Postoperative care in cataract surgery

• Abstract

Purpose of review The purpose of this study is to provide a summary of current trends and recent developments in postoperative care after cataract surgery.

Recent findings There is new evidence challenging the routine use of a protective eye shield after uncomplicated cataract surgery. Nonsteroidal anti-inflammatory drugs (NSAIDs) are effective in decreasing the risk of cystoid macular edema (CME) in high-risk eyes, but must be used with caution in patients with prior corneal disease. Pre-existing ocular comorbidities can have significant effects on postoperative outcomes. Management of postoperative visual expectations can be challenging in patients receiving newer advanced technology intraocular lenses (IOLs).

Summary Key practices such as restrictions on activities, prophylactic regimens against infection and inflammation, appropriate follow-up with adjustments for individual risk factors and management of complications, and continuing care until visual rehabilitation is complete are advised to optimize visual outcome for patients after cataract surgery.

INTRODUCTION

In the USA, cataracts affect about one in every six Americans older than 40 years of age. In those individuals who are older than 80 years of age, more than half have cataracts Although surgery remains the definitive treatment, current trends in perioperative care continue to evolve with changing technologies, newer surgical techniques and ongoing research developments. Postoperative care after modern cataract surgery remains a critical element to ensure that each patient has the best visual outcome possible. It is the operating ophthalmologist's responsibility to follow patients during the postoperative period when most complications occur and within which stable visual function is achieved. Ethically, this obligation extends until postoperative visual rehabilitation is completed

POSTOPERATIVE PERIOD

After uncomplicated cataract surgery, patients can generally be discharged from the recovery area once they are awake and alert with stable vital signs, demonstrate safe emergence from any anaesthetic or sedative agents given and report minimal or no pain. A plan for safe transport to the patient's home or other recovery location must be clear. Detailed written and verbal instructions must be given to the patient and any escort available with the patient. There should be a definite plan for a follow-up appointment

and contact information to reach the operating physician and/or a designated medical partner who is qualified to care for the patient if that physician is unavailable.

Rarely, patients must be admitted for complications. The Study of Medical Testing for Cataract Surgery published in 2000 showed only 61 out of 19 250 patients, or 0.3%, were hospitalized on the day of cataract surgery. Indications might include ocular complications such as uncontrolled elevated intraocular pressure (IOP), suprachoroidal hemorrhage and retrobulbar hemorrhage or systemic medical complications such as cardiovascular instability, respiratory compromise and uncontrolled diabetes mellitus or hypertension. Patients unable to provide self-care due to mental or physical disabilities may warrant admission as well

Follow-up visits should be tailored to individual patient risk factors with adjustments to appropriately address and manage any complications. A recent study by Allan *et al.* suggested that follow up after uncomplicated sutureless phacoemulsification surgery should be aimed at the detection of treatable, asymptomatic complications such as elevated IOP because other serious complications are virtually impossible to predict at a presymptomatic stage. Immediate self-referral could be used to assess and treat symptomatic issues. Several prospective studies in the United Kingdom have reported that omitting postoperative day 1 examinations was associated with a low frequency of serious ocular complications. Similarly, the American Academy of Ophthalmology's Preferred Practice Pattern suggests that although high-risk patients should be seen within 24 h of surgery, low-risk patients can be seen within 48 h ·These studies withstanding, most patients are still being seen within the first postoperative day.

Additional factors affecting the frequency and timing of postoperative visits include the size and type of incision, the need to remove sutures, management of postoperative inflammation and modifications for coexisting ocular comorbidities requiring closer follow-up. Interval patient history, visual acuity, IOP measurement and slit lamp examination should be included in each postoperative examination. A dilated fundus examination and additional diagnostic testing should be performed if clinically applicable, especially if postoperative visual acuity is less than expected. Optical coherence tomography (OCT) and/or fluorescein angiography can evaluate macular diseases such as cystoid and diffuse macular edema, epiretinal membranes and age-related macular degeneration (AMD). Similarly, corneal topography can diagnose irregular corneal astigmatism and an automated visual field examination may help characterize a neuro-ophthalmic abnormality. Other testing may be helpful in the right clinical setting.

POSTOPERATIVE RESTRICTIONS

Postoperative activity restrictions vary per physician. Some physicians recommend protective shielding on the day of surgery and in the evenings for the first week. Many advocate limitations on heavy lifting and bending to allow wounds more time to strengthen before any physical strain. Surgeons often restrict bathtub immersion in water. If applicable, other limitations could include no chlorinated pools or ocean swimming until given clearance by the surgeon. Limitation on eye makeup during the immediate postoperative period is also common.

Some clinicians are beginning to challenge the routine use of postoperative shields for protection after uncomplicated modern cataract surgery. Lindfield *et al.* suggested in a retrospective study that recent advances in wound construction, improved surgical outcomes and decreased complication rates may make shields no longer necessary. A follow-up response article by Banerjee and Elgohary [1] questioned some of the study design but agreed that this hypothesis should be followed-up with a properly powered prospective study.

Another study published in 1991 examined a group of postoperative cataract patients instructed only to refrain from activities that produced pain. No shield was required, and no instructions were given to restrict common daily activities such as showering and hair washing. This study found no complications related to any postoperative activity. Additional research assessing the impacts of different postoperative restrictions on outcomes would help guide clinicians to further optimize care in the future.

POSTOPERATIVE MEDICATION REGIMEN

Similar to restrictions, postoperative regimens of topical antibiotics, corticosteroids and NSAIDs vary widely among practitioners. There are no controlled investigations that establish an optimal regimen for the use of topical agents. It is the decision of the operating surgeon to use any or all of these medications. Potential complications of postoperative medications must be considered. Allergic reactions to antibiotics can be severe. Elevated IOP with corticosteroids is possible with steroid responders, often younger, highly myopic patients or those with glaucoma. Significant corneal reactions, including epithelial defects leading to stromal ulceration and melting, have rarely been reported with topical NSAIDs.

Topical antibiotics

Antibiotics are used to reduce the risk of postoperative endophthalmitis. Recent surveys from the Association of Veterans Affairs Ophthalmologists (AVAO) and the American Society for Cataract and Refractive Surgery (ASCRS) showed that 100% and 98% of respondents, respectively, used topical antibiotics in the postoperative setting. In the ASCRS survey, topical gatifloxacin and moxifloxacin were the most frequently prescribed antibiotics, likely because of their broad-spectrum coverage, bactericidal activity and improved intraocular penetration. Recent studies suggest that the initiation of antibiotics should begin immediately after surgery rather than delaying until the first postoperative day [.]. Surgeons must also be aware of evolving resistance to antibiotics, as multidrug-resistant bacteria are now present in the majority of patients undergoing routine cataract surgery. *Staphylococcus* species is the most common organism

implicated in acute postoperative infectious endophthalmitis and has demonstrated increasing resistance to many antibiotics, including the latest generation fluoroquinolones

To reach higher intraocular antibiotic concentrations, recent studies including one by the European Society of Cataract and Refractive Surgeon (ESCRS) have advocated the use of an intracameral antibiotic such as cefazolin or cefuroxime at the end of each case to supplement the topical antibiotics prescribed after surgery in prophylaxis against endophthalmitis. There is some evidence to support the use of injecting subconjunctival antibiotics at the conclusion of surgery, although there is a potential risk for intraocular toxicity due to leakage through surgical cataract incisions when aminoglycosides are used.

Topical corticosteroids

Corticosteroids are used to control postoperative inflammation. Clinically, this is commonly seen as cystoid macular edema (CME). Surgical factors such as longer operative times, prior surgery, extensive procedures and younger age may be associated with increased inflammation. Patients with small incision phacoemulsification cataract surgery often have little inflammation after 4 weeks of treatment with topical corticosteroids. Patients with larger wounds requiring manual expression of the nucleus can have visible inflammation for up to 8 weeks. Diabetic patients may show more prolonged postoperative inflammation due to increased compromise of the blood–aqueous barrier.

Topical nonsteroidal anti-inflammatory drugs

Prior studies have suggested that NSAIDs can be used to maintain pupillary dilatation during surgery, decrease perioperative pain and help decrease the incidence of postoperative cystoid macular edema. Although evidence does support the perioperative use of NSAIDs to prevent CME in high-risk eyes, there is no published evidence that routine use results in improved final visual outcomes. Evidence does suggest that NSAIDs alone or in combination with corticosteroids are more effective than corticosteroids alone in preventing and treating acute and chronic CMM. A recent prospective randomized clinical study reported that both bromfenac 0.09% and nepafenac 0.1% were well tolerated and resulted in positive outcomes in the treatment of pain and inflammation after cataract surgery. Regarding duration of treatment, a recent study by Chatziralli *et al.* points to 4 weeks as an adequate and reasonable choice for a postoperative treatment interval.

Topical NSAIDs such as nepafenac, ketorolac and diclofenac have been reported to cause corneal melt in the setting of epithelial breakdown. It is best to stop or taper these medications as soon as they are no longer necessary. Although there is some evidence that concomitant use of topical corticosteroids with NSAIDs may reduce incidence of this complication, some contend it is still advisable to minimize or avoid the use of topical NSAIDs, especially as a single agent.

POSTOPERATIVE MANAGEMENT OF COMPLICATIONS

Postoperative care includes the treatment of complications that arise.shows six large studies of postoperative complication rates in different population groups is adapted with permission from In general, cataract surgery has a very low risk of serious or vision-threatening complications. A study of Medicare beneficiaries showed an overall rate of 0.5% for severe complications in the 1-year postoperative period after cataract surgery. Severe complications were defined as endophthalmitis (0.16%), suprachoroidal hemorrhage (0.06%) and retinal detachment (0.26%)

Excessive severe inflammation presenting in the immediate postoperative period has been suggested to come from one of four causes: acute postoperative endophthalmitis, toxic anterior segment syndrome (TASS), lens-induced uveitis or reactivation of underlying uveitic disease. For acute postoperative endophthalmitis, pertinent risk factors include wound leakage, posterior capsular rupture, vitreous loss, prolonged surgery, immunodeficiency, active blepharitis, lacrimal duct obstruction, inferior incision location, male sex and older age. Early diagnosis with a prompt referral to a retinal specialist for definitive diagnosis and treatment per the Endophthalmitis Vitrectomy Study (EVS) is warranted. Alternately, TASS is a severe sterile inflammatory reaction that generally occurs within 12–48 h after surgery. Once the diagnosis is made, it is typically treated with intensive topical and/or systemic corticosteroids. TASS cases will often cluster. In this scenario, surgery at the affected site should be suspended until an investigation is completed.

Retained lens fragments after complicated cataract surgery will create a lens-induced immunogenic response with variable inflammation. Symptom onset is usually within 2 weeks after surgery, although it has been reported as long as a year after surgery. Early referral to a retina surgeon for possible secondary pars plana vitrectomy should be considered to decrease risk of complications from inflammation and elevated IOP. Lastly, patients with chronic uveitis have an increased risk for reactivation of uveitis after cataract surgery and often require more intensive topical corticosteroid or other immunomodulatory therapy for control of inflammation postoperatively.

Chronic inflammation after cataract surgery raises different concerns. Subacute endophthalmitis occurs at later than 6 weeks postoperatively in 0.02% of surgical cases and must always be considered, particularly if associated with significant vitritis or visible capsular plaque. Although systemic antibiotics and topical inflammatory medications are used for treatment, the definitive treatment frequently requires explantation of the lens and capsule along with intraocular antibiotic therapy. Infection with *Propionibacterium acnes* is most common, although other organisms including fungus have been reported [.

Mechanical lens-related causes of chronic inflammation can be seen postoperatively. Intraocular lens haptic touch to the iris or misplacement of haptics into the sulcus,

particularly with one-piece IOLs, can cause inflammation. Classically, uveitis–glaucoma–hyphema (UGH) syndrome was reported with anterior chamber implants, although now it is predominantly seen with posterior lenses placed in the sulcus. Iris or vitreous to the wound would also induce inflammation. Ultrasound biomicroscopy (UBM) should be performed to assess for the possibility of retained lens material or IOL malposition.

Clinically significant CME occurs infrequently after routine uncomplicated small-incision cataract surgery with a peak incidence at 4–6 weeks after surgery. A review of cataract surgery complications in the United States Veterans Affairs system from 2005 to 2007 reported an incidence of 3.3% for all cases of diagnosed CME. There is no standard protocol for prophylaxis and diagnosis is frequently made by OCT. Although it generally responds well to medical therapy, recalcitrant cases may be associated with permanent impairment of central visual acuity. The incidence of postoperative CME is higher in uveitic patients and has been reported between 4 and 21%. Those with preexisting macular lesions, such as epiretinal membrane or macular edema, have a higher risk for poor visual outcome after cataract surgery. Ideally, patients should demonstrate control of uveitis for 3 or more months prior to cataract surgery and be given perioperative oral corticosteroids to lower incidence of postoperative CME.

Treatment strategies for CME generally include topical NSAIDs, periocular and systemic corticosteroids, intravitreal vascular endothelial growth factor (VEGF) antagonists, as well as local and systemic carbonic anhydrase inhibitors. In one randomized clinical trial, CME improvement seen after intravitreal triamcinolone was better than after orbital floor triamcinolone injection. It was also significant that a single orbital floor triamcinolone injection was as effective on postoperative inflammation and visual outcome as a 4-week course of postoperative oral prednisolone. The use of anti-VEGF agents is currently being. investigated and there is not enough evidence to support their use for CME at this time

In addition to recognizing possible complications, it is important to be cognizant of preexisting ocular comorbid conditions that can have significant effects on postsurgical outcomes. Diabetic retinopathy, glaucoma, AMD, dry eye syndromes, corneal disease and uveitis are commonly seen. A careful preoperative assessment including relevant diagnostic tests is necessary to establish a baseline, to counsel the patient on visual outcome potential and to guide postsurgical care. As a general rule, care of preexisting ocular conditions should be optimized before the patient is taken for cataract surgery.

MANAGING POSTOPERATIVE VISUAL EXPECTATIONS

Cataract surgery remains popular because of its overwhelming record of positive outcomes. The ASCRS National Cataract Database and the European Cataract Outcome Study reported best corrected visual acuity (BCVA) of 20/40 or better in 85% of all enrolled patients. In the American Academy of Ophthalmology National Eyecare

Outcomes Network (NEON) study, BCVA of 20/40 or better was achieved in 96% of patients who did not have preexisting ocular comorbid conditions. Today, improved diagnostic testing, more accurate lens formula calculations and advanced-technology intraocular implants that can correct for astigmatism and/or presbyopia are moving patients closer to spectacle independence after surgery than ever before. Patient expectations have increased and managing their visual concerns after cataract surgery is an important part of postoperative management.

Postoperative management of an unhappy patient requires thorough evaluation and close follow-up. Some patients may experience visual complaints after only one eye has had surgery, and their symptoms will improve after their second eye surgery. Other causes of visual complaints are residual refractive error (especially cylinder), capsular opacification, cystoid macular oedema, corneal and ocular surface disease, small pupil size and poor centration of the IOL Patients often complain of positive dysphotopsias, or unwanted visual phenomena, such as haloes, ghosting, starbursts and other abnormal light distortions that affect vision and quality of life. Some patients experience negative dysphotopsias with a crescent or curved shadow in the peripheral temporal field of vision. According to the ASCRS and ESCRS registries of IOL explants, the most common causes for explantation of foldable IOLs include dislocation or loss of centration of the IOL relative to the pupil, glare or optical aberrations, incorrect power and IOL opacification. There is some evidence that explantation of multifocal IOLs is increasing due to complaints of glare and optical aberrations

In patients with refractive surprise, the patient must be given a sufficient amount of time for visual acuity to stabilize. In one study, changes in refraction of greater than 0.5 diopters from 1 week to 1 month postoperatively occurred in only 1.2% of patients. Optical correction can usually be prescribed between 1 and 4 weeks after small-incision cataract surgery and between 6 and 12 weeks after sutured large-incision cataract extraction surgery. For residual refractive error, risks of an additional procedure must be weighed against the alternatives of wearing a corrective power in eyeglasses and/or contact lenses.

CONCLUSION

Although postoperative care after cataract surgery can vary in practice, a similar goal of improved visual function is shared among all practitioners. Nearly all patients, including those with preexisting conditions such as diabetic retinopathy or AMD, report significant improvements in vision and quality of life after surgery In fact, a recent study looking at Medicare beneficiaries aged 65 years and older with diagnosis of a cataract demonstrated that patients who had cataract surgery showed a lower risk of hip fracture within 1 year of surgery than those who had not had cataract surgery. In the postoperative period, activity restrictions and medication regimens should be designed to prevent possible complications. Effective follow-up should be flexible enough to accommodate for individual differences in patient progress. Future research should focus on outcome measures related to different activity and medication regimens. Studies to improve diagnostic and treatment modalities for possible complications would also be warranted.