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Preventing Post Phacoemulsification Infection With Intracameral Levofloxacin Administrative

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ABSTRACT

Aim: To determine the efficacy of intracameral levofoxacin to prevent post phacoemulsification (phaco) infection.

Material and methods: 2864 eyes of 2032 patients underwent phacoemulsification. Levofloxacin 0.5% given at the end step of surgery intracamerally. Eye conditions, uncorrected visual acuity (UCVA), best corrected visual acuity (BCVA), and intraocular pressure (IOP) were observed and recorded.

Results: There is no observed infection event from day one until one month after surgery. UCVA and BCVA were improved (P<0.001) respectively, and IOP was reduced (P<0.001) on one month after surgery.

Conclusion: Intracameral levofloxacin may be effective to prevent post phaco infection. UCVA, BCVA, and IOP were improved following the absence of infection events.

Keywords: *phacoemulsification, intracameral levofloxacin, infection, prevention, surgery*

1. INTRODUCTION

Cataractous lens must be treated properly.[1,2] Early treatment ensures the absence of unnecessary complications from cataracts such as phacomorphic glaucoma, phacolytic glaucoma, and also avoids a longer surgical process and greater impact on the fine structure of the macula and cornea which is often followed by the result of surgery in the form of poor visual acuity due to operation delay.[1,3-5]

One of the most popular cataract treatments is phacoemulsification (phaco).[1,2] Phaco provides a fast operation, with a clear cornea incision, no injections needed, stitchless, no bleeding and no splints or bandages on the eye needed after surgery. Phaco also offers a more pleasant, painless surgical experience, as well as providing faster recovery and excellent improvement in visual function.[6,7]

Phaco is a considerably safe procedure with minimal complication rates.[1,2,4] However, awareness of complications is still something important that must be maintained, so that the phaco complication rate remains low. Phaco complications can include posterior capsule tear, nucleus drop, macular edema and corneal edema.[4] Meanwhile, the most feared complication after phaco is infection.[8,9]

Infections after phaco must be prevented from occurring, because infection could greatly affects the entire structure of the eye which supports the eye to see clearly.[4,8,9] One of the efforts to prevent infection carried out during the phaco process is the administration of intracameral antibiotic injection, and one of the antibiotics that could be chosen is levofloxacin.[10]

2. MATERIAL AND METHODS

2864 eyes of 2032 patients underwent phacoemulsification and intraocular lens (IOL) implantation at Sabang Merauke Eye Center (SMEC), Medan, Indonesia, with one surgeon (GP). Levofloxacin 0.5% intracamerally given at the end step or the conclusion of surgery.

Eye conditions including the signs of uveitis (inflammation) and infection ie: conjunctivitis, keratitis, and endophthalmitis were observed during every visit. The measurements of uncorrected visual acuity (UCVA), best corrected visual acuity (BCVA), and intraocular pressure (IOP) were recorded preoperatively (preop) and one month postoperatively (postop).

This combined pre-post quasi experimental and observational study was conducted from January 2021 until October 2024. This study meets the Declaration of Helsinki and hospital ethical clearance. The data were analyzed by employing the State Performance Standards System (SPSS) version 29.0 (International Business Machine (IBM) Inc, USA) with P value less than 0.05 is considered as statistically significant. The student paired t-test was employed in this study.

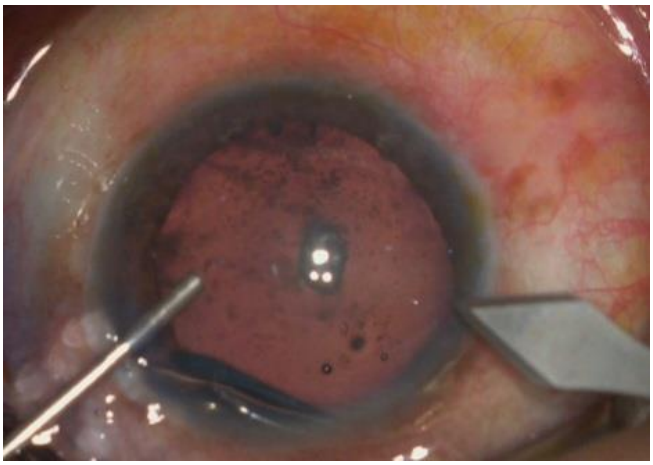

Figure 1. Early step of phaco

3. RESULTS

A total of 2864 eyes of 2032 cataract patients were included in this study. Baseline clinical characteristics of participants are presented in Table 1. The mean age was 62.74 ± 14.78-year-old. Male patients (1235 eyes (43.12%)), meanwhile female patients (1629 (56.88%)) were predominant in this study. The participants were Indonesian with ethnical distribution of Malay (1454 (50.77%)), Chinese (954 (33.31%)), Indian (443 (15.47%)), and also foreigners with distribution of African (8 (0,27%0, Arabian (4 (0.14%), and Caucasian (1 (0.04%)).

Table 1. Baseline data of the study

Characteristics	**Numbers**
Age at baseline (years)	62.74 ± 14.78
Sex, number of eye (%)	
Male (%)	1235 (43.12%)
Female (%)	1629 (56.88%)
Race, number of eye (%)	
Malay Indonesian (%)	1454 (50.77%)
Chinese Indonesian (%)	954 (33.31%)
Indian Indonesian (%)	443 (15.47%)
African (%)	8 (0.27%)
Arabian (%)	4 (0.14%)
Caucasian (%)	1 (0.04%)

We record any incidence of infection in binary data (yes or no) and record the additional outcome of the surgery based on the value of UCVA, BCVA and IOP in numerical data. There were 0 accident of postop uveitis (inflammation); and 0 accident of infections ie: conjunctivitis, keratitis, endophthalmitis (Table 2)

Table 2. Number of inflammation and infection event after surgery

Complication	N (total)	%
Uveitis (Inflammation)	0/2864	0
Conjunctivitis	0/2864	0
Keratitis	0/2864	0
Endophthalmitis	0/2864	0

UCVA and BCVA were significantly improved (P<0.001 consecutively for both eyes). UCVA was improved from 0.16 ± 0.127 (0.003-0.1) to 0.84 ± 0.10 (0.50-1.0), meanwhile BCVA was improved from 0.23 ± 0.122 (0.016-0.28) to 0.94 ± 0.06 (0.80-1.0) (in decimal). IOP value were better after 1 month postop (in mmHg) from 19.06 ± 1.81 (16-20) to 12.10 ± 1.22 (11-14) (P<0.001 for both eyes) as presented in Table 3.

Table 3. Preop and postop UCVA, BCVA and IOP.

	Preop (mean)	1 month postop (mean)	P-value
Visual acuity (decimal)			
Uncorrected	0.16 ± 0.127 (0.003-0.1)	0.84 ± 0.10 (0.50-1.0)	<0.001
Best corrected	0.23 ± 0.122 (0.016-0.28)	0.94 ± 0.06 (0.80-1.0)	<0.001
Intraocular pressure (mmHg)	19.06 ± 1.81 (16-20)	12.10 ± 1.22 (11-14)	<0.001

4. DISCUSSION

This study was conducted by administering intracameral injection of levofloxacin at the conclusion or the end of phaco. The procedures of phaco and IOL implantation were applicated to 2864 eyes of 2023 patients with baseline data distribution as shown in Table 1.

Phaco is a fast and safe procedure if carried out in accordance with quality standards that are continuously maintained.[1,2] One of the safety standards in phaco surgery is various aseptic, antiseptic measures, and the use of intracameral antibiotics to prevent infection.[10,11] The absence of infection greatly supports the success of the operation, the structure of the eye is maintained without damage and maximum visual function can be achieved. One antibiotic that can be used for intracameral infections is levofloxacin 0.5%.[10-12]

To date, intracameral levofloxacin 0.5% administration in phaco surgery has been widely studied with excellent results.[10,12,13] However, there has never been a research report with a number of eyes reaching thousands. Meanwhile, another antibiotic that is also widely reported is movifloxacin.[14,15] Levofloxacin was chosen to be used in our hospital considering that levofloxacin has good efficacy and is more economical for patients.[13,16]

The efficacy of intracameral levofloxacin is very good and has been used for more than a decade.[13,15,16] Observations in this study found the absence of inflammation (uveitis) and infections after surgery such as: conjunctivitis, keratitis and endophthalmitis (Table 2). This research strongly supports several previous studies which stated that levofloxacin was effective in preventing infections after surgery, especially the much feared endophthalmitis.[10,11]

This research also supports that phaco has been proven to help patients seeing with better visual acuity as presented in Table 3. This is of course supported by rigorous preop examinations, including IOL power calculation[17], as well as phaco technique and maneuver which, although relatively fast (10-15 minutes), but done with vigilance and following strict and careful protocols.[1,2,18]

IOP was also found to decrease in this study as shown in Table 3. This supports many studies which state that phaco can help reduce the patient's IOP. This decrease in IOP is caused by the IOL implanted to replace the cataractous lens having a thinner thickness.[12,19,20] This difference in thickness provides more space for the iris to move backwards, so that the anterior chamber angle is widely open more than before, which is then followed by improvements in aqueous outflow and results in a decrease in IOP.[12.19-21]

The absence of infection ensures that the quality and function of the structures in the eyeball are maintained, this also increases the chances for patients to get better quality of vision. A more controlled IOP also maintains the health of the retinal nerve fiber layer (RNFL), so that good visual function is even more guaranteed for a longer time.[21]

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REFERENCES

[1] Allen D, Vasavada A. Cataract and surgery for cataract. BMJ. 2006 Jul 15;333(7559):128-132. doi: 10.1136/bmj.333.7559.128. PMID: 16840470; PMCID: PMC1502210.

[2] Pardianto G, Tassignon MJ. (eds) Innovation in Cataract Surgery. Springer, Singapore. ISBN: 978-981-97-5191-4 (Hard Cover), 978-981-97-5194-5 (Soft Cover), 978-981-97-5192-1 (eBook) https://doi.org/10.1007/978-981-97-5192-1

[3] Chang A, Fridberg A, Kugelberg M. Comparison of phacoemulsification cataract surgery with low versus standard fluidic settings and the impact on postoperative parameters. Eur J Ophthalmol. 2017 Jan 19;27(1):39-44. doi: 10.5301/ejo.5000813. Epub 2016 May 31. PMID: 27312207.

[4] Astbury N, Nyamai LA. Detecting and managing complications in cataract patients. Community Eye Health. 2016;29(94):27-29. PMID: 27833260; PMCID: PMC5100470.

[5] Lapp T, Wacker K, Heinz C, Maier P, Eberwein P, Reinhard T. Cataract Surgery-Indications, Techniques, and Intraocular Lens Selection. Dtsch Arztebl Int. 2023 May 30;120(21):377-386. doi: 10.3238/arztebl.m2023.0028. PMID: 36794457; PMCID: PMC10413970.

[6] Al Mahmood AM, Al-Swailem SA, Behrens A. Clear corneal incision in cataract surgery. Middle East Afr J Ophthalmol. 2014 Jan-Mar;21(1):25-31. doi: 10.4103/0974-9233.124084. PMID: 24669142; PMCID: PMC3959037.

[7] Grzybowski A. Recent developments in cataract surgery. Ann Transl Med. 2020 Nov;8(22):1540. doi: 10.21037/atm-2020-rcs-16. PMID: 33313285; PMCID: PMC7729366.

[8] Shi SL, Yu XN, Cui YL, Zheng SF, Shentu XC. Incidence of endophthalmitis after phacoemulsification cataract surgery: a Meta-analysis. Int J Ophthalmol. 2022 Feb 18;15(2):327-335. doi: 10.18240/ijo.2022.02.20. PMID: 35186695; PMCID: PMC8818473.

[9] Kocak I, Kocak F, Teker B, Aydin A, Kaya F, Baybora H. Evaluation of bacterial contamination rate of the anterior chamber during phacoemulsification surgery using an automated microbial detection system. Int J Ophthalmol. 2014 Aug 18;7(4):686-8. doi: 10.3980/j.issn.2222-3959.2014.04.19. PMID: 25161944; PMCID: PMC4137208.

[10] Espiritu CRG, Bolinao JG. Prophylactic intracameral levofloxacin in cataract surgery - an evaluation of safety. Clin Ophthalmol. 2017 Dec 12;11:2199-2204. doi: 10.2147/OPTH.S144625. PMID: 29276375; PMCID: PMC5731440.

[11] Titiyal JS, Kaur M. Role of intracameral antibiotics in endophthalmitis prophylaxis following-cataract surgery.

Indian J Ophthalmol. 2020 May;68(5):688-691. doi: 10.4103/ijo.IJO_195_20. PMID: 32317429; PMCID: PMC7350474.

[12] Pardianto G, Moeloek N, Reveny J, Wage S, Satari I, Sembiring R, Srisamran N. Retinal thickness changes after phacoemulsification. Clin Ophthalmol. 2013;7:2207-14. doi: 10.2147/OPTH.S53223. Epub 2013 Nov 5. PMID: 24235812; PMCID: PMC3821754.

[13] Parmono AF, Pardianto G, Purworini D. Safety of phacoemulsification with gradual hydrodissection on posterior polar cataract. Vision Science and Eye Health Journal, 2024:3(3);51-54 DOI: https://doi.org/10.20473/vsehj.v3i3.2024.51-54

[14] Arshinoff SA, Modabber M. Dose and administration of intracameral moxifloxacin for prophylaxis of postoperative endophthalmitis. J Cataract Refract Surg. 2016 Dec;42(12):1730-1741. doi: 10.1016/j.jcrs.2016.10.017. PMID: 28007104.

[15] Haripriya A, Chang DF, Namburar S, Smita A, Ravindran RD. Efficacy of Intracameral Moxifloxacin Endophthalmitis Prophylaxis at Aravind Eye Hospital. Ophthalmology. 2016 Feb;123(2):302-308. doi: 10.1016/j.ophtha.2015.09.037. Epub 2015 Oct 30. PMID: 26522705.

[16] Ball P. Efficacy and safety of levofloxacin in the context of other contemporary fluoroquinolones: a review. Curr Ther Res Clin Exp. 2003 Nov;64(9):646-61. doi: 10.1016/j.curtheres.2003.11.003. PMID: 24944413; PMCID: PMC4053061.

[17] Pardianto G, editor. The Intraocular Lens Power Calculation. Medan: Anak Sudarti Foundation. 2022.

[18] Silitonga, A.R., Pardianto, G. (2024). Fundamentals of Phaco Innovations: Definitions and Basic Understanding. In: Pardianto, G., Tassignon, MJ. (eds) Innovation in Cataract Surgery. Springer, Singapore. https://doi.org/10.1007/978-981-97-5192-1_2

[19] Zuo C, Long B, Guo X, Chen L, Liu X. Effect of Phacoemulsification on Anterior Chamber Angle in Eyes with Medically Uncontrolled Filtered Primary Angle-Closure Glaucoma. J Ophthalmol. 2020 Apr 21;2020:8720450. doi: 10.1155/2020/8720450. PMID: 32377424; PMCID: PMC7191372.

[20] Wang SY, Azad AD, Lin SC, Hernandez-Boussard T, Pershing S. Intraocular Pressure Changes after Cataract Surgery in Patients with and without Glaucoma: An Informatics-Based Approach. Ophthalmol Glaucoma. 2020 Sep-Oct;3(5):343-349. doi: 10.1016/j.ogla.2020.06.002. Epub 2020 Jun 9. PMID: 32703703; PMCID: PMC7529869.

[21] Pardianto G. Recent awareness and consideration of intraocular pressure fluctuation during eye surgery. J Cataract Refract Surg. 2015 Mar;41(3):695. doi: 10.1016/j.jcrs.2015.01.009. PMID: 25804599.