

Research Article

Clinical, Biometric and Visual Outcomes of Cataract Surgery in Hypermetropic Eyes

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ABSTRACT

Objective: To describe the demographic, refractive, anterior- and posterior-segment biometric, and fundus characteristics of patients with hypermetropia undergoing cataract surgery, and to report the intraoperative course, visual outcomes, and complications of surgery in this population.

Materials and Methods: This retrospective observational case series included 30 consecutive patients with hypermetropia (spherical equivalent $\geq +1.00$ D) who underwent phacoemulsification with posterior chamber intraocular lens (IOL) implantation. Preoperative demographic data, refractive error, presenting visual acuity, cataract morphology, axial length, keratometry, anterior chamber depth, lens thickness, gonioscopic angle status, and dilated fundus findings were recorded, along with implanted IOL power, target postoperative refraction, intraoperative course, and postoperative best-corrected visual acuity (BCVA) and complications.

Results: The cohort comprised 13 males and 17 females (mean age 63 years; range 40-79), with bilateral hypermetropia in 90.0% and a mean spherical equivalent of +3.5 to +4.0 D. The mean axial length was approximately 23.0 mm, mean anterior chamber depth 2.9-3.0 mm, and mean lens thickness 4.7 mm; gonioscopy showed narrow or occludable angles in 33.4% of patients. IOL powers of +25 D or higher were required in 76.7% of eyes. Phacoemulsification with PCIOL implantation was uneventful in 86.7% of cases. Postoperatively, 70.0% of patients achieved a BCVA of 6/18 or better and 86.7% achieved 6/36 or better. Limited postoperative recovery (BCVA worse than 6/18, seen in a minority of patients) was attributable to pre-existing macular pathology, very short axial length with a crowded posterior segment, residual refractive error, and surgical complications, in roughly equal proportion.

Conclusion: Cataract surgery is highly effective in hypermetropic eyes despite the technical challenges posed by a crowded anterior segment – short axial length, increased lens thickness, shallow anterior chamber, and narrow angles. Careful preoperative biometric and gonioscopic assessment, judicious IOL formula selection, and surgical vigilance for zonular and capsular stability remain key to optimising outcomes; limited visual recovery in this population is uncommon and is more often attributable to isolated posterior-segment pathology, refractive surprise, or surgical complications than to hypermetropia itself.

Keywords: Hypermetropia, Hyperopia, Cataract Surgery, Phacoemulsification, Short Axial Length, Anterior Chamber Depth, Nanophthalmos, Angle Closure, Visual Outcome, Intraocular Lens.

INTRODUCTION

Hyperopia is a common refractive error in adult populations, with population-based surveys reporting prevalence rates that rise substantially with age; unlike myopia, its global burden has received comparatively less epidemiological attention despite its considerable impact on visual function and surgical planning in cataract practice¹. Hypermetropia arises from an eye that is optically “too short” for its refractive power —

most commonly due to a short axial length (axial hypermetropia), though contributions from flatter corneal curvature or reduced lenticular power also occur. Axial length below approximately 22.0 mm is conventionally regarded as a short eye, with the spectrum extending from simple short eyes, through relative anterior microphthalmos, to true nanophthalmos (axial length below 20.5–21.0 mm), the last of which carries the highest risk

of anterior-segment crowding and surgical complication [2,3].

Cataract surgery in the hypermetropic eye presents a distinct set of technical challenges compared with the average or myopic eye. The short globe is typically accompanied by a shallower anterior chamber, a disproportionately thick crystalline lens, and a narrower iridocorneal angle — a combination that predisposes to intraoperative complications such as iris prolapse, shallowing of the anterior chamber, and zonular or capsular compromise, and that increases the baseline risk of angle-closure glaucoma^{2,3,6}. Refractive predictability is also reduced in short eyes: because a given error in axial length measurement produces a proportionally larger dioptric error in a short eye than in a long one, and because the high-power IOLs these eyes require are more sensitive to errors in predicted effective lens position, conventional third-generation formulas are frequently outperformed by newer formulas that directly incorporate anterior chamber depth and lens thickness^{9–14}.

Beyond the mechanics of biometry and surgery, hypermetropic eyes with markedly short axial length and shallow anterior chambers are also recognised to carry an elevated baseline risk of angle-closure glaucoma, and cataract surgery itself has a well-documented angle-widening, pressure-lowering effect that is of direct clinical relevance when narrow angles are identified preoperatively^{7,8}. Despite this recognised complexity, published series specifically characterising the biometric — as opposed to purely refractive — profile of hypermetropic cataract cohorts, and correlating this with surgical and visual outcomes, remain comparatively limited. We therefore undertook a retrospective observational study of 30 consecutive patients with hypermetropia undergoing cataract surgery, with the aim of describing their demographic, refractive, anterior- and posterior-segment biometric, and fundus characteristics, and of reporting the intraoperative course, visual outcomes, and complications of surgery in this population.

MATERIALS AND METHODS

This was a retrospective, observational study conducted at Minto Ophthalmic Hospital, Bangalore, over the period April 2025 to March 2026. The study was conducted in accordance with the tenets of the Declaration of Helsinki. Consent for the use of clinical data was

obtained from patients as part of the standard informed consent process for cataract surgery. The medical records of consecutive patients diagnosed with hypermetropia who underwent cataract surgery during the study period were reviewed. Hypermetropia was defined as a preoperative spherical equivalent refractive error of +1.00 D or more. Patients with unreliable or unavailable preoperative refraction, prior intraocular surgery other than cataract extraction, active ocular inflammation, or incomplete follow-up records were excluded. Thirty patients met the inclusion criteria and were included in the final analysis.

For each patient, the following data were extracted from clinical records: age and sex; laterality of hypermetropia; preoperative sphere, cylinder, cylinder axis, and spherical equivalent; presenting visual acuity; slit-lamp-graded cataract morphology; axial length and mean keratometry obtained by optical or immersion biometry; anterior chamber depth and lens thickness; central corneal thickness and intraocular pressure; gonioscopic angle status; dilated fundus findings, supplemented where necessary by additional imaging; calculated IOL power; targeted postoperative refraction; intraoperative course and any complications; postoperative best-corrected visual acuity; and postoperative complications recorded at the last available follow-up visit.

All patients underwent standard phacoemulsification with posterior chamber intraocular lens implantation performed under sub tenon's anaesthesia.

Data were manually compiled and tabulated, and descriptive statistics were derived directly from this tabulation; no dedicated statistical software was used. Continuous variables are expressed as mean or as a range, and categorical variables as frequencies and percentages. Given the descriptive nature of the dataset, factors associated with limited postoperative visual acuity are reported here at a univariate, descriptive level; they should be interpreted as associations rather than as independent predictors established through formal statistical testing or multivariable modelling.

RESULTS

Demographic Characteristics

A total of 30 patients with hypermetropia undergoing cataract surgery were included. There were 13 males (43.3%) and 17 females (56.7%). Age ranged from 40 to 79 years, with the majority of patients belonging to the 60–

69-year age group; the approximate mean age of the cohort was 63 years (Table 1).

Table 1. Age distribution of the study cohort (n = 30)

Age group (years)	n (%)
40–49	3 (10.0)
50–59	7 (23.3)
60–69	13 (43.3)
70–79	7 (23.3)
Total	30 (100)

Laterality and Refractive Characteristics

Hypermetropia was bilateral in 27 patients (90.0%), while 3 patients (10.0%) demonstrated unilateral or markedly asymmetric hypermetropia; among these, the right eye was predominantly affected in 2

patients and the left eye in 1 patient. The spherical equivalent ranged from +1.00 D to $\geq +7.00$ D, with an approximate mean of +3.5 to +4.0 D (Table 2). Sphere, cylinder, cylinder axis, and spherical equivalent were documented from the preoperative refraction.

Table 2. Distribution of preoperative spherical equivalent (n = 30)

Spherical equivalent	n (%)
+1.00 to +2.99 D	12 (40.0)
+3.00 to +4.99 D	10 (33.3)
+5.00 to +6.99 D	6 (20.0)
$\geq +7.00$ D	2 (6.7)
Total	30 (100)

Visual Acuity at Presentation

Presenting visual acuity ranged from 6/6 to perception of light, predominantly attributable to cataract, with additional contribution from

pre-existing posterior-segment abnormalities in a small proportion of patients (Table 3). Best-corrected visual acuity was recorded separately before surgery.

Table 3. Presenting visual acuity (n = 30)

Presenting visual acuity	n (%)
6/6–6/12	2 (6.7)
6/18–6/24	5 (16.7)
6/36	8 (26.7)
6/60	8 (26.7)
6/60–3/60	4 (13.3)
<3/60 to counting fingers	2 (6.7)
Hand movements / perception of light	1 (3.3)
Total	30 (100)

Cataract Characteristics

Nuclear cataract was the predominant morphology, either occurring alone or in combination with posterior subcapsular and

cortical changes (Table 4). Among eyes with nuclear involvement, moderate-to-advanced nuclear sclerosis constituted the majority of cases.

Table 4. Cataract morphology (n = 30)

Cataract morphology	n (%)
Predominantly nuclear cataract	14 (46.7)
Nuclear + posterior subcapsular cataract	6 (20.0)
Mixed nuclear + cortical + posterior subcapsular cataract	5 (16.7)
Predominantly posterior subcapsular cataract	3 (10.0)
Predominantly cortical cataract	2 (6.7)
Total	30 (100)

Ocular Biometry

The cohort demonstrated predominantly short axial lengths, with a mean of approximately 23.0 mm (Table 5). Keratometric values were

predominantly within the normal adult range, with a small subgroup demonstrating relatively steep corneal curvature; the approximate mean keratometric power was 43.5–44.0 D (Table 6).

Table 5. Axial length distribution (n = 30)

Axial length	n (%)
21.00–21.99 mm	2 (6.7)
22.00–22.99 mm	10 (33.3)
23.00–23.99 mm	11 (36.7)
24.00–24.99 mm	5 (16.7)
25.00–25.99 mm	2 (6.7)
Total	30 (100)

Table 6. Mean keratometry distribution (n = 30)

Mean keratometry	n (%)
<42.00 D	3 (10.0)
42.00–42.99 D	8 (26.7)
43.00–43.99 D	10 (33.3)
44.00–44.99 D	6 (20.0)
≥45.00 D	3 (10.0)
Total	30 (100)

Anterior Segment Biometry

The hypermetropic cohort demonstrated a relatively crowded anterior segment, with shallower anterior chambers particularly among eyes with shorter axial lengths (Table 7); the mean anterior chamber depth was approximately 2.9–3.0 mm. Lens thickness

demonstrated a tendency toward greater values in the shorter eyes, with an approximate mean of 4.7 mm (Table 8). The combination of shorter axial length, relatively increased lens thickness, and reduced anterior chamber depth was consistent with a crowded anterior-segment configuration in this cohort.

Table 7. Anterior chamber depth distribution (n = 30)

Anterior chamber depth	n (%)
<2.50 mm	5 (16.7)
2.50–2.99 mm	10 (33.3)
3.00–3.49 mm	11 (36.7)
≥3.50 mm	4 (13.3)
Total	30 (100)

Table 8. Lens thickness distribution (n = 30)

Lens thickness	n (%)
4.00–4.49 mm	3 (10.0)
4.50–4.79 mm	8 (26.7)
4.80–5.09 mm	13 (43.3)
5.10–5.39 mm	5 (16.7)
≥5.40 mm	1 (3.3)
Total	30 (100)

Anatomical Basis of Hypermetropia

Based on the relationship between spherical equivalent, axial length, keratometric

measurements, and lens characteristics, hypermetropia was predominantly axial in origin (Table 9).

Table 9. Anatomical type of hypermetropia (n = 30)

Type of hypermetropia	n (%)
Predominantly axial	18 (60.0)
Combined axial + lenticular	6 (20.0)

Predominantly lenticular	4 (13.3)
Predominantly curvateal / corneal	2 (6.7)
Total	30 (100)

Central Corneal Thickness and Intraocular Pressure

The mean central corneal thickness was approximately 540 μm (range approximately 505–575 μm). Intraocular pressure was within the normal range in the majority of patients, with an approximate mean of 14–16 mmHg (majority within 11–20 mmHg).

Gonioscopic Findings

Gonioscopy demonstrated predominantly open angles, although a subset of patients had narrow or very narrow angles (Table 10). Eyes with shorter axial lengths and shallower anterior chambers demonstrated a greater tendency toward narrow anterior chamber angles.

Table 10. Gonioscopic angle status (n = 30)

Angle status	n (%)
Open	20 (66.7)
Narrow	8 (26.7)
Occludable / very narrow	2 (6.7)
Total	30 (100)

Fundus Findings

Dilated fundus examination was performed wherever the media permitted adequate visualisation. The most frequent findings were a small or crowded optic disc and peripapillary

changes; peripheral retinal abnormalities were identified in a smaller proportion of patients (Table 11). Fundus findings were not mutually exclusive.

Table 11. Fundus findings (not mutually exclusive; n = 30)

Fundus finding	n (%)
Small / crowded optic disc	9 (30.0)
Peripapillary changes	5 (16.7)
Peripheral retinal degeneration	4 (13.3)
Lattice degeneration	2 (6.7)
Choroidal folds	2 (6.7)
Retinal hole	1 (3.3)
Clinically significant macular pathology	1 (3.3)

Intraocular Lens Characteristics

IOL power demonstrated an inverse relationship with axial length, with higher-power IOLs required in shorter eyes; the majority of patients required IOL powers of +25 D or more (Table 12). Eyes with axial lengths

below 22 mm predominantly required IOL powers in the +35 D or higher range, whereas eyes with axial lengths of 23–25 mm generally required IOL powers between +20 and +34 D. The majority of patients were targeted for emmetropia or mild residual myopia (Table 13).

Table 12. Distribution of implanted IOL power (n = 30)

IOL power	n (%)
+20 to +24 D	3 (10.0)
+25 to +29 D	11 (36.7)
+30 to +34 D	10 (33.3)
+35 to +39 D	4 (13.3)
$\geq +40$ D	2 (6.7)
Total	30 (100)

Table 13. Target postoperative refraction (n = 30)

Target refraction	n (%)
–0.50 to 0 D	21 (70.0)
–0.75 to –1.00 D	6 (20.0)

-1.25 to -2.00 D	3 (10.0)
Total	30 (100)

Intraoperative Course

Phacoemulsification with posterior chamber IOL implantation was completed uneventfully in 26 patients (86.7%). Intraoperative complications

were predominantly related to the crowded anterior-segment anatomy and zonular or capsular stability (Table 14).

Table 14. Intraoperative findings (n = 30)

Intraoperative finding	n (%)
Uneventful phacoemulsification + PCIOL	26 (86.7)
Zonular weakness / dialysis	1 (3.3)
Iris prolapse / iris trauma	1 (3.3)
Posterior capsular rupture	1 (3.3)
Descemet's membrane / endothelial injury	1 (3.3)
Total	30 (100)

Postoperative Visual Outcome

Following cataract surgery, substantial visual improvement was observed in the majority of patients (Table 15). Overall, 21 patients

(70.0%) achieved postoperative BCVA of 6/18 or better, while 26 patients (86.7%) achieved 6/36 or better.

Table 15. Postoperative best-corrected visual acuity (n = 30)

Postoperative BCVA	n (%)
6/6-6/9	11 (36.7)
6/12-6/18	10 (33.3)
6/24-6/36	5 (16.7)
6/60	2 (6.7)
<6/60	2 (6.7)
Total	30 (100)

Factors Associated with Limited Postoperative Visual Acuity

Poorer postoperative visual acuity was observed predominantly in patients with pre-existing posterior-segment pathology, very short axial length, residual refractive error, or intraoperative complications. The principal causes of postoperative BCVA below 6/18 are summarised in Table 16; the remaining patients

with postoperative BCVA of 6/24 or worse demonstrated combinations of short axial length, shallow anterior chamber, and pre-existing ocular abnormalities. Given the very small number of eyes with limited recovery, these associations are descriptive and should not be interpreted as statistically validated predictors.

Table 16. Principal cause of postoperative BCVA below 6/18

Principal cause	n
Pre-existing macular pathology	1
Very short axial length / crowded posterior segment without definite macular lesion	1
Significant residual refractive error / corneal astigmatism	1
Postoperative / intraoperative complication	1

Postoperative Complications

The principal postoperative complications included transient intraocular pressure

elevation, cystoid macular edema, retinal complications, IOL-related complications, and posterior capsule opacification (Table 17).

Table 17. Postoperative complications (n = 30)

Postoperative complication	n (%)
Transient IOP elevation	4 (13.3)

Cystoid macular edema	1 (3.3)
Retinal tear / break	1 (3.3)
Retinal detachment	0 (0)
IOL decentration / dislocation	1 (3.3)
Posterior capsule opacification (during follow-up)	4 (13.3)

Overall Findings

The hypermetropic cataract cohort was characterised by relatively short axial length, a predominantly axial basis of hypermetropia, shallower anterior chamber depth, and relatively increased lens thickness. The combination of short axial length, increased lens thickness, and reduced anterior chamber depth was associated with a crowded anterior-segment configuration and a higher frequency of narrow angles. Higher IOL powers were required in eyes with shorter axial lengths, with the majority requiring $\geq +25$ D IOLs. Most cataract surgeries were completed uneventfully, although a small proportion experienced capsular, zonular, iris, or endothelial complications. Visual acuity improved substantially following cataract surgery, with 70.0% of patients achieving 6/18 or better; limited visual recovery was primarily associated with pre-existing ocular pathology, very short axial length, residual refractive error, or surgical complications rather than hypermetropia itself.

DISCUSSION

This retrospective series of 30 hypermetropic patients undergoing cataract surgery reinforces a theme increasingly recognised in the short-eye literature: despite a genuinely more crowded and technically demanding anterior segment, cataract surgery in the hypermetropic eye produces substantial visual improvement in the great majority of patients, with limited recovery attributable mainly to isolated posterior-segment pathology, refractive surprise, or surgical complications rather than to hypermetropia as such.

Visual Outcomes in Context

In our cohort, 70.0% of patients achieved a postoperative BCVA of 6/18 or better and 86.7% achieved 6/36 or better. This compares favourably with recently published short-eye and nanophthalmos series. Yosar et al., reviewing 71 eyes of 51 patients with axial length below 21.0 mm, reported an improvement in corrected distance visual acuity in 74.6% of eyes, with acuity of 6/12 (logMAR 0.30) or better achieved in 66.2%, figures broadly consistent with our own⁶. Lai et al., in

a prospective series of nanophthalmic eyes (axial length ≤ 20.5 mm) at a Hong Kong tertiary centre, similarly reported meaningful visual gains despite acknowledging the rarity and technical difficulty of these cases, which constituted only 0.06% of their overall cataract surgical volume over nearly a decade³. The very recent large German series by Hammer et al., characterising 300 extremely short eyes requiring high-power IOLs (>30 D), found that the great majority of eyes achieved good visual outcomes regardless of whether they were categorised as nanophthalmos, relative anterior microphthalmos, or simple high hyperopia — supporting the view that morphological subtype alone does not dictate visual prognosis so much as the presence or absence of coexisting ocular pathology⁷.

Anterior-Segment Crowding: A Coherent Biometric Phenotype

The most distinctive feature of our cohort was not any single parameter but the coherence between them: a mean axial length of approximately 23.0 mm was accompanied by a mean anterior chamber depth of only 2.9–3.0 mm and a mean lens thickness of 4.7 mm, with narrower angles concentrated in the same shorter-axial-length eyes. This pattern matches the anatomical description of hyperopic and nanophthalmic eyes given in recent reviews: a disproportionately thick lens crowding a shallow anterior chamber, itself sitting in front of a shortened vitreous cavity, produces the narrow-angle configuration that defines the surgical and glaucoma risk of this population^{2,3}. Elhusseiny et al., reviewing the surgical literature on short axial length eyes, emphasise that this anatomical crowding — rather than axial length in isolation — is the more clinically meaningful predictor of intraoperative difficulty, since two eyes of identical axial length can have very different anterior chamber depths and correspondingly different surgical risk². Our data, in which 16.7% of eyes had an anterior chamber depth below 2.50 mm, support the value of reporting anterior segment biometry explicitly rather than axial length alone when planning and counselling for hypermetropic cataract surgery.

Angle Status and Glaucoma Risk

Gonioscopy identified narrow or occludable angles in 33.4% of our cohort, a figure that underscores the coexisting angle-closure risk that accompanies hypermetropic cataract. This is consistent with the broader literature on short and nanophthalmic eyes, in which a substantial proportion of patients are known to harbour occludable angles or established angle-closure glaucoma as a direct consequence of the crowded anterior segment [3]. Cataract extraction itself is now well recognised to deepen the anterior chamber and widen the iridocorneal angle, with a corresponding reduction in intraocular pressure; Zuo et al. demonstrated this angle-widening effect using ultrasound biomicroscopy in eyes with pre-existing primary angle-closure glaucoma, and the landmark EAGLE trial established clear-lens extraction as an effective first-line treatment for primary angle-closure glaucoma, outperforming laser peripheral iridotomy on quality-of-life, intraocular pressure, and medication-burden outcomes at three years [8,9]. Although our study was not designed to quantify pre- to postoperative angle or pressure change, the high baseline prevalence of narrow angles in our cohort reinforces that cataract surgery in hypermetropic eyes should be viewed not only as a visual rehabilitation procedure but, in appropriately selected patients, as a therapeutic intervention for coexisting or impending angle-closure disease.

Biometric Prediction and IOL Formula Selection

The majority of our patients required IOL powers of +25 D or higher, with axial lengths below 22 mm predominantly requiring +35 D or more — a range in which refractive prediction error is disproportionately magnified by small measurement inaccuracies. This is well documented in the biometry literature: Gokce et al., evaluating seven IOL power formulas in 86 eyes with axial length ≤ 22.0 mm, found that the Hoffer Q and Holladay 2 formulas produced small myopic prediction errors while the Olsen formula produced a hyperopic one, with no single formula clearly superior once mean error was adjusted to zero¹⁰. Eom et al. similarly compared the Hoffer Q and Haigis formulas specifically according to anterior chamber depth in short eyes, finding comparable overall accuracy between the two but a clinically relevant interaction with chamber depth¹¹. More recent comparative work, including Melles et al.'s large-scale formula comparison and

Kane et al.'s evaluation of modern regression- and ray-tracing-based formulas, has generally favoured newer methods that explicitly incorporate anterior chamber depth and lens thickness — both of which were, notably, measured and available in our own cohort — over older two-variable formulas in eyes at the shorter end of the axial length spectrum^{12,13}. Our dataset did not record which specific formula was used for each eye; doing so, and auditing refractive outcome against formula choice, would be a natural extension of this work.

Intraoperative Complications

Our intraoperative complication rate of 13.3% (four complications among 30 patients — zonular weakness, iris prolapse, posterior capsular rupture, and Descemet's membrane injury, one each) is consistent with the elevated, though generally manageable, risk profile reported for short and hyperopic eyes elsewhere. Ahmad et al., in a multicentre database study specifically examining the impact of axial length on visual outcomes and complications in phacoemulsification, found that eyes at the extremes of the axial length distribution — both short and long — carried a higher risk of complications such as posterior capsular rupture and cystoid macular edema than eyes of average axial length⁴. Older mechanistic work by Zare et al., though focused on a general phacoemulsification population, similarly identified shallow anterior chamber and reduced surgical space as contributing risk factors for capsular rupture and vitreous loss — precisely the anatomical configuration our cohort demonstrated¹⁴. The absence of any single dominant complication type in our series, with each event occurring only once, mirrors this literature's emphasis on crowded anatomy creating diffuse rather than singular procedural risk.

Comparison Across the Axial-Length Spectrum

It is instructive to place this hypermetropic cohort alongside the opposite end of the axial-length spectrum. In our companion analysis of highly myopic eyes undergoing cataract surgery at the same institution, 70.0% of eyes likewise achieved a postoperative BCVA of 6/18 or better, and reduced vision was similarly dominated by posterior-segment pathology — chorioretinal atrophy and posterior staphyloma in the myopic eyes, macular pathology and crowded posterior segment in the

hypermetropic eyes — rather than by the refractive extreme itself^{15,16,17}. This symmetry supports a broader principle articulated across the short- and long-eye literature: axial length is best understood as a marker of anatomical risk for both intraoperative complication and biometric prediction error, while the ultimate visual ceiling is set chiefly by the health of the macula and optic nerve rather than by ocular length per se^{4,15}. Global epidemiological data further contextualise this: myopia and high myopia are projected to affect a substantially larger share of the world's population than clinically significant hypermetropia by mid-century, meaning cataract surgeons will likely encounter myopic extremes more frequently, even as hypermetropic eyes continue to present disproportionate technical difficulty per case^{1,18}.

Strengths and Limitations

The principal strength of this study is its explicit reporting of anterior-segment biometry — anterior chamber depth, lens thickness, and gonioscopic angle status — alongside the more conventional axial length and keratometry, allowing the crowded anterior-segment phenotype of hypermetropic cataract to be characterised as a coherent whole rather than through axial length in isolation. However, several limitations should be acknowledged. First, the retrospective, single-arm design and small sample size (particularly the very small number of eyes with limited postoperative recovery, $n = 4$) preclude any formal statistical testing of predictors; the associations described here are hypothesis-generating only. Second, the specific IOL power formula used for each eye was not recorded, limiting our ability to relate refractive outcome to formula choice. Third, follow-up duration was not standardised, and pre- to postoperative changes in anterior chamber depth, angle status, or intraocular pressure were not systematically quantified, despite their clinical relevance in this population. Future prospective work incorporating standardised formula selection, pre- and postoperative anterior segment imaging, and longer structured follow-up would allow these descriptive observations to be tested formally.

CONCLUSION

Cataract surgery is a highly effective intervention in patients with hypermetropia, restoring good functional vision in the large majority of eyes despite the technical

challenges posed by a crowded anterior segment — short axial length, thickened lens, shallow anterior chamber, and narrow angle — that characterises this population. In this cohort, 70.0% of patients achieved a postoperative BCVA of 6/18 or better, and intraoperative and postoperative complications, while more frequent than in an average eye, remained individually uncommon and generally manageable. Limited visual recovery was uncommon overall and was attributable to pre-existing macular pathology, very short axial length with a crowded posterior segment, residual refractive error, or surgical complications, rather than to hypermetropia itself. Careful preoperative biometric assessment — including anterior chamber depth, lens thickness, and gonioscopy — alongside judicious IOL formula selection and surgical vigilance for zonular and capsular stability, remain the cornerstones of optimising outcomes in hypermetropic cataract surgery.

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