Clinical Ophthalmology

Dovepress
Taylor & Francis Group

Open Access Full Text Article

ORIGINAL RESEARCH

Visual Outcomes and Complication Rates of Cataract Surgery in Asian High Myopic Patients: A Meta-Analysis and Systematic Review

Ke-Bing Zhao[1,2], Jing-Shang Zhang[2], Xiu-Hua Wan[2]

[1]School of Clinical Medicine, Shandong Second Medical University, Weifang, Shandong, 261000, People's Republic of China; [2]Beijing Tongren Eye Center, Beijing Tongren Hospital, Capital Medical University, Beijing Ophthalmology & Visual Sciences Key Laboratory, Beijing, 100730, People's Republic of China

Correspondence: Xiu-Hua Wan, Email xiuhuawan@126.com

Purpose: To evaluate the visual outcomes and complication rates of cataract surgery in high myopic patients through a systematic review and meta-analysis.

Methods: Following the PRISMA 2020 guidelines, a comprehensive literature search was conducted across multiple databases to identify studies reporting on cataract surgery outcomes in highly myopic patients. Eight studies, involving 1,996 patients (2,826 eyes), were included in the meta-analysis. Data on pre- and postoperative best-corrected visual acuity (BCVA), intraoperative and postoperative complications, and study characteristics were extracted. Random-effects models were used to calculate pooled estimates due to significant heterogeneity among studies.

Results: Cataract surgery significantly improved BCVA in high myopic patients, with an average improvement of −1.72 logMAR units (95% CI: −2.37 to −1.06). Substantial heterogeneity was observed across studies (I^2 = 84.4%, 95% CI: 65.2%–93.1%). Intraoperative and postoperative complications occurred at the following pooled incidences: transient intraocular pressure (IOP) elevation 13.03% (95% CI, 9.59%–17.47%), posterior capsule opacification (PCO) at 12.11% (95% CI, 4.00%–31.30%), cystoid macular edema (CME) at 2.41% (95% CI, 0.84%–6.76%), intraoperative posterior capsule rupture (PCR) at 2.01% (95% CI, 0.89%–4.44%), retinal detachment (RD) at 1.97% (95% CI, 1.21%–3.21%), retinal breaks at 1.89% (95% CI, 0.85%–4.14%) and intraocular lens (IOL) dislocation at 0.67% (95% CI, 0.21%–2.04%).

Conclusion: Cataract surgery is effective in improving vision in highly myopic patients but is associated with a moderate risk of complications. The high heterogeneity among studies underscores the need for standardized methodologies and more comprehensive assessments of ocular health in future research. These findings provide valuable insights for optimizing clinical management and enhancing patient counseling.

Keywords: high myopia, cataract surgery, visual outcomes, complications, meta-analysis

Introduction

High myopia, defined as a refractive error of −6.0 diopters (D) or more, is a growing public health concern worldwide due to its increasing prevalence and associated ocular complications.[1] In East Asia, the prevalence of myopia in young adults ranged from 80% to 90%, of which one-fifth had high myopia.[2] By 2050, the number of highly myopic individuals was predicted to be 938 million, which was about 9.8% of the world population.[3] The elongation of the eye axis, a characteristic feature of high myopia, brings about a series of anatomical and pathological changes that pose substantial challenges, such as posterior staphyloma, thinner sclera, fragile zonular fibers and chorioretinal atrophy. Therefore, patients with high myopia are at higher risk of developing various sight-threatening conditions, including cataracts, retinal detachment, macular degeneration, and glaucoma.

Cataract surgery is one of the most commonly performed ophthalmic procedures globally and is generally effective in restoring vision.[4,5] Highly myopic patients are more prone to developing cataracts due to pathological changes associated

Received: 23 May 2025
Accepted: 7 July 2025
Published: 12 July 2025

with high myopia,[6] which also influence their surgical outcomes. The curvature changes of the ocular wall caused by posterior scleral staphyloma could lead to positioning deviations of surgical instruments, and the fragile zonular fibers increase the risk of posterior capsule rupture (PCR) during the operation; the deformation of the posterior pole easily causes the optical center of the intraocular lens (IOL) to deviate from the visual axis, affecting the refractive effect; the thinner sclera makes it more difficult to maintain the stability of the anterior chamber under intraoperative negative pressure, which also increases the probability of iris injury and PCR. Chorioretinal atrophy makes highly myopic patients more likely to develop peripheral retinal breaks under the influence of intraoperative intraocular pressure fluctuations and vitreous disturbances, which may develop into rhegmatogenous retinal detachment. In addition, the poor baseline retinal function also leads to limited visual acuity improvement after surgery.[7] Therefore, understanding the visual outcomes and complication rates of cataract surgery in this population is critical for optimizing clinical management.

Previous studies have investigated the efficacy and safety of cataract surgery in highly myopic patients, but the findings remain inconsistent. While some reports suggest significant improvements in best-corrected visual acuity (BCVA) after surgery,[8] others highlight the challenges posed by high rates of intraoperative and postoperative complications.[9] Common intraoperative and postoperative complications of cataract surgery include PCR, anterior chamber collapse, endophthalmitis, corneal edema, increased intraocular pressure, posterior capsular opacification, retinal detachment, and macular edema.[10] Zuberbuhler found a posterior capsule rupture rate of 2.8% and a retinal detachment rate of 1.3% in highly myopic patients with an axial length longer than 30.0 mm and considered that this ratio was unrelated to axial length growth.[11] However, Fesharaki et al found that for every 1 mm increase in axial length, the incidence of intraoperative complications increased by 1.22 times.[12] The heterogeneity in study designs, patient selection criteria, and outcome measurements has limited the comparability and generalizability of existing evidence. A previous meta-analysis has demonstrated that such surgery significantly improves visual acuity in patients with high myopia (defined as axial length > 25.0 mm), as shown in a review of 28 studies involving 19,586 eyes—though the procedure involves higher risks of complications compared to non-myopic populations.[7] Considering that there is no classification for high myopia based on axial length, and the classification of myopia relies on the refractive value, this study introduces a different definition of high myopia (preoperative refraction < −6D) to homogenize the study population and reduce confounding from moderate myopia, and inclusion of the most recent literature to reflect evolving surgical techniques and outcomes. By addressing these gaps, our analysis aims to provide updated, refined evidence on postoperative outcomes, including complications like retinal detachment and capsular contraction, in a more recently defined high-myopia cohort. Our findings may help guide clinicians in preoperative counseling, surgical planning, and postoperative care for this challenging patient population.

Methods

Literature Search Strategy and Quality Evaluation

A comprehensive literature search was conducted on 5 April 2025 across four databases: Embase, Medline, Web of Science, and CINAHL, with publication dates restricted to the period from January 2000 to December 2024. The primary search terms included “high myopia”, “cataract”, and “phacoemulsification”. The full search strategy was structured as (“high myopia” OR “pathologic myopia”) AND “cataract” AND “phacoemulsification”. Additional filters limited the results to articles published in English, involving human subjects, and categorized as “article” document types.

Search results from these databases were imported into Zotero software for consolidation. Two researchers (K.Z. and Z.Z.) independently reviewed titles and abstracts based on predefined inclusion criteria: (1) the study’s primary aim must focus on visual outcomes in patients with high myopia (defined as <-6D)[13] following phacoemulsification; (2) the study population must include high myopia patients who underwent phacoemulsification, with or without IOL implantation; (3) visual outcomes, such as uncorrected visual acuity (UCVA) or best-corrected visual acuity (BCVA), must be clearly defined and reported. To ensure consistency in the meta-analysis, exclusion criteria were applied: (1) studies involving patients with specific high myopia-related complications; (2) patients who underwent additional surgeries or had conditions potentially impacting vision; (3) duplicate publications using identical datasets were removed. After initial screening, full-text articles were retrieved, and their quality was assessed using a “rate” methodological scoring system.

Quality evaluation criteria included: (1) explicit definition of high myopia; (2) sample size exceeding 34 cases; (3) clear reporting of postoperative UCVA/BCVA after completion of follow-up; (4) inclusion of well-defined study parameters (eg, sample size, additional visual metrics); and (5) presence of a control group. Comprehensive data reporting was expected to cover study population characteristics, surgical techniques, IOL power calculation methods, follow-up duration, and complications (eg, intraoperative PCR and postoperative issues such as retinal detachment [RD], posterior capsule opacification [PCO], IOL dislocation, retinal breaks, transient intraocular pressure [IOP] elevation, and cystoid macular edema [CME]). Each quality criterion contributed one point, with studies scoring 4 or higher deemed high quality and eligible for inclusion. Screening and quality assessments were conducted independently by K.Z. and Z.Z., with disputes resolved by a third senior researcher (W.X.). Additionally, a modified version of the QUADAS-2 tool[14] was employed to assess bias.

Data Collection

A tailored data extraction framework was designed to align with the study objectives. For each qualifying article, data were extracted in 2 key areas: (1) basic publication details and author affiliations, including publication year, study period, author names, article title, and medical institution; (2) critical outcome measures of cataract surgery in high myopia patients, such as visual acuity, postoperative spherical equivalent refraction, and rates of surgical complications. All extracted data were compiled into Microsoft Excel for analysis.

Statistical Methods

Data analysis was performed using SPSS software (Version 16.0, SPSS Inc., Chicago, IL, USA). Meta-analysis was executed with the R program (Version 4.0, R Foundation for Statistical Computing, Vienna, Austria) using the "meta" package. Forest plots were generated to display individual study estimates and pooled effect sizes with the same method. The choice between a random effects model and a fixed effects model for meta-analysis was guided by the I^2 statistic: an I^2 value exceeding 50% indicated significant heterogeneity, prompting the use of a random effects model, while lower values supported a fixed effects model. Leave-one-out sensitivity analyses were performed to evaluate individual study contributions to persistent heterogeneity. Meta-regression analyses were performed to explore potential sources of heterogeneity in visual outcomes improvement, with axial length and preoperative BCVA as prespecified covariates. For visual outcomes, pooled estimates were calculated as mean differences (MD) with 95% confidence intervals (CIs). For the synthesis of complication rates across studies, the pooled proportion was calculated with 95% CIs. Eligibility for synthesis was determined by alignment with predefined outcomes: (1) For LogMAR visual acuity change (continuous outcome), studies were included if they reported mean differences (MD) with standard deviations (SD) or provided data convertible to MD/SD (eg, pre- and post-operative LogMAR values); studies using non-LogMAR scales (eg, Snellen) were excluded unless convertible. (2) For complication rates (proportion outcome), studies were included if they reported event counts and total sample sizes for intraoperative/postoperative complications; studies with ambiguous definitions (eg, combining minor/major complications without stratification) were excluded.

Results

Literature Screening Results

A total of 201 potentially relevant references were retrieved from the selected databases. No references were removed due to duplication, with the full details of the search and deduplication process outlined in Appendix A. Initial screening of titles and abstracts led to the exclusion of 180 references. Subsequent full-text review of the remaining 21 articles resulted in the exclusion of 11 studies, leaving 10 papers for eligibility assessment. Ultimately, 8 studies[15–22] were included in the meta-analysis. The quality of these studies was evaluated using the "rate" methodological scoring system, with all studies achieving a score of 4 or higher. The study selection process was illustrated in Figure 1, and key characteristics of the included studies were summarized in Table 1. Risk of bias was evaluated using a modified QUADAS-2 tool, with results summarized in Supplement Figure 1. All 8 studies were conducted in Asia, featured sample sizes exceeding 34 cases, and reported follow-up periods of at least 3 months.

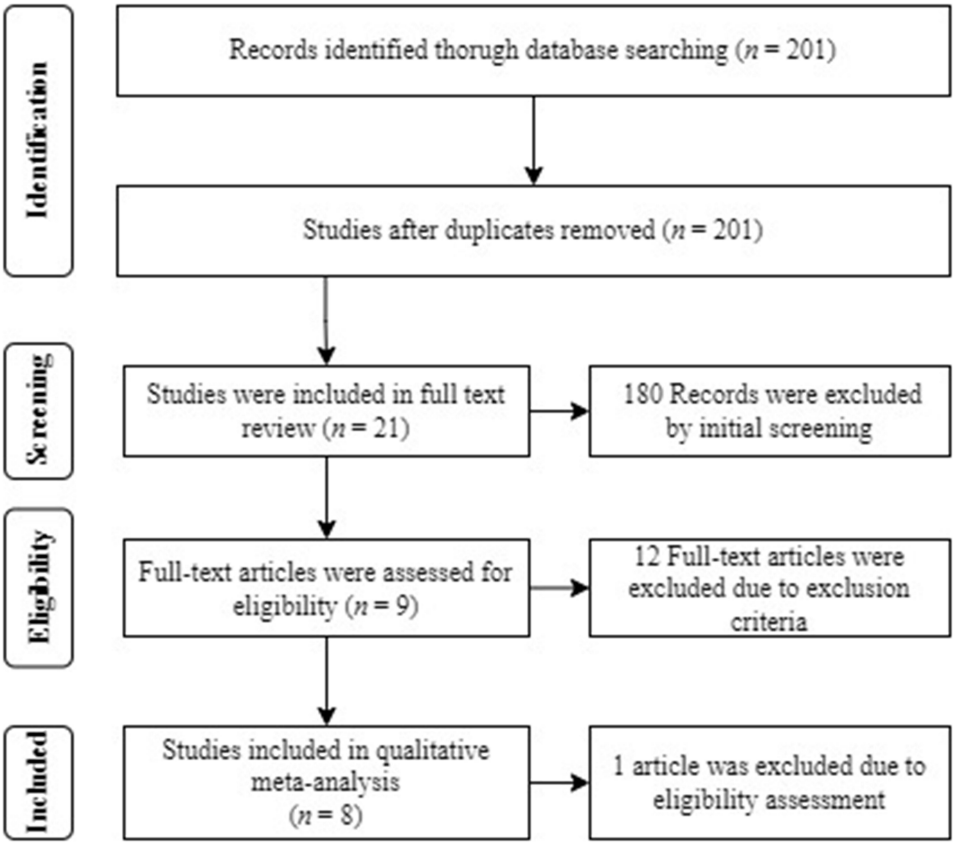

Figure 1 The PRISMA flow chart of paper selection.

Statistical Heterogeneity and Inconsistency

Our meta-analysis revealed a high level of heterogeneity among the included studies (I^2 = 84.4%, 95% CI: 65.2%–93.1%). Therefore, a random effects model was used for subsequent analysis. The inclusion of 8 studies demonstrated significant global heterogeneity ($p < 0.0001$). Local inconsistency testing using sensitivity analysis indicated that the heterogeneity remained significant even after excluding individual studies ($p < 0.0001$).

Visual Outcomes of Patients with High Myopia and Cataract

The demographic and baseline information of the highly myopic patients collected in this study are presented in Table 2, and forest plot of meta-analysis is shown in Figure 2. We collected data on 1,996 highly myopic patients (a total of 2,826 eyes) who underwent cataract surgery from 8 studies. In all the studies, the mean BCVA of highly myopic patients

Table 1 Characteristics of the Studies Included in the Meta-Analysis

Authors (Years)	Location	Study period	Sample Size	Follow-up Duration
Zhang et al (2024)[15]	China, Asia	2021-2022	230 eyes, 121 patients	1 year
Tamaskar et al (2024)[16]	India, Asia	2022-2024	95 eyes, 60 patients	1 year
Liang et al (2024)[17]	China, Asia	2020-2023	102 eyes, 102 patients	6 months
Hua et al (2024)[18]	China, Asia	2020-2023	98 eyes, 74 patients	2 years
He et al (2021)[19]	China, Asia	Not mentioned	2,027 eyes, 1,400 patients	1 month
Lam et al (2016)[20]	China, Asia	2010-2013	221 eyes, 221 patients	6 months
Cetinkaya et al (2015)[21]	Turkey, Asia	2008-2011	43 eyes, 28 patients	1 year
Li et al (2007)[22]	China, Asia	1995-2003	110 eyes, 79 patients	6 months

Table 2 Baseline Characteristics of Patients Included in the Meta-Analysis

Authors (Years)	Num of eyes	Age	Gender (Male/Female)	Pre-operative BCVA	Post-operative BCVA	Axial Length
Zhang et al (2024)[15]	230	56.29±8.14	32/28	1.01±0.43	0.49±0.43	34.87±1.28
Tamaskar et al (2024)[16]	95	55.10±15.03	28/32	0.88±1.27	0.32±0.18	27.77±1.08
Liang et al (2024)[17]	54	60.57±11.43	29/25	1.21±0.45	0.45±0.28	29.88±2.33
Hua et al (2024)[18]	46	52.48±6.41	9/24	1.07±0.34	0.07±0.09	27.09±1.01
He et al (2021)[19]	2,027	61.48±9.68	601/799	0.78±0.49	0.17±0.26	29.52±2.26
Lam et al (2016)[20]	221	60.10±10.80	Not mentioned	1.23±0.63	0.55±0.54	31.70±1.40
Cetinkaya et al (2015)[21]	43	59.20±11.08	12/16	0.91±0.37	0.29±0.25	28.97±1.99
Li et al (2007)[22]	110	54.35±10.44	39/46	1.54±0.70	0.60±0.48	32.43±1.13

improved after cataract surgery, from 0.88 ± 0.54 logMAR to 0.25 ± 0.31 logMAR with a significant improvement of −1.72 logMAR (95% CI: −2.37 to −1.06 logMAR, $P<0.001$) according to the random-effects model. The AL ($\beta = 0.16$, $p = 0.23$, $R^2 = 0.03$) and pre-BCVA ($\beta = -0.33$, $p = 0.83$, $R^2 = 0$) were not significantly associated with the degree of visual improvement in the meta-regression analysis.

Incidence of Intra-Operative and Post-Operative Complications of Cataract Surgery in High Myopia Patients

For intraoperative complications, the incidence of PCR in highly myopic patients during cataract surgery was evaluated in five studies. The reported rates ranged from 0.94% to 8.18%, and a meta-analysis showed a pooled PCR rate of 2.01% (95% CI, 0.89%–4.44%, Figure 3).

For postoperative complications, transient IOP elevation was examined in two studies, with reported rates from 11.74% to 18.52%, and the pooled estimate reached 13.03% (95% CI, 9.59%–17.47%). Posterior capsule opacification (PCO) was investigated in 5 studies, with an incidence range of 1.36% to 40.00%, and the pooled estimate was 12.11% (95% CI, 4.00%–31.30%, Figure 4). Cystoid macular edema (CME) was assessed in 2 studies post-surgery, with incidence rates ranging from 2.17% to 2.53%, and the pooled rate was 2.41% (95% CI, 0.84%–6.76%). Postoperative RD was evaluated in 7 studies, with incidence rates spanning 0.82% to 4.35%, and the pooled overall rate was 1.97% (95% CI, 1.21%–3.21%, Figure 5). Data from 3 studies on postoperative retinal breaks showed incidence rates between 1.36% and 4.65%, with a pooled rate of 1.89% (95% CI, 0.85%–4.14%). Two studies reported IOL dislocation post-surgery, with rates ranging from 0.45% to 0.87%, and the combined rate was 0.67% (95% CI, 0.21%–2.04%, Figure 6). Summarized ocular complications were shown in Table 3.

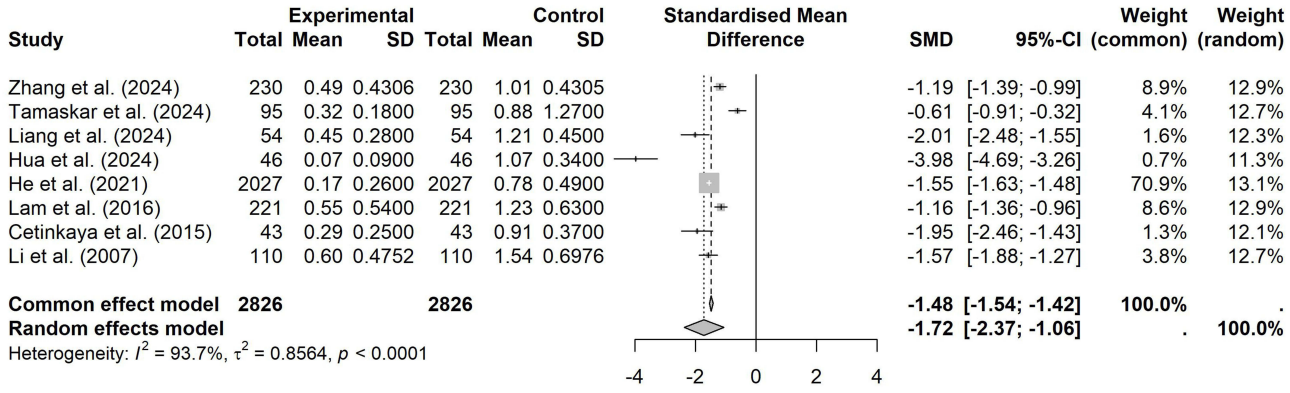

Figure 2 Meta-analysis forest plot of vision improvement (8 studies).

https://doi.org/10.2147/OPTH.S532853

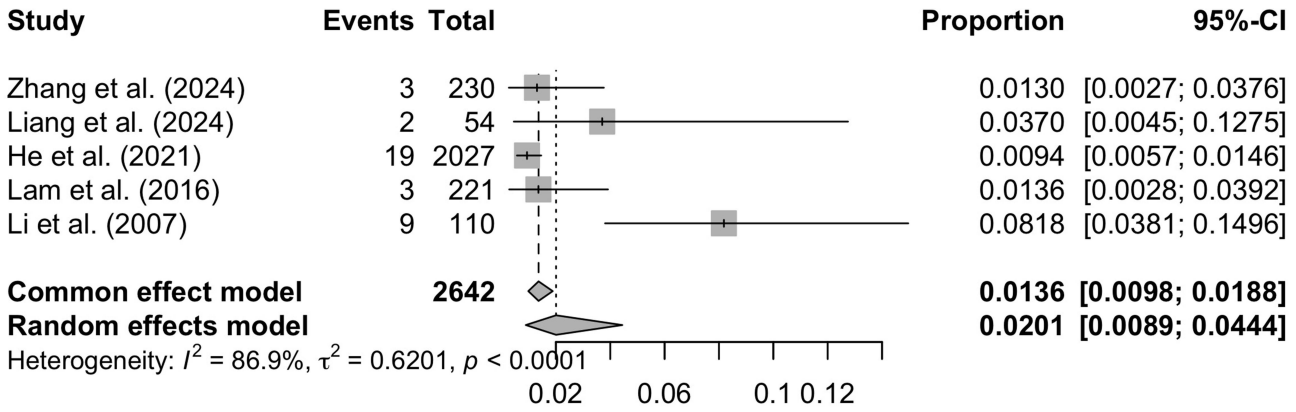

Figure 3 Meta-analysis forest plot of incidence of posterior capsule rupture during surgery in high myopia patients.

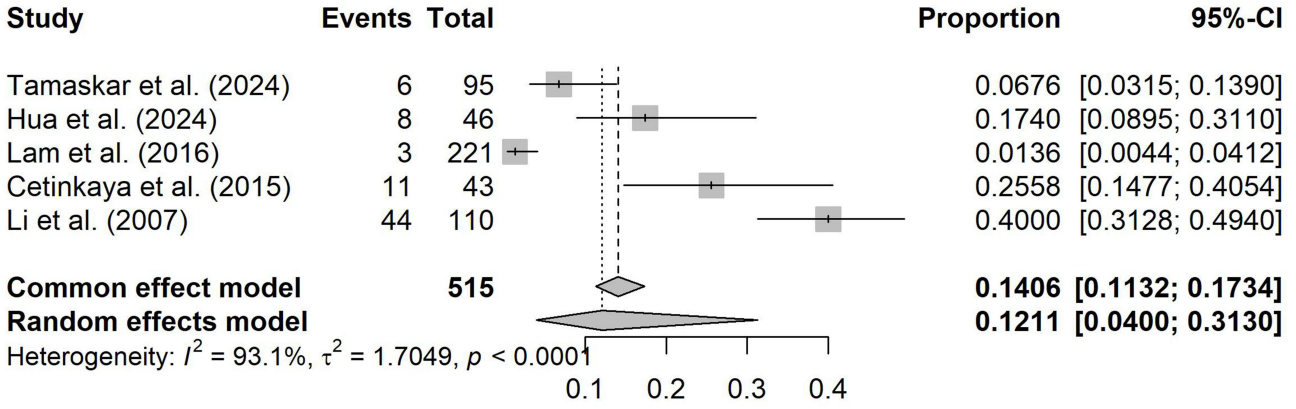

Figure 4 Meta-analysis forest plot of incidence of posterior capsule opacity after surgery in high myopia patients.

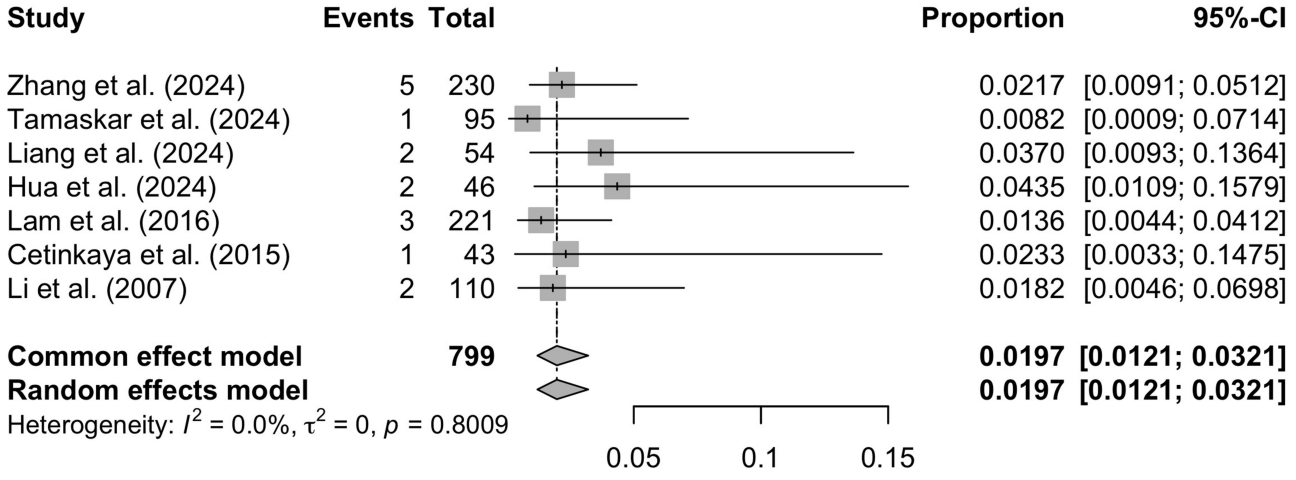

Figure 5 Meta-analysis forest plot of incidence of retinal detachment after surgery in high myopia patients.

Discussion

Cataract surgery in highly myopic patients presents unique challenges due to the anatomical and pathological features. The presence of pre-existing chorioretinal lesions limited visual acuity improvement,[23] and complication of cataract surgery was increased including posterior capsular rupture,[12] retinal detachment, macular edema,[24] posterior capsular

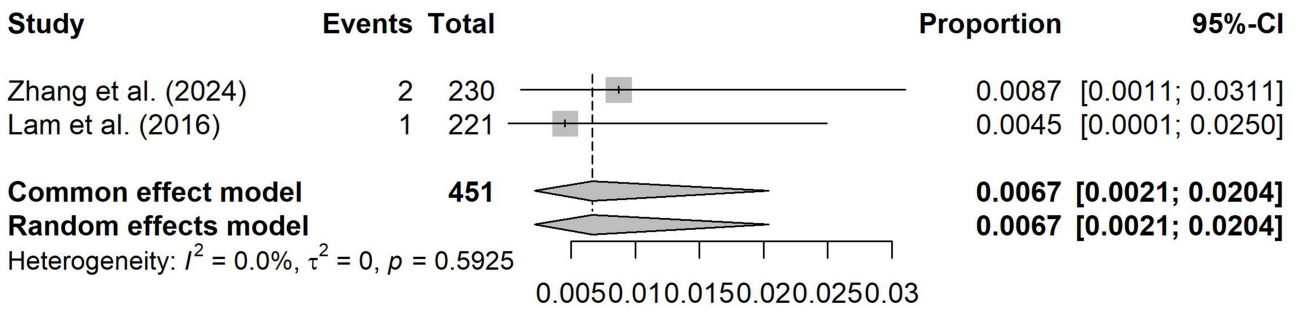

Figure 6 Meta-analysis forest plot of incidence of IOL dislocation after surgery in high myopia patients.

opacification,[25] capsular contraction syndrome[26] and transient intraocular pressure elevation.[27,28] This study systematically evaluated 8 high-quality studies via meta-analysis to assess the benefits and risks of cataract surgery in this population, focusing on visual acuity changes and complication incidences.

The high level of heterogeneity observed in this meta-analysis highlights the variability across studies. This heterogeneity may stem from differences in patient selection criteria, surgical techniques, and postoperative care protocols. Although all included studies used axial length and refractive error as initial screening parameters, they did not consistently account for or control other critical factors, such as the presence of fundus lesions or systemic comorbidities. These unmeasured confounders likely contributed to the observed variability in complication rates and visual outcomes. Although all studies met the inclusion criteria, in Zhang[15] and Lam's[20] studies, their patients had an axial length greater than 30.0 mm, indicating poorer fundus conditions compared to other highly myopic eyes, which was associated with higher incidences of intraoperative and postoperative complications. In contrast, Hua's[18] study excluded patients with fundus lesions, which may have contributed to the heterogeneity.

Our analysis demonstrated a significant improvement in BCVA from 0.88 ± 0.54 logMAR to 0.25 ± 0.31 logMAR after cataract surgery in highly myopic patients, with an average improvement of −1.72 logMAR units. Neither AL nor pre-BCVA was significantly associated with the degree of visual improvement. Considering highly myopic patients with longer AL were more prone to developing high-density nuclear cataracts,[29] the cataract surgery could effectively remove the opaque lens, improving the transparency of the patient's refractive media. However, for highly myopic patients with concurrent fundus lesions, the efficacy of the surgery can be significantly reduced. In this study, all included patients were free of other fundus diseases prior to surgery, which may partially explain why the degree of visual improvement was not influenced by axial length or preoperative BCVA.

Cataract surgery in highly myopic patients presents unique challenges due to the anatomical and pathological characteristics of these eyes, such as elongated axial lengths and pre-existing retinal or choroidal vulnerabilities.[30] These factors contribute to a spectrum of intraoperative and postoperative complications, which we systematically evaluated in this meta-analysis. PCR emerged as a notable intraoperative complication in highly myopic patients, with a pooled incidence of 2.01% (95% CI, 0.89%–4.44%) across five studies. This rate is higher than the approximately 1.1%

Table 3 Summarized Incidence of Intra-Operative and Post-Operative Complications of Cataract Surgery in High Myopia Patients

Complication	Report Counts	Pooled Rate (95% CI)
Posterior capsule rupture	5	2.01% (0.89%–4.44%)
Retinal detachment	7	1.97% (1.21%–3.21%)
Transient intraocular pressure	2	13.03% (9.59%–17.47%)
Posterior capsule opacification	6	11.68% (4.54%–26.85%)
Cystoid macular edema	2	2.41% (0.84%–6.76%)
Retinal breaks	3	1.89% (0.85%–4.14%)
IOL dislocation	3	0.83% (0.31%–2.19%)

https://doi.org/10.2147/OPTH.S532853

reported in the general population undergoing cataract surgery,[31,32] which may result from the higher prevalence of thin weak zonules in high myopia.[33] Besides, weak zonules could also lead to IOL dislocation after surgery.[34] A study has reported that high myopia is a primary risk factor for intraocular lens (IOL) dislocation, with the duration from surgery to dislocation documented as 7.5 ± 5.2 years.[35] In our study, IOL dislocation occurred at a pooled rate of 0.67% across 2 studies, which was lower than the 1.85% reported in the general population.[36] This discrepancy may be attributed to insufficient follow-up duration in the included studies.

RD is a well-recognized postoperative concern in high myopia, with our meta-analysis reporting a pooled incidence of 1.97% across seven studies. This rate markedly exceeds the 0.51% observed in the general cataract surgery population.[37] The heightened susceptibility in highly myopic patients is attributable to the inherent retinal thinning and stretching associated with axial elongation, which renders the retina more prone to tears and detachment, particularly if vitreoretinal traction is exacerbated during surgery.[37] Furthermore, intraoperative events such as PCR or vitreous loss may amplify this risk by disrupting vitreoretinal stability. Additional, retinal breaks were reported in three studies with a pooled incidence of 1.89%. While specific data for the general population are less commonly isolated, their incidence is inferred to be lower (likely < 1%) based on RD rates. In highly myopic eyes, retinal breaks arise from similar mechanisms as RD.[38] This disparity underscores the critical need for preoperative retinal assessment and meticulous surgical technique in this cohort. Besides, cataract surgery in highly myopic patients can exacerbate vitreous disturbances, promoting posterior vitreous detachment (PVD) that increases retinal traction. It has been confirmed that the progression rate of PVD after cataract surgery is significantly higher in highly myopic patients.[39] This heightened PVD risk, coupled with preexisting retinal thinning from axial elongation, elevates the likelihood of retinal breaks and detachment.

PCO, a frequent postoperative complication, showed a pooled incidence of 12.11% across 5 studies in our analysis. In contrast, PCO rates in the general population can reach up to 50% within 2–5 years post-surgery.[40] In the literatures included in this study, there were three studies with a follow-up period of more than 2 years, and the highest PCO rate observed in them was 25.6%. The seemingly lower pooled rate in our cohort may reflect differences in surgical techniques, such as IOL design or capsular polishing. However, the wide confidence interval suggests significant heterogeneity, possibly due to variations in axial length or capsular bag dynamics in highly myopic eyes. The stretched capsular bag in these patients might alter epithelial cell proliferation patterns, potentially reducing PCO formation compared to the general population, though further studies are needed to confirm this hypothesis.

CME presented a pooled incidence of 2.41% across two studies, higher than the 1.17% in the general population.[41] In highly myopic patients, longer axial lengths and potential choroidal vascular changes may disrupt the blood-retinal barrier, increasing CME risk.[42] The slight elevation observed here may reflect these physiological differences, though the small sample size limits definitive conclusions.

Transient IOP elevation was observed at a pooled incidence of 13.03% in two studies, which was lower than 22.0% observed in the general cataract surgery population.[43] It has been documented in the literature that a smaller vertical diameter of Schlemm's canal and a thinner trabecular meshwork are two anatomical risk factors for early postoperative intraocular pressure elevation in highly myopic eyes following cataract surgery.[44] The lower pooled rate in our analysis could be influenced by limited study numbers or variations in viscoelastic use and postoperative management.

This meta-analysis has several limitations that warrant consideration. First, all included studies were conducted in Asia, limiting the generalizability of our findings to other populations. Second, the high heterogeneity across studies suggests potential biases or inconsistencies in follow-up duration, data collection and reporting methods. Third, although we attempted to control for key variables such as axial length and refractive error, other important factors, such as fundus status, were not consistently measured or reported. Fourth, the quality of healthcare services can significantly impact the incidence of intra- and postoperative complications as well as final visual prognosis. Due to the lack of objective evaluation indicators for the quality of medical institution services, this study was unable to perform regression analysis on this factor. Finally, the retrospective nature of most included studies introduces inherent biases, necessitating cautious interpretation of the results.

In conclusion, cataract surgery in highly myopic patients is associated with significant improvements in visual acuity but also carries a moderate risk of complications. Our findings emphasize the importance of close postoperative monitoring to ensure optimal outcomes. Future research should focus on standardizing methodologies and incorporating more comprehensive assessments of ocular health to address the observed heterogeneity and enhance the reliability of evidence in this field.

Data Sharing Statement

The data that support the findings of this study are available from the corresponding author, W.H.X., upon reasonable request.

Funding

This research received no specific grant or financial support.

Disclosure

The authors declare that they have no conflicts of interest related to this study.

References

1. Pärssinen O, Kauppinen M. Risk factors for high myopia: a 22-year follow-up study from childhood to adulthood. *Acta Ophthalmol*. 2019;97(5):510–518. doi:10.1111/aos.13964
2. Wu P-C, Huang H-M, Yu H-J, Fang P-C, Chen C-T. Epidemiology of Myopia. *Asia-Pac J Ophthalmol Phila Pa*. 2016;5(6):386–393. doi:10.1097/APO.0000000000000236
3. Holden BA, Fricke TR, Wilson DA, et al. Global prevalence of Myopia and high Myopia and temporal trends from 2000 through 2050. *Ophthalmology*. 2016;123(5):1036–1042. doi:10.1016/j.ophtha.2016.01.006
4. Chen X, Xu J, Chen X, Yao K. Cataract: advances in surgery and whether surgery remains the only treatment in future. *Adv Ophthalmol Prac Res*. 2021;1(1):100008. doi:10.1016/j.aopr.2021.100008
5. Rossi T, Romano MR, Iannetta D, et al. Cataract surgery practice patterns worldwide: a survey. *BMJ Open Ophthalmol*. 2021;6(1):e000464. doi:10.1136/bmjophth-2020-000464
6. Haarman AEG, Enthoven CA, Tideman JWL, Tedja MS, Verhoeven VJM, Klaver CCW. The complications of Myopia: a review and meta-analysis. *Invest Ophthalmol Vis Sci*. 2020;61(4):49. doi:10.1167/iovs.61.4.49
7. Yao Y, Lu Q, Wei L, Cheng K, Lu Y, Zhu X. Efficacy and complications of cataract surgery in high myopia. *J Cataract Refract Surg*. 2021;47(11):1473–1480. doi:10.1097/j.jcrs.0000000000000664
8. Zhang R, Li F, Yu Y, Wang T, Wu C. Factors affecting early postoperative visual acuity in cataract patients with high Myopia. *Int J Ophthalmol Clin Res*. 2020;7(3):117. doi:10.23937/2378-346X/1410117
9. Du Y, Meng J, He W, Lu Y, Zhu X. Challenges of refractive cataract surgery in the era of myopia epidemic: a mini-review. *Front Med*. 2023;10:1128818. doi:10.3389/fmed.2023.1128818
10. Beheiri SI, Alghorair AS, Aljambi FA, et al. Incidence and risk factors for retinal detachment following cataract surgery at a tertiary center in Jeddah, Saudi Arabia. *Cureus*. 2023;15(1):e33968. doi:10.7759/cureus.33968
11. Zuberbuhler B, Seyedian M, Tuft S. Phacoemulsification in eyes with extreme axial myopia. *J Cataract Refract Surg*. 2009;35(2):335–340. doi:10.1016/j.jcrs.2008.10.044
12. Fesharaki H, Peyman A, Rowshandel M, et al. A comparative study of complications of cataract surgery with phacoemulsification in eyes with high and normal axial length. *Adv Biomed Res*. 2012;1(1):67. doi:10.4103/2277-9175.102971
13. Flitcroft DI, He M, Jonas JB, et al. IMI – defining and classifying myopia: a proposed set of standards for clinical and epidemiologic studies. *Invest Ophthalmol Vis Sci*. 2019;60(3):M20–M30. doi:10.1167/iovs.18-25957
14. Whiting PF, Rutjes AWS, Westwood ME, et al. QUADAS-2: a revised tool for the quality assessment of diagnostic accuracy studies. *Ann Intern Med*. 2011;155(8):529–536. doi:10.7326/0003-4819-155-8-201110180-00009
15. Zhang Y, Du Y, Wang A, Zhou X, Lu Y, Zhu X. Outcomes of Cataract Surgery in Eyes With Axial Length > 33 mm. *Am J Ophthalmol*. 2024;265:137–146. doi:10.1016/j.ajo.2024.04.020
16. Tamaskar S, Sahoo H, Tiwari UC. Phacoemulsification in patients with high Myopia: a retrospective analysis. *SSR Inst Int J Life Sci*. 2024;10(2):5167–5173. doi:10.21276/SSR-IIJLS.2024.10.2.23
17. Liang X, Luo S, Deng K, Li L. Comparison of macular changes and visual outcomes between femtosecond laser-assisted cataract surgery and conventional phacoemulsification surgery for high myopic cataract patients. *BMC Ophthalmol*. 2024;24(1):212. doi:10.1186/s12886-024-03479-6
18. Hua S, Xie Q-X, Wang H, Zhong J-X. Effectivity and safety of trifocal intraocular lenses and capsular tension rings implantation for cataract patients with axial high myopia. *Int J Ophthalmol*. 2024;17(3):499–508. doi:10.18240/ijo.2024.03.12
19. He W, Yao Y, Zhang K, et al. Clinical characteristics and early visual outcomes of highly myopic cataract eyes: the Shanghai high Myopia study. *Front Med*. 2021;8:671521. doi:10.3389/fmed.2021.671521
20. Lam JKM, Chan TCY, ALK N, Chow VWS, Wong VWY, Jhanji V. Outcomes of cataract operations in extreme high axial myopia. *Graefes Arch Clin Exp Ophthalmol Albrecht Von Graefes Arch Klin Exp Ophthalmol*. 2016;254(9):1811–1817. doi:10.1007/s00417-016-3414-y
21. Cetinkaya S, Acir NO, Cetinkaya YF, Dadaci Z, Hİ Y, Saglam F. Phacoemulsificatıon in eyes wıth cataract and high myopia. *Arq Bras Oftalmol*. 2015;78(5):286–289. doi:10.5935/0004-2749.20150076
22. Li C-Y, Chen Y-C, See L-C, Lin -K-K, Lee J-S. Visual outcome after cataract surgery in extremely high axial myopia. *Ann Ophthalmol Skokie Ill*. 2007;39(1):27–35. doi:10.1007/BF02697323
23. Ruiz-Medrano J, Montero JA, Flores-Moreno I, Arias L, García-Layana A, Ruiz-Moreno JM. Myopic maculopathy: current status and proposal for a new classification and grading system (ATN). *Prog Retin Eye Res*. 2019;69:80–115. doi:10.1016/j.preteyeres.2018.10.005
24. Ikuno Y. OVERVIEW OF THE COMPLICATIONS OF HIGH MYOPIA. *Retina Phila Pa*. 2017;37(12):2347–2351. doi:10.1097/IAE.0000000000001489
25. Vasavada AR, Shah A, Raj SM, Praveen MR, Shah GD. Prospective evaluation of posterior capsule opacification in myopic eyes 4 years after implantation of a single-piece acrylic IOL. *J Cataract Refract Surg*. 2009;35(9):1532–1539. doi:10.1016/j.jcrs.2009.04.039

26. Zhang K, Zhu X, Chen M, et al. Elevated transforming growth factor-β2 in the aqueous humor: a possible explanation for high rate of capsular contraction syndrome in high Myopia. *J Ophthalmol*. 2016;5438676. doi:10.1155/2016/5438676
27. Lv H, Yang J, Liu Y, et al. Changes of intraocular pressure after cataract surgery in myopic and emmetropic patients. *Medicine*. 2018;97(38): e12023. doi:10.1097/MD.0000000000012023
28. Zhu X, Qi J, He W, et al. Early transient intraocular pressure spike after cataract surgery in highly myopic cataract eyes and associated risk factors. *Br J Ophthalmol*. 2020;104(8):1137–1141. doi:10.1136/bjophthalmol-2019-315117
29. Praveen MR, Vasavada AR, Jani UD, Trivedi RH, Choudhary PK. Prevalence of cataract type in relation to axial length in subjects with high myopia and emmetropia in an Indian population. *Am J Ophthalmol*. 2008;145(1):176–181. doi:10.1016/j.ajo.2007.07.043
30. Jeon S, Kim HS. Clinical characteristics and outcomes of cataract surgery in highly Myopic Koreans. *Korean J Ophthalmol KJO*. 2011;25 (2):84–89. doi:10.3341/kjo.2011.25.2.84
31. Segers MHM, Behndig A, van den Biggelaar FJHM, et al. Risk factors for posterior capsule rupture in cataract surgery as reflected in the European registry of quality outcomes for cataract and refractive surgery. *J Cataract Refract Surg*. 2022;48(1):51–55. doi:10.1097/j.jcrs.0000000000000708
32. Sim PY, Donachie PHJ, Day AC, Buchan JC. The royal college of ophthalmologists' national ophthalmology database study of cataract surgery: report 17, a risk factor model for posterior capsule rupture. *Eye Lond Engl*. 2024;38(18):3495–3503. doi:10.1038/s41433-024-03344-2
33. Elhusseiny AM, Salim S. Cataract surgery in myopic eyes. *Curr Opin Ophthalmol*. 2023;34(1):64–70. doi:10.1097/ICU.0000000000000914
34. Bisevac J, Anisimova NS, Nagymihály R, et al. Long-term myofibroblast persistence in the capsular bag contributes to the late spontaneous in-the-bag intraocular lens dislocation. *Sci Rep*. 2020;10(1):20532. doi:10.1038/s41598-020-77207-7
35. Fernández-Buenaga R, Alio JL, Pérez-Ardoy AL, et al. Late in-the-bag intraocular lens dislocation requiring explantation: risk factors and outcomes. *Eye Lond Engl*. 2013;27(7):795–801. doi:10.1038/eye.2013.95
36. Lee G-I, Lim DH, Chi SA, et al. Incidence and characteristics of intraocular lens dislocation after phacoemulsification: an eight-year, nationwide, population-based study. *J Clin Med*. 2021;10(17):3830. doi:10.3390/jcm10173830
37. Thylefors J, Jakobsson G, Zetterberg M, Sheikh R. Retinal detachment after cataract surgery: a population-based study. *Acta Ophthalmol*. 2022;100 (8):e1595–e1599. doi:10.1111/aos.15142
38. Du Y, Meng J, He W, Qi J, Lu Y, Zhu X. Complications of high myopia: an update from clinical manifestations to underlying mechanisms. *Adv Ophthalmol Pract Res*. 2024;4(3):156–163. doi:10.1016/j.aopr.2024.06.003
39. Hayashi K, Yoshida M, Hayashi S, Hirata A. Posterior vitreous detachment after cataract surgery in eyes with high myopia: an optical coherence tomography study. *Jpn J Ophthalmol*. 2022;66(2):167–172. doi:10.1007/s10384-022-00903-6
40. Apple DJ, Solomon KD, Tetz MR, et al. Posterior capsule opacification. *Surv Ophthalmol*. 1992;37(2):73–116. doi:10.1016/0039-6257(92)90073-3
41. Chu CJ, Johnston RL, Buscombe C, Sallam AB, Mohamed Q, Yang YC. Risk factors and incidence of macular edema after cataract surgery a database study of 81984 eyes. *Ophthalmology*. 2016;123(2):316–323. doi:10.1016/j.ophtha.2015.10.001
42. Xuan M, Wang D, Xiao O, et al. Choroidal vascularity and axial length elongation in highly myopic children: a 2-year longitudinal investigation. *Invest Ophthalmol Vis Sci*. 2024;65(10):7. doi:10.1167/iovs.65.10.7
43. Kim JY, Jo M-W, Brauner SC, et al. Increased intraocular pressure on the first postoperative day following resident-performed cataract surgery. *Eye*. 2011;25(7):929–936. doi:10.1038/eye.2011.93
44. Qi J, He W, Lu Q, Zhang K, Lu Y, Zhu X. Schlemm canal and trabecular meshwork features in highly myopic eyes with early intraocular pressure elevation after cataract surgery. *Am J Ophthalmol*. 2020;216:193–200. ((Qi J.; He W.; Lu Q.; Zhang K.; Lu Y.; Zhu X. zhuxiangjia1982@126.com) Department of Ophthalmology,Eye,Ear, Nose, and Throat Hospital of Fudan University, Shanghai, China). doi:10.1016/j.ajo.2020.02.005