ORIGINAL ARTICLE

Role of Intracameral Dexamethasone in Preventing Immediate Postoperative Anterior Uveitis in Paediatric Cataract Extraction

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ABSTRACT

Objective: Paediatric cataract surgery can result in several complications like post operative inflammation. Topical steroids are relied upon as mainstay of treatment and prevention, adjuvant periocular and systemic steroids may be required to control the inflammation. The purpose of study was to evaluate the role of intracameral dexamethasone in preventing immediate postoperative anterior uveitis in paediatric cataract extraction.

Methods: This was comparative study done at institute of Ophthalmology Mayo Hospital Lahore. Sixty patients were selected and divided into two equal groups. Group I were given routinely subconjuctival injection of gentamycin 20 mg and dexamethasone 2 mg while patients in group II were given subconjuctival injection of gentamycin 20 mg and intracameral dexamethasone 0.4 mg (0.1ml). Evaluation was done on 1st and 3rd postoperative day and on first follow up visit. Examination of children was done with help of slit lamp for cells, flare or any other sign of inflammation. In case of non cooperative children examination was done with microscope under sedation/general anesthesia for fibrinous reaction, exudative membrane, posterior synechiae and red reflex.

Results: There were total of sixty patients age below 12 years divided into two equal groups, 43 were males and 17were females. Group I was given routinely subconjuctival injection of dexamethasone, while group II patients were given intracameral injection of dexamethasone. Group II patients showed better results than that of group I.

Conclusion: Intracameral injection of dexamethasone was found superior to subconjuctival injection of dexamethasone in preventing immediate postoperative anterior uveitis.

Key words: Intracameral, dexamethasone, anterior uveitis, paediatric cataract.

INTRODUCTION

Paediatric cataracts occur approximately 1 in 250 live births. Paediatric can present in any type like nuclear, lamellar, sutural, coronary, polar and membranous cataract. The treatment for pediatric cataract is surgical management. Early management of pediatric cataract prevents the child from developing amblyopia and ensures good visual outcome.

Pediatric cataract surgery can result in complication like posterior capsule opacification, lens epithelial reproliferation, glaucoma and retinal detachment. But one of common complications associated with paediatric cataract surgery is high incidence of post operative inflammation. Intensive topical steroid therapy is still relied upon as conventional mode of prevention and treatment of inflammation. Adjuvant systemic and periocular steroids may be required.

Post operative uveitis can lead to complications like peripheral anterior synechiae, posterior synechiae, exudative membrane and pupil block glaucoma, thus hampering good visual rehabilitation. The conventional way of treatment is not so effective in the control of post operative inflammation due to non compliance and also the patient may squeeze his eyes while instilling drops that reduce the contact time of medication in the cornea. Then the other options for administration of medication at the time of surgery include subconjuctival injection, collagen shield, intracameral injection or infusion and sustained release intraocular drug delivery system.

Intracameral injections of antibiotics have been used for the control of postoperative endophthalmitis and are widely accepted.

Intracameral injection of recombinant tissue plasminogen activator (r-TAP) has been advocated for the treatment of postsurgical inflammation following paediatric cataract surgery. Surodex is the first sustained release product that contains 600ug dexamethasone incorporated with polymer. This was found effective for the control of post cataract surgery inflammation.

The purpose of my study was to evaluate the role of intracameral injection of dexamethasone in preventing immediate post operative anterior uveitis following paediatric cataract extraction.

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MATERIAL AND METHODS

This study was conducted at the institute of Ophthalmology, unit III, Mayo hospital Lahore over the duration one year from 15th June 2004 to 30th June 2005. Sixty patients with congenital / developmental cataract of age below twelve years were included. The patients were divided into two groups of equal suze on the basis of simple random sampling.

Group 1: It included thirty patients who were given routinely subconjuctival injection of dexamethasone (2mg) and gentamycin 20mg.

Group 2: It included thirty patients who were given routinely subconjuctival injection of gentamycin (20mg) and intracameral injection of dexamethasone 0.1cc (0.4mg). All patients of age twelve and under with uncomplicated cataract, were included. Patients above the age 12 years with corneal opacity, with visually insignificant cataract, cataract due to trauma and cataract with persistent hyperplasic primary vitreous or any other ocular pathology were all excluded. Informed consent was taken from the parents of children. Detailed history of the patients was taken. Detailed examination of anterior segment was done with the help of standard slit lamp and hand held slit lamp where needed.

Examination of posterior segment was done with indirect ophthalmoscope and slit lamp biomicroscopy. In non cooperative cases examination was done under sedation or general anesthesia with microscope for anterior segment and indirect ophthalmoscope for posterior segment. In cases with invisible fundus, B scan was performed for evaluation of posterior segment.

All the children were operated for aspiration of lens, primary posterior surgical capsulotomy and anterior vitrectomy. Children below age of two years were operated without intraocular lens implantations while above two years were operated with intraocular lens implantation. Postoperatively the patients in both groups were given topical dexamethasone suspension (1 drop after every ½ an hour), tobramycin eye drops (one drop after every 2 hours), 2.5% phenylephrine eye drops (one drop after every 8 hours) homatropine eye drops (one drop after 8 hours) for initial three postoperative days along with oral antibiotics (for one week).

Then for next one week dexamethasone suspension (one drop after every 2 hours), tobramycin eye drops (one drop every 4 hours), 2.5% Phenylephrine eye drops (one drop every 8 hours), and Homatropine eye drops (one drop every 8 hours) were given topically.

Evaluation was done on first to third postoperative days daily (during which patient remained in the ward for postoperative assessment) and on the first follow up visit (one week after being discharged from ward). The examination of the children was done with the help of standard slit lamp or hand slit lamp for cells, flare or any other sign of inflammation. In case of non cooperative children examination was done with microscope under sedation or general anesthesia for fibrinous reaction, exudative membrane, posterior synechiae & red reflex.

RESULTS

Sixty patients below twelve years were included in the study divided into two groups, containing 30 patients each. There were 43 male (71%) and 17 females (29%. In group 1 there were 19 (63.34%) male and 11 (36.66%) female, while in group II, 24 (80%) male and 6 (20%) female. Table I

At the first post operative day 33.33% in group I had flare of grade +2 and less while 66.67% patients had flare of grade +3 and above. Regarding cells in anterior chamber 40% of patients had cells of grade +2 and less, while 60% of patients had cells of grade +3 and above. Exudative membrane was present in 16.67% of patients and posterior synechiae were present in 13.33% of patients.

At the third post operative day 60% of patients in group I had flare of grade +2 and less while 40% had flare of grade +3 and above. As far as cells in anterior chamber were concerned, 66.66% had cells of grade +2 and less, while 33.34% had cells of grade +3 and above. Exudative membrane was present in 10% and posterior synechiae were present in 6.66% of patients.

On evaluation of patients in group II 66.66% patients had flare of grade +2 and less, while 33.33% had flare of grade +3 and more. While looking for cells 66.67% patients had cells of grade +2 and less while 33.33% had cells of grade +3 and more. Exudative membrane was present in 6.66% and posterior synechiae were present in 3.34.66% of patients. At the third postoperative day 83.34% patients had flare of grade +2 and less, while 16.66% patients had flare of grade +3 & more. 90% patients had cells of grade +2 and less, while 10% had cells of grade +3 and more. Exudative membrane was present in 3.34% and posterior synechiae were present in no more of the patients. On first follow up visit results are as shown in table II.

Regarding the management of complications of both groups, two patients in group I required injection mydricaine along with subconjuctival injection of dexamethasone and gentamycin to break posterior synechiae. For statistical analysis chi square was applied and significant difference was found between

two groups. At first postoperative day for flare +2 and less (p=0.0009) and for +3 and above (p=0.0009). for cells +2 and less (p=0.038) and for +3 and above (p=0.03)

In cases of Exudative membrane and posterior synechiae there was significant clinical difference but not statistically significant. While in case of Exudative membrane (p=0.2) and for posterior synechiae (p=0.16).

At third postoperative day for flare +2 and less (p=0.04) and flare +3 and above (p=0.045). For cells +2 and above (p=0.028) and +3 and above (P=0.028)/ in case of Exudative membrane (Fisher exact test P=0.24).

At first follow up visit for flare +2 and less (P=0.35), while for flare in +3 and above (P=0.55). For cells +2 and less (0.07), for +3 and above (P=0.23).

Table I: Age distribution

Age (Years)	**Gp**	**Male**	**Female**	**Total**
Below 4 yrs	I	6(66.66%)	3(3.33%)	09
	II	5(71.42%)	2(28.58%)	07
4-8 yrs	I	9(60.29%)	6(40%)	15
	II	13(81.25%)	3(18.75%)	16
8-12 yrs	I	4(66.67%)	1(42.86%)	06
	II	6(57.14%)	1(42.86%)	07

Table II: Comparison of signs of inflammation between two groups 1st follow up visit

Signs	***Group I with S/CG+D***	***% age***	***Group II with intracameral Dexamethasone***	***% age***
Flare				
+	23	76.67	26	86.67
++	05	16.67	03	13.33
+++	02	06.66	-	-
++++	-	-	-	-
Cells				
+	19	63.33	26	86.67
++	08	26.67	04	13.33
+++	02	06.66		
++++	01	3.34		

DISCUSSION

Cataract is the leading cause of blindness in Pakistan contributing to 66.7% of the total 1.78% blindness. Paediatric cataract presents as a significant problem in developing countries in terms of human morbidity, economic loss and social burden. Managing paediatric cataract remains a challenge.

Paediatric cataract surgery can result in complications like posterior capsule opacification, lens epithelial reproliferation, glaucoma and retinal detachment. But one of the common complications associated with paediatric cataract surgery is high incidence of postoperative inflammation. The post operative uveitis is serious complication and if not controlled can lead to peripheral anterior synechiae, posterior synechiae, exudative membrane and pupil block glaucoma thus hampering good visual rehabilitation.

To prevent the postoperative uveitis the use of perioperative steroids and/ or antibiotics continue to be standard of care. Options for medication administration at the time of surgery include topical medication, subconjuctival, intracameral injection and sustained release intraocular drug delivery system.

Topically non steroidal anti-inflammatory drugs appear to have comparable effect to that of steroid in mild cases of post operative inflammation. In cases of moderate to severe inflammation, topical steroids appear to have greater effect due to quicker reduction of inflammation. Frequently adjuvant systemic/and or periocular steroids may be required for control of inflammation. However topical route of administration of drugs may not be so effective due to poor corneal penetration. In addition, the topical therapy is associated with patient's non-compliance, patient's inconvenience and problems for physician or staff instructing patients. Patients' non compliance may result in improper dosage, or frequency. To achieve better control of post operative uveitis Oculex pharmaceutical developed an intraocular drug delivery system which is superior to topical therapy and subconjuctival injection, due to relatively prolonged effect and direct action on the desired tissue. Their first product was surodex containing 60ug dexamethasone which is inserted into anterior or posterior chamber at the end of surgery which results in sustained release of dexamethasone.

In our study sixty patients were divided into two equal groups. All the patients were operated for lens aspiration, primary posterior capsulotomy and anterior vitrectomy. Children below two years were operated without intraocular lens implantation, while children above two years were operated with intraocular lens implantation. Patients in group I were given routinely subconjuctival injection of gentamycin (20mg) and dexamethasone (2mg) while patient in group II were given subconjuctival injection of gentamycin (20mg) and intracameral injection of dexamethasone (0.4mg).

On evaluation at first postoperative day 33.33% in group I while 66.6% in group II had flare of +2 and less. 66.67 %in group I and 33.33% in group II had flare +3 and above (P=0.009).

For cells 40% in group I and 66.67% in group II had cells +2 and less (P=0.038) while 60% in Group I and 33.33% in Group II had Cells +3 and above (P=o.o38). Exudative membrane was present in 16.67% in group II (P=0.22). Posterior synechiae

were present in 13.33% in group I and 3.34% in group II (P+0.16). At the third postoperative day 60% in group I and 83.34% in group II had Flare +2 or less (P= 0.04) while 40% in group I and 16.66% in Group II had Flare +3 and above (P= 0.045), 66.66% in group I and 90% in group II had cell +2 and less (P=0.28) while 33.34% in group I and 10% in group II had cells +3 and above (P=0.028).

Exudative membrane was present in 10% and 3.34% in group II (P=0.24). Posterior synechiae were present in 6.66% in group I and none of the patients in group II. On first follow up visit 93.34% in group I and 100% in group II had flare +2and less (P=0.35) while 6.66% in Group I and none in Group II had Flare +3 and above. For cells 90% in group I and 100% in group II had cells +2 and less (P=0.07) while 10% in group I and none in group II had cells +3 and above. Exudative membrane was present in 6.66%in group I and none in group II. Posterior synechiae were present in none of the patient at that time.

As clear from above, while evaluating for cells and flare, post operative inflammation was significantly less severe in group II than group I on first and third postoperative day (also statistically significant). Also exudative membrane and posterior synechiae were present in relatively more patients in group I than group II and even two patients in group I required additional subconjuctival injection of gentamycin and dexamethasone along with injection mydricaine to control postoperative inflammation.

At first follow up visit there was not statistically significant difference between the two groups. This might be due to intensive therapy which was being done post operatively and also the effect of intracameral was washed away after few days.

So comparing group I and II, intracameral injection is superior to subconjuctival up till the 3rd post operative day. But there is no statistically significant difference between two groups by 10 days after surgery. Thus intracameral dexamethasone can be good alternative to subconjuctival injection of dexamethasone due to its direct effect on the desired tissue, also it is easily available and patient does not have to cost anything for it.

It also avoids the long term complications of uveitis. Intracameral dexamethasone itself was not associated with any complication during this study. Although no study is available internationally which compares intracameral injection of dexamethasone with subconjuctival dexamethasone however intracameral route has been found significantly effective in many studies.

During the phase I study which was conducted on 90 patients by the Oculex pharmaceutical 90 patients were randomized into two groups. Group I received surodex and the group II received either no treatment or placebo delivery particle.

Masked slit lamp grading of cells & flare was lower in surodex treated groups than in the control group throughout 60 days of postoperative period. The difference was statistically significant at 3rd day and at first two postoperative weeks (P=0.004).

Surodex was directly compared with topical dexamethasone in a separate randomized double masked study of 60 cataract patients conducted in Singapore by Tan and chee.

One half of patients were randomized to treatment with dexamethasone 0.1 % eye drops four times a day for 30 days postoperatively, the other half of patients received single surdoxe pellet at the conclusion of uncomplicated surgery followed by normal saline placebo eye drops four times a day for 30 days. Postoperatively mean kowa laser flare values were significantly lower in surodex treated group compared with the topical steroid treatment group during the first two post operative weeks (P=0.001). Mean Cell and Flare scores, as judged by masked slit lamp examination were slightly lower in surodex treated group.

Intracameral injection of tissue plasminogen activator (tPA) was found significantly effective in controlling post cataract surgery fibrinous membrane formation in 37 patients in a study conducted at Moorefield Eye Hospital. As intracameral route results in the enhancing effect of medication on the desired tissue, lidocaine has been used intracameral to get more effective anesthesia for cataract surgery in many studies. Similarly intracameral injection of various antibiotics (e.g. vancomycin) has been used prophylactically to prevent post operative endophthalmitis and is found significantly effective.

CONCLUSION

The result of study showed that intracameral injection of dexamethasone is significantly superior to subconjunctival injection of dexamethasone until 3rd post operative day. This effect is not statistically significant by day 10 after surgery. Therefore overall it is good alternative to subconjunctival injection of dexamethasone which avoids many of the complications associated with subconjuctival injection.

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