

Comparison of Incidence And Prognosis of Acute Endophthalmitis after Cataract Surgery And Intravitreal Avastin Injection

A. Eftekhari Milani (MD)¹, N. Hassanpoor (MD)¹, H. Farshkaran (MD)², V. Manouchehri (MD)¹,
M. R. Niyousha (MD)*¹

1.Department of Ophthalmology, Faculty of Medicine, Tabriz University of Medical Sciences, Tabriz, I.R.Iran

2.Department of Surgery, School of Medicine, Tabriz Branch, Islamic Azad University, Tabriz, I.R.Iran

J Babol Univ Med Sci; 23; 2021; PP: 114-118

Received: Apr 14th 2020, Revised: Nov 8th 2020, Accepted: Nov 16th 2020.

ABSTRACT

BACKGROUND AND OBJECTIVE: Acute endophthalmitis is one of the most dangerous complications after eye surgeries. Knowing the severity of this complication is critical for treatment policy in ophthalmology departments. The aim of this study was to determine the incidence of this complication and its prognosis in cataract surgery and intravitreal Avastin injection.

METHODS: This retrospective study was performed on patients who developed acute endophthalmitis following cataract surgery and intravitreal injection of Avastin in 2011-2018. Incidence, treatment method and visual acuity of patients were compared based on the logMAR unit (minimum angle of resolution) at referral and at the end of treatment.

FINDINGS: The incidence of acute endophthalmitis following cataract surgery in this study was 0.058% (20 cases of 34297 surgeries) with 95% confidence interval (0.032-0.083) and after intravitreal injection of Avastin was 0.042% (14 cases of 33273 injections) with 95% confidence interval (0.021-0.063). The mean age of the first group was 68.3±3.3 years and in the second group was 66.3±2.4 years. The mean final visual acuity of patients in the cataract group was 1.73±0.91 logMAR and in the intravitreal injection group was 1.61±0.87 logMAR, which was not statistically different between the two groups. Deep vitrectomy was performed in 35% of patients in the cataract group and 45% of patients in intravitreal Avastin injection group, but there was no significant difference between the two groups.

CONCLUSION: The results of the study showed that the incidence of acute endophthalmitis following cataract surgery and intravitreal injection of Avastin showed no significant correlation.

KEY WORDS: *Cataracts, Intravitreal Injection, Avastin, Endophthalmitis.*

Please cite this article as follows:

Eftekhari Milani A, Hassanpoor N, Farshkaran H, Manouchehri V, Niyousha MR. Comparison of Incidence And Prognosis of Acute Endophthalmitis after Cataract Surgery And Intravitreal Avastin Injection. J Babol Univ Med Sci. 2021; 23: 114-8.

*Corresponding Author: M. R. Niyousha (MD)

Address: Department of Ophthalmology, Faculty of Medicine, Tabriz University of Medical Sciences, Tabriz, I.R.Iran

Tel: +98 41 36551332

E-mail: mreza63neusha@gmail.com

Introduction

Endophthalmitis is inflammation of the eye with a severe threat to vision which is divided into acute and chronic. Infectious endophthalmitis usually occurs due to transmission of the infectious agent following surgery or trauma (1). Visual outcomes after endophthalmitis depend on early diagnosis, acute or chronic, cause of rapid treatment and appropriate treatment methods. If endophthalmitis occurs in the first 6 weeks after surgery, endophthalmitis is considered as acute. Clinical findings in acute endophthalmitis include redness of the eye, blepharitis, impaired vision, abnormal pupillary reflex, corneal infiltration, anterior chamber fibrin reaction, vitreous inflammation, retinitis, and retinal periphlebitis (2, 3).

In a study conducted in France, the incidence of endophthalmitis decreased from 0.145% to 0.053% within 10 years from 2005 to 2014 (2). This rate varies from 0.053% in cataract surgery with intraocular lens implantation, and 0.033% and 0.056% following intravitreal injection (2-4). There are different risk factors for acute endophthalmitis. Evidence shows that topical betadine 5% is effective in reducing the rate of post-injection infection and ocular interventions (5). Topical antibiotics before and after interventions do not have a definite effect on reducing the incidence of eye infections (2-6).

In our study, serum antibiotics were not used to prevent endophthalmitis and the greatest emphasis was on the use of betadine. The most common cause of endophthalmitis is microorganisms present in the superficial tissues of the eye such as eyelids, lacrimal sac and conjunctiva (7). Visual acuity of patients after endophthalmitis is generally poor. However, timely and appropriate treatment of patients can improve the visual acuity of patients to some extent (8). A final vision of 20/100 or more is seen in endophthalmitis of staphylococcus epidermidis origin, but the patient's initial vision is more important than the microbial factors in the prognosis of the final vision (9). Initial visual acuity, the result of microbial culture and the type of treatment of patients have a direct effect on the final visual acuity of patients (10).

The most common surgeries performed in the eye are cataract surgery and intraocular injection of Avastin, and endophthalmitis is one of the most dangerous complications after surgery. Knowing the extent of this complication is critical to treatment policy in ophthalmology departments such as infection control, sterilization conditions, and operating room staff

training. We need periodic studies to improve infection control methods, especially in dangerous cases such as endophthalmitis. Therefore, the aim of this study was to compare the incidence and prognosis of acute endophthalmitis after intravitreal injection of Avastin and cataract surgery.

Methods

This retrospective cross-sectional study was conducted after approval in the ethics committee of Islamic Azad University of Medical Sciences, Tabriz Branch under the code IR.IAU.TABRIZ.REC.1398.086. In this study, cases of acute endophthalmitis following cataract surgery (group 1) and intravitreal injection of Avastin (group 2) in Nikukari Eye Hospital in Tabriz from 2011 to 2018 were determined and the frequency of endophthalmitis was determined. Patients with endophthalmitis were enrolled in the study after these two surgical procedures. Inclusion criteria were the incidence of endophthalmitis within 6 weeks after intervention. Diagnosis of endophthalmitis is based on the patient's symptoms such as eye pain, decreased vision and clinical examination, corneal edema, anterior chamber inflammation, hypopyon, decreased red reflex and vitreous opacity, retinitis and retinal periphlebitis. The number of cases that did not improve with intravitreal injection of antibiotics and required deep vitrectomy was compared between the two groups. Patients' vision at admission and at the end of treatment was calculated and compared based on logMAR unit. The data obtained from the study were analyzed by SPSS software version 22 using independent t-test and $p < 0.05$ was considered significant.

Results

The total number of cases of acute endophthalmitis was 121, of which 101 were in the first group and 20 in the second group. The mean age of the first group was 68.3 ± 3.3 years and in the second group was 66.3 ± 2.4 years. In the first group, 58% (70 out of 121) were male and in the second group, 60% (12 out of 20) were male. There was no significant difference between the two groups in terms of age and gender. Of the 101 cases in the first group, 20 were related to surgeries performed at Nikukari Eye Hospital and 81 were referred from other centers. Out of 20 cases in the second group, 14 cases were related to injections performed in Nikukari

Eye Hospital and 6 cases were referred from other centers. According to the number of cataract surgeries (34297 cases) and intravitreal injections (33273 cases) performed in Nikukari Eye Hospital, the incidence of acute endophthalmitis in this center following each of these interventions was 0.058% with 95% confidence interval (0.032-0.083) and 0.042% with 95% confidence interval (0.021-0.063), respectively. In the first group, 35 out of 101 cases (35%) and in the second group, 9 out of 20 cases (45%) underwent deep vitrectomy. The percentage of deep vitrectomy in the second group was higher than the first group, but this finding is not statistically significant. The mean initial and final visual acuity of the two groups showed no statistically significant difference (Table 1).

Table 1. Mean visual acuity of patients before and after treatment based on logMAR unit

	Cataract group	Avastin group	p-value
Mean initial visual acuity	2.37±0.57	2.26±0.61	0.585
Mean final visual acuity	1.73±1.91	1.61±0.87	0.657
Mean absolute value of changes	0.70±0.43	0.65±0.46	0.684

Discussion

Acute endophthalmitis in this study in the first and second groups was 0.06% and 0.04%, respectively. There was no significant difference between the two groups in terms of the need for vitrectomy and final vision after endophthalmitis. In our study, patients' vision at the beginning of referral and final vision were not statistically different between the two groups. The results of our study also showed that standard interventions in patients can lead to a significant improvement in patients' visual acuity, but only a small percentage (14%) of visual acuity above 20/200 was obtained after the intervention.

This low recovery rate was mainly obtained in people with an initial vision of 20/200, which in general caused the mean visual improvement to be statistically insignificant. Other causes include high percentage of patients referred from other centers, which results in loss of critical time for intervention, low initial visual acuity of patients in the Avastin group before endophthalmitis, and in some cases, failure to perform emergency vitrectomy surgery. In the study of Wong et al., a direct relationship between final visual acuity and patients' initial vision was reported. In their study, the annual incidence of endophthalmitis after cataract was

0.076% and in case of posterior capsule rupture, the probability of endophthalmitis increases up to 10 times. Patients had a better prognosis if there was an initial hand motion vision, negative culture or culture of coagulase-negative staphylococci (11).

In the study of Jabbarvand et al. about endophthalmitis following cataract surgery at Farabi Eye Hospital in Tehran, the prevalence of endophthalmitis was estimated to be 0.023%, which is lower than our study, which could be due to the use of antibiotic injection during surgery. No cases of endophthalmitis were reported in 26,000 patients who received cefuroxime during surgery. Intravitreal injection of antibiotics has been introduced as the first step in treatment and immediate vitrectomy has been introduced as the main treatment (12).

In a study by Dar et al., which compared clinical signs, visual outcomes, and organisms involved in endophthalmitis after cataract surgery and intravitreal injection in a 15-year cohort, the rate of improvement in endophthalmitis following cataract surgery compared to endophthalmitis following intravitreal injection was overall better (13). In our study, no significant difference was observed between the two groups. However, the number of cases requiring deep vitrectomy was higher in the second group than in the first group.

Further improvement of vision after endophthalmitis following cataracts can be attributed to the lower initial vision of patients in intravitreal injections and lack of symptoms in this group, which causes them to refer later compared to the cataract group. On the other hand, in endophthalmitis, after intravitreal injection, the retina is affected faster and the final vision is lower. In general, the prognosis of vision is poor after endophthalmitis, but if the patient is referred quickly in the first few hours, the improvement of vision can be very significant; for this purpose, educating the patient and his/her relatives about the symptoms of this complication can reduce the consequences of this complication in the community.

The prevalence of acute endophthalmitis following cataract surgery and intravitreal injection of Avastin in this study is similar to other studies. There was no significant difference in the treatment outcomes of endophthalmitis between the two groups. The patient's initial vision is a very important factor in determining the final prognosis, and one of the best ways to improve the results is to refer quickly and to follow the correct symptoms.

Conflict of interest: There is no conflict of interest.

Acknowledgment

We hereby appreciate the support of the Vice Chancellor for Research of Tabriz Islamic Azad

University of Medical Sciences and the Head of Retina Ward of Nikukari Eye Hospital in Tabriz, Dr. Mohammad Hossein Ahoor.

References

1. Gower EW, Lindsley K, Tulenko SE, Nanji AA, Leyngold I, McDonnell PJ. Perioperative antibiotics for prevention of acute endophthalmitis after cataract surgery. *Cochrane Database Syst Rev*. 2017;2(2):CD006364.
2. Creuzot-Garcher C, Benzenine E, Mariet A-S, de Lazzer A, Chiquet C, Bron AM, et al. Incidence of acute postoperative endophthalmitis after cataract surgery: a nationwide study in France from 2005 to 2014. *Ophthalmology* 2016;123(7):1414-20.
3. Li AL, Wykoff CC, Wang R, Chen E, Benz MS, Fish RH, et al. Endophthalmitis After Intravitreal Injection: Role of Prophylactic Topical Ophthalmic Antibiotic. *Retina*. 2016;36(7):1349-56.
4. Fileta JB, Scott IU, Flynn Jr HW. Meta-analysis of infectious endophthalmitis after intravitreal injection of anti-vascular endothelial growth factor agents. *Ophthalmic Surg Lasers Imaging Retina*. 2014;45(2):143-9.
5. Doshi RR, Leng T, Fung AE. Povidone-iodine before lidocaine gel anesthesia achieves surface antisepsis. *Ophthalmic Surg Lasers Imaging*. 2011;42(4):346-9.
6. Huang J, Wang X, Chen X, Song Q, Liu W, Lu L. Perioperative antibiotics to prevent acute endophthalmitis after ophthalmic surgery: a systematic review and meta-analysis. *PLoS One*. 2016;11(11):e0166141.
7. Soleimani A, Sefidgar AA, Ramezani H. Evaluation of aerobic bacterial normal flora of conjunctiva in healthy persons, Babol Shahid Beheshti Hospital. *J Babol Univ Med Sci*. 2003;5(4):33-6. [In Persian]
8. Ausayakhun S, Itthipunkul N, Patikulsil D, Choovuthayakorn J, Kunavisarut P, Wattananikorn S, et al. An outbreak of acute postoperative endophthalmitis after cataract surgery. *J Med Assoc Thai*. 2008;91(8):1239-43.
9. Livingston ET, Mursalin MH, Callegan MC. A Pyrrhic Victory: The PMN Response to Ocular Bacterial Infections. *Microorganisms*. 2019;7(11):537.
10. Jeong SH, Cho HJ, Kim HS, Han JI, Lee DW, Kim CG, et al. Acute endophthalmitis after cataract surgery: 164 consecutive cases treated at a referral center in South Korea. *Eye (Lond)*. 2017;31(10):1456-62.
11. Wong TY, Chee S-P. The epidemiology of acute endophthalmitis after cataract surgery in an Asian population. *Ophthalmology*. 2004;111(4):699-705.
12. Jabbarvand M, Hashemian H, Khodaparast M, Jouharu M, Tabatabaei A, Rezaei S. Endophthalmitis occurring after cataract surgery: outcomes of more than 480 000 cataract surgeries, epidemiologic features, and risk factors. *Ophthalmology*. 2016;123(2):295-301.
13. Dar N, Pillar S, Friehmann A, Belkin A, Ofir S. Endophthalmitis after intravitreal injections versus cataract surgery: a 15-year cohort. *Int Ophthalmol*. 2020;40(1):73-9.