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A Study of Reccurence of Pterygium in Maharashtra

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Abstract:-

➢ ***Background***

This study investigated the recurrence rates of primary pterygium following different surgical approaches, including conjunctival autografting alone, conjunctival autografting with intraoperative mitomycin C, and amniotic membrane grafting.

➢ ***Methods***

In a retrospective cohort study of primary pterygium conducted from October 2022 to October 2024, 560 patients with an average age of 53.3 ± 14.1 years were included, with 94 cases undergoing surgery. Pterygium involving the cornea was present in 55% of cases. The overall recurrence rate for the three procedures was 17%, with an average time to recurrence of 14.2 ± 11.9 months, and 37% of recurrences occurred after the first year. Dry eye disease was the only significant risk factor for recurrence in both univariate (p = 0.021) and multivariate analysis (p = 0.026). The recurrence rates following conjunctival autografting with and without mitomycin C were 15.6% and 15.8%, respectively, while the rate following amniotic membrane grafting was twofold higher at 27% (OR= 2.02) compared to conjunctival autografting (15.8%).

➢ ***Conclusions***

Dry eye disease was identified as the sole factor associated with pterygium recurrence in this study. The finding highlights the significance of extended post-operative monitoring, as over one-third of recurrences were detected after the first year. The slightly elevated recurrence rate following conjunctival grafting in our study, compared to existing literature, can be attributed to variances in study locations, demographics, and follow-up durations.

Keywords:- *Pterygium, Conjunctival, Amniotic.*

I. INTRODUCTION

A pterygium is a triangular, wing-shaped growth of fibrovascular tissue that extends from the conjunctiva over the white part of the eye (bulbar conjunctiva) onto the cornea [1]. While pterygium can often go asymptomatic, it may present symptoms such as tearing, a sensation of having a foreign object in the eye, or redness. As it progresses and extends onto the cornea, it can lead to visual disturbances due to astigmatism, obstruction of the visual axis, or even double vision resulting from restricted eye movement. Therefore, recognizing these signs and seeking prompt medical evaluation is crucial to address potential complications and maintain optimal eye health [2]. The etiology of pterygium is complex and involves multiple factors, although prolonged exposure to ultraviolet (UV) light stands out as the primary contributing factor. UV light exposure leads to oxidative stress and triggers the release of cytokines and growth factors, which stimulate the proliferation of cells in the affected area. This cascade of events underscores the importance of UV protection and highlights the role of environmental factors in the pathogenesis of pterygium. [3, 4]. This also explains why lower geographic latitude, outdoor activity, and living in rural areas and countries close to the equator are associated with an increased prevalence of pterygium [5, 6]. In both 2013 and 2018 meta-analyses, pterygium was found to affect approximately 10-12% of the global population, highlighting its widespread prevalence [5, 7]. Although dry and dusty environments are often associated with increased pterygium risk, our study focused on assessing pterygium prevalence in Maharashtra. Conducted in the Eastern Province, our findings revealed a surprisingly low prevalence of only 0.07%. This suggests potential regional variations in pterygium prevalence, highlighting the importance of localized research for a comprehensive understanding of the condition [8]. Our study may have underestimated pterygium prevalence by focusing on advanced cases only. Furthermore, we did not examine pterygium management or surgical recurrence rates, highlighting areas for further research. Surgical techniques for pterygium have advanced over the years, yet recurrence remains a persistent issue across all procedures.

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In the past, excision with bare sclera was common, but recurrence rates soared as high as 88% [9]. Various methods have been developed to excise pterygium, such as mitomycin C injection, conjunctival autografting, amniotic membrane transplantation, and beta irradiation [10]. While mitomycin C effectively reduces recurrence compared to bare sclera techniques, it's associated with potential complications such as necrotizing scleritis, scleral ulceration, endothelial cell loss, and corneal edema. [11–13]. The ideal procedure should offer minimal recurrence and a low risk of complications. Ethnicity may influence recurrence rates, as studies indicate higher rates among Hispanic and Black patients [14].

Conclusions from studies elsewhere may not directly apply to our population. Mumbai's dusty climate, a known risk factor, complicates matters, as does the geographical location's influence, particularly in regions with lower latitudes, which show higher pterygium incidence [15, 16].

In this study, we examined the recurrence rates following conjunctival autografting alone, conjunctival autografting combined with intraoperative mitomycin C (0.02%), and amniotic membrane grafting over an extended follow-up period.

II. METHODOLOGY

➢ *Sample Population*

This retrospective cohort study reviewed pterygium cases (ICD-10 code H110) from October 2022 to October 2024 in an outpatient ophthalmology department. Using consecutive nonprobability sampling, 560 patients with available medical records and sufficient follow-up were included. Of these, 87 (31%) underwent surgical excision with an average follow-up of 26 months.

➢ *Data Collection*

Patient records were reviewed for age, gender, smoking status, and primary pterygium details. This included location, corneal involvement, dry eye presence, and comorbidities. Surgical procedures and recurrence dates were analyzed for a subset of patients (n = 87). Additionally, pterygium severity, location, and dry eye assessment were documented. Surgical options were categorized into conjunctival autografting alone, autografting with mitomycin C, or amniotic membrane grafting. Description of these procedures follows.

For conjunctival autografting, surgery began with lidocaine 1% and epinephrine subconjunctival injection for anesthesia and hemostasis. Pterygium excision followed, using forceps and Westcott scissors, moving from the periphery toward the limbus. The cornea was smoothed with a diamond burr. Attention then shifted to the superior bulbar conjunctiva, where a matching size of conjunctiva was marked, dissected, and carefully moved to cover the bare sclera, finally sutured with 8-0 Vicryl or fibrin glue. In cases of intraoperative mitomycin C application, a low dose of 0.2 mg/ml (0.02%) was used for 1 minute. Each pterygium specimen was sent to the pathology lab for confirmation.

For amniotic membrane grafting, the procedure began similarly with lidocaine 1% and epinephrine injection for anesthesia and hemostasis. Pterygium excision, corneal smoothing, and subsequent amniotic membrane graft placement, cut to size, and sutured using Vicryl 8-0 followed. Each pterygium specimen underwent pathology confirmation.

Post-surgery, patients were prescribed tobramycin-dexamethasone ointment twice daily for 2 weeks and tapering topical steroid drops for 4 weeks. They were scheduled for regular follow-up appointments and advised to seek emergency care if needed.

➢ *Statistical Analysis*

Demographic characteristics were analyzed using chi-square tests and independent t-tests. Multiple logistic regression adjusted for age and gender, with significance set at 0.05.

III. RESULTS

The study included 560 patients diagnosed with primary pterygium, averaging 52.5 ± 13.1 years in age with a predominant male representation (75%) and bilateral cases accounting for 18.9% (Table 1). Surgery was performed on 174 eyes, primarily targeting nasal pterygium (93.6%). Over an average 26-month follow-up, the overall recurrence rate was 18%, with no recurrence noted in patients aged over 69 years. While the 30-50 age group displayed a slightly elevated risk of recurrence (adjusted OR=1.4, p=0.528), it was not statistically significant. Dry eye disease correlated with increased recurrence, whereas pre-surgery corneal involvement did not significantly impact recurrence rates. Recurrence occurred in 17% of eyes at an average of 14.2 ± 11.9 months, with a 12-month average recurrence rate of 10.4% (Table 2). Following conjunctival autografting, recurrence rates with and without mitomycin C were 16.5% and 17.6%, respectively, whereas amniotic membrane grafting showed a 34% recurrence compared to conjunctival autografting (17.6%). There was no statistically significant difference in recurrence rates or time among the three surgical interventions (p=0.453 and p=0.479, respectively). Chi-square test was done to analyze the visul outcome (Table 3).

Table.1 Clinical Features of Patients Presenting with Pterygium

Characteristics n = 560		
Age groups	30-50	116(42.1%)
	51-69	127 (45.9 %)
	70-90	37 (12 %)
Age range (years)	30-90	
Gender	Male	207 (73.92 %)
	Female	73 (26.07 %)

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Table 2. Details of Overall Recurrence Rate

Recurrence Rate	
Overall postoperative recurrence	15(18 %)
Recurrence before the first year	11(73.4%)
Recurrence after the first year	4(26.6%)

Table 3. Effect of Age at Surgery on Visual Outcome

Age	Good Outcomes		Poor Outcomes		Chi-square test
	No.	%	No.	%	16.86
2-3	46	72	18	29	
3-12	38	28	102	71	
Total	84	41	120	59	

IV. DISCUSSION

The study in Maharashtra suggests that pterygium recurrence is often found on the nasal side. This may be due to the protective role of the nose, shielding the temporal side from direct UV light exposure [17, 18]. Another theory proposed in the Maharashtra study is that dust particles entering the nasolacrimal duct from the nasal side could mechanically irritate the eye, potentially contributing to the higher occurrence of pterygium on the nasal side [17, 19]. The research from Maharashtra indicates that pterygium is most prevalent among individuals aged 50 to 70 years. Several studies have identified age over 50 as a significant risk factor for developing pterygium. [7, 20, 21]. Our study suggests that increasing age correlates with higher exposure to UV radiation, potentially contributing to the prevalence of pterygium. Additionally, we found a higher incidence among males, possibly due to differences in outdoor activities between genders in Maharashtra. This aligns with findings from South Korea, where male gender was also identified as a risk factor. Past research indicates that larger pterygia not only cause astigmatism but also lead to high-order aberrations [22, 23]. Our study found that female gender was the sole significant independent risk factor for corneal involvement. Tan et al. developed a grading system based on blood vessel clarity, which they determined to be a risk factor for recurrence following bare scleral excision [24].

In our current study, we observed a higher recurrence rate after conjunctival autografting in patients under 50 years old, but this difference was not statistically significant. Multiple studies have consistently identified young age as a risk factor for recurrence following a limbal conjunctival autograft [25]. Regarding conjunctival autografting, a technique initially described by Kenyon et al [2], in 1998, recurrence occurred in 15.8% of cases in our study. Our findings are in close agreement with those of Huerva et al., who reported an 11.76% recurrence rate over an average follow-up duration of 49 months [26]. We hypothesize that the higher recurrence rate observed in our study may be attributed to geographical variations. Our extended follow-up period could have also contributed to detecting more recurrences. Comparatively, in a recent study examining primary closure, conjunctival autografts, and amniotic membrane transplantation, the mean overall recurrence rate over 12 months was 11.3% [27].

In our study, we found that the 12-month overall recurrence rate was 10.6%, which closely resembles rates reported in other studies. We observed similar recurrence rates between conjunctival autografts with and without mitomycin C. Additionally, in a retrospective observational study, the application of mitomycin C 0.04% for 2 minutes did not decrease the risk of recurrence [28]. Another study combining conjunctival autografts with mitomycin C reported a recurrence rate of 3.6% [29]. Recurrences after conjunctival grafting with intraoperative mitomycin C occurred, on average, 13.5 months postoperatively. Fibrin glue and Vicryl sutures were sometimes used to enhance patient comfort and reduce graft-related complications [30].

Two meta-analytical studies reported a lower recurrence rate with fibrin glue compared to sutures [31-32]. In our study, using fibrin glue with sutures showed a similar recurrence rate, with no statistically significant difference. Likewise, a recent study on pterygium recurrence compared three groups—fibrin glue with sutures, fibrin glue alone, and sutures alone—and found no significant difference among them [30]. Due to the limited number of recurrences observed, differences were challenging to discern. Further studies are warranted to establish whether the application of fibrin glue over Vicryl sutures can effectively reduce pterygium recurrence.

Our study revealed comparable recurrence rates, although the lack of statistical significance may be attributed to the relatively small number of cases involving amniotic membrane grafts. Due to the retrospective design of our study, accurately reporting the size and morphological characteristics of lesions proved challenging. Additionally, data on pterygium severity was only available for patients who underwent surgical excision, leading to missing information for those who did not undergo excision. Since all patients in our study shared the same race, we were unable to analyze whether race serves as a risk factor for recurrence. Long-term multicenter prospective studies focusing on pterygium recurrence are necessary to thoroughly analyze recurrence risk factors. Our study did not include a healthy control group, thus precluding the calculation of pterygium risk factors and prevalence rates; however, this was beyond the study's scope. Future studies on pterygium recurrence might benefit from being conducted by a single surgeon to mitigate variations in surgical experience.

V. CONCLUSION

In conclusion, dry eye disease emerged as the sole significant factor associated with pterygium recurrence. A notable portion of recurrences occurred beyond the first year, underscoring the importance of extended monitoring. Recurrence rates after conjunctival autografting were slightly elevated compared to existing literature, possibly reflecting regional variations. While comparable recurrence rates were seen with and without mitomycin C, amniotic membrane

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grafting exhibited a doubled recurrence rate, though not statistically significant due to the smaller sample size.

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