Visual Outcomes After Phacoemulsification in
Sanjiwani Hospital Gianyar, Bali, Indonesia

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ABSTRACT

The rate of blindness and visual impairment due to cataract is still high, especially in developing countries such as Indonesia. Phacoemulsification is one of the most advanced cataract surgery methods currently available. This study aims to evaluate the result of visual acuity in post-phacoemulsification cataract patients in Sanjiwani Hospital. This retrospective study used data obtained from medical records of patients who underwent phacoemulsification between 2019-2020. There were 45 eyes from a total of 35 patients. Most patients were male with an average age of 71±9.58 years old. Around 71.1% of samples obtained good outcome (visual acuity of ≥ 6/18) 6 weeks after surgery. Meanwhile, 26.6% obtained a borderline outcome (visual acuity of 6/18-6/60) and one person had a poor outcome (visual acuity of < 6/60). No intraoperative complication was recorded. There were 2 postoperative complications in the form of IOL dislocation. This result revealed a low complication rate. However, the percentage of good outcome has not reached WHO’s recommendation, which is 80%. Further studies with larger sample size and more complete data will be good to evaluate visual outcomes of phacoemulsification more optimally.

Keywords: cataract, phacoemulsification, visual acuity.

I. INTRODUCTION

Cataract is still the main cause of blindness and visual impairment globally. It was placed first as the cause of blindness, more than glaucoma and refractory disorders, especially in developing countries [1]. As a degenerative disease, the risk of cataracts is higher in the elderly population. The incidence rate of cataracts is estimated to increase along with life expectancy [2]. Blindness due to cataracts is estimated to increase up to 13.4 million cases in 2020 [1]. In Indonesia, data up to 2016 showed that 77.7% of blindness above 50 years old was caused by unoperated cataract [3].

Phacoemulsification is the current most advanced surgical technique. It has a higher complication risk. However, the wound is smaller, which leads to faster wound healing and better vision improvement [4]. Phacoemulsification is the main choice in developed countries. In developing countries, the small incision cataract surgery (SICS) technique is still widely used [5]. In Sanjiwani hospital where this study took place, phacoemulsification was only started in 2018. The evaluation of visual outcomes after surgery is an important part of the effort to reduce the rate of visual impairment and blindness related to cataracts.

II. METHODS

This is a descriptive study with a retrospective design that used data from medical records. The samples were cataract patients who underwent phacoemulsification in Sanjiwani Hospital from January 2019 to December 2020. The diagnosis of cataract was established based on the result of visual acuity assessment, slit lamp, and funduscopy. Patients with a history of other ocular comorbidities (glaucoma, corneal opacity, diabetic retinopathy) and patients lost to follow-up were excluded.

We obtained 45 eyes from a total of 35 patients. Phacoemulsification was performed by two different operators, using the same procedure and postoperative medication. The phacoemulsification procedure consisted of 1) clear corneal incision with an approximate size of 2.75 mm, 2) continuous circular capsulorhexis (CCC) after injection of trypan blue, 3) phacoemulsification of the nucleus with the stop and chop technique, 4) placement of the intraocular lens (IOL) in the posterior chamber. The visual acuity assessed in this study was uncorrected visual acuity (UCVA). Visual acuity was assessed before surgery, one day after surgery, one week after surgery, and six weeks after surgery. The results were then categorized into good outcome (vision ≥ 6/18), borderline outcome (vision 6/18-6/60), and poor outcome (vision < 6/60).

III. RESULTS

Out of 35 patients, most were men. The age range of patients was from 50 to 90 years old, with an average of 71±9.58 years. Cataract in the immature stage was found in 60% of samples. There were 26 cataract that were found in left eye (57.8%) and 19 (42.2%) in right eye.
The visual acuity before and after phacoemulsification were shown in Fig. 1. Before phacoemulsification, there was a similar number of eyes with visual acuity 6/18-6/60 and <6/60, which were 22 (48.9%). Only 1 eye had a visual acuity of ≥ 6/18. One day after surgery, 46.7% of samples obtained a visual acuity of ≥ 6/18. One week after surgery, the number slightly increased, where more than 50% of samples obtained a visual acuity of ≥ 6/18. Meanwhile, the other 42.2% still had visual acuity between 6/18-6/60, and 3 people had a visual acuity of < 6/60. Six weeks after surgery, only 1 eye had poor outcome, while the other 71.1% had good outcome. Twelve people or 26.7% had borderline outcome. There was no intraoperative complication recorded. Postoperative complication occurred in 2 eyes, in the form of IOL dislocation.

![Graph showing visual acuity before and after phacoemulsification.](image)

**Fig. 1.** Percentage of visual acuity of each category before and after phacoemulsification.

### IV. DISCUSSION

Cataract patients in this study were dominated by men with a range of ages mostly between 70-79 years old. Data compiled in 2002 showed that men are 1.2 to 1.7 times more likely to undergo cataract surgery than women, especially in developing countries [4]. This was associated with socioeconomic factors, such as transportation problems, education, and role in the family [6].

All cataract cases in this study were senile cataracts. This type of cataract usually begins from 40 years of age and is caused by a change in the lens due to aging. The risk of cataract increases along with age [7]. Compared to previous studies, the dominant age in this study was slightly older. Previous studies in Africa, Nigeria, and India showed that the average age of patients was 60-65 years old [8]-[10]. Meanwhile, a study in Spain in 2017 had a similar average age of cataract patients with this study, which is 70 years old [11]. Postoperative visual acuity showed gradual improvements. Samples with good outcome increased from 46.7% one day after surgery to 51.1%, then 71.1% in 1 week and 6 weeks after surgery, respectively. A previous study in Africa revealed 85.4% of eyes with a visual acuity of ≥ 6/18 a month after phacoemulsification [8]. Meanwhile, another study in India revealed that 92% of eyes reached a vision of ≥ 6/18 6 weeks after phacoemulsification [10].

WHO recommends evaluation after cataract surgery, where a good outcome should be achieved by at least 80%, borderline outcome by not more than 15%, and poor outcome by not more than 5% [12]. In this study, the percentage of eyes with good outcome (71.1%) and moderate outcome (26.7%) had not fulfilled the recommendation of WHO. Based on the literature, factors that cause a suboptimal result of cataract surgery are other eye pathologies, intraoperative and postoperative complications, and uncorrected refractive error [13]. The complication recorded in this study was IOL dislocation, which occurred in 2 cases, where all of them did not reach a visual acuity of ≥ 6/18 6 weeks after surgery. In this study, the visual acuity assessed was uncorrected visual acuity (UCVA) because of limited data in medical records. This might be a factor that contributed to the low percentage of sample with good outcome. Another study in Nigeria showed an increased percentage of eyes with a visual acuity of ≥ 6/18 of almost two folds before and after refractive correction, which was 38.8% in UCVA and 78.8% in BCVA [9].

This study was limited by small sample size and a retrospective type of study, where data were dependent on complete medical records. Further studies with larger sample size and more complete data are suggested in order to evaluate the visual outcomes of phacoemulsification more optimally.

### REFERENCES

1. S.R. Flaxman, R.R.A. Bourne, S. Resnikoff, P. Ackland, T. Branthwaite, M.V. Cicinelli, A. Das, J.B. Jonas, J. Keeffe, J.H. Kenpem, J. Leasher, H. Limburg, K. Naidoo, K. Pesudovs, A. Silvester, G.A. Stevens, N. Tahhan, T.Y. Wong, H.R. Taylor, Vision Loss Expert Group of the Global Burden of Disease Study, “Global causes of blindness and distance vision impairment 1990-2020: a systematic review and meta-analysis,” *Lancet Glob Health*, vol. 5, no. 12, pp. 1221-34, 2017.

2. H. Limburg, J. Ramke, “Cataract indicators: their development and use over the last 30 years,” *Community eye health*, vol. 30, no. 100, pp. 82-4, 2017.

3. Kementrian Kesehatan Republik Indonesia, *InfoDATIN Pasat Data dan Informasi*, Jakarta: Kementrian Kesehatan RI, 2018. pp. 5-6.
4. Suhardjo, A. Nugroho, T. Winarti, “Lensa Mata dan Katarak,” in *Ilmu Kesehatan Mata*, 3rd edition, Suhardjo, A.N. Agni, Ed. Yogyakarta: Departemen Ilmu Kesehatan Mata Fakultas Kedokteran Universitas Gadjah Mada, 2017, pp. 111-25.
5. D. Yorston, “High-volume surgery in developing countries,” *Eye*, vol. 19, pp. 1083–89, 2005.
6. S. Lewallen, P. Courtright, “Gender and use of cataract surgical services in developing countries,” *Bull World Health Organ*, vol. 80, no. 4, pp. 300-3, 2002.
7. A.A. Nizami, A.C. Galani, Cataract. [Updated 2020 Nov 18]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK539699/.
8. O. Oderinlo, A.O. Hassan, F.O. Oluyadi, A.O. Ogunro, O.N. Okonkwo, M.O. Ulaikere, O. Ashano, “Refractive aim and visual outcome after phacoemulsification: A 2-year review from a Tertiary Private Eye Hospital in Sub-Saharan Africa,” *Niger J Clin Pract*, vol. 20, no. 2, pp. 147-52, 2017.
9. O.O. Olawoye, A.O. Ashaye, C.O. Bekibele, B.G. Ajayi, “Visual outcome after cataract surgery at the university college hospital, ibadan,” *Ann Bi Postgrad Med*, vol. 9, no. 1, pp. 8-13, 2011.
10. S. Matta, J. Park, G. Palamaner Subash Shantha, R.C. Khanna, G.N. Rao, “Cataract Surgery Visual Outcomes and Associated Risk Factors in Secondary Level Eye Care Centers of L V Prasad Eye Institute, India,” *PloS One*, vol. 11, no. 1, 2016.
11. L. Rementería-Capelo, J. García-Pérez, J. Gros-Otero, A. Morán, J. Sánchez-Pina, I. Contreras, “Visual and Refractive Outcomes of Cataract Surgeries Performed in One Year in a Private Practice Setting: Review of 2714 Procedures,” *Journal of Ophthalmology*, pp.1-9, 2020.
12. World Health Organization, Informal consultation on analysis of blindness prevention outcomes; Geneva: WHO, 1998.
13. C. Cook, “How to improve the outcome of cataract surgery,” *Community Eye Health*, vol. 13, no. 35, pp. 37-8, 2000.