Section: Ophthalmology

Original Research Article

IMPACT OF CATARACT SURGERY ON VISUAL ACUITY AND QUALITY OF LIFE IN ELDERLY PATIENTS WITH CONCURRENT AGE-RELATED MACULAR DEGENERATION: A PROSPECTIVE OBSERVATIONAL STUDY

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ABSTRACT

Background: Age-related macular degeneration (AMD) and cataract frequently coexist in the elderly, contributing to significant visual disability. While cataract surgery is known to improve visual acuity, its impact on quality of life (QoL) in patients with concurrent AMD remains an area of clinical interest. **Objective:** To evaluate the effect of cataract surgery on visual outcomes and quality of life in elderly patients diagnosed with AMD.

Materials and Methods: This prospective observational study included 100 patients aged ≥60 years with clinically significant cataract and concurrent AMD. All patients underwent standard Small Incision Cataract Surgery (SICS) with intraocular lens implantation. Best corrected visual acuity (BCVA) and vision-related quality of life were assessed preoperatively and at 3 months postoperatively using the NEI VFQ-25 questionnaire. Subgroup analysis was performed for dry and wet AMD cohorts.

Results: The mean age of participants was 71.6 ± 6.4 years, with 58% males. Dry AMD was present in 76% and wet AMD in 24% of patients. Postoperative BCVA showed significant improvement (0.86 ± 0.21 vs. 0.49 ± 0.19 logMAR; $p < 0.001$). NEI VFQ-25 composite score increased from 41.2 ± 6.4 to 64.7 ± 8.9 ($p < 0.001$), with marked gains across all domains. Patients with dry AMD had greater QoL improvement than those with wet AMD (66.4 vs. 58.2; $p = 0.02$).

Conclusion: Cataract surgery significantly enhances visual function and quality of life in elderly patients with AMD, particularly in those with dry AMD. It should be considered a valuable intervention despite underlying macular pathology.

Keywords: Cataract surgery, macular degeneration, quality of life, elderly, NEI VFQ-25, visual acuity.

INTRODUCTION

Age-related visual impairment is a significant public health concern, especially in the elderly, where it leads to functional disability, loss of independence, and reduced quality of life. Two major contributors to this burden are cataract a reversible cause of vision loss and age-related macular degeneration (AMD), which is a progressive and often irreversible condition affecting central vision.[1,2] Cataract, characterized by progressive opacification of the crystalline lens, is effectively treated with Small Incision Cataract surgery (SICS), which generally results in improved visual acuity and functional outcomes.[3] AMD, particularly in its advanced stages, can compromise the macula, leading to central vision loss that limits activities such as reading and recognizing faces. When both

conditions coexist, as is often the case in elderly patients, visual prognosis becomes more complex.[4]
The benefits of cataract surgery in the presence of AMD have been debated due to concerns about limited postoperative improvement and potential acceleration of macular pathology. However, several studies have demonstrated that even modest gains in visual acuity can lead to significant improvements in vision-related quality of life (QoL), mobility, and psychological well-being.[1,2,5] The Age-Related Eye Disease Study (AREDS) and its follow-ups further confirmed that patients with AMD can derive substantial visual and functional benefits from cataract extraction.[2,6]
The National Eye Institute Visual Function Questionnaire-25 (NEI VFQ-25) is a validated tool that assesses vision-related QoL, making it ideal for evaluating surgical outcomes in patients with macular disease.[1,3] While such data are available in Western populations, there is a paucity of Indian evidence assessing the impact of cataract surgery on QoL in patients with AMD, particularly when stratified by AMD subtype and severity.
This study aims to evaluate the impact of cataract surgery on visual outcomes and quality of life in elderly patients with concurrent AMD and to compare outcomes between those with dry and wet forms of the disease.

MATERIALS AND METHODS

Study Design and Duration
This was a prospective observational study conducted over a period of 10 months, from July 2024 to April 2025, at the Government Medical College and General Hospital, Siddipet, Telangana, a tertiary care institution catering to the healthcare needs of the elderly population in the region.
Study Population
The study included elderly patients aged 60 years and above diagnosed with visually significant cataract along with coexisting age-related macular degeneration (AMD). Only patients who were scheduled for cataract surgery and consented to participate were enrolled in the study.
Inclusion Criteria
- Age ≥ 60 years
- Clinically significant cataract in at least one eye
- Presence of AMD (either dry or wet type) confirmed by fundus examination and/or OCT
- Ability to provide informed consent and participate in follow-up assessments

Exclusion Criteria
- Presence of other ocular pathologies affecting visual prognosis (e.g., diabetic retinopathy, glaucoma)
- History of prior intraocular surgery in the study eye
- Active ocular infection or inflammation

Cognitive impairment or language barrier preventing completion of the NEI VFQ-25 questionnaire, Dense Cataract
Surgical Procedure
All patients underwent Small Incision Cataract Surgery (SICS) with posterior chamber intraocular lens implantation under local anesthesia. Standard preoperative and postoperative care protocols were followed.
Outcome Measures
Visual acuity was assessed using the logMAR chart, and quality of life was measured using the National Eye Institute Visual Function Questionnaire-25 (NEI VFQ-25) before surgery and at 3 months postoperatively. The questionnaire was administered in the local language by a trained interviewer.
Primary Outcomes
Change in best corrected visual acuity (BCVA)
Change in NEI VFQ-25 composite and domain scores
Secondary Outcome
Comparison of postoperative QoL improvement between patients with dry AMD and wet AMD
Statistical Analysis
Data analysis was performed using SPSS version 25.0. Continuous variables were expressed as means ± standard deviations, and categorical variables as frequencies and percentages. Paired t-tests were used to evaluate pre- and postoperative changes, and independent t-tests for subgroup comparisons. A p-value < 0.05 was considered statistically significant.
Ethical Considerations
The study received approval from the Institutional Ethics Committee of Government Medical College and General Hospital, Siddipet. All participants provided written informed consent prior to enrollment.

RESULTS

A total of 100 elderly patients with visually significant cataract and concurrent age-related macular degeneration (AMD) were enrolled in the study. The mean age of the participants was 71.6 ± 6.4 years. There was a male predominance (58%), and unilateral cataract surgery was more common (62%) than bilateral procedures (38%). The majority of patients had dry AMD (76%), while the remaining 24% had wet AMD (Table 1).

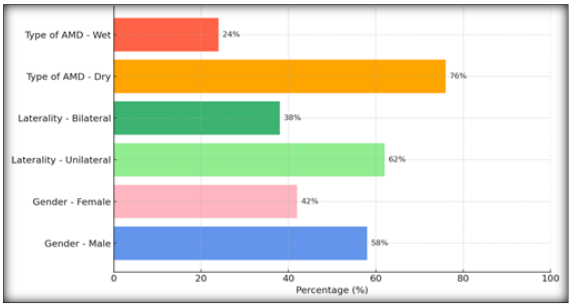

Figure 1: Demographic and Clinical Profile of Study Participants

Postoperative improvement in visual acuity was significant. The mean best corrected visual acuity (BCVA) improved from 0.86 ± 0.21 logMAR preoperatively to 0.49 ± 0.19 logMAR at 3 months postoperatively ($p < 0.001$), indicating substantial visual rehabilitation after cataract extraction (Table 2).

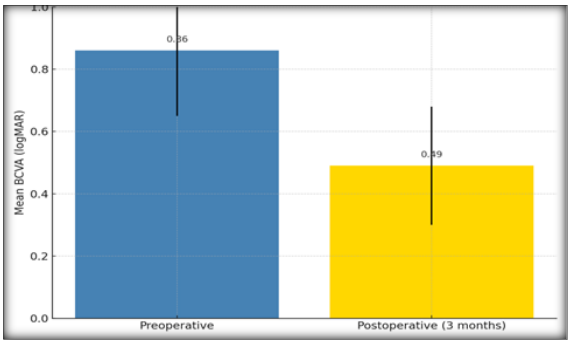

Figure 2: Comparison of Visual Acuity (BCVA) Pre and Post Cataract Surgery

Quality of life was assessed using the NEI VFQ-25 questionnaire before and three months after surgery. All domains of vision-related functioning showed statistically significant improvements. The mean composite VFQ-25 score increased from 41.2 ± 6.4 preoperatively to 64.7 ± 8.9 postoperatively ($p < 0.001$). Notable improvements were observed in general vision, near and distance activities, social functioning, and role difficulties (Table 3).

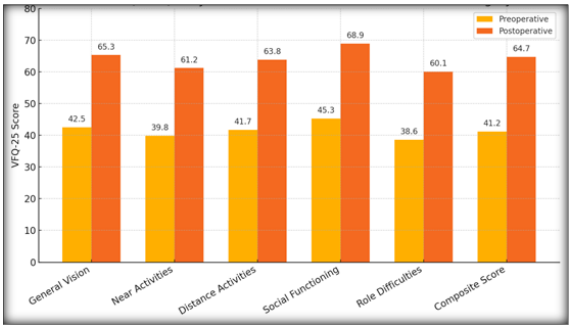

Figure 3: Quality of Life Scores (NEI VFQ-25) Before and After Cataract Surgery

Subgroup analysis revealed that patients with dry AMD experienced greater postoperative improvement in composite VFQ-25 scores (mean score: 66.4) compared to those with wet AMD (mean score: 58.2), and this difference was statistically significant ($p = 0.02$) (Table 4).

No major intraoperative complications were observed. Six patients (6%) developed posterior capsular opacification during follow-up, which was managed with YAG capsulotomy. No cases of worsening macular edema or new onset neovascularization were reported postoperatively.

Table 1: Demographic and Clinical Profile of Study Participants (n = 100)

Parameter	Value
Mean Age (years)	71.6 ± 6.4
Gender - Male	58%
Gender - Female	42%
Laterality - Unilateral	62%
Laterality - Bilateral	38%
Type of AMD - Dry	76%
Type of AMD - Wet	24%

Table 2: Comparison of Visual Acuity (BCVA) Pre and Post Cataract Surgery

Time Point	Mean BCVA (logMAR)	Standard Deviation	p-value
Preoperative	0.86	± 0.21	-
Postoperative (3 months)	0.49	± 0.19	<0.001

Table 3: Quality of Life Scores (NEI VFQ-25) Before and After Surgery

Domain	Preoperative Score (Mean ± SD)	Postoperative Score (Mean ± SD)	p-value
General Vision	42.5 ± 7.6	65.3 ± 9.4	<0.001
Near Activities	39.8 ± 8.2	61.2 ± 10.1	<0.001
Distance Activities	41.7 ± 6.9	63.8 ± 8.7	<0.001
Social Functioning	45.3 ± 7.1	68.9 ± 9.2	<0.001
Role Difficulties	38.6 ± 8.5	60.1 ± 10.5	<0.001
Composite Score	41.2 ± 6.4	64.7 ± 8.9	<0.001

Table 4: Subgroup Analysis – Postoperative Composite VFQ-25 Scores

Group	Mean Composite VFQ Score	p-value
Dry AMD	66.4	0.02
Wet AMD	58.2	-

DISCUSSION

This prospective observational study evaluated the impact of cataract surgery on visual acuity and quality of life in elderly patients with concurrent age-related macular degeneration (AMD). The findings confirmed that cataract surgery significantly improved both objective visual outcomes and subjective vision-related quality of

life, despite the presence of underlying macular pathology.

The mean best corrected visual acuity (BCVA) improved from 0.86 to 0.49 logMAR postoperatively ($p < 0.001$), indicating a clinically meaningful enhancement in functional vision. These results align with existing literature demonstrating visual benefits following cataract extraction even in patients with coexisting retinal disease.[9,11] In our cohort, such improvement was further supported by substantial gains in vision-related quality of life, as reflected in the NEI VFQ-25 scores. The composite score increased significantly from 41.2 to 64.7 ($p < 0.001$), with notable improvements across domains such as general vision, near activities, and social functioning.

Importantly, patients with dry AMD experienced greater improvements in quality of life compared to those with wet AMD (66.4 vs. 58.2; $p = 0.02$), which aligns with reports suggesting that visual prognosis post-cataract surgery is generally better in the absence of neovascular AMD.[10,12] Nevertheless, even patients with wet AMD demonstrated meaningful functional improvements, supporting the recommendation that cataract surgery should not be routinely deferred in these cases.

Beyond visual parameters, emerging evidence also underscores the broader health benefits of cataract surgery, including improvements in mental health, mobility, and reduced risk of cognitive decline.[7,10,12] This highlights the interconnectedness of vision and overall geriatric health, suggesting that timely surgical intervention may play a protective role in maintaining independence and quality of life in aging populations.

The low rate of postoperative complications in our study (6% posterior capsular opacification) and absence of AMD progression following surgery support the safety of the procedure, which is consistent with earlier observations.[8] Furthermore, attention to preoperative counseling and perioperative care has been shown to enhance patient satisfaction and outcomes, especially when delivered through high-quality nursing interventions and multidisciplinary collaboration.[11,12]

Limitations

The study was conducted at a single center with a follow-up duration limited to three months. Long-term outcomes, including stability of vision and progression of AMD, were not assessed. Further, optical coherence tomography (OCT) grading was not uniformly stratified, which may have impacted the granularity of subgroup analysis.

CONCLUSION

This study demonstrates that cataract surgery significantly improves both visual acuity and vision-related quality of life in elderly patients with concurrent age-related macular degeneration. Despite underlying macular pathology, patients experienced meaningful postoperative benefits, particularly in domains such as general vision, near activities, and social functioning. Those with dry AMD showed greater improvement compared to those with wet AMD. These findings suggest that cataract surgery should not be withheld solely due to the presence of AMD. Careful preoperative assessment and patient counseling remain essential. Overall, cataract extraction remains a valuable intervention to enhance functional vision and daily living in this high-risk elderly population.

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