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ORIGINAL ARTICLE

VISUAL OUTCOME BETWEEN EARLY AND DELAYED VITRECTOMY IN ENDOPHTHALMITIS PATIENTS OPERATED IN KARIADI HOSPITAL, SEMARANG : TWO YEARS DESCRIPTIVE STUDY

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ABSTRACT

Introduction : *Endophthalmitis is a medical emergency caused by infection of tissue or fluids inside the eyeball. Vitrectomy for endophthalmitis is one of the treatment choice and leads to VA gains in some cases. Timing of surgery and visual outcome after surgery are vital to acknowledge. This study aims to analyze the difference of visual outcome between early and delayed vitrectomy in endophthalmitis patients operated in Dr. Kariadi General Hospital*

Methods : *A Retrospective study held from medical record of patients with endophthalmitis underwent vitrectomy surgery from January 2021 – January 2023 in Dr. Kariadi General Hospital, Semarang. Endophthalmitis patients caused by trauma were excluded. All of the patients had immediate vitrectomy, and based on the onset, the patients were divided into two groups, early vitrectomy (onset ≤ 7 days) and delayed vitrectomy (onset > 7 days). Independent t- test method was used to analyze the data (significant if $p<0.05$)*

Result : *Totally 30 endophthalmitis patients (30 eyes) were obtained. There were 18 patients (60%) had early vitrectomy and 12 patients (40%) had delayed vitrectomy. Postoperative examination showed 13 (72%) patients with early vitrectomy had improved VA, and 5 (28%) had constant VA. On the other hand, patients with delayed vitrectomy showed 5 (42%) had improved VA, 6 (50%) had constant VA, and 1 (8%) had decreased VA. The difference between two groups was significant ($p=0.014$)*

Conclusion : *This study found endophthalmitis patients with early vitrectomy had significant better visual outcome than delayed vitrectomy.*

Keywords : *endophthalmitis, early vitrectomy, delayed vitrectomy*

INTRODUCTION

Endophthalmitis is a devastating eye complication that may lead to blindness. It is a true ocular emergency that calls for fast and suitable treatment. Infection control, inflammation management, and supportive therapy are the major goals of endophthalmitis treatment.[1] Endophthalmitis treatment options include vitrectomy, which can improve visual acuity (VA) in some cases. Compared to conventional therapy, vitrectomy has a number of benefits. The vitrectomy enhances retinal oxygenation, lowers inflammatory burden in the eye, supplies

specimens for diagnostic examination, permits direct retinal inspection, enables definite treatment, and accelerates visual recovery. There are two sets of recommendation : one based on EVS study and another based on Complete and Early Vitrectomy for Endophthalmitis (CEVE) study.[2,3]

The 1995 EVS study found that if the vision is superior than perception of light (PL), such as the ability to see hand motions (HMs), then vitrectomy is not beneficial.[2] Contrary to the findings of the EVS trial, the CEVE (complete and early vitrectomy for endophthalmitis) study advises CEVE as the first-line therapy for all fundus obscuring acute post-cataract endphthalmitis (75% of cases), which includes all PL/HM eyes and almost half of eyes with CF or greater visual acuity.[4]

Timing of surgery and visual outcome after surgery are vital to acknowledge. According to a study conducted by Negreti et al., patients may experience enhanced visual benefits if surgery is carried out within 7 days.[5] This study aims to analyze the difference of visual outcome between early and delayed vitrectomy in endophthalmitis patients operated in Dr. Kariadi General Hospital.

METHODS

A retrospective study of 30 patients (30 eyes) with endophthalmitis operated in Dr. Kariadi General Hospital, Semarang was held. Inclusion criteria was all endophthalmitis patients underwent vitrectomy surgery from January 2021 – January 2023. Exclusion criteria were patients with history of trauma, patients who had additional surgery besides vitrectomy such as lens extraction, corneal suture and glaucoma surgery, patients with underlying ocular disorder before endophthalmitis onset, and patients who had incomplete medical record data.

All of the patients had immediate vitrectomy surgery. Based on the onset, the patients were divided into two groups. The first group was early vitrectomy group. It consisted of patients who had onset of less than 7 days. The second was delayed vitrectomy group, which had onset more than 7 days.

All patients underwent a comprehensive eye examination including visual acuity (VA) testing before and after surgery. After surgery, patients were followed up until the last follow up visit (1-2 months).

The VA was assessed using Snellen chart and then converted from Snellen to LogMAR for analysis. Snellen counting fingers at 1 metre vision was converted to 1.80 LogMAR, Snellen HMs vision to 2.2 LogMAR, and Snellen PL vision to 2.9 LogMAR.

Ophthalmol Ina 2023;Supplement Ed.: 223-229

Medical records were reviewed to obtain the clinical characteristics of patients including sex, age, onset, cause of endophthalmitis, and visual acuity before and after surgery. Fundus examination was done using 20D and 78D Volks© condensing lens.

The study was approved by the research ethics committee of Medical Faculty Diponegoro University. Data were analyzed using statistical software program SPSS V26.0. Clinical parameter distributions were tested for normality by The Kolmogorov Smirnov test. Independent *t* test was conducted for variable with a normal distribution. *P* values less than 0.05 on a 2-sided test were considered statistically significant.

RESULTS

From January 2021-January 2023, there were 35 patients registered with endophthalmitis who underwent vitrectomy. Five patients were excluded because of incomplete medical record (3 patients) and had lens extraction beside vitrectomy (2 patients), and 30 patients were included in the study. Demography characteristic of the patients are shown in Table 1.

Table 1. Demography characteristics of Endophthalmitis patients (n=30)

Demography Characteristic	Frequency	%
Sex		
Male	22	73
Female	8	27
Age		
< 50 y.o	8	27
50-59 y.o	5	17
≥ 60 y.o	17	57
Avg (years)	55.9±15.3	

y.o : years old, Avg : average

A significant proportion of our study subjects, 22 patients (73%) were men, and 17 patients (57%) aged more than 60 years old. The average age of the participants was 55.9±15.3 years. The youngest participants was 20 years old while the oldest was 80.

All of the patients underwent immediate vitrectomy surgery. Based on the onset, the timing of surgery was divided into early and delayed vitrectomy as explained in Table 2.

Table 2. Time of Vitrectomy Surgery of Endophthalmitis patients (n=30)

Time of Surgery	Frequency	%
≤ 7 days	18	60
> 7 days	12	40

From totally 30 endophthalmitis patients (30 eyes) obtained, there were 18 patients (60%) had early vitrectomy and 12 patients (40%) had delayed vitrectomy. All patients underwent 23-gauge pars plana vitrectomy with vitreous tap and intravitreal antibiotic injection performed by vitreoretinal consultant surgeon.

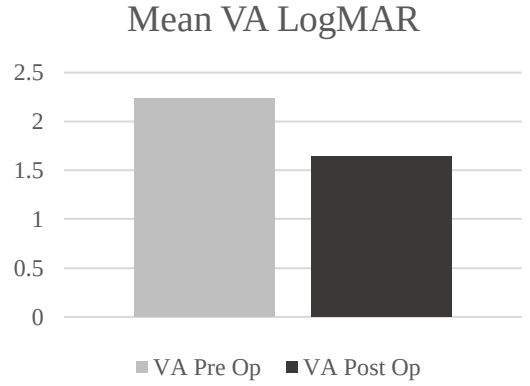
VA Outcomes

The preoperative VA measured in this study population varied with 1 (3%) patient had VA < 1.0 LogMAR, 6 (20%) patients had VA range at 1.00-2.00 LogMAR, while 23 (77%) patients had VA > 2.00 LogMAR. The mean LogMAR VA prior to vitrectomy was 2.23.

Post operatively, VA was measured regularly and VA in 2 months after surgery was obtained. Eight (27%) patients had VA < 1.00, 6 (20%) patients had VA range at 1.00-2.00, and 16 (53%) patients had VA > 2.00. The mean LogMAR post operative VA showed an improvement with value 1.64.

Table 3. Visual Acuity Pre and Post Operative of Endophthalmitis patients (n=30)

Visual Acuity	Frequency	%
Before Surgery		
< 1.00	1	3
1.00 - 2.00	6	20
> 2.00	23	77
Mean VA	2.23	
After Surgery		
< 1.00	8	27
1.00 - 2.00	6	20
> 2.00	16	53
Mean VA	1.64	



Ophthalmol Ina 2023;Supplement Ed.: 223-229

Figure 1. Mean VA LogMAR pre and post operative

Better VA improvement was shown in early vitrectomy group. As described ini Tabel 4, 13 (72%) patients with early vitrectomy had improved VA, and 5 (28%) had constant VA. On the other hand, patients with delayed vitrectomy showed 5 (42%) had improved VA, 6 (50%) had constant VA, and 1 (8%) had decreased VA. The difference between two groups was calculated with independent t test and revealed significant difference (p=0.014) between VA result in early and delayed vitrectomy groups.

Table 4. VA Improvement In Early and Delayed Vitrectomy (n=30)

VA Improvement	Frequency
Early Vitrectomy	
Improve	13
Constant	5
Decrease	0
Delayed Vitrectomy	
Improve	5
Constant	6
Decrease	1

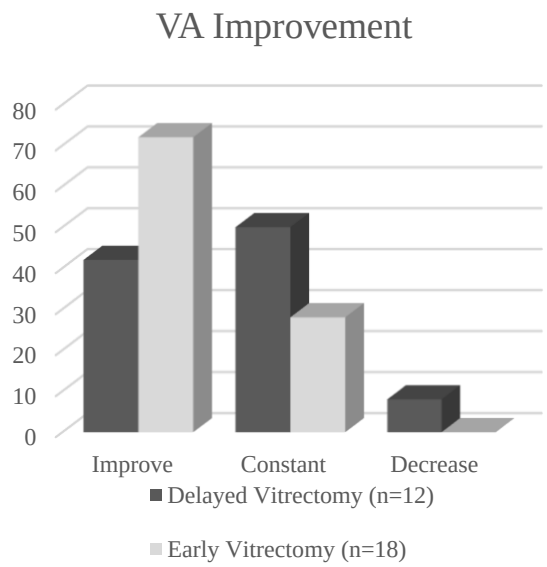


Figure 2. Difference of VA Improvement between early and delayed vitrectomy

DISCUSSION

This study subjects comprised 30 patients. Most of the patients were male (73%) and aged 60 years old or older (57%). This is consistent with reported study that stated that endophthalmitis was associated with older age and male gender. In a population-based retrospective epidemiological survey held by Nowak et al stated that endophthalmitis was significantly associated with older age, male gender, black race, diabetes mellitus, presence of renal disease as well as extracapsular cataract extraction, cataract surgery combined with other procedures, intraoperative posterior capsule rupture, and non-use of intracameral antibiotic.[6]

Previously, endophthalmitis patients are treated based on Endophthalmitis Vitrectomy Study (EVS) guidelines. The EVS, published in 1995, is regarded as the landmark investigation exploring the use of vitrectomy for post-cataract surgery endophthalmitis. The EVS came to the conclusion that if the vision is better than the perception of light (PL), specifically hand motions (HMs), then vitrectomy is not beneficial.[2]

Most of the patients in this study had an initial VA better than PL, even though we know that EVS states that vitrectomy in patients with this VA will not have a meaningful outcome. This is in accordance with a study conducted by Bernard Dip et al on the new paradigm of endophthalmitis therapy.[4]

In a study held by Kim J et al, it was stated that recently, vitrectomy is frequently done in endophthalmitis patients who report with VA better than PL, although this surgery disregards the EVS recommendations.[7] With the advent of small gauge surgery, wide-field viewing devices, and the more frequent use of silicone oil, vitrectomy surgery has recently seen significant change in the past ten years. Because it allows for the use of a large specimen for diagnostic examination, the removal of an infectious agent, and the reduction of inflammatory debris or mediators in the vitreous cavity, vitrectomy may have various benefits for the therapy of endophthalmitis. Additionally, vitrectomy increases access to the retina, making it simpler to administer intravitreal antibiotics.[2,8,9,11]

All patients in this study underwent immediate vitrectomy. However, 40% of the patients had an onset of more than 7 days, therefore we categorized these patients into the delayed vitrectomy group when the others were classified as early vitrectomy.

We found that patients who underwent early vitrectomy had a more significant improvement in VA compared to patients who underwent delayed vitrectomy. This is in line with the study by Van Ho et al which stated that a majority of patients with acute infectious endophthalmitis undergoing early pars plana vitrectomy experience VA improvement.[10]

The result of our study is also in line with another study conducted by Negreti et al which stated that delay in surgery was associated with less VA gain, and also the final vision

for patients having surgery at 7 days or less was significantly better than patients having vitrectomy after 7 days.[5]

CONCLUSION

From 30 endophthalmitis patients who underwent vitrectomy at Dr. Kariadi Hospital, we discovered that mean post operative VA showed an improvement compared to pre operative VA, and patients with early vitrectomy had significant better visual outcome than delayed vitrectomy.

This study's limitations include the fact that it is retrospective in nature. The great variety of endophthalmitis aetiologies should also be considered as a potential cause of confusion.

Further research can be carried out with a larger sample size, using cohort prospective model along with data on microorganism caused endophthalmitis.

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