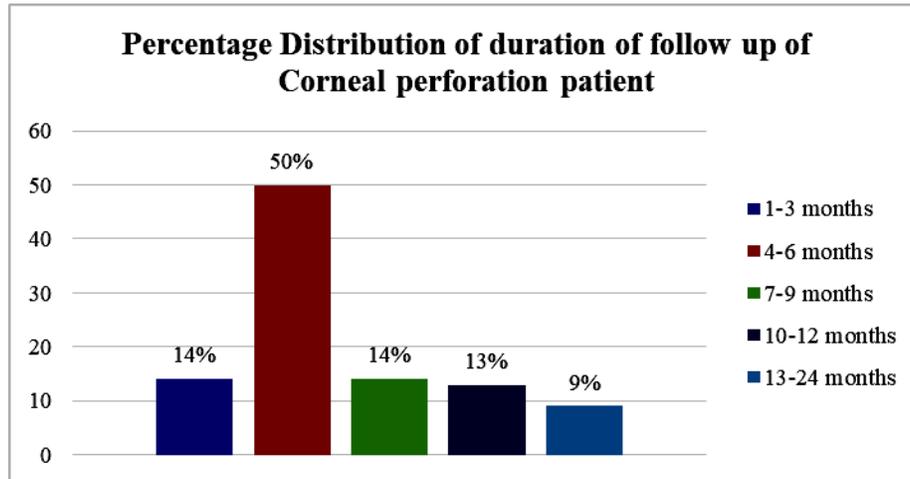


Figure 1: Percentage distribution of duration of follow up of corneal perforation patient

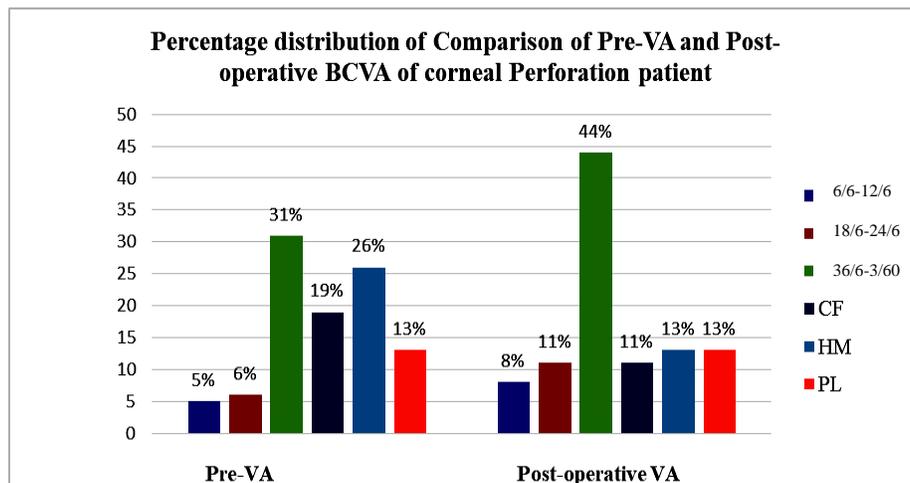


Figure 2: Percentage distribution of comparison of Pre-Visual Acuity and Post-operative BCVA of corneal perforation Patient

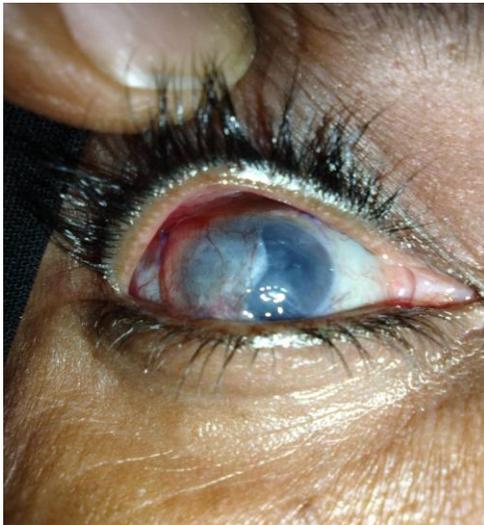


Figure3: Tenon's patch graft with conjunctival hood

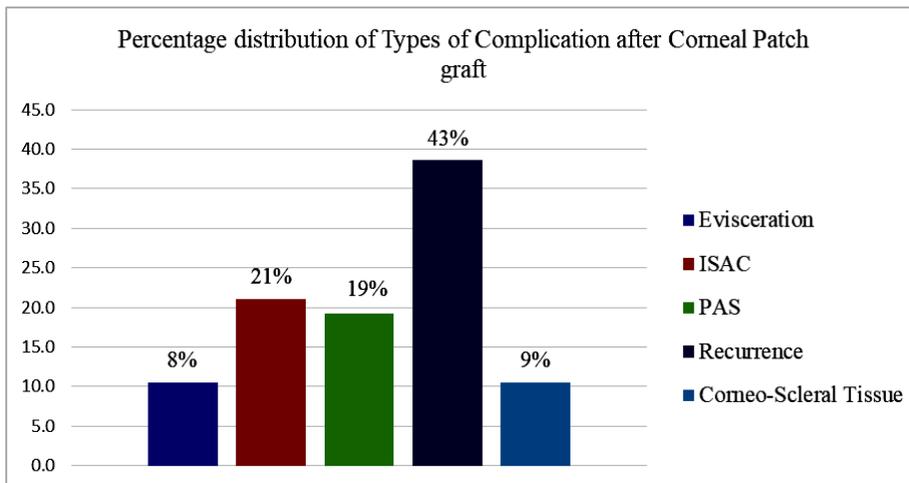


Figure 4: Percentage distribution of Types of complication after Corneal Patch Graft surgery



Figure 5: Corneal perforation with iris prolapse RE, size 3.25 mm, managed by scleral patch graft.



Figure 6: Sclero corneal patch graft in the management of Mooren's ulcer perforation

4. Discussion

We had collected data from a tertiary eye hospital cornea department for two years duration and a total of 100 patients undergone in this study. We had followed the International Classification of Diseases (ICD) and data retrieve from well-maintained hospital data management system. In our study the majority of the patient was adults and elderly. Patients were males' dominant and vast majority (74%) of the patients went outside of the capital city of Dhaka. We found that corneal perforation patients living of placement and age of the respondents had a strong relationship. This meant that environmental factors influence of patient disease profile and their daily job has an impact on corneal related diseases [7]. The majority of the patients' level of education was poor and an average they came about 134 kilometers distance. There is a strong association between patient level of education and types of complication on corneal perforation. The same finding was found by Prajna, et al. (2017) and reveal that patient socio-demographic status strongly influences the pattern of corneal perforation complications [8]. The important fact is that surgery complication is decreases with increase the

level of education of the patient. Patients who come for treatment the education level poor along with the financial condition. Low education and poor level of awareness create demand for high quality counseling to increase the awareness to attend the regular follow up. Our socio-demographic data reveal that low socio-economic background patient is the main service recipient of the hospital for their corneal perforation treatment. In Bangladesh poor rural people are engaged in subsistence economic activities and such busy work schedule pushes them to delay in follow up which increases the risk of complication and poor outcome of the vision. Study data suggested that poor education low level awareness and distance is the barriers to attend the patients to regular follow up. These barriers are responsible for the cause of poor outcome of the visual acuity among the study patient. The pre-visual acuity and post-operative BCVA comparison data indicates a moderate outcome and this finding are supported by study conducted by Yokogawa et al., (2014). They found that poor socio-economic community group visual outcome comparatively is moderate compared to economically

rich group [9]. Bangladesh is religious Muslim country and the crisis of cornea for transplantation is common features. Considering the fact corneal perforation become a popular option to physician and the patients. Recurrence was the highest complication among the corneal perforation patients and multi-varieties regression analysis suggest a strong association between surgery

complication and structural integrity. In our data about 92% structural integrity was maintained very well while 15% of complicated eyes need second surgical intervention. Our study reveals that the main reason of the poor outcome of structural integrity and vision was an irregular shallow anterior chamber and uncontrolled IOP which led to evisceration.

5. Conclusion

Patient low level of awareness is associated with the missing of follow up and this increase the chance of complications. The structural integrity maintained outcome suggest that the scarcity of corneal tissue structure of eye ball in developing countries like Bangladesh can be minimized by using tenons patch with conjunctival hood or multi-layer AMG or Corneo scleral patch graft.

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