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Review article

RECENT ADVANCES IN MANAGMENT OF CATARACT SURGERY COMPLICATIONS

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Abstract

Cataract disease is the main cause of the global burden of visual impairment. As the technology advances, phacoemulsification becomes the surgical procedure of choice for cataract treatment; However, phacoemulsification is not a completely safe procedure and has many complications including Endophthalmitis, Cystoid macular edema, Endothelial cells loss, Vitreous loss, and retinal detachment. The aim of this review is to discuss the recent advances in management of cataract surgery complications.

Keywords: *Cataract surgery, Phacoemulsification, Complications, Endophthalmitis, Cystoid macular edema, Endothelial cells loss, Vitreous loss*

1. Introduction

Cataract disease is mainly responsible for about half of the global burden of visual impairment. Recently, phacoemulsification is the surgical procedarn of choice routinely which provides excellent visual and safety outcome. About 18 million cataract surgeries are performed all over the world every year [1]. However, phacoemulsification is not a perfect procedure and complications such as endophthalmitis, cystoid macular edema, endothelial cell damage, vitreous loss and retinal detachment remain sight threatening concerns [2].

2. Endophthalmitis Prophylaxis

Endophthalmitis is the most serious postoperative complication of phacoemulsification. Postoperative endophthalmitis is caused by entry of microorganisms into the eye during or after the surgical procedure [3]. Different methods are used to avoid endophthalmitis, Injecting intracameral antibiotics at the end of surgery is intended to kill bacterial microbes that have been introduced during the procedure [4]. The most commonly used antibiotics for intracameral prophylaxis are cephalosporins (cefuroxime and cefazolin), vancomycin, and moxifloxacin. Cefuroxime is a second-generation cephalosporin. The ESCRS study recommended intracameral injection of cefuroxime (1.0 mg in 0.1 ml) at the time of

cataract surgery for prevention of post-operative endophthalmitis [5]. Despite of different Opinions, the drug became available for commercial use (Aprokam, Thea group, Clermont Ferrad, France) and it is used both in Europe (where the drug is approved) and in the USA (off-label use) [4]. Moxifloxacin is a fourth-generation fluoroquinolone that was approved for topical ophthalmic use in 2003. Intracameral moxifloxacin achieves bactericidal levels 10 times more than the most resistant bacteria for a limited time period; also, due to its potent dose-dependent activity at low concentrations of injection, in addition that it remains bactericidal for a longer period than cefuroxime [6].

3. Cystoid Macular Edema

Postoperative cystoid macular edema (PCME) is the most common cause of decreased postoperative visual results after cataract surgery [7,8]. Risk factors of pseudophakic CME have been thoroughly studied. Diabetes, hypertension, epiretinal membrane, uveitis, glaucoma, and vascular occlusion can be linked to the incidence of pseudophakic CME [9-11]. Topical nonsteroidal anti-inflammatory drugs (NSAIDs) [12], intravitreal anti-vascular endothelial growth factor (anti-VEGF) injections [13], intravitreal steroids [14] and oral acetazolamide [15] have all been used in the treatment of pseudophakic cystoid macular edema with different results. Recurrence of PCME after successful therapy is very low, but still some cases are refractive to standard therapy [16]. Intravitreal dexamethasone (DEX) implant has been used as a new therapy in PCME in recent years [17]. In a study of Kakkassery V et al, [18] they found that the use of DEX in PCME resulted in significant improvements in visual acuity and central foveal thickness. Recently, in a study of Maleki A et al, [19]. They studied the efficacy and safety of interferon alpha 2b in the treatment of PCME resistant to conventional therapy with favorable results.

4. Endothelial Cells Loss

The endothelial cell count is known to decline with age. With increasedlife expectancy and also, most of patients undergoing phacoemulsification belong to the elderly age group; endothelial cell loss during surgery becomes an important factor [20]. The choice of surgical incision plays an important role in the efficacy of surgery, as the incision damages the surrounding tissues. The size of microincisional phacoemulsification surgery incisions ranges from 1.8 mm to 2.2 mm, whereas standard-incision phacoemulsification surgery incisions range from 2.8 mm to 3.2 mm [21]. In a study of Wang L et al, [22] they compared the efficacy between coaxial microincision and standard-incision phacoemulsification in patients with age-related cataracts in a meta-analysis study, however, they found that there is no difference between both groups. As regards the use of femtosecond laser in cataract surgery, in a study of Khan MS et al, [23] they compared the change in endothelial cell count after femtosecond laser-assisted cataract surgery versus conventional phacoemulsification, they found that femtosecond laser in cataract surgery is a safe and effective modality for cataract treatment and it induces significantly less endothelial cell loss than conventional phacoemulsification.

5. Vitreous loss

Vitreous loss during phacoemulsification is associated with low visual results. Experienced surgeons who performed a high volume of Phaco operations have lower rates of vitreous loss [24]. The predisposing factors for vitreous loss may be classified into patient-related, surgeon-related, intraoperative factors, and to

devices/machines-related [25]. There are recent techniques available to anterior and posterior segment surgeons in posterior capsule rupture. Endoillumination facilitate visualization during anterior vitrectomy and the implanted IOL may be used as a pupillary barrier to prevent further loss of lens fragments. Also, early return to the operating room and small-gauge pars plana procedures may reduce patient morbidity [26].

6. Retinal Detachment

Retinal detachmentis one of the most frequent sight-threatening complications of modern cataract surgery and complicates about 1% of all cataract operations operated in Western countries [27,28] multiple risk factors are implicated, including patient factors (young age, male sex, and long axial length) [29,30]. In a study of Daien V et al, [31] they assessed the incidence, risk factors, and impact of age on retinal detachment (RD) after cataract surgery in France, They provide a list of risk factors for RD onset: high myopia, young age, capsular rupture, history of eye trauma, extra capsular extraction technique, male gender, and diabetes. Young age was also an additional risk factor in myopic patients. Pars plana vitrectomy with phacofragmentation is the preferred technique of treatment of dropped lens fragments [32,33]. With availability of new fragmatomes, most of cases can be treated successfully with satisfactory results. Perfluorocarbon liquids (PFCL) are an effective surgical method for prevention of this damage. But retained PFCL bubbles are associated with multiple complications. Torsional phacoemulsification has a less repulsive action on nuclear piece.

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