

A decade of intracapsular cataract extraction: clinical profile and visual outcomes at Hospital Melaka, Malaysia

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ABSTRACT

Introduction: Cataract is a leading cause of visual impairment globally and in Malaysia, with surgery being the definitive treatment. While intracapsular cataract extraction (ICCE) is now less commonly performed due to advancements in surgical techniques, it remains essential in specific cases, such as those with weak zonular support. This study aims to evaluate the incidence, clinical profiles, and visual outcomes of patients who underwent ICCE, with or without intraocular lens (IOL) implantation, at Hospital Melaka, Malaysia, over the past decade.

Materials and Methods: A retrospective review was conducted on patients who underwent ICCE at Hospital Melaka, Malaysia, from January 2014 to December 2023.

Results: A total of 143 ICCE surgeries were performed on 135 patients. Most patients were male (n=88, 65.2%), with females comprising 34.8% (n=47). Most surgeries were performed on patients aged 60–69 years (n=48, 35.5%), followed by those aged 50–59 years (n=31, 23.0%) and 70–79 years (n=28, 20.7%). Incidence was lower among patients below 50 years and above 80 years. In terms of ethnicity, the highest incidence was among Malays (n=77, 57.0%), followed by Chinese (n=42, 31.1%) and Indians (n=15, 11.1%).

The leading cause of ICCE was senile cataract with weak zonular support (n=58, 40.6%), followed by trauma (n=33, 23.1%), intraoperative complications (n=30, 21.0%), congenital cataracts (n=14, 9.8%), pseudoexfoliation (n=4, 2.8%), and lens-induced glaucoma (n=4, 2.8%).

Post-surgery, 76 patients (53.1%) were left aphakic. Among those receiving IOL implants, 21.0% (n=30) had anterior chamber IOL, 14.7% (n=21) received an iris-claw IOL, and 11.2% (n=16) had a scleral-fixated IOL. Twelve weeks after IOL implantation, 60.9% (n=39) achieved good visual acuity of 6/12 or better, while 17.2% (n=11) had moderate vision (6/18 to 6/36), and 21.9% (n=14) had poor vision (worse than 6/60).

Conclusion: The incidence of ICCE was low, accounting for only 0.66% of the 21,596 cataract surgeries performed at Hospital Melaka, Malaysia, during the study period. The primary indication was senile cataracts with weak zonular support. Most patients achieved favourable visual outcomes at 12 weeks postsurgery following IOL implantation, with the

iris-claw IOL showing superior postoperative visual results compared to other IOL types.

KEYWORDS:

Intracapsular cataract extraction, cataract, visual outcomes, intraocular lens, aphakia

INTRODUCTION

Cataract remains one of the leading causes of visual impairment and blindness globally, including in Malaysia. Although cataracts primarily affect the elderly, they can also manifest in early childhood due to intrauterine infections, chromosomal abnormalities, or metabolic disorders.^{1,2} Trauma is another significant factor contributing to cataract development. According to the National Eye Survey, 39.11% of bilateral blindness cases in Malaysia are attributed to cataracts.² Fortunately, cataract-induced blindness is preventable with cataract surgery, which remains the most frequently performed refractive procedure in government hospitals across Malaysia and worldwide.

Cataract surgery techniques have evolved substantially, progressing from intracapsular cataract extraction (ICCE) to extracapsular cataract extraction (ECCE) and, more recently, to phacoemulsification. The choice of surgical approach depends on the patient's visual needs and eye condition, as each technique carries distinct indications and associated risks.³ While ICCE is less commonly performed in high-income countries compared to ECCE or phacoemulsification, it remains a viable option in low and middle-income settings, especially where other methods are not feasible.⁴ During ICCE, various intraocular lenses (IOLs) may be implanted in different anatomical locations, such as the anterior chamber, iris-claw, or scleral-fixated positions. However, ICCE is associated with a higher risk of complications, such as endophthalmitis, which has led to its decreased use, although it is still indicated in cases with weak zonules or other specific conditions.

This study aims to evaluate the incidence, clinical profiles, and visual outcomes of patients who underwent ICCE, with or without IOL implantation, at Hospital Melaka over the past decade.

MATERIALS AND METHODS

This retrospective study analysed ten years of data from

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Table I: Clinical profile of patients who underwent intracapsular cataract extraction (ICCE)

Gender	Frequency, n (%)
Male	88 (65.2)
Female	47 (34.8)
Age (Years Old)	
1 - 9	4 (3.0)
10 - 19	2 (1.5)
30 - 39	5 (3.7)
40 - 49	5 (3.7)
50 - 59	31 (23.0)
60 - 69	48 (35.5)
70 - 79	28 (20.7)
>80	12 (8.9)
Race	
Malay	77 (57.0)
Chinese	42 (31.1)
Indian	15 (11.1)
Non-Malaysian	1 (0.74)
Aphakia	76 (53.1%)
Types of IOL	
a. AC IOL	30 (21.0%)
b. Iris claw IOL	21 (14.7%)
c. Scleral fixated IOL	16 (11.2%)

Abbreviations: IOL: intraocular lens; AC IOL: anterior chamber intraocular lens

Table II: Visual acuity post-operative with and without intraocular lens implantation

Lens status	6/6 to 6/12	6/18 to 6/36	6/60 and worse	Missing data
Aphakia	0 (0%)	7 (9.2%)	57 (75.0%)	12 (15.8%)
AC IOL	17 (56.6%)	5 (16.7%)	6 (20.0%)	2 (6.7%)
Iris-claw IOL	16 (76.2%)	5 (23.8%)	0 (0%)	0 (0%)
Scleral-fixated IOL	6 (37.5%)	1 (6.25%)	8 (50.0%)	1 (6.25%)

Abbreviations: IOL: intraocular lens; AC IOL: anterior chamber intraocular lens

patients who underwent ICCE at Hospital Melaka, Malaysia, between January 2014 and December 2023. Data were sourced from the National Eye Database (NED), which includes the Cataract Surgical Registry. The study adhered to the principles of the Declaration of Helsinki and received approval from the Malaysian Medical Research Ethics Committee (NMRR ID-24-02322-FYK (2)). Data collection was facilitated by doctors assisting in the operating theatres at Hospital Melaka, Malaysia. Hospital Melaka is a government-funded public hospital that serves as a referral centre for patients from primary care facilities and private hospitals in Melaka and northern Johor. It also serves as a teaching hospital for Melaka Manipal Medical College medical students.

This study included all patients who underwent ICCE, with or without IOL implantation, between January 2013 and December 2023. Data collected encompassed patients' clinical profiles, including age, gender, ethnicity, indications for surgery, type of IOL implantation, and visual outcomes. The World Health Organization (WHO) established the International Classification of Diseases 11 (2018) criteria for visual impairment. According to these standards, visual acuity is categorised as follows: good vision (6/6 to 6/12), moderate visual impairment (6/18 to 6/60), and poor vision (worse than 6/60). Patients who underwent phacoemulsification or ECCE were excluded from the study.

Statistical Analysis

Statistical analysis was conducted using the Statistical Package for the Social Sciences (SPSS) for Windows, version

29.0. Categorical variables are presented as frequencies and percentages. Descriptive analysis was used to summarise the data. The Wilcoxon Signed Ranks test was employed to compare pre- and postoperative visual acuity, measured in LogMAR, for each type of IOL.

RESULTS

A total of 143 ICCE surgeries were performed on 135 patients at Hospital Melaka from 2014 to 2023. The incidence of ICCE was notably low, with only 143 cases (0.66%) out of 21,596 cataract operations. The majority of cases involved male patients and those of Malay ethnicity, with the highest incidence of ICCE surgeries occurring in patients aged 60 to 69 years (Table I). Senile cataracts with weak zonular support were the leading cause of ICCE among male patients, followed by trauma and intraoperative complications (Figure 1 and Figure 2). Post-operatively, more than half of the patients (53.1%) remained aphakic. In contrast, the others received various intraocular lens implants, including anterior chamber IOLs, iris-claw lenses, and scleral-fixated lenses (Table I).

Figure 3 illustrates the best corrected visual acuity (BCVA) outcomes in LogMAR before and after surgery for different types of IOL implants, excluding cases of aphakia. Visual outcomes 12 weeks post-surgery were favourable in patients with primary IOL implantation, with the iris-claw IOL group showing the best results, followed by anterior chamber and scleral-fixated IOLs. Patients left aphakic generally had poorer outcomes.

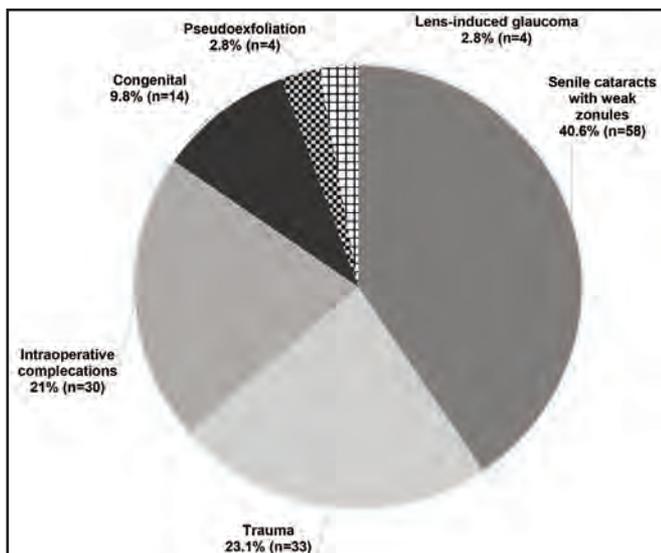


Fig. 1: Indications for intracapsular cataract extraction surgery

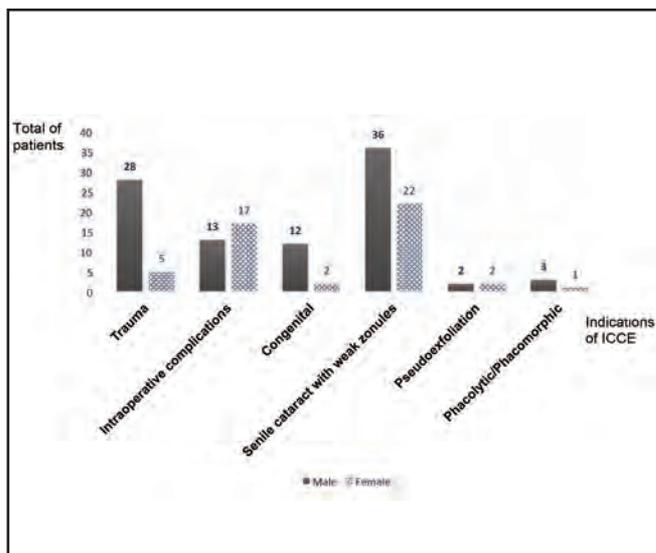


Fig. 2: Indications for intracapsular cataract extraction categorised by gender
Abbreviation: ICCE: intracapsular cataract extraction

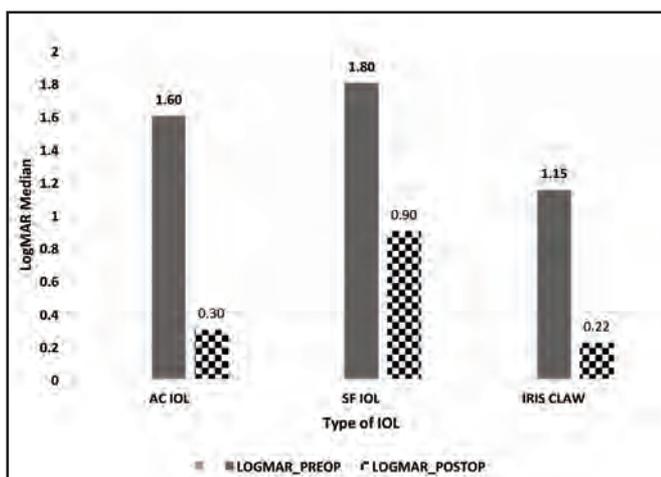


Fig. 3: Pre- and Post-Operative Visual Acuity (LogMAR) by Type of Intraocular Lens
Abbreviations: AC IOL: anterior chamber intraocular lens; SF IOL: scleral fixated intraocular lens; IOL: intraocular lens, LogMAR: Logarithm of the Minimum Angle of Resolution

Tables I and II summarise further details of patient demographics, causes, and visual outcomes, with Figures 1–3 illustrating key surgical indications and postoperative visual acuity.

DISCUSSION

This study offers valuable insights into the outcomes of ICCE surgeries conducted at Hospital Melaka from 2014 to 2023. Among the 143 ICCE surgeries performed, the leading cause was senile cataracts with weak zonular support, particularly in patients aged 60 to 69 years. Weak zonules often necessitate ICCE over other cataract surgery techniques, such as ECCE or phacemulsification, due to an increased risk of complications such as posterior capsule rupture or vitreous loss.⁵ These complications prolong surgical time, elevate the risk of retinal detachment, and impair proper IOL placement,

frequently resulting in aphakia or necessitating anterior chamber IOL placement.

Our findings align with Berler et al.⁶, who reported that older cataract patients, particularly those over 88 years, experience higher complication rates, including posterior capsule tears and poorer visual outcomes, than younger patients.⁶ In our cohort, a significant portion of patients with weak zonular support underwent ICCE, highlighting the importance of early detection of zonular instability and the potential role of capsular support devices in improving outcomes.

Male patients comprised the majority of ICCE cases, with trauma being a significant contributing factor, particularly among those aged 50 to 59 years. This finding is consistent with studies by Özbilen et al.⁷, as well as Wong et al.⁸, both of which reported a higher incidence of traumatic cataracts in men, often resulting from motor vehicle accidents and sports injuries.^{7,8} Mariya et al.⁹ stated that there is a higher incidence of traumatic cataracts in males due to their involvement in outdoor activities and sports.⁹ Our study further supports these findings, with 19.6% of male patients undergoing ICCE due to trauma. However, types of trauma are not further evaluated. Given the substantial impact of trauma on male patients, especially those of working age, public health efforts should focus on prevention, particularly in high-risk occupations and environments.

In paediatric patients, congenital diseases, such as Marfan's syndrome, accounted for 9.8% of cases. This is consistent with previous studies indicating that systemic disorders like Marfan's syndrome, homocystinuria, and sulfite oxidase deficiency are associated with lens subluxation due to zonular weakness.¹⁰ However, Kabylbekova et al.¹¹ have highlighted Down syndrome as the most common syndrome associated with cataracts.¹¹ Our study identified Marfan's syndrome as the predominant congenital condition in paediatric ICCE cases, emphasising the need for early diagnosis and appropriate surgical intervention in these patients.

A significant proportion of patients in this study were left aphakic post-ICCE (53.1%), particularly those in the 60 to 69 age group. Aphakia, in these cases, may have been planned, with secondary IOL implantation intended, but patients failed to return for follow-up. Barriers to follow-up may include socioeconomic challenges, transportation difficulties, or a lack of understanding about the importance of further treatment. This finding underscores the need for improved postoperative care and patient education to ensure optimal visual rehabilitation.

Postoperatively, patients with IOL implantation demonstrated better visual outcomes compared to those left aphakic. Among aphakic patients, 9.2% (n=7) had a BCVA between 6/18 and 6/36. In contrast, 58.2% (n=39) of patients who received IOL implants achieved good visual acuity, with vision of 6/12 or better. Notably, the iris-claw IOL provided superior visual outcomes compared to AC IOL and scleral-fixated IOLs. This could be attributed to the younger age of patients receiving iris-claw IOLs, which may contribute to better postoperative results. Additionally, the stability offered by iris-claw IOLs, particularly in patients with Marfan's syndrome, makes them a preferred option over scleral-fixated IOLs, as shown by studies like Al-Dwairi et al.¹⁴ and Muthukumar et al.¹⁵

Patients who underwent ICCE or ECCE faced a significantly higher risk of postoperative BCVA of 6/18 or worse compared to those who had phacoemulsification, primarily due to increased postoperative astigmatism, discomfort, and slower visual recovery.¹⁶ This underscores the importance of innovating surgical techniques, especially for complex cases requiring ICCE.

Aphakic patients need thorough visual prognosis assessments before secondary IOL implantation, with temporary corrective lenses improving their quality of life while awaiting implantation. Post-ICCE refractive monitoring is vital to address high astigmatism from sutures. Factors like intraoperative complications, surgeon experience, and operation time significantly influence visual outcomes, emphasising the need for skilled surgeons and efficient procedures to reduce risks such as posterior capsule rupture or prolonged inflammation. Enhancing follow-up rates through community outreach and rehabilitation programs can improve postoperative care, particularly for remote patients. Limitations, such as the absence of long-term follow-up data and variability in surgeon expertise, highlight the need for future research on extended outcomes, IOL types, less invasive trauma case alternatives, and improved postoperative care to optimise ICCE results.

CONCLUSION

In conclusion, ICCE accounted for a small fraction of cataract surgeries performed at Hospital Melaka, with senile cataracts and weak zonular support being the predominant causes. Notably, ICCE represented only 0.66% of the 21,596 cataract surgeries conducted during the study period. Trauma was a significant contributor, especially among male patients. Although patients with IOL implants generally experienced better visual outcomes, those left aphakic faced greater difficulties in achieving good vision. Patients with iris-claw IOLs, particularly those with Marfan syndrome, showed

positive visual results postoperatively. Strengthening postoperative care, particularly in follow-up and rehabilitation, is essential. Further studies are needed to evaluate alternatives to ICCE and to better understand long-term outcomes, especially for aphakic patients.

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