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Editorial

# Acute Post Cataract Surgery Endophthalmitis: An Update

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Cataract surgery is the most common operative procedure performed in the aged population and in ophthalmology practice. Usually, visual recovery following cataract surgery is very satisfying for the patient [1]. Acute post-cataract surgery endophthalmitis (PCSE) is defined as marked inflammation of intraocular fluids and tissues occurring within 6 weeks following cataract surgery. Its incidence ranges from 0.03 to 0.2%. Although relatively rare, it may result in poor visual outcomes, and may eventually lead to blindness [2]. According to Endophthalmitis vitrectomy study (EVS), only 53% of patients with acute PCSE had a final visual acuity of 20/40 or better, and around 15% of patients had a visual acuity of 20/200 or worse [3].

Many risk factors have been reported for acute PCSE and included preoperative factors (diabetes mellitus, older age, and blepharitis), perioperative factors (intraoperative complications including posterior capsular rupture, vitreous loss, and less-experienced surgeons), and postoperative factors (wound leaking at postoperative day 1) [4].

The diagnosis of acute PCSE is mainly a clinical diagnosis, and it is subsequently confirmed with laboratory analysis of aqueous and/or vitreous specimens. Vitreous specimens have higher yield of culture-positive results than aqueous specimens; and around 50% of endophthalmitis with negative aqueous culture may show positive vitreous culture [5]. Analysis of vitreous and aqueous specimens may be helpful for identifying the causative pathogen, assessing antibiotic susceptibility and guiding treatment. However, the treatment of PCSE should start as soon as possible after obtaining aqueous and vitreous tap, without waiting for culture results.

According to EVS, the most common pathogens isolated in cases of acute PCSE were coagulase-negative staphylococci (70%), Staphylococcus aureus (9.9%) and streptococcus species (9%) [3]. The functional outcome after endophthalmitis is directly related to the microorganism causing the endophthalmitis. A recent study reported better visual outcomes with endophthalmitis caused by coagulase-negative staphylococci than endophthalmitis caused by streptococcus species [6]. Although rare in developed countries, PCSE may be caused by fungal microorganisms in developing countries (incidence of 17 to 22% according to some reports) [7].

## Treatment

The EVS was a cornerstone study for the management of postoperative endophthalmitis [3]. It showed that in patients with presenting visual acuity (VA) of hand motion (HM) or better, there was no difference in final visual acuity between vitreous tap and pars plana vitrectomy (PPV). Patients with presenting VA of light perception (LP) or less had better final outcomes (statistically significant) with PPV as compared to vitreous tap. In this subset of patients, prompt PPV was associated with a 2-fold increase in the proportion of patients achieving VA of 20/100 or better, and a 3-fold increase in the proportion of patients achieving VA of 20/40 or better.[3] However, in some cases with refractory or fulminate acute PCSE, associated with rapidly worsening VA, PPV may be considered at an earlier stage, even if VA is HM or better [8].

Whether prompt PPV is considered or not, intravitreal injection of a broad-spectrum combination of antibiotics is considered the main initial step for the treatment of endophthalmitis. Vancomycin and ceftazidime, OR vancomycin and amikacin are considered first- and second-line therapy [9]. In cases where fungal endophthalmitis is suspected, intravitreal Amphotericin B and voriconazole can be considered [10]. Based on clinical response, intravitreal injections can be repeated at an interval of 48-72 hours.

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On the other hand, there was no difference in outcomes when subconjunctival antibiotics were used in addition to intravitreal antibiotics [3].

The benefit of adding systemic antibiotics for the treatment of acute PCSE remains controversial. The EVS study showed no benefit in terms of final VA in patients receiving systemic ceftazidime and amikacin [3]. However, the European Society of Cataract & Refractive Surgeons (ESCRS) recommends the use of systemic antibiotics (same regimen as intravitreal antibiotic) in cases with fulminant acute endophthalmitis [8]. More recent studies have shown that fourth generation fluoroquinolones may achieve good intraocular therapeutic levels, and may be beneficial for the treatment of acute PCSE [11]. For patients with suspected fungal endophthalmitis, systemic antifungal therapy must be considered.

A recent Cochrane review assessed the benefit of adding steroids to intravitreal antibiotics in the treatment of acute endophthalmitis following intraocular surgery. This study showed that adjunctive steroids may provide a higher probability of having a good visual outcome at three months [12]. However, for the authors of this review, it was not possible to conclude whether the use adjunctive steroids are significantly effective in the clinical settings [12].

## Prophylaxis

Noncontroversial pre-operative measures include lid hygiene (especially if the patient had blepharitis), meticulous skin and surgical site preparation with a drape and topical povidone–iodine [13]. Povidone–iodine is a potent antiseptic with a wide spectrum of activity against both gram-positive and gram-negative bacteria, fungi, and viruses, and its use has not been associated with the development of antimicrobial resistance. For the skin preparation, 10% povidone-iodine is better than 5% povidone-iodine; and for the conjunctival cul-de-sac pre-operative irrigation, 5% povidone-iodine is preferred to avoid corneal epithelial toxicity [14].

In recent years, prophylaxis against endophthalmitis after cataract surgery has evolved with a main focus on the use of prophylactic intracameral antibiotics. In 2007, the ESCRS has published guidelines for the prophylaxis and treatment of post cataract surgery endophthalmitis. Their guidelines were based on a multicenter randomized clinical trial, and recommended the use of intracameral prophylactic antibiotic, specifically cefuroxime. [8] Intracameral cefuroxime during phacoemulsification reduced the incidence of postoperative endophthalmitis by approximately 5-fold [15]. Other recent large cohort studies support the efficacy of vancomycin or moxifloxacin intracamerally for the prevention of post-operative endophthalmitis [16-18]. However, a recent report clearly linked the development of a serious post-operative sight-threatening complication with the use of vancomycin, including the intracameral route (Vancomycin-associated hemorrhagic occlusive retinal vasculitis), and the authors of this report recommended that surgeons desiring to use intracameral prophylaxis for cataract surgery should avoid using vancomycin and consider cefuroxime or moxifloxacin [19]. Despite increasing evidence of the efficacy of prophylactic intracameral antibiotic in decreasing the risk of postoperative endophthalmitis, [20] some authors consider that the use of prophylactic antibiotic is associated with increased costs, risks to the individual patient, and to the population at large by contributing to the emergence of drug-resistant organisms [21]. In our practice, we recommend the use of intracameral prophylactic antibiotic (cefuroxime or moxifloxacin) only in cases with complicated cataract surgery (posterior capsular rupture). On the other hand, the use of subconjunctival or topical antibiotics have not been associated with a decrease of the risk of post-operative endophthalmitis [20].

In conclusion, endophthalmitis remains an important and sight-threatening complication of cataract surgery. Strategies for the treatment and prophylaxis continue to evolve based on recent evidence provided by newly published studies.

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