ORIGINAL ARTICLE

The Effect of Heparin on Anterior Chamber Reaction in Pediatric Cataract Surgery

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ABSTRACT

Objective: To find out the effects of heparin added to the irrigating solution on anterior chamber reaction in pediatric cataract surgery.

Study Design: A quasi experimental study.

Place and Duration of study: This study was conducted in a tertiary eye care hospital from Jan 2008 to July 2010.

Materials and Methods: Twenty eyes of fifteen patients aging 4 years to 10 years with uncomplicated pediatric cataract were selected in the study. All children underwent cataract extraction under general anesthesia and received anterior chamber irrigation with heparin sodium (5 IU/cc) during operation added to the irrigating solution of balanced salt solution (BSS Plus). All patients received standardized postoperative treatment. All patients were followed on the first post operative day, after one week, after one month and were advised follow up at the 3rd and 6th months and postoperative anterior chamber reaction was documented according to modified Hogan's classification on each visit.

Results: Mild anterior chamber reaction was observed in 10 patients (50%) and moderate anterior reaction was observed in only (15%) three patients on first follow up. Anterior chamber reaction disappeared on 7th post operative day in all patients. Fibrin formation, anterior and posterior synechia, cyclitic and pupillary membrane formation was not observed in any patient. There was also no intraocular lens deposits or posterior capsular opacification (PCO) in any of the cases after the follow up of 6th months.

Conclusion: Heparin sodium in the irrigating solution is safe, effective, and promising method to prevent early postoperative inflammatory reaction in pediatric cataract surgery.

Key Words: *Heparin, Cataract, Anterior Chamber Reaction, Anticoagulation, Antiproliferative*.

Introduction

Pediatric cataract presents the major preventable cause of visual impairment and blindness in childhood.[1] The estimated number of children who are blind because of cataract is as high as 200,000.[2] Cataract surgery with intraocular lens (IOL) implantation has been fully accepted in children over the age of 12 years since several years.[3,4] Cataract surgery and other intraocular procedures have a higher incidence and more pronounced postoperative inflammatory reactions in children compared with adults.[5] These reactions are associated with younger age and may be affected by surgical technique, intraoperative injury to adjacent structures such as iris, presence of antecedent ocular infection, and remnants of retained cortical material .[5]

Heparin has anti-inflammatory and antiproliferative effects in addition to its anticoagulant function, inhibits fibrin formation after intraocular surgery, and has also been shown to inhibit fibroblast activity. [6] We present a prospective study to determine the influence of heparin in irrigating solution on the post operative cellular reaction in pediatric cataract surgery.

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Materials and Methods

It was a prospective non-randomized clinical interventional study conducted

during the period of Jan 2008 to July 2010. All the children with uncomplicated cataract were selected. They were allotted hospital number and were prepared for general anesthesia with all the systemic review and investigations. The parents were asked to sign an informed consent for the procedure. All children underwent cataract extraction under general anesthesia by an experienced surgeon. The patients received anterior chamber irrigation with heparin sodium (5 IU/cc) during operation added to the irrigating solution of balanced salt solution (BSS Plus).A conjunctival flap was made at superotemporal part of the limbus.

Scleral tunnel was constructed using a crescent knife and extended up to 1.0 mm into clear cornea. A 3.2mm keratome was used to access the anterior chamber and the internal corneal incision was extended for about 0.5mm more than the external scleral incision. The anterior chamber was deepened using a viscoelastic and continuous curvilinear capsulorrehexis of 5 - 6 mm was done using a bent 27-gauge needle mounted on the irrigating infusion. The nucleus was aspirated and the cortex was washed using a simcoe cannula. A 6.5 mm optic PMMA PCIOL was implanted in the capsular bag inflated by viscoelastic. The viscoelastic material was replaced by BSS solution containing heparin sodium (5 IU/cc). The integrity of the self-sealing scleral incision was ensured and the cut conjunctival flap was apposed using a forceps fitted to bipolar diathermy. Subconjunctival injection containing gentacin and dexamethasone were given in the end. Standardized postoperative treatment comprised of prednisolone acetate 1% (Pred Forte by Allergan) one hourly for one week followed by five times a day for the second week and tapered over six weeks and moxifloxacin (Vigamox by Alcon) four times a day for one month. No oral steroids or topical mydriatic treatment was given. All patients were followed on the first post operative day, after one week, after one month and were advised follow up at the 3rd and 6th months. At all visits, postoperative intraocular complications, including cellular reaction based upon modified Hogan's classification, fibrin formation, anterior and posterior synechia, cyclitic and pupillary membrane formation, intraocular lens deposits and posterior capsular opacification (PCO),were recorded.

Results

Twenty eyes of fifteen patients aging 4 years to 10 (mean +.05) years consisting of 45% males and 55% females were included in the study. Mild anterior reaction was seen in 10 cases (50%) and moderate anterior chamber reaction was observed in only (15%) three patients (table. I). It was observed that anterior chamber reaction disappeared in all cases on the 7th post operative day. Pupillary irregularity was not reported in any of these cases. There was no fibrin formation, anterior and posterior synechia, cyclitic and pupillary membrane formation. There were no intraocular lens deposits or posterior capsular opacification (PCO) in any of the cases after the follow up of 6th month. Hyphema or intraocular hemorrhage due to heparin was not reported in any of the cases.

Discussion

A tendency towards increased

Table-I: Anterior Chamber Reaction in Post Operation Cataract Children (n=20)

Severity of anterior chamber reaction	1st post op day	7th Day	6th Months
Mild	10(50%)	Nil	Nil
Moderate	3 (15%)	Nil	Nil
Severe	Nil	Nil	Nil

postoperative inflammation in children is well recognized.[7] To control post op inflammation in pediatric cataract surgery is always a challenge for eye surgeon. Intraocular inflammation manifests itself as increased cells and flare, inflammatory precipitates on the IOL and the endothelium, formation of synechia, and inflammatory cyclitic membranes.[7] The pathogenesis of postoperative fibrinoid inflammation is unknown.

The fibrinoid reaction after pediatric cataract surgery is may be caused by the breakdown of the immature blood aqueous barrier (BAB) and insufficient trabecular meshwork fibrinolytic activity.[8] Secondary complications of severe fibrinoid reaction include pupillary membrane and opacification of the anterior hyaloid face.[9] Therefore, measures that may prevent or decrease inflammation in these eyes deserve consideration. In addition to its well-known anticoagulant activity, heparin has anti-inflammatory and antiproliferative properties. Heparin inhibits fibrin formation after intraocular surgery and has also been shown to inhibit fibroblast activity.[10] Studies.[10,11] elucidate several mechanisms through which heparin may inhibit inflammation including induction of apoptosis in human peripheral blood neutrophils, inhibition of the complement activation and lymphocyte migration, l- and p-selectin, adhesion-molecule support of the initial attachment of leukocytes to the vessel wall at the inflammation site, neutrophil chemotaxis, and generation of refractive oxygen species by mononuclear and polymorphonuclear leukocytes. In our study of pediatric cataract surgery, addition of heparin to the irrigating BSS prevented postoperative inflammatory complications. In this study it was shown that early postoperative inflammatory reactions were rare. Bayramlar and colleagues.[13] also concluded that the addition of heparin to the irrigating solution during surgery decreases postoperative fibrinoid reaction and late inflammatory complications. The same was concluded by Iverson and colleagues.[14] in their study.Hyphema, which can be thought of have occurred during surgery due to heparin irrigation, was not seen in our study. However, this risk can also be diminished by using low molecular weight heparin. Iverson and colleagues.[14] suggest that fragmin, at a concentration of 5 IU/mL, lowers the risk of hemorrhage during vitreoretinal and lensectomy surgeries.

Conclusion

Our results suggest that adding heparin sodium to the irrigating solution seems to be a safe, effective, and promising method to prevent early postoperative inflammatory reaction in pediatric cataract surgery.

References

1. Taylor D. The Doyne lecture. Congenital cataract: the history, the nature and the practice. Eye. 1998; 12:9-36.
2. Lloyd I C, Ashworth J, Biswas S, Abadi R V. Advances in the management of congenital and infantile cataract .Eye 2007; 21, 1301-9.

3. Simons BD, Siatkowski RM, Schiffman JC, Surgical technique, visual outcome, and complications of pediatric intraocular lens implantation. J Pediatr Ophthalmol Strabismus 1999; 36:118-24.
4. Mazhar U H, Umair A Q, Aziz U R , Nasir B, Rashid H A. Complication and Visual Outcome after Peadiatric Cataract Surgery with or Without Intra Ocular Lens Implantation. Pak J Ophthalmol 2011; 27 30-4.
5. Rumelt S, Stolovich C, Segal ZI, Rehany U. Intraoperative enoxaparin minimizes inflammatory reaction after pediatric cataract sutgery. Am J Ophthalmol. 2006; 141:433-7.
6. Kruger A, Amon M, Formanek CA, Schild G, Kolodjaschna J, Schauersberger J. Effect of heparin in the irrigation solution on postoperative inflammation and cellular reaction on the intraocular lens surface. J Cataract Refract Surg. 2002; 28:87-92.
7. Dada T. Intracameral heparin in pediatric cataract surgery. J Cataract Refract Surg. 2003; 29:1056.
8. Mehta JS, Adams GG. r-TPA following pediatric cataract surgery. Br J Ophthalmol, 2000; 84:983-6.
9. Charlotta Z , Maria K. Paediatric cataract surgery .Acta Ophthalmol Scand, 2007;85: 698-710
10. Wilson ME, Trivedi RH. Low molecular-weight heparin in the intraocular irrigating solution in pediatric cataract and intraocular lens surgery. Am J Opthalmol, 2006; 141:537-8.
11. Yelda B Ö, Arzu T, Nadire E, Baran K, Ömer K D. Effect of heparin in the intraocular irrigating solution on postoperative inflammation in the pediatric cataract surgery. Clin Ophthalmol. 2009; 3: 363-5.
12. Knight-Nanan D, O'Keefe M, Bowell R. Outcome and complications of intraocular lenses in children with cataract. J Cataract Refract Surg, 1996; 22:730-6.
13. Bayramlar H, Totan Y, Borazan M. Heparin in the intraocular irrigating solution in pediatric cataract surgery. J Cataract Refract Surg. 2004; 30:2163-9.
14. Iverson D, Katsura H, Hartzer MK. Inhibition of intraocular fibrin formation following infusion of low-molecular-weight heparin during vitrectomy. Arch Ophthalmol,1991; 104:405-9.