


Comparasion Of Visual Outcomes Post Small Incision Cataract Surgery With Phacoemulsification At Dustira Hospital 2017-2022

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Article Info	ABSTRACT
Keywords: Cataract, SICS, Phacoemulsification, Visual Outcome	The eye is a human visual instrument that functions to provide information visually to the brain. One of the vision disorders that often occurs is cataracts. Global data on visual impairment in 2010 stated that cataracts are one of the most common visual impairment disorders worldwide (33%). Based on Riskesdas in 2018, the prevalence rate of cataracts in Indonesia is 1.5%. Treatment of eyes diagnosed with cataracts can be done with several surgical techniques including SICS and phacoemulsification. The purpose of this research is to determine the comparison of visual outcomes post surgery small incision cataract surgery with phacoemulsification at Dustira Hospital in 2017-2022. This research is an analytical descriptive research using retrospective cross sectional design. The sample of this study was patients diagnosed with cataracts who underwent surgery using SICS techniques and phacoemulsification in 2017-2022 at the Eye Poly of Dustira Hospital. The selection of research samples uses total sampling methods and those in accordance with the inclusion criteria and exclusion criteria that have been determined. The data were analyzed using Man Whitney's non-parametric hypothesis test. The results of this study obtained the results of visual examination of post-cataract surgery outcomes on the SICS technique and phacoemulsification techniques had p-values on the control day 1 p = 0.019, day 7 p = 0.008 and day 30 p = 0.046. So it can be concluded that there is a significant difference in visual outcomes after cataract surgery using the SICS technique with phacoemulsification at Dustira Hospital in 2017-2022.
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INTRODUCTION

The eye is a human sensory organ that functions to provide visual information to the brain, so it has a very important role in human life. ¹ According to research conducted by *Global Data on Visual Impairment* in 2010, the causes of visual impairment worldwide were refraction (43%), cataracts (33%) and glaucoma (2%). By 2 because of that, cataracts are the second leading cause of blindness in the world. ² According to Riskesdas 2018, the prevalence rate of cataracts in Indonesia was 1.5%. Cataracts are a condition of impaired

vision due to cloudiness in the eye lens. Around 90% of cataract cases are reported to occur in developing countries.

The population of Asia and Africa are countries that have a 10 times greater risk of experiencing blindness compared to the population of developed countries, where only around 4 million people are at risk of experiencing blindness.³ Cataracts can be found in various age groups, but generally begin to occur in the age group over 40 years. Cataracts caused by aging factors called senile cataracts.^{4,5} There are several risk factors associated with cataracts, including age, diabetes mellitus, hypertension, family history, exposure to ultraviolet light, regular use of steroid eye drops and smoking habits.^{6,7} Cataracts can be treated with surgery using various techniques, namely intra capsular cataract extraction (ICCE), extra capsular cataract extraction (ECCE), small incision cataract surgery (SICS), and phacoemulsification.⁸ The SICS surgical technique is a surgical technique with a small incision (7-8 mm), almost no stitches required, using simpler equipment, easy to perform, and cheaper. The SICS surgical technique is also faster and more precise for mature cataracts.⁹ Meanwhile, phacoemulsification is a cataract surgery technique that aims to destroy the lens that is experiencing cloudiness by making a very small incision of around 1.5 mm to 3 mm using an ultrasonic probe that has a needle tip.⁸ Therefore, phacoemulsification is a cataract surgery technique that is often performed by eye specialists because it reduces the risk of astigmatism, healing is faster, and minimize the occurrence complications.¹⁰⁻¹²

The results of cataract surgery can be assessed based on visual outcomes. According to the World Health Organization (WHO) standards, visual outcomes after cataract surgery can be grouped into three categories, namely good, moderate, and poor vision. Good vision is indicated by postoperative vision of 6/66/18, moderate vision is indicated by postoperative vision < 6/18-6/60, and poor vision is indicated by postoperative vision < 6/60.¹³

According to research conducted by Muhammad F in 2018, regarding the effectiveness of phacoemulsification and small incision cataract surgery (SICS) techniques in mass cataract surgery in South Sulawesi Province, visual outcomes on days 1, 7, and 30 post-operatively in the phacoemulsification group were significantly higher than in the phacoemulsification group.

Based on the explanation, the author is interested in conducting this study because the SICS and Phacoemulsification cataract surgery procedures are currently the two main choices in cataract surgery procedures at Dustira Hospital and this study has never been conducted related research at Dustira Hospital with the aim of determining the comparison of visual outcomes *post* SICS surgery with phacoemulsification at Dustira Hospital in 2017-2022.

METHODS

This study is a descriptive analytical study using a *retrospective cross-sectional research design* using data sources recorded in medical records at the Eye Clinic of DUSTIRA Hospital, Cimahi in 2017-2022 with the aim of determining the comparison of *visual outcomes. post-operative* SICS with Phacoemulsification at Dustira Hospital in 2017-2022. The subjects of

the study were cataract patients at Dustira Hospital in 2017-2022 who had undergone SICS or phacoemulsification surgery.

a. Inclusion Criteria

Patients who have been diagnosed with cataracts, cataract patients who have undergone cataract surgery using the SICS technique or phacoemulsification using IOL, *post*- SICS or phacoemulsification patients who were controlled on days 1, 7, and 30.

b. Exclusion Criteria

Post- cataract surgery patients with SICS technique or incomplete phacoemulsification come for *post*- operative control

c. Sampling Method

The selection of research samples used the *total sampling method* on patient medical records. diagnosed with cataracts who underwent surgical procedures using the SICS technique or phacoemulsification starting from 2017-2022 who met the inclusion and exclusion criteria.

RESULTS AND DISCUSSION

This study was conducted by taking secondary data from medical records of *post*- cataract surgery patients at the Eye Clinic of Dustira Hospital in 2017-2022. The data used as the object of the study were *visual outcomes after* cataract surgery using the SICS and phacoemulsification techniques at the time of control on days 1, 7 and 30. The collected research data were analyzed and tested statistically and presented in the form of tables and figures.

Table 1 Characteristics of cataract surgery patients based on age using SICS and phacoemulsification techniques at RS ustira 2017-2022

Age group (years)	Operating technique		Total	
	SICS	Fakoemul sification		%
36-45	2	0	2	3,2%
46-55	2	5	7	11,3%
56-65	10	14	24	38,7%
>65	17	12	29	46,8%

Table 1 shows that the number of patients who underwent cataract surgery using either the SICS technique or phacoemulsification was mostly in the elderly age group with a percentage of 46.8%. This is because as age increases, the protein in the lens will experience nonenzymatic processes, increased susceptibility to oxidation processes, changes in the molecular structure of the lens and increased light scattering. These factors will cause cloudiness in the eye lens. As a result, the lens becomes stiffer so that it can increase the risk of cataract formation. ¹⁵ Cataracts at a young age can be caused by a history of eye trauma that damages the structure of the lens capsule or can also occur due to systemic and congenital diseases. ¹⁶

Table 2 Characteristics of Cataract Surgery Patients Based on Gender in the SICS Technique and Phacoemulsification at Dustira Hospital in 2017-2022

Type Sex	SICS	Phacoemulsification	Total (%)
Man	15	13	28 (45.1%)
Woman	16	18	34 (54.9%)

Table 2 shows that the number of patients who underwent cataract surgery using either the SICS technique or the phacoemulsification technique was predominantly female with a percentage of 54.9%. Based on gender, the prevalence of cataracts in women tends to be higher than in men. The hormone estrogen has been shown to play a role in protecting the lens from cataractogenesis because it has mitogenic and antioxidant properties against human lens epithelial cells. Decreased estrogen levels in women due to increasing age will increase the risk of cataracts.¹⁵

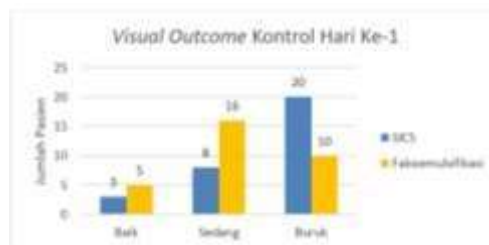


Figure 1 Visual Comparison SICS Outcomes with Phacoemulsification on Control Day 1st

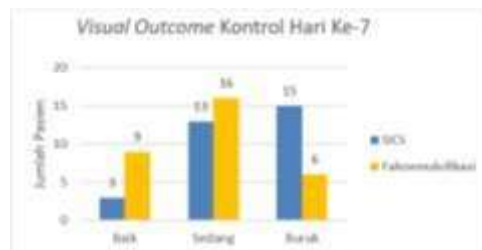


Figure 2 Visual Comparison SICS Outcomes with Phacoemulsification on Control Day The 7th

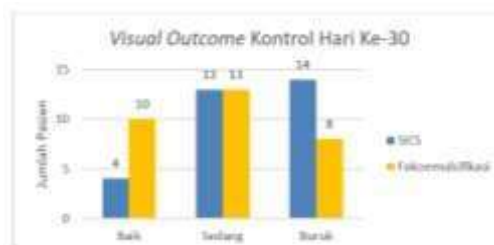


Figure 3 Visual Comparison of SICS Outcomes And Phacoemulsification on Day 30 Control

From the results of the comparison, it can be seen that there is always a change in the number of patients from each category of *visual outcome assessment* at each control time, both in the SICS technique and the phacoemulsification technique. This change is a natural thing to happen because there are many factors that play a role such as *post*-operative complications, patient age, patient history of disease, one of which is diabetes mellitus and differences in the *corneal wound healing process* of each patient which may have a direct impact on *visual outcome*.^{17,18} The process of healing wounds on the cornea *after* cataract surgery has several characteristics due to the avascular condition of the cornea which is also called *angiogenic-privileged*. These characteristics are important for the cornea to be able to maintain its function. Proper healing of *post*-cataract surgery wounds can restore the structure and function of the cornea. Each layer of the cornea has a different type of cell with its own characteristics, which causes the healing process that occurs to be different according to the layer that experienced an injury.⁴¹ So from the data that has been compared, the researcher sees the direction changes *in visual outcome* of each cataract surgery technique and it was found that the phacoemulsification technique had a positive direction. better *visual outcome* changes when compared with the SICS technique.

Man Whitney hypothesis test in table 4.10, it shows that there is a significant difference between *the visual outcome of post*-cataract surgery using the SICS technique and the phacoemulsification technique at the control time of days 1, 7 and 30. This is indicated by the sig. value (2-tailed) or p- value <0.05, which means there is a significant difference.

The results of this study are in accordance with several studies that have been conducted by other researchers, including research conducted by Rathi, et al at the Regional Institute of Ophthalmology in 2020. showed that the phacoemulsification cataract surgery technique had better visual outcome results at postoperative control on days 1 and 7 when compared with the SICS technique.¹⁹ Another study conducted by Kumari et al in 2022 in the Department of Ophthalmology, Era University also showed that the phacoemulsification technique has advantages in early vision rehabilitation after cataract surgery and visual outcomes with the phacoemulsification technique have better unaided visual acuity when compared to the SICS technique. This is because the induced astigmatism is much less in the phacoemulsification technique.²⁰ Research conducted by Iqbal S et al, 2015 also showed that the phacoemulsification technique has better *post*-cataract surgery visual outcomes than the SICS technique because surgically induced astigmatism has less chance of experiencing *post*-operative complications and the phacoemulsification technique has a shorter visual rehabilitation time than the SICS technique.²¹ So the phacoemulsification technique has more advantages that are obtained by *post*-cataract surgery patients such as rapid wound healing, low incidence of wound-related complications, does not cause *post*-operative astigmatism and most importantly better vision improvement when compared to the SICS technique.

The effect of *visual outcome* on *post*-cataract surgery patients is not only influenced by the surgical technique performed, but can also be influenced by several factors such as the severity of cataracts, history of systemic disease, and asigmatism and treatment complications such as increased intraocular pressure, hyphema, *post*-operative corneal

edema, residual cortex, iris prolapse, vitreous prolapse, posterior capsule damage and bleeding.²¹ In addition, other factors that can affect *post-cataract surgery visual outcome* are the occurrence of astigmatism. Many factors can affect the occurrence of astigmatism such as incision size, incision location and *pre-* operative astigmatism. Although the patient has undergone cataract surgery, it does not guarantee that *the visual outcome* will be good. Using vector analysis, surgical astigmatism should be added to the preoperative corneal astigmatism measurement.

This will allow to explain the total astigmatism required to correct with IOL and the effect of *postoperative visual outcome*. The value of astigmatism resulting from surgery varies between operators and patients due to the location and size of the incision and the biological reaction of the patient's cornea.²² Therefore, after surgery, the patient will undergo ocular lens implantation or use glasses as a correction of *postoperative visual outcome* in order to improve it.²³ Another thing that must be considered when performing intraocular lens implantation is the IOL power because it is related to determining the target refraction of *post-* cataract surgery patients. IOL power can be given with an emmetropia target, namely by providing IOL power until the vision is at 6/6 without the aid of glasses or providing a target myopia -1.00 diopters.^{24,25}

CONCLUSION

Based on the results of the research that has been conducted, it can be concluded that: Characteristics of cataract surgery patients based on age in the SICS and phacoemulsification techniques, namely in the elderly age group (46.8%). Characteristics of cataract surgery patients at Dustira Hospital in 2017-2022 based on gender in the SICS and phacoemulsification techniques were that the majority were women (54.9%). There is a significant difference in *visual outcome after* cataract surgery using the SICS technique with phacoemulsification at Dustira Hospital in 2017-2022. Based on the research that has been conducted, the researcher provides several suggestions for further research references: Further research can determine other influences on *visual outcomes* in *post-* SICS and phacoemulsification patients, such as the accuracy of IOL size, comorbidities and *post-* operative complications. Further research can compare more specific *visual outcomes in patients undergoing SICS and phacoemulsification surgery, namely uncorrected best visual acuity* (UBCVA) with *best corrected visual acuity* (BCVA). Further research can identify factors that can influence *visual outcomes. post-* operative SICS and phacoemulsification.

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