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THE OUTCOME OF VITRECTOMY IN ACUTE POSTOPERATIVE ENDOPHTHALMITIS: AN EIGHT-YEAR EXPERIENCE

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ABSTRACT

***Introduction**: Twenty years ago, the results of Endophthalmitis Vitrectomy Study (EVS) were adapted worldwide as the standard management of endophthalmitis. The study suggested that there was no benefit of performing vitrectomy for acute postoperative endophthalmitis, unless for patients who presents with visual acuity of light perception. However, vitrectomy with advanced technology and technique has been changed rapidly in the last decades; therefore, we need to reconsider its role. We conducted a study and the purpose of our study was to describe the indications for vitrectomy and the outcomes in acute postoperative endophthalmitis at Cipto Mangunkusumo Hospital, Jakarta, Indonesia.*

***Methods**: Our study was a descriptive-retrospective case series. We reviewed clinical and microbiological records of all patients with clinical diagnosis of acute postoperative endophthalmitis who underwent vitrectomy in Cipto Mangunkusumo Hospital between 2007 and September 2015. Presenting visual acuity, visual outcome and complications were described.*

***Result**: Our study was a descriptive-retrospective case series. We reviewed clinical and microbiological records of all patients with clinical diagnosis of acute postoperative endophthalmitis who underwent vitrectomy in Cipto Mangunkusumo Hospital between 2007 and September 2015. Presenting visual acuity, visual outcome and complications were described.*

***Conclusion**: An eight-year experience has taught us that vitrectomy offers better treatment outcome in the group with visual acuity of hand movement than those who only had visual acuity of light perception.*

Keywords: endophthalmitis, vitrectomy
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INTRODUCTION

Endophthalmitis is an intraocular fluid accumulation of purulent inflammation. It is the most terrifying condition developed following intraocular surgery. Without judicious and timely management, it may lead to the loss of vision and even loss of the eye.

Endophthalmitis is basically an abscess; therefore, the principles of treatment are similar to therapy for abscess, i.e. eliminating the microorganism and draining fluid accumulation to cease the ongoing inflammatory process. Vitrectomy ensures that both principles are applied. However, the Endophthalmitis Vitrectomy Study (EVS) in 1995, which has been known as the best-designed research on the management of acute post operative endophthalmitis, found that there was no benefit of performing vitrectomy, unless for patients with visual acuity of light perception. Kuhn suggested that since the era of EVS, the role of vitrectomy has become less prioritized, except for those who have visual acuity of light perception.

Twenty years after the EVS, advanced vitrectomy techniques, improved intraoperative visualization technology and new antibiotics have been developed; therefore, the role of vitrectomy in the treatment of acute postoperative endophthalmitis should be reconsidered.

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In the study by Kuhn, which included 47 eyes, early vitrectomy was performed as the first-line treatment for acute postoperative endophthalmitis. The study shows that 91% eyes achieve better treatment outcome (final visual acuity of ≥ 20/40) as opposed to only 53% in EVS.[3]

Although the EVS has suggested the appropriate condition for vitrectomy in acute postoperative endophthalmitis, but twenty years later, there are still controversies worldwide on the indication for vitrectomy. As a national referral hospital in Indonesia and one of the few having vitreoretina surgeon and machine available, Cipto Mangunkusumo Hospital enables vitrectomy as a standard approach in managing acute postoperative endophthalmitis. The hospital is no longer use the EVS recommendation. Therefore, we conduct a study to evaluate the outcome of vitrectomy in the hospital. Clinical characteristics including presenting visual acuity, visual outcome and complications will be described. The purpose of our study was to identify the treatment outcome of vitrectomy in acute postoperative endophthalmitis.

METHOD

The study was a descriptive-retrospective case series. We reviewed clinical and microbiological records of all patients with clinical diagnosis of acute postoperative endophthalmitis who underwent vitrectomy in Cipto Mangunkusumo Hospital between 2007 and September 2015. The clinicaldiagnosis of acute endophthalmitis was made, which was defined as a marked intraocular inflammation occurring after intraocular procedure characterized by increased pain, redness and decreased vision in the presence of hypopion and cellular infiltration in the anterior chamber and vitreus within 6 weeks following intraocular surgery. Subjects were excluded if there were other retinal pathologies diagnosed before the preceding intraocular surgeries. Cipto Mangunkusumo hospital is a teaching hospital; hence, multiple surgeons performed the vitrectomy.

All patients with acute endophthalmitis who sought treatment at Cipto Mangunkusumo Hospital or other hospitals and subsequently being referred to Cipto Mangunkusumo Hospital were included in our study. Collected data included age, gender, interval between the preceding intraocular surgery and the symptoms, presenting visual acuity, final visual acuity, microbial profiles, complications and time to follow up. Categorical variables were described as frequency or proportion, while numeric variables were described as mean, median or range. Data was computed using SPSS version 21 for Mac.

Visual acuity (VA) was determined as the best-corrected Snellen VA found at the time of diagnosis and the last known VA. For the purpose of data analysis, patients were categorized into three groups based on presenting visual acuity; better than hand movement, hand movement and light perception. Visual outcome was categorized into two; good visual outcome defined as visual acuity better than 6/12 and poor visual outcome defined as visual acuity hand movement or worse.

RESULTS

Over the 8-year period, there were 98 eyes of 98 acute endophthalmitis patients (51 right eyes and 47 left eyes) that underwent vitrectomy. The mean age was 61.2 years (age range: 12-88 years) and there were 59.2% male patients. The characteristics of the subjects are described in table 1.

Table 1**. Subject characteristic As (n=98 eyes)**

		Total	Percentage
Demographics			
Age (years) (mean)		61.2	
Gender			
	Male	58	59.2 %
	Female	40	40.8 %
Surgical characteristics			
Operated eye			
	Right	51	52 %
	Left	47	48 %
Procedure type			
	Phacoemulsification	67	68.4 %
	ECCE	19	19.4 %
	Vitrectomy	4	4 %
	Others	8	8.2 %
Interval between the preceding intraocular surgery and symptoms (days) (mean)		13.1	

ECCE : Extra capsular catar act extraction

Acute endophthalmitis in our study mostly occurred following phacoemulsification (68,4%) and extra capsular cataract extraction (19%). The mean interval between the preceding intraocular surgery and symptoms was 13.1 days (range, 1-42 days). The mean of follow up was 24.5 weeks (range, 1-228 weeks).

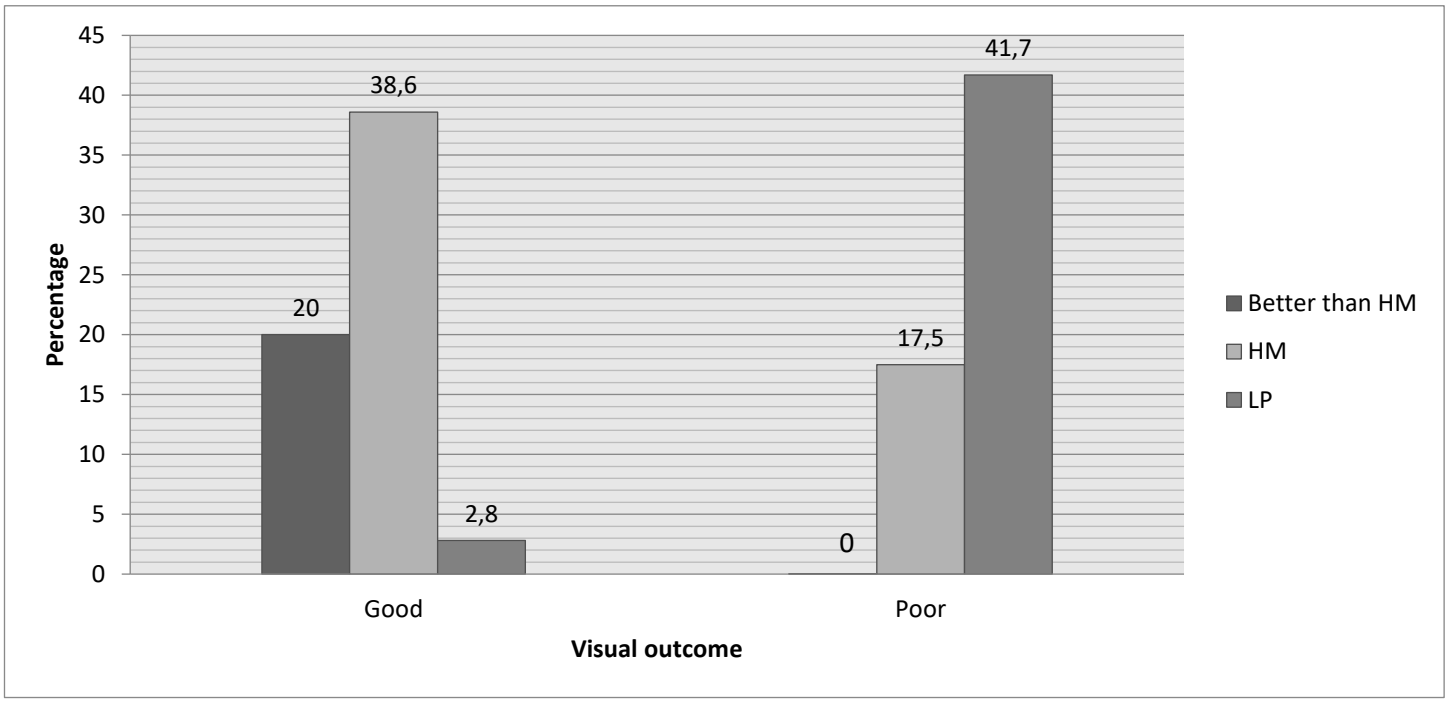
The microbiological profiles were based on the culture results of 67 patients, which 33 (49.25%) of them showed positive results. The most common causative microorganism was *Pseudomonas sp* (30%) followed by *Acinetobacter* (18%). Seventy percent of the microorganisms were gram-negative, 18% were gram-positive and 12% were fungi. The microbiological profile is described in table 2.

Table 2**. The microbiological profiles**

Causative microorganisms	Total	%
Pseudomonas	10	30
Acinetobacter	6	18
Streptococcus	3	9
Klebsiella	3	9
Pseudomonas and *Acinetobacter*	2	6
Aspergillus	2	6
Bacillus	2	6
Others	5	15

Presenting visual acuity of hand-movement was found in most subjects, i.e. in 57 eyes (58.2%) followed by visual acuity of light perception in 36 eyes (36.7%); while visual acuity of better than hand movement was found in 5 patients (5.1%). Twenty four percent cases achieved good visual outcome, while 25 % achieved poor visual outcome. The comparison of final visual outcome following the vitrectomy based on presenting visual acuity can be found in figure 1. Proportion of subject achieving good visual outcome was highest in hand movement group presenting visual acuity (22 of 57, 38.6%). Proportion of subject having poor visual outcome was highest in light perception presenting visual acuity (15 of 36, 41.7%). In 34 cases vitrectomy procedure was carried out one day after the diagnosis. In 93.5% cases, was performed within 7 days after the diagnosis of endophthalmitis was made.

Figure 1. **Comparison of visual outcome based on the presenting visual acuity**



Complications following vitrectomy in acute endophthalmitis were found in 20 cases (20.4%) listed in table 3. The most common complication was retinal detachment, which was found in 10 cases (10.2%).

Table 3. **Complications following vitrectomy**

Complications	Total	Percentage
Retinal detachment	10	50%
Persistent vitreus haziness	2	10%
Secondary glaucoma	2	10%
Choroidal detachment	2	10 %
IOL dislocation	1	5 %
Iatrogenic hole	1	5 %
Preretinal hemorrhage	1	5 %
Recurrent inflammation	1	5 %
	20	100 %

IOL : Intraocular lens

DISCUSSION

Our study showed that endophthalmitis occurred in older age, which is similar to the results shown by previous studies.[4,5] There are two possible causes that may explain this finding. First, in cataract surgery, complications are more prevalent in elderly than young patients since the lens is harder and the zonules are weaker. Second, elderly patients have more conjunctival bacteria.[4]

In our study, endophthalmitis was found mostly following the phacoemulsification procedure. The findings is different from another study that found equal or higher rate of endophthalmitis in patients underwent extra capsular cataract extraction (ECCE).[4] However, our result is similar with the result of Wong TY study[6] and it is also consistent with previous study reported by Aziza.[5] Wong TY found that phacoemulsification was associated with a higher risk of acute endophthalmitis compared to ECCE.[6] Clear corneal incision surgery such as phacoemulsification is getting more popular nowadays. The surgical rate was raising from 5% in 1993 to 72% in 2003.[7] Based on ex vivo study conducted by May et al,[8] it has been known that wound construction in a single-plane clear corneal incision enables micro particles to enter the eye.

Twenty-four percent cases in our study achieved visual outcome of better than 6/12. The result was lower than those in other studies. Choi et al[9] found 58.8% cases achieved visual outcome of better than 6/12; while Kuhn et al[3] found that in 91% cases. We learned that our microbiological profile was different from Choi et al study. Gram-negative bacteria, the most pathogenic causative micro-organism that commonly associated with poorer prognosis,[10] were predominant in our study.

In our study, most patients had presenting visual acuity of hand movement; 38.6% of them results in good visual outcome. In the other hand, only 2.8% of LP presenting visual acuity subjects that achieved good visual outcome. Poor visual outcome was higher in the LP presenting visual acuity (41.7%) as opposed to that of HM (17.5%). From this data we concluded that vitrectomy in the HM group provided better visual outcome. Moreover, poor visual outcome was found more frequent in those with LP presenting visual acuity. We assumed that this finding results from the advantages of vitrectomy; improved identification on microbiological profile, removal of infectious microorganism and reducing inflammatory cells and mediators.[11] The earlier vitrectomy performed, the greater advantages it could provide in managing the disease. Although our data is contradictory with EVS recommendation, we strongly advised that clinical diagnosis and principal of therapy should be the most important consideration in deciding when to perform vitrectomy in endophthalmitis.

In our hospital, vitrectomy was performed within 7 days after the diagnosis was made in 93.5% patients. Moreover, the procedure was performed one day after diagnosis in 34 cases. Immediate vitrectomy became possible since the national health insurance had been implemented. In Gower et al study,[12] 76% percent of cases with initial acuity of LP underwent immediate vitrectomy, and 9% underwent vitrectomy in 2 days or more after initial presentation. Among cases with initial acuity better than LP, 28% underwent immediate vitrectomy and 13% underwent vitrectomy 2 days or more later.[7]

The most common complication found in our study was retinal detachment (10.2%). The rate was similar with EVS report.[2] However, unlike the EVS, Kuhn[1,3] reported 0% of retinal detachment in his series. We believed that his excellent visual outcome could be achieved since the study included only a single expert surgeon to perform the procedure. We believe that a champion data belongs only to the champion. Therefore, it could not be generalized to a population.

The limitations of this study originated from its retrospective study design. Important variables that may confound the outcome were not well documented the medical record, i.e. intraoperative retinal condition, the exact time interval between symptoms and surgery.

Vitrectomy performed by multiple surgeon so that wide variability of surgeon factor is inevitable.

In conclusion, an eight-year experience has taught us that vitrectomy in the group of patients with presenting visual acuity of hand movement provides a better visual outcome compared to those with visual acuity of light perception. However, these advantages should be weighed further against the risk of postoperative complications.

Conflicts of Interest: The authors affirm there is no conflict of interest in this study

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