ASIAN JOURNAL OF PHARMACEUTICAL AND CLINICAL RESEARCH

INNOVARE ACADEMIC SCIENCES
Knowledge to Innovation

Vol 17, Issue 8, 2024

Online - 2455-3891
Print - 0974-2441

Research Article

PREVALENCE OF PTOSIS IN CATARACT SURGERY PATIENTS AT A TERTIARY CARE CENTER IN ARUNACHAL PRADESH

NYAI ETE*, TOJUM GONGO, PRAMOD KUMAR

Department of Ophthalmology, Tomo Riba Institute of Health and Medical Sciences, Arunachal Pradesh, India.
***Corresponding author: Nyai Ete; Email: nyaiete5@gmail.com**

Received: 10 June 2024, Revised and Accepted: 22 July 2024

ABSTRACT

Objective: The objective of this study was to estimate the prevalence of ptosis in patients undergoing cataract surgery.

Methods: This retrospective study, conducted in a tertiary care ophthalmology department, analyzed data from 520 adult cataract surgery patients over 6 months (July–December 2023). Of these, 88 patients had varying degrees of ptosis. Demographic details, medical history, and specific ophthalmic history were reviewed. Ptosis severity was assessed using margin-reflex distance 1 and levator function tests, categorizing ptosis as mild, moderate, or severe. The presence of any ocular abnormalities was noted. Keratometric readings were analyzed for astigmatism severity. SSPS 22.0 was used for statistical analysis and $p<0.05$ was taken as statistically significant.

Results: In a study of 520 cataract surgery patients, 88 (16.92%) patients were found to have ptosis. Out of 88 cases with ptosis, there were 55 (62.50%) males and 33 (37.50%). The mean age of male and female patients was found to be comparable with no statistically significant difference. Bilateral ptosis (79 cases, 89.7%) was more common. Unilateral ptosis was observed in 9 (10.3%) cases. Mild ptosis was observed in 59 cases (67.05%), moderate in 21 cases (23.86%), and severe in 8 cases (9.09%). Ptosis was most commonly seen in age group of 61-70 years (34.09%) followed by 51-60 years (29.55%), above 70 years (20.45%) and 41-50 years (15.91%). The mean magnitude of astigmatism was 0.98 (±0.712) the mild ptosis, 1.39 (±0.953) for moderate ptosis, and 2.14 (±0.74) for severe ptosis, respectively.

Conclusion: The presence of ptosis in patients undergoing cataract surgery can lead to suboptimal visual outcomes post-surgery. Addressing ptosis before cataract surgery ensures accurate lens selection and placement, enhancing patient satisfaction and visual acuity.

Keywords: Ptosis, Cataract surgery, Astigmatism, Outcome.

 DOI: http://dx.doi.org/10.22159/ajpcr.2024v17i8.52198. Journal homepage: https://innovareacademics.in/journals/index.php/ajpcr

INTRODUCTION

Ptosis, also known as blepharoptosis, is defined as the abnormal drooping of the upper eyelid. This condition can affect one or both eyes and may be present at birth (congenital) or develop later in life (acquired) [1]. The condition arises from various underlying pathophysiological mechanisms, most commonly involving the muscles responsible for eyelid elevation, the levator palpebrae superioris, and Müller's muscle or the nerves supplying these muscles. The severity of ptosis can vary, ranging from mild, where the drooping is barely noticeable, to severe, where the eyelid can cover a significant portion of the pupil, leading to visual impairment. The pathophysiology of ptosis involves several components. In congenital ptosis, the most common cause is a developmental defect of the levator muscle. In acquired ptosis, factors such as aging (involutional or aponeurotic ptosis), trauma, neurogenic causes (e.g., third nerve palsy), myogenic disorders (e.g., myasthenia gravis), and mechanical factors (e.g., tumors) can contribute to the condition. Age-related degeneration and disinsertion of the levator aponeurosis are prevalent in older adults, leading to a gradual descent of the upper eyelid [2].

Ptosis is classified into several types based on its etiology: Congenital, aponeurotic, neurogenic, myogenic, mechanical, and traumatic [3]. Evaluating patients for ptosis before cataract surgery is crucial for several reasons. Ptosis can significantly affect the outcomes of cataract surgery and overall visual function [4]. Patients with undiagnosed or untreated ptosis may experience suboptimal post-operative results, as the drooping eyelid can interfere with the visual axis, leading to incomplete visual rehabilitation. Accurate diagnosis and appropriate management of ptosis are essential to ensure that patients achieve the best possible visual outcomes after cataract surgery [5]. Furthermore, ptosis can obscure pre-operative measurements and complicate the surgical procedure. For instance, intraoperative access to the cataract and precise placement of intraocular lenses (IOLs) can be hindered by the presence of a drooping eyelid. Addressing ptosis either before or during cataract surgery can optimize surgical conditions and improve the overall efficacy of the procedure [6].

Ptosis can adversely affect visual outcomes following cataract surgery in several ways. Postoperatively, a drooping eyelid can obstruct the visual axis, limiting the patient's ability to achieve clear and unobstructed vision. This obstruction can result in a perceived failure of the cataract surgery, even if the procedure itself was technically successful [7]. In addition, ptosis can contribute to a reduction in contrast sensitivity and peripheral vision, further impairing the patient's visual experience. Moreover, untreated ptosis can lead to compensatory mechanisms, such as chin-up head posturing, brow elevation, and forehead wrinkling, which can cause discomfort and affect the patient's quality of life [3].

Despite the recognized impact of ptosis on visual outcomes, there is a paucity of comprehensive data on the prevalence of ptosis in patients presenting for cataract surgery, particularly in tertiary care settings. The existing literature often focuses on the surgical techniques and outcomes of ptosis correction rather than its prevalence and implications for cataract surgery patients [8]. This gap in knowledge underscores the need for further research to better understand the epidemiology of ptosis in this patient population. The present study aims to fill this knowledge gap by determining the prevalence of ptosis in patients undergoing cataract surgery at a tertiary care center [9].

METHODS

This was a retrospective study conducted in the department of ophthalmology of a tertiary care medical institute in which adult patients coming for cataract surgery were included on the basis of pre-defined inclusion and exclusion criteria. The duration of the study was 6 months extending from July 2023 to December 2023. Data of 520 cases coming for cataract surgery during the study period were analyzed from electronic records available in the record section of the institute. Out of these 520 cases, 88 patients were found to have ptosis of varying degrees. Data of these 88 patients were further analyzed for assessment of the severity of ptosis. The presence of associated nystagmus was also noted.

From the electronic records, various details were extracted and analyzed. Demographic information, including age, gender, ethnicity, and residence (urban or rural), was noted. The medical history of each patient was reviewed, particularly focusing on the presence of systemic diseases such as diabetes, hypertension, and any history of neurological disorders. Specific ophthalmic history, including prior eye surgeries, trauma, or infections, was also considered.

The severity of ptosis was assessed using several tests and measurements. These included the margin-reflex distance (MRD1), which measures the distance between the upper eyelid margin and the corneal light reflex, and the levator function test, which evaluates the movement of the upper eyelid. The degree of ptosis was classified as mild, moderate, or severe based on these measurements. The type of ptosis (congenital or acquired) was determined through clinical history and examination findings. The presence of associated nystagmus was documented, along with any other ocular abnormalities or comorbidities, such as strabismus, amblyopia, or eyelid malposition. The data pertaining to keratometric reading 1 (K1), keratometric reading 2 (K2), as well as axis of both eyes were analyzed to know the presence of severity of astigmatism in patients.

Post-operative assessments included repeat visual acuity measurements, intraocular pressure checks, and slit-lamp examinations to monitor the surgical site and detect any complications. Any changes in the severity of ptosis or associated symptoms, if available in an electronic record, were also noted.

Statistical analysis will be performed using SPSS version 22.0 Software. Quantitative data will be presented as mean and standard deviation. Qualitative data, such as the presence or absence of ptosis, the severity of cataracts, and other comorbidities, will be presented in incidence and percentage tables. For the analysis of quantitative data, an unpaired t-test will be applied. For qualitative data, the Chi-square test will be used to assess associations. $p<0.05$ will be considered statistically significant, indicating a meaningful relationship between the presence of ptosis and factors associated with cataract surgery.

Inclusion criteria

The following criteria were included in the study**:**

1. Patients coming for cataract surgery and found to have any degree of ptosis.
2. Age 18 years and above.
3. Complete electronic medical records available for review, including demographic information, medical history, and ophthalmic assessments.
4. Patients who underwent cataract surgery between July 2023 and December 2023.

Exclusion criteria

The following criteria were excluded from the study

1. Patients with incomplete or missing electronic medical records.
2. Individuals under the age of 18.
3. Patients who had undergone prior surgical correction for ptosis.
4. Patients with acute ocular infections or inflammations at the time of cataract surgery.

RESULTS

An electronic record of a total of 520 patients coming for cataract surgery during the study period was analyzed. Out of these 520 cases, 88 patients were sound to have some or the other degree of ptosis and were included in this study on the basis of inclusion and exclusion criteria. The overall prevalence of ptosis in patients coming for cataract surgery was thus 16.92% (Fig. 1).

The analysis of the gender distribution of the cases showed that out of 88 cases with ptosis, there were 55 (62.50%) males and 33 (37.50%) females. There was a significant male preponderance in the incidence of ptosis with a M: F ratio of 1:0.6. The analysis of age distribution among the cases showed that males were more prevalent across all age groups, accounting for 62.50% of the total cases, while females made up 37.50%. The age groups with the highest male cases were 61–70 years (22.73%) and 51–60 years (15.91%). The mean ages were 61.81 years for males and 59.67 years for females. The mean age of male and female patients was found to be comparable with no statistically significant difference ($p=0.3105$) (Table 1).

The analysis of unilateral versus bilateral ptosis among the studied cases showed that bilateral ptosis was significantly more common, with 79 cases (89.77%). In contrast, unilateral ptosis was observed in 9 cases (10.23%) (Table 2).

The data for MRD1 for all the patients were collected to assess the severity of ptosis. The analysis of the severity of ptosis (MRD1) among the studied cases revealed that mild ptosis (1–2 mm) was the most common, observed in 59 cases (67.05%). Moderate ptosis (3–4 mm) was seen in 21 cases (23.86%), while severe ptosis (more than 4 mm) was the least common, noted in 8 cases (9.09%). In cases of bilateral ptosis, severity of ptosis was determined by the eye in which the severity of ptosis was more as compared to the less severe ptosis in the other eye (Table 3).

The analysis of keratometric readings (K1 and K2) and the axis values for both eyes was conducted to assess the severity of astigmatism in patients. For mild ptosis, the mean K1 was 44.02 (±1.75), the mean axis K1 was 87.94 (±71.79), the mean K2 was 44.93 (±2.02), and the mean axis K2 was 84.96 (±28.76). For the moderate ptosis group, the mean K1 was 43.96 (±2.06), the mean axis K1 was 72.06 (±70.91), the mean K2 was 45.23 (±2.39), and the mean axis K2 was 94.64 (±26.13). For the severe ptosis group, the mean K1 was 42.87(±2.08), the mean axis K1 was 47 (±50), the mean K2 was 45.00 (±2.22), and the mean axis K2 was 137 (±21.22). The mean magnitude of astigmatism was 0.98 (±0.712) for mild ptosis, 1.39 (±0.953) for moderate ptosis, and 2.14(±0.74) for severe ptosis, respectively (Table 4).

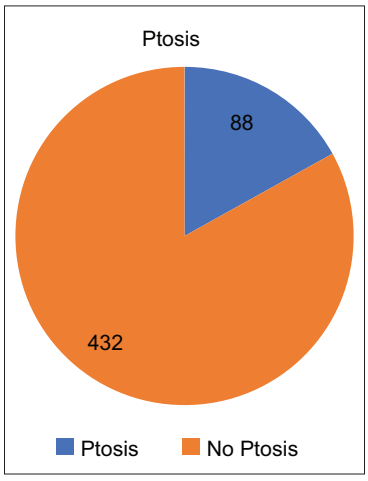

Fig. 1: Gender distribution in the studied cases

Table 1: Gender-wise mean age of the studied cases

Age group	Male, number of cases (%)	Female, number of cases (%)
18–30 years	0	0
31–40 years	0	0
41–50 years	8 (9.09)	6 (6.82)
51–60 years	14 (15.91)	12 (13.64)
61–70 years	20 (22.73)	10 (11.36)
Above 70 years	11 (14.77)	5 (5.68)
Total	55 (62.50)	33 (37.50)
Mean age	61.81±9.59	59.67±9.42

p=0.3105 (not significant)

Table 2: Unilateral versus bilateral ptosis in studied cases

Unilateral versus bilateral ptosis	Number of cases (%)
Bilateral	79 (89.7)
Unilateral	9 (10.23)
Total	88 (100.00)

Table 3: Severity of ptosis in studied cases

Severity of ptosis (MRD1)	Number of cases (%)
Mild ptosis	59 (67.05)
Moderate ptosis	21 (23.86)
Severe	8 (9.09)
Total	88 (100.00)

Table 4: Astigmatism in studied cases

Astigmatism	Mild ptosis	Moderate ptosis	Severe ptosis
Mean K1	44.02±1.75	43.96±2.06	42.87±2.08
Mean axis K1	87.94±71.79	72.06±70.91	47±50
Mean K2	44.93±2.02	45.23±2.39	45.00±2.22
Mean axis K2	84.96±28.76	94.64±26.13	137±21.22
Mean magnitude of astigmatism	0.98±0.712	1.39±0.953	2.14±0.74

DISCUSSION

Ptosis, if undiagnosed, can significantly impair the visual outcomes after cataract surgery by obstructing the visual axis. This obstruction may lead to a perceived failure of the cataract procedure despite a technically successful surgery [10]. Furthermore, undetected ptosis can complicate intraoperative conditions, affecting the precision in the placement of IOLs and overall surgical efficacy [11]. In addition, patients may develop compensatory mechanisms, such as chin-up posturing and brow elevation, which can cause discomfort and further impair visual function. Therefore, routine screening for ptosis in cataract surgery candidates is crucial to ensure comprehensive pre-operative planning and optimal post-operative outcomes [3].

The analysis of gender distribution of the cases showed that out of 88 cases with ptosis, there were 55 (62.50%) males and 33 (37.50%) females. There was a significant male preponderance in the incidence of ptosis with a M: F ratio of 1:0.6. The mean ages were 61.81±9.59 years for males and 59.67±9.42 years for females. Ali *et al*. conducted a retrospective study to determine the clinical characteristics of patients with ptosis [12]. For this purpose, the authors undertook a study comprising medical records of post-surgical ptosis patients. The study found that the majority of patients were male (56.1%) and over 40 years old (42.1%), with unilateral ptosis being more common (87.7%), particularly affecting the left eye (58%). Acquired ptosis was prevalent in 80.7% of cases, primarily neurogenic (33.3%). Most patients had no previous surgical history (71.9%) and exhibited moderate levator function (73.7%) and underwent frontal suspension surgery with synthetic materials (34%). The male preponderance in the prevalence of ptosis in this study was found to be similar to our study. However, other authors such as Hanif *et al*. (M: F ratio of 1:1.5) [13] and Taherian *et al*. (1:1.05) [14] reported ptosis to be more common in females. The male preponderance in our study may be due to the underutilization of ophthalmology services by female patients as compared to men.

The analysis of unilateral versus bilateral ptosis among the studied cases showed that bilateral ptosis was significantly more common, with 70 cases (79.5%). In contrast, unilateral ptosis was observed in 18 cases (20.5%). Pan *et al*. conducted a retrospective study to assess the effect of Hering's law on surgical outcomes of patients with asymmetrical ptosis [15]. For this purpose, the authors undertook a study comprising 300 patients with mild-to-moderate asymmetrical ptosis who underwent advancement or plication of upper eyelid aponeurosis. Fifty patients (group A) underwent surgery out of which there were 35 patients with unilateral ptosis (subgroup A1) and 15 patients with bilateral ptosis (subgroup A2). Similar other studies, such as done by Kupersmith *et al.,* reported unilateral ptosis to be consistently more common than bilateral ptosis [16].

The presence of ptosis in patients undergoing cataract surgery has significant implications for surgical planning, particularly in cases involving toric intraocular lens (IOL) implantation. Kuo IC has reported that ptosis can alter the corneal astigmatism measurements postoperatively, leading to suboptimal visual outcomes [17]. This case by Kuo IC highlights the necessity of evaluating and addressing eyelid position before cataract surgery, as ptosis can cause fluctuations in corneal shape and astigmatism. Studies reporting the management of cataract in patients having concurrent ptosis have emphasized the need for careful surgical strategy formulation to achieve better results. Therefore, incorporating ptosis evaluation into the pre-operative cataract surgery planning can enhance surgical accuracy and patient satisfaction [18].

CONCLUSION

Ptosis can significantly alter corneal astigmatism and affect the accuracy of pre-operative measurements, leading to suboptimal visual results post-surgery. By identifying and addressing ptosis before cataract surgery, surgeons can ensure more accurate lens selection and placement, ultimately improving patient satisfaction and visual acuity. This proactive approach is particularly crucial for patients opting for premium IOLs, where higher visual expectations necessitate precise surgical planning and execution. The prevalence of ptosis in this study was considerably high and significantly increased with age.

CONFLICTS OF INTEREST

None.

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