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Original article

Visual and refractive outcomes following combined pterygium and cataract surgery: A longitudinal follow up study

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Abstract

Background: The primary risk factors is UV (ultraviolet) rays, hot and dry weather, wind, dusty atmosphere, and the period of exposure to such conditions. Other contributing factors include older age, male gender, outdoor occupations and dry eye conditions. Removal of pterygium can be performed either before or subsequently with cataract surgery. Sequential pterygium excision followed by cataract surgery has been the preferred strategy. **Objective:** To analyse visual and refractive outcomes of surgery in pterygium patients with concurrent cataract. **Methodology:** The presentlongitudinal follow up studywas carried out inDepartment of ophthalmology at NMCH Raichur involving 60 cases of pterygium and cataract during the period of January to July 2024.

Results: We included total 60 cases of pterygium in our study. Of these 60 cases, majority (73.3%) were having early stage of pterygium i.e. grade 1 and 2 whereas 26.7% were having late stage of pterygium i.e. grade 3 and 4. Out of total 60 cases (73.3%) found to have 1.23 ± 0.54 D mean astigmatism preoperatively which significantly improved to 0.62 ± 0.27 D. Whereas the mean astigmatism in late stage (26.7%) of pterygium patients found to be 3.85± 0.72D which reduced to 2.16 ± 0.37 D which was not found to be significant. **Conclusion:** Our study revealed that combined pterygium and cataract surgery with conjunctival autograft is safe and provides predictable refractive outcomes.Simultaneous pterygium excision with cataract surgery in early stages of pterygium will help to improve much better vision as compared to late stages and is a feasible option for elderly patients, especially when the size of pterygium is small.

Key words: Visual acuity, refractive outcomes, combined pterygium and cataract surgery

Introduction

Pterygium is one of the common ocular surface disorders which occurs more commonly in older age groups. [1] Pterygium is basically a fibrovascular overgrowth of the subconjunctival tissue, triangular in shape, and encroaching on to the cornea in the medial and lateral palpebral fissure. The various known risk factors are immune mechanism, genetic predisposition, and chronic environmental irritation, which include UV (ultraviolet) rays, hot and dry weather, wind, dusty atmosphere, and the period of exposure to such conditions. However, the most common is the increased time of exposure to UV rays of the sunlight, followed by chronic eye irritation from dry and dusty conditions. [2]

Pterygia do not only lead to visual impairment by invading the visual axis or distorting the central topography, but they also induce focal corneal flattening, severe astigmatism, and deterioration of corneal aberrations.

While surgical excision can improve pterygium-induced refractive errors and topographical changes, corneal distortion may be more difficult to reverse completely, particularly in cases of large pterygia. Thus,clinically the timing of pterygium excision and subsequent cataract surgery, in eyes with coexisting cataract is important.Pterygium commonly occurs in older patients and is usually accompanied by cataract.[3,4] Removal of pterygium can be performed either before or subsequently with cataract surgery. Sequential pterygium excision followed by cataract surgery has been the preferred strategy. This approach has advantages over combined pterygium and cataract surgery in terms of better corneal stability and subsequent higher predictability of intraocular lens (IOL) power calculation.[5] However, most of the patients prefer single-step combined procedures rather than two-step separate procedures.

Simultaneous cataract and pterygium surgery provides faster visual recovery and cosmetic improvement and reduces hospital visits and the overall treatment cost.[6,7,8] The current study aimed to assess the Visual outcomes in patients with simultaneous pterygium and cataract surgery.

Objective: To analyse visual and refractive outcomes of surgery in pterygium patients with concurrent cataract.

Materials and Methods

Study setting: Department of ophthalmology at NMCH Raichur

Study population: Diagnosed cases of pterygium and cataract

Study period: January to July 2024

Study design: Longitudinal follow up study

Sample size: 60 cases

Sampling technique: Simple Random sampling method

Inclusion criteria:

- Age above 50 years
- Patients diagnosed of having cataract and pterygium
- Willing to participate in the study with due consent

- The pterygia were graded according to the extent of involvement (Grade 1: crossing limbus; Grade 2: midway between limbus and pupil; Grade 3: reaching up to pupillary margin; and Grade 4: crossing pupillary margin)

Exclusion criteria:

- The patients of cataract with other ocular comorbidities (apart from pterygium) and a history of previous ocular surgery or recurrent pterygium and bi-headed pterygium or pseudo-pterygium were excluded from the study

- Those not willing to participate in the study

Methods of data collection:

The patients above the age of 50 years with cataract were enrolled for the study. The patients had predominant visual complaint and gave a history of pterygium which was present before the visual deterioration. The patient's history and ocular complaints were elicited. Slit-lamp biomicroscopic examination of the anterior segment was done. Pterygium extension and the total area have a stronger correlation with corneal astigmatism than does width. A dilated fundus examination was performed to rule out posterior segment pathology. The selected patients underwent cataract surgery workup which included keratometry using an automated keratometer and axial length measurement using an ultrasonic A-scan and intraocular lens power calculation. All Patients underwent phacoemulsification with clear corneal 2.8mm incision and pterygium excision with limbal conjunctival autografting under local anaesthesia. Postoperative BCVA and corneal astigmatism at 1week, 6weeks and 6months was evaluated.

Statistical analysis:

Data was collected by using a structure proforma. Data entered in MS excel sheet and analysed by using SPSS 24.0 version IBM USA. Qualitative data was expressed in terms of proportions. Quantitative data was expressed in terms of Mean and Standard deviation. Association between two qualitative variables was seen by using Chi square test. Comparison of mean and SD between two groups was done by using unpaired t test to assess whether the mean difference between groups is significant or not. A p value of <0.05 was considered as statistically significant whereas a p value <0.001 was considered as highly significant.

Results

Table 1: Distribution according to stage of pterygium

		Frequency	Percent
Grade	Grade 1 and 2	44	73.3
	Grade 3 and 4	16	26.7
	Total	60	100.0

We included total 60 cases of pterygium in our study. Of these 60 cases, majority (73.3%) were having early stage of pterygium i.e. grade 1 and 2 whereas 26.7% were having late stage of pterygium i.e. grade 3 and 4.

Table 2: Distribution according to age group

		Frequency	Percent
Age group in years	40-50	8	13.3
	51-60	28	46.7
	61-70	20	33.3
	>70	4	6.7
	Total	60	100.0

Out of total 60 cases, 46.7% were from 51-60 years age group followed by 33.3% from 61-70 years, 13.3% from 40-50 years and remaining 6.7% from above 70 years age group.

Table 3: Distribution according to preop and post operative visual acuity

		Preop		Post op	
		Frequency	Percent	Frequency	Percent
BCVA	Normal vision	0	0	20	33.3
	6/12 to 6/18	0	0	20	33.3
	6/18-6/60	44	73.3	20	33.3
	6/60-3/60	16	26.7	0	0.0
	Total	60	100.0	60	100.0

We categorised the cases as per BCVA and observed the preoperative and post operative difference. 33.3% of the cases achieved normal vision post operatively. 33.3% had BCVA 6/12-6/18 post operatively. 73.3% had BCVA 6/18-6/60 preoperatively and 33.3% achieved the same postoperatively. 26.7% had BCVA 6/60-3/60 preoperatively.

Table 4: Distribution according to pre op and postoperative manifestion of astigmatism

	preoperative Mean +- SD	postoperative MEAN +- SD	P Value
Grade I &II	1.23 ±0.54 D	0.62+- 0.27 D	0.023
Grade III & IV	3.85+- 0.72 D	2.16 +- 0.37 D	0.048

Table 4 compare the pre operative and post operative astigmatism in the patients, with early stage of pterygium (73.3%) found to have 1.23 ± 0.54 D mean astigmatism preoperatively which significantly improved to 0.62 ± 0.27 D. Whereas the mean astigmatism in late stage (26.7%) of pterygium patients found to be 3.85± 0.72D which reduced to 2.16 ± 0.37 D which was not found to be significant.

Discussion

Pterygium causes flattening of the cornea in the horizontal meridian and consequently results in with-the-rule corneal astigmatism, which is against the rule and irregular in advanced stages of the disease. Pterygium leads to deterioration of visual performance not only by causing refractive changes but also by causing a significant increase in corneal wavefront aberrations.11

We included total 60 cases of pterygium in our study. Of these 60 cases, majority (73.3%) were having early stage of pterygium i.e. grade 1 and 2 whereas 26.7% were having late stage of pterygium i.e. grade 3 and 4. Out of total 60 cases, 46.7% were from 51-60 years age group followed by 33.3% from 61-70 years, 13.3% from 40-50 years and remaining 6.7% from above 70 years age group.

In smaller grade of pterygium the mean astigmatism found to be reduced from 1.23+- 0.54D pre-operatively to 0.62± 0.27D post-operatively which was found to be significant. In larger grades of pterygium patients mean astigmatism changes from 3.85± 0.72 D pre- operatively to 2.16 ± 0.37 D post-operatively which was not found to be significant.

The coexistence of pterygium and cataract, particularly in older adults, is an important challenge for clinicians, because of the ongoing debate regarding the "ideal" timing and technique of pterygium surgery. With recent technological advances both in surgical technique and in intraocular lenses, cataract surgery has become more sophisticated in that it approaches the precision of refractive surgery. In addition, patient expectations have risen as they expect a perfect refractive result after cataract surgery. This is the reason that the timing and the refractive outcomes of pterygium surgery have attracted more attention in the last few years.

Our results revealed that combined cataract and pterygium surgery was safe and effective and provided reasonably predictable refractive results. This predictability of refractive outcomes depends on the size and grade of extension into cornea and pre operative keratometry values.

The current study has certain limitations. First, the sample size of the study was small. Second, the corneal topographic changes and high order aberrations were not assessed in this study. Third, the outcomes of combined surgery were not compared with those of sequential pterygium and cataract surgeries.

Jain P. et al[6] in their study involving 60 patients reported that 31 (51.7%) patients were male and 29 (48.3%) were female. Their mean age was 61 ± 8.32 years (range: 50–73 years). Type 1 pterygium was seen in 14 (46.7%) patients, whereas 16 (53.3%) had type 2 pterygium.

Kamiya et al[7] in their study, reported that 82% of eyes achieved the target refraction within ± 1D 3 months after simultaneous pterygium excision and phacoemulsification surgery.

In a study conducted by **Sharma B. et al**[8] revealed that combined cataract and pterygium surgery was safe and effective and provided reasonably predictable refractive results. In our study, significant improvement in BCVA was observed 6months after surgery ($p < 0.01$). Refractive results of simultaneous pterygium and cataract surgery have been described in a limited number of studies.

Ibechukwu et al[9]first described that simultaneous cataract and pterygium surgery was beneficial in terms of cost reduction and visual prognosis to both the hospital and patients; however, the refractive outcomes of these procedures were not described.

Gulani and Dastur et al[10]stated that simultaneous cataract and pterygium surgery is beneficial for patients. Out of 30 patients undergoing simultaneous surgery, 63% patients exhibited visual recovery to 6/12, and the mean with-the rule and against-the-rule astigmatism, was 1.3 D and 1.2 D, respectively, six months postoperatively.

Conclusion: Our study revealed that combined pterygium and cataract surgery with conjunctival autograft is safe and provides predictable refractive outcomes. Conjunctival autograft is an ideal alternative to suturing in these combined cases because it shortens the operative time, is easy to use, and is associated with less postoperative inflammation and discomfort. Simultaneous pterygium excision with cataract surgery in early stages of pterygium will help to improve much better vision as compared to late stages and is a feasible option for elderly patients, especially when the size of pterygium is small.

whereas the patients in our study withsignificant pterygium and cataract shows more post-operative astigmatism, in such patients sequential procedure ofpterygium excision with conjunctival autograftfollowed by cataract surgeryafter a month is the cost effective way for better visualoutcome. However comparison between sequential pterygium and cataract surgery and combined pterygium and cataract surgery visual outcomes was not done in our study.

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