

Visual Outcome in Grade IV Nuclear Cataract After Small Incision Cataract Surgery in Patients Attending Tertiary Care Centre

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Abstract

Aim: To evaluate the visual outcome in grade IV nuclear cataract after small incision cataract surgery.

Materials and Methods: A prospective study of 100 patients with grade IV nuclear cataract (grade IV) were reviewed. All patients underwent small incision cataract surgery with effective technique of minimal hydrodissection and copious viscoelastic usage. The surgical techniques used, intraoperative complications, preoperative and postoperative visual acuity and the causes of impaired visual acuity after surgery were examined.

Results: Among 100 patients, majority of the patients were from 61-70 years age group (i.e., 52%), mean age of the study population was 65.42 +/- 8.56 years, males were predominant in our study with male to female ratio as 1.71:1. Intraoperative complications included iris injury (2%), posterior capsular rent (3%), aphakia (3%), post operative complications included epithelial edema (5%), stromal edema (6%), anterior chamber reaction (5%), iritis (5%). Snellen's visual acuity on day 1 was > 6/18 in 85% cases, and after one week was > 6/18 in 90% cases. BCVA after 6 weeks was >6/18 in 98% cases.

Conclusion: Visual outcome in patients with grade IV nuclear cataract is good when surgery done after proper pre-op assessment, with thorough planning. Experienced surgeons with proper knowledge of the technique during the surgery.

Keywords: BCVA; Grade IV nuclear cataract; Intraoperative complications; SICS; Visual outcome.

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INTRODUCTION

Cataract is a significant and increasing global problem with vast economic and social implications.¹ It is the principal cause of blindness in India accounting for 62.6%.^{2,3} Grade IV nuclear cataract represents an exaggerated densification of the crystalline fibers transforming the entire lens into nucleus. The lens nucleus has become so hardened, sclerotic and blackened that it has gone

beyond what is known as brunescence. Brunescence is a discolouration of the nucleus that occurs as the nucleus becomes sclerotic. Brunescence begins as a yellowing and progresses to orange and brown. With the progressive discolouration and opacification, the vision gradually diminishes over time. Grade IV nuclear cataract causes legal blindness meaning the vision is expected to be Hand Motion or Light Perception and not much better. This presents serious and anticipated risks for planning surgery. With a diagnosis of Grade IV nuclear cataract, the preferred surgical procedure may be a planned Extracapsular Cataract Extraction.⁴

MATERIALS AND METHODS

Study setting: Tertiary Care Centre

Study population: The patients with Grade IV attending tertiary care centre.

Study period: December 2019 to June 2021 (18 months)

Study design: Descriptive study

Sample size: 100

Inclusion criteria:

1. All grade IV nuclear cataracts, including the grade IV nuclear cataract with systemic diseases with age >50 years

Exclusion criteria:

- Grade I to III cataract
- Age less than 50 years
- Complicated cataract
- Traumatic cataract
- Cataract associated with increased intra ocular pressure

History: Detailed history including that of diabetes mellitus, hypertension, cardiovascular disease & drug intake was taken.

Clinical examination:

- Pre-operative ocular examination including systemic examination.

- Measurement of uncorrected visual acuity and best corrected visual acuity.
- Intra-ocular pressure by Applanation tonometer.
- Keratometry and A-Scan biometry.
- Grading cataract using lens opacity classification system 3.
- Detailed fundus examination with Slit-lamp biomicroscopy using + 90D and indirect ophthalmoscopy using + 20D lens.
- Anaesthesia - peribulbar block was given for all operating cases.
- Intraoperative - under aseptic precautions all patients were operated by standard small incision (6 to 6.5 mm) cataract surgery, with effective technique of minimal hydrodissection and copious viscoelastic usage by well experienced and skilled surgeon.
- Visual outcome evaluation was done in all the study subject.
- Post-Operative Evaluations Done on post-operative day 1, post-operative day 7 and after 6 weeks postoperative.
- Visual acuity testing for distance vision and near vision using Snellen's distant chart and Jaeger's chart respectively.
- Refraction and correction.
- Slit lamp bio-microscopic examination for details of: a) Cornea. b) Placement of IOL. c) Posterior capsule evaluation. d) Fundus examination using 90 D lens.

RESULTS

Majority of the patients in our study were from 61-70 years age group i.e. 52%, followed by 31% from 50-60 years and 17% from above 70 years. Mean age of the study population was 65.42±8.56 years.

Table 1: Distribution according to age group

		Frequency	Percent(%)
Age group in years	50-60	31	31
	61-70	52	52
	> 70	17	17
	Total	100	100

Table 2: Distribution according to gender

		Frequency	Percent(%)
Gender	Male	54	54
	Female	46	46
	Total	100	100

Males were 54% and females were 46%. Males were predominant in our study with male to female ratio as 1.17:1.

Table 3: Distribution according to laterality of eye

		Frequency	Percentage (%)
Eye	Right	45	45
	Left	55	55
	Total	100	100

Right eye was affected in 45% cases and left eye in 55% cases in our study.

Table 4: Distribution according to preoperative visual acuity

Pre op vision	Frequency	Percentage(%)
PL + ve - CF 2mts	88	88
CF 3mts - 6/60	12	12
<6/60	0	0
Total	100	100

88% patients had pre op vision as PL +ve - CF 2mts followed by 12% had CF 3mts - 6/60

Post operative vision on day 1 revealed that 85% patients had VA >6/18 followed by 10% had <6/18 - 6/60 and 5% had <6/60.

Table 5: Post operative vision on day 1 and day 7

Visual acuity	Post op day 1	Post op day 7
>6/18	85	90
<6/18 - 6/60	10	6
<6/60	5	4
Total	100	100

Post operative vision after one week revealed that 90% patients had VA >6/18 followed by 6% had <6/18 - 6/60 and 4% had <6/60.

BCVA after 6 week revealed that 98% patients had VA >6/18 followed by 1% had <6/18 - 6/60 and 1% had <6/60

Table 6: BCVA after 6 weeks

Visual acuity	Frequency	Percentage
>6/18	98	98

<6/18 - 6/60	1	1
<6/60	1	1
Total	100	100

DISCUSSION

Table 7: Intraoperative complications

Intra-operative complications	Frequency	Percentage (%)
Iris injury	2	2
Posterior capsular rent	3	3
Aphakia	3	3

Table 8: Post-operative complications

Post-operative complications	Frequency	Percentage (%)
Corneal edema	11	11
Iritis	10	10

Age and Sex Distribution in patients with Grade IV nuclear cataract

A study conducted by Venkatesh R. et al¹⁰ showed the mean age of the patients was 66.2 years, there were 41 male and 61 female patients, Our findings were comparable with this study. A study conducted by Abhinav Ashok Agrawal et al⁸ showed that the age range of patients was between 40 - 80 years, there were 64 males and 56 females, Our findings were comparable with this study.

Intraoperative complications

Iridodialysis

Patil et al,¹¹ reported that two eyes had superior iridodialysis during delivery of the nucleus. In our study 2 cases had iris injury in the form of sphincter damage, however no cases of iridodialysis were observed in our study.

Intraoperative hyphaema

Patil et al,¹¹ reported that 8% had Intraoperative hyphaema. In our study no such cases were found.

Posterior capsular rent

A study conducted by Venkatesh R. et al¹⁰, showed the main intraoperative complication was

posterior capsule rupture in two patients (2.0%), Our findings were comparable with this study. In our study there were 3 % cases of PCR and aphakic state of the patient was 3% which was comparatively lesser when compared to above studies.

Postoperative complications

Corneal edema

Addagarla SR et al⁷ conducted a study, 8% cases had corneal edema, which was high as compared to our study findings.

Striate keratopathy (SK)

Addagarla SR et al⁷ reported there was striate keratopathy (SK) in 12 cases.

In our study there was corneal epithelial edema seen in 5%,stromal edema in 6% cases.

Anterior chamber reaction

A study conducted by Addagarla SR et al⁷, Toxic syndrome (TASS) with Anterior chamber reaction are seen in 10% cases which was high as compared to our study findings. In our study there was Anterior chamber reaction seen in 5% cases which were comparatively lesser compared to above studies.

Iritis

A study conducted by Addagarla SR et al⁷, 10% cases had iritis which was higher as compared to our study findings

In our study iritis seen in 5% cases which were comparatively lesser compared to above studies.

IOL decentration

Khandekar RB et al⁶ reported that there was 3 cases of IOL decentration seen. In our study no such cases were found.

Treatment outcome

In our study, on post operative day 1, majority of the patients had >6/18 vision i.e. 85%, followed by 6/18 - 6/60 i.e. 10% ,5% of the patients still had <6/60.

After one week of post operative period, majority of the patients had >6/18vision i.e. 90%, followed by 6/18 - 6/60 i.e. 6%, 4% of the patients still had <6/60 vision. After six weeks of post operative, majority of the patients had vision >6/18 i.e. 98%, followed by 6/18 - 6/60 i.e. 1% , <6/60 i.e. 1%.

Abhinav Ashok Agrawal et al⁸ reported that post operative best corrected visual acuity was >6/18 in 80 % cases which was less as compared to our study findings.

Addagarla SR et al⁷ reported that good outcome with best corrected visual acuity was recorded in 92% cases, which was less as compared to our study findings.

Khandekar RB et al⁵ reported that post operative 6 weeks visual acuity >6/18 in 87% cases, which was less as compared to our study findings.

CONCLUSION

Small incision cataract surgery is a safe and effective technique with excellent visual outcome in dealing with grade IV nuclear cataract, with lower complication rate and earlier post operative visual rehabilitation.

Visual outcome in patients with grade IV nuclear cataract is good when surgery done after proper pre-op assessment, due intra operative precautions and thorough planning of experienced surgeons with proper knowledge of the technique during the surgery.

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