Chapter 10
Postoperative Care

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Postoperative Medication Regimen

Much of the postoperative management in the setting of pediatric cataract surgery is extrapolated from the practice patterns of cataract surgery in adults. The American Academy of Ophthalmology Preferred Practice Guidelines do not specify a particular regimen for postoperative topical agents, as this varies by surgeon and there are no controlled trials establishing guidelines for postoperative topical agents [1]. Most adult patients are treated with a topical antibiotic, corticosteroid, and NSAID following cataract surgery. The postoperative eyedrop regimen used in the Infant Aphakia Treatment Study consisted of topical prednisolone acetate 1% 4 times per day for 1 month, a topical antibiotic 3–4 times per day for 1 week, and atropine 2 times per day for 2–4 weeks following surgery [2]. When an intraocular lens (IOL) is placed after pediatric cataract surgery, atropine and other cycloplegics are not generally advised due to the risk of IOL pupillary capture, especially with sulcus lens placement. In addition, topical NSAIDs are typically not necessary due to the lower risk of cystoid macular edema (CME) in pediatric patients and the lower incidence of comorbid risk factors such as diabetes. Medication side effects such as intraocular hypertension with corticosteroid use and allergic reactions to topical antibiotic use should be discussed with the patient or patient's family prior to use [1].

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Postoperative Complications

Endophthalmitis

Endophthalmitis is a severe and devastating complication following cataract surgery. This complication typically presents 3–5 days after surgery and presents as blurry vision, eye pain, and light sensitivity. In pediatric patients, the most common presenting symptoms are photophobia (50%) and pain (40.9%), and the most common clinical signs are conjunctival injection (36.4%) and hypopyon (31.8%) of the operated eye [3]. Other symptoms reported include eyelid swelling, fever, and lethargy. The pediatric patient may not be able to verbalize eye pain or a change in vision, and conjunctival injection and other clinical signs may not be immediately apparent; therefore close vigilance postoperatively is essential.

In 2007 the European Society of Cataract and Refractive Surgeons published a large prospective study that demonstrated a 4.92-fold increase in postoperative endophthalmitis in the absence of prophylactic intracameral antibiotics [4]. However, the use of intracameral antibiotics does not completely prevent endophthalmitis. In one series of pediatric postoperative endophthalmitis cases, 68.2% had received prophylactic intracameral antibiotics, and therefore, the use of postoperative topical antibiotics to prevent endophthalmitis and close postoperative monitoring to identify infection are necessary [3].

The management of endophthalmitis in the acute setting relies on early diagnosis and prompt treatment to prevent permanent vision loss. To ensure proper diagnosis, the operative surgeon or practice must be easy to contact, the patient or patient's family must be warned of the postoperative signs of infection, and the family must be instructed to contact immediately at the first signs of clinical worsening. The physician must then respond early with the correct diagnosis, which in the pediatric population may require an examination under anesthesia for definitive diagnosis. The physician must then treat immediately once the diagnosis is suspected.

Treatment consists of obtaining a specimen for gram stain and culture via vitreous or anterior chamber tap, with a 25- or 23-gauge needle, or 30-gauge needle, respectively. Intravitreal antibiotics, prepared by the pharmacy, are then injected. These include vancomycin (1 mg/0.1 cc) for gram-positive coverage and ceftazidime (2.25 mg/0.1 cc) for gram-negative coverage. The concurrent use of systemic antibiotics does not improve visual outcomes [5]. In adult cases of severe endophthalmitis, vitrectomy in addition to intravitreal antibiotics is the standard of care, though its use in pediatrics is variable. There is some evidence that vitrectomy in pediatric endophthalmitis also improves visual outcomes [6].

Case 1

A 15-month-old female presented with a progressive anterior pyramidal cataract of the left eye who underwent uncomplicated cataract extraction and posterior chamber intraocular lens placement followed by pars plana anterior vitrectomy and

posterior vitrectorrhexis. She received prophylactic intracameral moxifloxacin after implantation of the lens, and she was treated postoperatively with moxifloxacin and prednisolone 4 times daily and tobramycin/dexamethasone ointment at bedtime.

The patient presented for urgent follow-up on postoperative day 4 for redness and swelling of the left eyelid that had acutely worsened over the 24 hours prior to presentation. She had been compliant with her postoperative eyedrop regimen. On presentation, she was light sensitive; however, she was cooperative with the examination and did not appear to be in significant pain.

On examination, the vision in her left eye was difficult to elicit due to photophobia. Her left upper eyelid demonstrated 2+ edema with mild erythema, and her left eye had 2–3+ diffusely injected conjunctiva with horizontal fibrinous/plasmoid strands in the anterior chamber tracking to the paracentesis ports with no hypopyon.

Due to a concern for endophthalmitis, a retina specialist was consulted, and she was immediately taken to the operating room and examined under anesthesia. Endophthalmitis was suspected based on her exam findings, and an intravitreal tap was attempted 3 mm posterior to the limbus; due to her formed vitreous, no fluid could be aspirated. An anterior chamber tap was performed, and fluid was sent for bacterial and fungal culture. 2.25 mg of ceftazidime and 1.0 mg of vancomycin was then injected into the vitreous cavity of the left eye.

Postoperatively, she was placed on moxifloxacin and prednisolone drops every 2 hours while awake followed by atropine ointment and tobradex ointment at bedtime in the left eye. Her anterior chamber fluid was tested for gram stain and cultured for bacteria and fungi, all of which returned negative. She responded well to the intravitreal antibiotics and her clinical picture significantly improved over the following week. She is now doing well with preserved vision and no permanent structural damage to her left eye.

Comment In this case of suspected postoperative infectious endophthalmitis immediate diagnosis and treatment resulted in preserved vision in the operated eye. Often the presenting signs can be subtle and overlap with typical healing. This case demonstrates the importance of early identification and treatment of endophthalmitis in the pediatric population. The parents' early observation of eyelid swelling followed by immediate evaluation by her surgeon and treatment by the retina specialist resulted in preservation of her vision. In addition, while always recommended, cultures may not be diagnostic.

Intraocular Hypertension

Intraocular pressure (IOP) elevation following cataract surgery can occur acutely due to retained viscoelastic or within several days to weeks from steroid response due to the use of topical, intracameral, or intravitreal corticosteroids. In the pediatric population, this steroid response often occurs earlier and to a greater degree and frequency than in adults [7]. The use of Icare tonometry has made IOP monitoring much easier, especially in younger patients who do not tolerate applanation.

Dexamethasone and prednisolone cause a greater increase in IOP than fluorometholone, medrysone, rimexolone, and loteprednol. If a patient exhibits a steroid response, tapering off corticosteroids or transitioning to a topical steroid with less effect on IOP may be necessary [7]. For milder elevations of eye pressure, topical glaucoma medications should be initiated. First-line treatment is dorzolamide (1 drop twice daily), which is safe and effective in all pediatric age groups. Timolol (0.5% solution twice daily or 0.25% gel once daily) is also effective, but should be used cautiously in young children and asthmatics. Alpha-agonists, such as brimonidine 0.2% (1 drop twice daily), are effective but must be avoided in children under 6 years of age due to risk of CNS depression [8]. The prostaglandin analogue latanoprost (1 drop once daily) is safe, and it has a better IOP-lowering effect in older children [9]. It takes 2 weeks to reach a therapeutic effect, so latanoprost should not be selected to lower pressure acutely. For very elevated IOP, oral acetazolamide (15–30 mg/kg divided TID or QID) is sometimes necessary. Unlike in adults, acetazolamide can have an additive IOP-lowering effect when used concurrently with dorzolamide drops [10]. Acetazolamide is generally well tolerated, though there is a risk of metabolic acidosis, often presenting with tachypnea and light-headedness, which may require bicarbonate supplementation if the bicarbonate level is found to be low. Some pharmacies are able to compound acetazolamide in an oral solution for those patients who cannot swallow pills.

Case 2

A 7-year-old male presented for a secondary IOL implantation in both eyes. His past ocular history was significant for bilateral congenital cataracts that were removed at 3 months of age. His right eye underwent an anterior vitrectomy under visualization with intraoperative Triesence® with sulcus lens placement. His postoperative course was complicated by an IOP spike of 50 mmHg by Icare tonometry on postoperative day 1. This was accompanied by nausea and vomiting. His IOP was reduced in the office with topical dorzolamide/timolol and brimonidine and 250 mg of oral acetazolamide. He was sent home on 250 mg of acetazolamide 4×/day, Trusopt/timolol 2×/day, and brimonidine 2×/day. On postoperative day 4 he returned with an IOP of 10 mmHg in the right eye and was only taking acetazolamide at that time. He then returned on postoperative week 2, noncompliant with all topical glaucoma medications, and his IOP had increased to 42 mmHg in the right eye. It was again brought down with dorzolamide/timolol and brimonidine in the office. On subsequent visits his IOP returned to normal after tapering off topical corticosteroids, and he was weaned off topical glaucoma medications over several weeks. He had a similar course of steroid response glaucoma after secondary intraocular lens placement in his left eye.

Comment This case highlights the potential for IOP elevation following surgery after the use of intraocular Triesence and postoperative topical corticosteroids and the ability of the resulting pressure spike to be managed medically.

Visual Axis Opacification

In compliance with the official American Association of Pediatric Ophthalmology and Strabismus policy all children under the age of 9 should receive a posterior capsulotomy and anterior vitrectomy following cataract extraction to prevent visual axis opacification [11]. Surgeon discretion can be used in children >6 years of age, as some may be able to sit for a neodymium-yttrium-aluminum-garnet (Nd:YAG) capsulotomy. Visual axis opacification occurs in almost all pediatric patients that undergo cataract extraction without posterior capsulotomy and anterior vitrectomy and in up to 37% of patients who undergo posterior capsulotomy with anterior vitrectomy [12]. Pediatric patients who are unable to tolerate YAG capsulotomy in the office require repeat intraocular surgery with membranectomy to restore vision.

Glasses and Bifocal Use

Glasses are necessary after pediatric cataract surgery because the postoperative IOL target is typically hyperopic to adjust for eye growth over the first two decades of life. Generally, if vicryl sutures are used to close the corneal wounds, they dissolve by 1–2 months postoperatively, at which point a more stable final refraction can be obtained and glasses prescribed. Patients with IOL implants should receive spectacle correction for hyperopia >1 D, myopia >3 D, or astigmatism >1.5 D [2]. Patients should be left slightly myopic until 2–3 years of age at which point they can be transitioned into bifocals. Initially, the bifocal should be executive style with the line bisecting the pupil. Once a patient is well-adjusted to using the bifocal, they can be transitioned to a progressive bifocal if they prefer a less obvious bifocal appearance. If a patient has unilateral pseudophakia, the bifocal can be placed bilaterally and atropine used in the phakic eye to help them learn to use the bifocal segment well.

Amblyopia Treatment

Patients with unilateral or bilateral infantile cataracts develop dense amblyopia that must be aggressively treated following cataract surgery. Patching should be initiated 1–2 weeks postoperatively in the phakic eye in patients with unilateral cataracts. Recommendations on patching regimens vary. The Infant Aphakia Treatment Study patched patients for 1 hour per day per month of age until 8 months of age after which the phakic eye was patched for all hours the child was awake every other day or 1/2 of the child's waking hours per day [2]. There is now evidence that severe amblyopia may be successfully treated with patching the contralateral eye 6 hours per day [13]. Parents must be educated to only count patching hours when the

patient is awake and to provide full optical correction at all times. If the dominant eye is hyperopic, atropine penalization is as effective at treating amblyopia as occlusive patching and is a good alternative in patients who demonstrate difficulty tolerating patching [14].

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