



## Original research

# Treatment outcomes of post cataract surgery endophthalmitis in the tertiary referral center in Iran

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## Abstract

**Purpose:** To evaluate the treatment outcomes of patients with post cataract surgery endophthalmitis in our tertiary referral center.

**Methods:** In this prospective study, patients with presumed post cataract surgery endophthalmitis were treated based on the modified endophthalmitis vitrectomy study (EVS) guidelines and followed for at least three months. Visual and anatomical outcomes were assessed in the last follow-up visit.

**Results:** A total of 46 eyes with presumed post cataract surgery endophthalmitis were admitted to our hospital, of which 3 eyes with initial visual acuity of no light perception (NLP) and severe inflammation underwent primary enucleation. Forty-three patients were included to this study and followed up for at least three months. Culture results were positive in 51.2% of cases and streptococcus viridans was the most frequent isolated organism. Pars plana vitrectomy was performed in 16 eyes as primary treatment, and intravitreal antibiotic injection was done in 27 eyes. Re-treatment with pars plana vitrectomy was required in 15 eyes (34.9%). Best corrected visual acuity (BCVA) at final visit was 20/40 or better in 12 eyes (27.9%), between 20/200 to 20/40 in 17 eyes (39.5%), and worse than 20/200 in 14 eyes (32.6%). Enucleation was done in one eye (2.3%), and retinal detachment happened in 4 eyes (9.3%).

**Conclusions:** The visual outcomes of post cataract surgery endophthalmitis are generally poor. Our results in this study were comparable with many previous studies from other referral centers, however, unlike many reports, streptococcus viridans was the most common isolate in our study.

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**Keywords:** Endophthalmitis; Cataract surgery; Phacoemulsification; Vitrectomy; Intravitreal antibiotic

## Introduction

Endophthalmitis is the vision-threatening intraocular infection that may occur following any intraocular surgery or open globe injury.<sup>1</sup> Causative organisms may enter the eye exogenously or from another site of systemic infections (endogenous). Cataract surgery is the most common cause of postoperative endophthalmitis because of the great number of cataract surgeries worldwide.<sup>2</sup> The incidence of endophthalmitis following cataract surgery varies in different studies (0.02–0.68).<sup>2–4</sup>

The visual outcome of post cataract surgery endophthalmitis is generally poor, and early diagnosis and appropriate treatment are essential for the improvement of visual

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prognosis. There is no agreement on the preferred treatment for post cataract surgery endophthalmitis. Endophthalmitis vitrectomy study (EVS) consider pars plana vitrectomy only for patients with initial visual acuity of light perception while some studies recommended early pars plana vitrectomy for all patients with post cataract surgery endophthalmitis.<sup>5,6</sup>

The aim of this study is to describe the treatment outcomes of eyes with presumed post cataract surgery endophthalmitis in the tertiary referral center in Iran.

## Methods

From April 2015 to January 2016, we followed all patients that were admitted with presumed post cataract surgery endophthalmitis in Farabi Eye Hospital, Tehran, Iran. Only the cases that underwent phacoemulsification surgery were included in this study. Eyes with simultaneous intravitreal anti-vascular endothelial growth factors (anti-VEGFs) or intravitreal triamcinolone acetonide injection were excluded. Diagnosis of endophthalmitis was performed clinically based on the patients' signs and symptoms including presence of visual acuity reduction, prominent inflammatory anterior chamber reaction or hypopyon, vitreous cellular reaction or marked vitreous opacification in B-scan ultrasonography. In all cases, clinical diagnosis of endophthalmitis was confirmed by a vitreoretinal fellowship or attending before treatment initiation.

Management of presumed post cataract surgery endophthalmitis cases followed the modified EVS guidelines.<sup>5</sup> Pars plana vitrectomy, vitreous sampling for smear and culture with a conjunction of intravitreal antibiotic injection (1 mg/0.1 ml vancomycin and 2.25 mg/0.1 ml ceftazidime) were considered for patients with initial visual acuity of light perception. Eyes with initial visual acuity of hand movements or more underwent intravitreal antibiotic injection (1 mg/0.1 ml vancomycin and 2.25 mg/0.1 ml ceftazidime) as an initial treatment. In eyes with initial visual acuity of light perception and severe corneal clouding, intravitreal antibiotic injection was performed as a primary treatment, and pars plana vitrectomy, using keratoprosthesis, was performed as soon as possible. Also, all of the cases received an adjunctive intravenous antibiotics (ceftazidime and vancomycin) and topical fortified antibiotics, besides the primary surgical intervention. Pars plana vitrectomy was performed if intraocular inflammation persisted or progressed.

Three months after initial treatment, complete ophthalmic examination including best corrected visual acuity (BCVA) measurement by Snellen charts, slit-lamp examination, and funduscopy were performed, and data was recorded.

The main outcome was the visual outcomes following treatment of post cataract surgery endophthalmitis, and anatomical outcome was the secondary outcome.

Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 22.0 (IBM Corp, Armonk, NY, USA).

## Results

A total of 46 cases with presumed post cataract surgery endophthalmitis were admitted to our hospital. Primary

evisceration was performed in 3 eyes (6.5%) with initial visual acuity of no light perception (NLP), severe inflammation, and corneal melting. Forty-three patients were included to this study, and all of them were followed up for at least 3 months after treatment. The patients' mean age was  $68.7 \pm 11$  years. Twenty-five cases (58.1%) were male, and 18 cases (41.9%) were female. Ocular involvement was unilateral in all of them. The mean interval from primary phacoemulsification surgery to onset of symptoms was  $6.43 \pm 4.31$  days, and all of cases underwent surgical intervention on the day of admission.

Culture results were positive in 22 cases (51.2%), and the most commonly isolated organism was Gram-positive bacteria in 16 cases (72.7% of culture positive cases). Among them, streptococcus viridans (8 eyes) was the most common isolate followed by *Staphylococcus epidermidis* (5 eyes), *Staphylococcus aureus* (2 eyes), and *Streptococcus pneumoniae* (one eye). Gram-negative bacteria was isolated from 6 eyes (27.3% of culture positive cases) including *Pseudomonas aeruginosa* in 3 eyes, haemophilus sp, *Escherichia coli*, and enterobacteriaceae sp, each of them in one eye.

Initial visual acuity was light perception in 19 eyes (44.2%), and hand motion or better in 24 eyes (55.8%) ranged from light perception to counting finger at 3 m. Pars plana vitrectomy was performed in 16 eyes from 19 eyes with initial visual acuity of light perception, and in 3 eyes, intravitreal antibiotics injection was performed as a primary treatment because of corneal haziness that precluded pars plana vitrectomy. Intravitreal antibiotic injection was done in eyes with initial visual acuity of better than light perception (24 eyes) as a primary management and in 3 eyes with corneal haziness. Pars plana vitrectomy using keratoprosthesis was performed in these 3 cases the next day.

Re-treatment with pars plana vitrectomy was performed in 15 eyes (34.9%) including 8 eyes with severe persistent or progressive inflammation (6 eyes with intravitreal antibiotic injection as a primary treatment and 2 eyes with primary pars plana vitrectomy as initial treatment), 4 eyes with retinal detachment, and 3 eyes with severe corneal clouding that underwent pars plana vitrectomy using keratoprosthesis.

Silicone oil tamponade was used in 16 eyes from 31 eyes that underwent pars plana vitrectomy in this study (16 eyes underwent primary pars plana vitrectomy and totally 15 pars plana vitrectomy was done as a re-treatment). Evisceration was performed in one eye (2.3%) in which *Pseudomonas aeruginosa* was isolated. BCVA was 20/40 or better in 12 eyes (27.9%), between 20/200 and 20/40 in 17 eyes (39.5%) and worse than 20/200 in 14 eyes (32.6%) including 4 eyes with retinal detachment and one eviscerated eye. Final visual acuity was NLP in 5 eyes (11.63%) at the end of a three-month follow-up period (including one eviscerated eye).

Retinal detachment happened in 4 eyes (9.3%) of post cataract surgery endophthalmitis cases. Pars plana vitrectomy with silicone oil tamponed had been performed for all of them. At the final follow-up visit, retina was attached in 3 eyes, and re-detachment happened in one eye.

The mean logMAR final BCVA in eyes that treated with pars plana vitrectomy was  $0.80 \pm 0.50$ , and it was  $0.70 \pm 0.40$

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