Section: Ophthalmology

Original Research Article

A RETROSPECTIVE ANALYSIS OF SYSTEMIC COMORBIDITIES IN PATIENTS WHO UNDERWENT CATARACT SURGERY IN A TERTIARY CARE HOSPITAL IN CHENNAI, TAMIL NADU

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Received : 10/06/2025
Received in revised form : 03/08/2025
Accepted : 22/08/2025

Keywords:
Cataract, systemic comorbidity, hypertension, diabetes mellitus, coronary heart disease, chronic kidney disease.

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DOI: 10.47009/jamp.2025.7.5.93

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2025; 7 (5); 472-476

ABSTRACT

Background: Cataract continues to be one of the leading causes of preventable blindness and visual impairment in people aged ≥ 50 years worldwide. As it is an age-related change, it is usually associated with other systemic conditions. The aim is to assess the presence of systemic comorbidities, such as diabetes mellitus, systemic hypertension, chronic kidney disease, coronary heart disease, dyslipidemia, bronchial asthma, and thyroid disorders, among patients who had undergone cataract surgery in a tertiary care hospital. **Materials and Methods:** This retrospective cross-sectional study analyzed the digital case records of patients who underwent cataract surgery between January 2024 and May 2025 at our institution. A total of 1,125 patient records were reviewed to assess age, sex distribution, and prevalence of various systemic comorbidities. **Result:** Out of 1125 patients who underwent cataract surgery, 578 (51.38%) were females and 547 (48.62%) were males. The most common age group was 61-70 years, comprising 586 patients (52.08%). Among the total cohort, 956 patients (84.98%) had systemic comorbidities. The most prevalent comorbidity was hypertension, which was observed in 672 patients (59.73%), followed by diabetes mellitus in 601 patients (53.42%). Other comorbid conditions observed were coronary heart disease in 216 (19.2%), dyslipidemia in 106 (9.42%), hypothyroidism in 50 (4.44%), chronic kidney disease in 44 (3.91%), respiratory diseases in 59 (5.24%), and cerebrovascular accident (CVA) in 13 patients (1.15%). Infectious disease screening revealed seropositivity for TPHA (1.16%), HBsAg (0.53%), anti-HCV (0.44%), and anti-HIV (0.26%). Multiple comorbidities were observed in 69 patients (6.13%). **Conclusion:** The high prevalence of systemic comorbidities among patients undergoing cataract surgery highlights the importance of thorough preoperative evaluation and management. Optimal control of these conditions is essential to minimize the risk of intraoperative and postoperative complications and improve visual outcomes.

INTRODUCTION

Cataract remains the foremost cause of adult blindness, affecting over 15 million people and contributing to nearly 45% of cases globally.[1] According to the national blindness and visual impairment (NPCB and VI) survey 2015–2019, cataract contributes to 66.2% of blindness and 71.2% of visual impairment in the population above 50 years in India.[2] Cataract progression is influenced by multiple factors, including race, genetic predisposition, high altitude, malnutrition, diabetes, prolonged corticosteroid use, and extended exposure to sunlight.[3,4] However, age remains the most

significant risk factor. Systemic diseases and medications, as well as other ocular conditions and previous ocular or extraocular surgeries, are commonly associated with cataracts in the elderly population. Therefore, a comprehensive treatment plan, including preoperative evaluation, perioperative management, and postoperative rehabilitation, is essential to ensure optimal surgical outcomes and visual recovery.

Comorbid conditions have been shown to significantly influence the success of cataract surgery.[5] For example, patients with poorly controlled arterial hypertension and those on anticoagulant therapy are at a higher risk of developing complications such as suprachoroidal hemorrhage.[6] Systemic α_1-adrenergic antagonists, such as tamsulosin, commonly prescribed for symptomatic benign prostatic hyperplasia, have been associated with an increased risk of intraoperative complications during cataract surgery.[7] This is primarily due to a condition known as intraoperative floppy iris syndrome (IFIS). Therefore, some ophthalmologists recommend temporarily discontinuing the medication before surgery to minimize associated risks. Cataract surgery in diabetic patients has been associated with decreased subfoveal choroidal thickness, likely due to choroidal metabolic suppression, which may adversely affect postoperative visual outcomes.[8] Additionally, retinopathies in patients with uncontrolled diabetes may worsen following cataract surgery.[9] Also, diabetic patients have an increased risk of developing postoperative cystoid macular edema (CME), endophthalmitis, and posterior capsular opacification.[10]

India has a high prevalence of age-related cataract that requires surgical intervention and a rapidly increasing prevalence of Non-Communicable Diseases (NCDs) like diabetes mellitus (DM), hypertension (HTN), dyslipidemia (DLP), cardiac diseases, bronchial asthma, seizure disorder, chronic kidney disease (CKD), cerebrovascular accident (CVA) and thyroid disorders.[11] The present study highlights the significant burden of systemic comorbidities among patients undergoing cataract surgery and underscores the need for comprehensive health screening as part of the preoperative evaluation. These findings support the importance of a holistic approach to patient care, which may improve surgical outcomes and overall health.

MATERIALS AND METHODS

About 1125 patients who underwent cataract surgery in the Department of Ophthalmology at Southern Railway Headquarters Hospital, Ayanavaram, Chennai, Tamil Nadu, between January 2024 and May 2025 were included in the study, and digital case records were collected and analyzed retrospectively. Patients with incomplete case records and those with traumatic or congenital cataracts were excluded from the study.

Preoperatively, a detailed history was taken, and a comprehensive systemic and ocular examination was performed for all patients, which included a general examination, pulse and blood pressure measurement, CVS and RS examination, visual acuity examination using Snellen's chart, intraocular pressure measurement using a Goldmann applanation tonometer, slit lamp examination, fundus examination using a 90D non-contact lens, and USG B scan in cases where fundus examination was not possible because of hazy media.

Prior to surgery, all patients underwent blood investigations, which included a complete blood count and routine biochemical parameters such as fasting and postprandial glucose, blood urea, creatinine, and lipid profile. Coagulation profiles, including prothrombin time (PT), activated partial thromboplastin time (aPTT), and serological tests for anti-HIV, anti-HCV, HBsAg, and TPHA, were also conducted. An ECG was performed in all patients to assess cardiac status, and a 2D echocardiogram was performed in patients with ECG abnormalities. If systemic diseases were present, patients were referred to the concerned departments, such as internal medicine, cardiology, and pulmonology, for evaluation and were optimized preoperatively based on their recommendations.

All the above preoperative details were collected from the records maintained digitally and entered into a Microsoft Excel sheet. The prevalence of age and sex wise distribution of the study population were calculated from the above data using Statistical Package for Social Sciences (SPSS) software version 20.0. The mean and standard deviation of the continuous variable (age) and the number or percentage of categorical variables were calculated. This study complied with Declaration of Helsinki and was approved by the Institutional Ethics Committee.

RESULTS

Out of 1125 cataract-operated patients, 578 (51.38%) were females and 547 (48.62%) were males, as shown in Table 1. The female to male ratio was 1.05:1. The most common age group associated with cataract was 61-70 years (n=586, 52.09%), as shown in Table 2, and the mean age of the study population was 63.81 ± 7.973 years; the minimum and maximum ages were 20 and 93 years, respectively.

In our study, hypertension was the most prevalent systemic comorbidity among cataract-operated patients, affecting 672 individuals (59.73%), followed by diabetes mellitus in 601 (53.01%), coronary artery disease in 216 (19.20%), and dyslipidemia in 106 (9.42%), as detailed in Table 3. Other systemic comorbid conditions observed in this study were respiratory diseases such as bronchial asthma and COPD in 59 patients (5.24%), hypothyroidism in 50 (4.40%), and chronic kidney

ISSN (O): 2687-5365; ISSN (P): 2753-6556

disease in 44 (3.91%). Less frequently observed conditions were malignancies in 14 patients (1.24%), cerebrovascular accidents in 13 patients (1.15%), rheumatoid arthritis in 10 patients (0.89%), old pulmonary tuberculosis in 9 patients (0.80%), seizure disorders in 6 patients (0.53%), and anemia in 5 patients (0.44%).

Other less frequently observed systemic illnesses were atrial fibrillation, cirrhosis, rheumatic heart disease, and psychiatric disorders, each seen in three patients (0.26%). The least prevalent conditions in our study were dilated cardiomyopathy, heart block, paroxysmal supraventricular tachycardia (PSVT), sarcoidosis, and benign paroxysmal positional vertigo (BPPV), each reported in two cases (0.17%). In our study, Wolff–Parkinson–White (WPW) syndrome, thrombocytopenia, sickle cell trait, and factor VII deficiency were infrequently encountered, with each condition observed in only one patient (0.09%). Serological screening for infectious diseases showed positivity for TPHA in 13 (1.16%), HBsAg in 6 (0.53%), anti-HCV in 5 (0.44%), and anti-HIV in 3 patients (0.26%), as shown in Table 4.

In this study, 171 patients (15.20%) had no systemic comorbidities, as shown in Table 3. A single comorbid condition was observed in 262 patients (23.28%), with the most common being hypertension in 116 patients (10.31%), followed by diabetes mellitus in 91 patients (8.08%). Two comorbid conditions were present in 437 patients (38.85%), with the most frequent combination being hypertension and diabetes mellitus in 235 patients (20.88%). Three comorbid conditions were noted in 186 patients (16.53%), most commonly the combination of hypertension, diabetes mellitus, and coronary artery disease, which was observed in 96 patients (8.53%). More than three comorbidities were identified in 69 patients (6.13%), with the most common combination being hypertension, diabetes mellitus, coronary artery disease, and dyslipidemia, which was found in 22 patients (1.95%).

Table 1: Sex distribution of patients (n=1125)

Sex	No. of Patients	Percentage
Females	578	51.38%
Males	547	48.62%
Total	1125	100%

Table 2: Age distribution of patients (n=1125)

Age group	Number (n)	Percentage (%)
Less than 40 years	8	0.71
41-50 years	51	4.5
51-60 years	289	25.68
61-70 years	586	52.09
71-80 years	174	15.47
81-90 years	14	1.24
> 90 years	3	0.26

Table 3: Associated systemic co-morbidity in cataract cases

Systemic comorbidity	No of patients	Percentage (%)
Hypertension	672	59.73
Diabetes mellitus	601	53.42
Coronary heart disease	216	19.2
Dyslipidaemia	106	9.42
Respiratory diseases	59	5.24
Hypothyroidism	50	4.4
Chronic kidney disease	44	3.91
Malignancies	14	1.24
Cerebrovascular accident	13	1.15
TPHA+	13	1.15
Cardiac disorders*	13	1.15
Rheumatoid arthritis	10	0.8
Old pulmonary TB	9	0.8
Benign prostatic hypertrophy	8	0.71
Haematological disorders#	8	0.71
Seizure disorder	6	0.53
HBsAg+	6	0.53
HCV+	5	0.4
HIV+	3	0.26
Psychiatric illness	3	0.26
Others~	7	0.62

*Atrial fibrillation (n=3), RHD (n=3), DCM (n=2), PSVT (n=2), heart block (n=2), WPW syndrome (n=1)

Anaemia (n=5), Thrombocytopenia (n=1), Sickle cell trait (n=1), Factor 7 deficiency (n=1)

~ Cirrhosis liver (n=3), BPPV (n=2), sarcoidosis(n=2)

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Table 4: Cataract cases having more than one systemic comorbidity

No. of Comorbidity	No. of patients (n)	Percentage (%)
None	171	15.20
Single	262	23.28
Two	437	38.85
Three	186	16.53
> Three	69	6.13

Table 5: Comparison of prevalence of systemic comorbidities in patients who underwent cataract surgery

Systemic illness	Our study (n = 1125)	Sathyan et al (n = 1351)	Ersekerci et al (n = 1197)	Mishrikotkar et al (n=147)	Prashanth et al (n =2444)
Hypertension	59.73%	62.18%	46.9%	53.74%	44.2%
Diabetes mellitus	53.42%	60.18%	32.6%	31.97%	20.4%
CAD	19.2%	7.7%	14.6%	5.44%	5.3%
Respiratory diseases	5.24%	2.27%	10.4%	13.61%	0.20%
CKD	3.91%	0.03%	1.3%	0.68%	4.8%
Thyroid disorders	4.4%	1.29%	1.8%	1.36%	0.12%
Psychiatric illness	0.26%	-	1.2%	1.36%	-
HIV+	0.26%	0.07%	-	1.36%	-
HbsAg+	0.53%	-	3.2%	2.72%	-
HCV+	0.4%	-	0.1%	-	-
TPHA +	1.15%	-	-	-	-

DISCUSSION

The aging population is steadily increasing globally owing to the rise in the average life expectancy of people. India has a high prevalence of age-related cataract that need surgical intervention, along with rapidly rising systemic comorbidities.[12] Our study showed that there is a substantial burden of systemic comorbidities among cataract-operated patients, with 84.80% of patients presenting with at least one comorbid illness. This is in accordance with the study done by Riley, Andrew F. et al,[13] The Auckland cataract study, where systemic illness affected about 80% of the subjects presented for cataract surgery. The mean age in our study was 63.81 ± 7.97 years, with a slight female preponderance (51.38%); this is similar to the observation made by Raina, B., & Sharma P,[14] in their study, where mean age of the patient was 62.4 years and a female preponderance of 58.53%. Arthur, D. K., and Kalaiselri, G,[15] in their study, documented a mean age of 64.6 ± 7.2 years.

The prevalence of systemic comorbidities observed in our study, compared with previous studies, is summarized in [Table 5]. In our study the most common comorbidity observed was hypertension, seen in 59.73%, comparable to previous studies, including Sathyan et al,[5] (62.18%), Mishrikotkar et al,[16] (53.74%), Ersekerci et al,[17] (46.9%), and Prashanth et al,[11] (44.2%). In our study, the next most common systemic comorbidity observed was diabetes mellitus, present in 53.42% of cases. This finding is consistent with previous reports, including Sathyan et al,[5] (60.18%), Ersekerci et al,[17] (32.6%), and Mishrikotkar et al (31.97%).[16] However, a lower prevalence was noted in the study by Prashanth et al,[11] where diabetes mellitus was seen in only 20.4% of cases.

In our study, coronary artery disease (CAD) was observed in 19.2% of patients. This finding is comparable to the results of Ersekerci et al,[17] where CAD was seen in 14.6%, but was notably higher than the prevalence reported by Prashanth et al (5.3%).[11] Respiratory diseases were documented in 5.24% of cases in our study, a prevalence similar to Sathyan et al,[5] (2.27%) and Ersekerci et al,[17] (10.4%). However, a higher prevalence was noted in the study by Mishrikotkar et al,[16] (13.61%), while Prashanth et al,[11] reported a much lower rate (0.20%). Thyroid disorders were observed in 4.4% of our patients and psychiatric illnesses in 0.26%, which is consistent with the prevalence reported in other comparative studies, as summarized in [Table 5].

In our study, the prevalence of seropositive cases was as follows: HIV in 0.26%, HBsAg in 0.53%, HCV in 0.40%, and TPHA in 1.15% of patients, as tabulated in [Table 5]. These findings were compared with previous studies, Mishrikotkar et al,[16] reported a higher prevalence of HIV at 1.36% and HBsAg at 2.72%. In contrast, Sathyan et al,[5] observed a much lower HIV prevalence of 0.07%. Ersekerci et al,[17] documented HBsAg and HCV prevalence rates of 3.2% and 0.1%, respectively. TPHA results could not be directly compared, as the corresponding data were not reported in the referenced studies. The prevalence rate of TPHA positivity in our study was 1.15%, signifying that the test must be performed routinely, resulting in the early detection of asymptomatic syphilis. This aids in the timely medical management of latent syphilis and plays a critical role in limiting silent transmission within the community.

In our study, 23.28% of patients had a single systemic comorbidity, with hypertension being the most frequently observed. Two comorbid conditions, most commonly hypertension and diabetes mellitus, were observed in 38.85% of the cases. Three comorbidities, predominantly a combination of hypertension, diabetes mellitus, and coronary artery disease, were present in 16.53% of patients, while more than three comorbidities were identified in 6.13% of patients. These findings show a relatively higher burden of multimorbidity compared to the study by Mishrikotkar et al,[16] where 68% of patients

ISSN (O): 2687-5365; ISSN (P): 2753-6556

had a single comorbidity, 21.21% had two, and only 4.76% had three comorbidities.

One of the major drawbacks of our study was that it did not assess the impact of systemic comorbidities on postoperative visual or surgical outcomes. Since this was a retrospective single-center study, there may be inherent selection biases and limitations in data completeness. Future prospective studies incorporating postoperative assessments are essential to better understand the clinical implications of systemic diseases on cataract surgery outcomes.

CONCLUSION

Our study identified a significant burden of systemic comorbidities among patients undergoing cataract surgery, with hypertension and diabetes mellitus being the most prevalent comorbidities. The presence of multiple systemic comorbidities emphasizes the need for comprehensive preoperative evaluation and multidisciplinary coordination. It is crucial to include serological testing in cataract surgery workups to prevent disease transmission and ensure patient, surgeon, and paramedic safety. Early identification and optimal management of these comorbidities are crucial for minimizing perioperative risks and enhancing postoperative visual and systemic outcomes.

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ISSN (O): 2687-5365; ISSN (P): 2753-6556