Pediatrics intraocular lens implantation complications and visual outcome

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SUMMARY

Objectives: To identify the postoperative complications and visual outcome after posterior chamber intraocular lens (IOL) implantation in children.

Design: It was a prospective study of 29 eyes of 25 children who were below 16 years of age.

Place & Duration: This study was in Ophthalmology Department, Post Graduate Medical Institute, Lady Reading Hospital, Peshawar, from January 1998 to December 1999.

Material & Methods: After preoperative assessment and investigations all cases underwent extracapsular cataract extraction with posterior chamber intraocular lens implants under general anaesthesia. These patients were then followed up on 1st postoperative day, 10th day, 30th day and then after 90th day. Their postoperative complications and visual outcome were recorded.

Results: Eighteen (72%) of children were male. Four patients had bilateral intraocular lens implantation. In 68% cases, cataract was traumatic in origin, while 32% were congenital or developmental lens opacities. Visual acuity (VA), on presentation was less than 3/60 in 89.65% of cases. Postoperative final visual acuity of 6/18 or better was found in 43.37% of cases. In 24.13%, corrected visual acuity in the range of 6/60 to 6/24 was noted. In 6.89%, visual acuity of 3/60 or better (but less than 6/60) was achieved. In 24.13%, final visual acuity was less than 3/60. The most common complication encountered was posterior capsule opacification (PCO) i.e. 51.72%. This was followed by fibrinous exudates formation (20.68%).

Conclusion: Posterior capsule opacification and fibrinous exudation are the common postoperative complications after intraocular lens implantation in children. Better visual outcome can be achieved by parent’s guidance and motivation.

Key Words: Pediatrics IOL implantation; IOL in children; Complications of IOL.

INTRODUCTION

Pediatric cataract is one of the leading causes of childhood blindness. Management of cataracts in children had a lot of controversies and so is regarding pediatric intraocular lens implantation. Cataracts in children are mostly congenital or developmental but may be traumatic or due to other causes. Unilateral cataract offers special challenge as amblyopia is difficult to manage in these cases. Morbidity and economic loss due to childhood cataracts could not be underestimated. Restoring the sight of one blind child from cataracts may be equivalent to restoring the sight of 10 elderly adults due to disability burden in terms of “blind years”.

Management of childhood blindness is priority in the “Vision 2020: the right to sight”. Cataract is one of the preventable causes of childhood blindness. There is higher incidence of exudative membrane formation and posterior capsule opacification after IOL implantation in children. Amblyopia related to cataracts is also one of common cause of childhood blindness specially in developing world.

This study was designed to identify postoperative complications and visual outcome in cases of pediatrics cataracts after intraocular lens implantation.

MATERIALS AND METHODS

All patients underwent complete ophthalmological prior to surgery. This included detailed history, visual acuity (depending upon cooperation and intelligence of the children), slit lamp examination, fundoscopy, Tonometry if possible, was also performed.

After complete clinical evaluation, the relevant investigations were performed, like full blood count, urine analysis, blood glucose and chest X-rays. B-scan in
traumatic cases was also performed. Medical check-up was carried by pediatrician whenever, required. Biometry was performed in all cases except one who didn’t cooperate, so IOL power was selected in on empirical basis.

Proper consent was taken in all. Atropine 1% or homatropine 2% was used for mydriasis prior to surgery. General anaesthesia was used in all cases. Surgical technique was basically the same with some variation, particularly in traumatic cases. After limbal incision, entry was made into anterior chamber. Anterior capsulotomy was done by can-opener or capsulorrhexis techniques. Lens material was aspirated by Simcoe cannula and IOL implanted in scleral sulcus or in bag depending upon surgeon’s preference. Occasionally posterior capsulotomy with anterior vitrectomy was done. Viscoelastic, usually methycellulose was used to maintain the anterior chamber. One-piece polymethylmethacrylate lenses of C-loop design were implanted. Wound was sutured with 10/0 Ethilon interrupted sutures which were then buried. Patients were put on topical steroids and oral analgesics accordingly.

Patients were meticulously followed up on 1st postoperative day, 10th day, 30th day, and then on 90th day. Complications, if any, were recorded and treated accordingly. Visual outcome after 90th day were noted.

Amblyopia treatment was given as indicated. Wound sutures were usually removed after 2 months.

**RESULTS**

Twenty-five patients (29 eyes) underwent extracapsular cataract extraction with posterior chamber IOL implantation in our unit and were then observed for a minimum period of ninety days postoperatively. Majority of the patients were male (18 or 72%) as compared to 7(28%) female.

Aetiology of cataract in our cases is shown in Fig 1. Congenital and developmental cataracts were merged into one category because in most cases parents didn’t remember the exact time of onset.

In traumatic cataract cases, 16 patients (89%) out of 18 were male children. While in congenital or developmental cataracts 3 eyes (27%) were of male patients while eight (73%) eyes were of female children. Mean age at the time of surgery was 8.48 years.

On presentation, 26 eyes (89.65%) of patients had poor visual acuity of less than 3/60. One patient (3.44%) had visual acuity of 6/60 and another one (3.44%) had 6/36. While in one case, visual acuity couldn’t be assessed properly because of his young age. Patients were regularly followed up for a minimum period of 90 days and final visual acuity after correction was recorded in all cases.

In our series, out of 29 eyes, visual acuity was restored to 6/18 or better in 12 (41.37) eyes. Seventeen (24.13%) cases regained final visual acuity in the range of less than 6/18 to 6/60. Two patients (6.89%) recovered to visual acuity of 6/60 or better but less than 6/60. While in seven cases (24.13%) final vision was very poor (<3/60). In one child (3.44%) final vision couldn’t be assessed accurately because child was uncooperative due to young age.

We noted final visual acuity of less than 6/60 in 9(31%) eyes. Preoperative visual acuity versus postoperative visual acuity in our patients is shown in Table 1.

<table>
<thead>
<tr>
<th>Snellen’s acuity</th>
<th>Pre OP VA</th>
<th>Post OP Final VA (corrected)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/60 to 6/18</td>
<td>0</td>
<td>12 41.37</td>
</tr>
<tr>
<td>&lt;6/18 to 6/60</td>
<td>1</td>
<td>3.44 7 24.13</td>
</tr>
<tr>
<td>&lt;6/60 to 3/60</td>
<td>1</td>
<td>3.44 2 6.89</td>
</tr>
<tr>
<td>&lt;3/60</td>
<td>26</td>
<td>89.65 7 24.13</td>
</tr>
<tr>
<td>Couldn’t be assessed</td>
<td>1</td>
<td>3.44 1</td>
</tr>
</tbody>
</table>

VA = Visual acuity, Pre OP = Preoperative, Post OP = Postoperative

Accidental breaks in posterior capsule was noted in 2 eyes (6.89%). Surgery was complicated with accidental vitreous loss in 2 cases (6.89%) which was successfully cleared off the anterior chamber. Posterior chamber IOL was successfully implanted in all eyes.

The most common postoperative complication observed was posterior capsule opacification followed by fibrinous exudative membrane in the anterior chamber. This responded well to intensive instillation of topical steroids but in many cases it was continued for a long period of time. Two patients (6.89%) were seen with postoperative striae keratitis, which then subsided without subsequent complications. Three patients

**Fig 1: Aetiology of cataract (n = 29)**
Intraocular lens implantation in children has always been a subject of debate because of its various implications. It is now increasingly being practiced in Pakistan. IOL = Intraocular lens

The introduction of surgical microscope revolutionised surgical techniques. Harold Ridley® at St. Thomas Hospital London was the first to use modern implant in 1949. Further modifications gave further stability and lead to modern days stable implants. But complications rate is still high in pediatric population. As IOL implants are increasingly being practiced in children, there still, is scope for further improvement in IOLs designs, IOL’s material as well as surgical techniques to avoid associated complications. Poverty and illiteracy is prevalent in our province. Majority of patients needed a lot of persuasion for proper follow up. Contact lens wear in these children to correct aphakia has a lot of associated challenges. These are expensive and are frequently lost due to frequent rubbing of the eyes by children. Maintenance and sterility is almost impossible which under these circumstances make it of very limited use. The better alternative with which we are left is, intraocular lens implantation, which has long been a controversial mode of treatment of childhood cataracts6, although it had been carried out successfully for more than 2 decades7.

Childhood cataracts have been treated in the past with anterior chamber IOLs8 and iris supported lenses associated with major complications9. The introduction of posterior chamber IOLs have brought about a lot of relief10-12. These lenses have reduced complications rate and improved visual restoration10,12. It has now become a preferred practice for surgical treatment13 of childhood cataracts. While results are much better in older children14, complication rate is still comparatively high in small children under the age of two years15.

In our series, posterior capsule opacification was the commonest complication observed. It occurred in 20.68% of eyes. Eckstein, et al 16 reported it in 92% of cases operated for traumatic cataract after a follow-up of 3 years who needed further intervention. This is quite similar to Akhtar and Waheed’s report, which observed PCO in 94% of cases after a follow up of 10 years17. Bienfait, et al found PCO in 83% of his cases18, whereas Gupta, et al observed PCO in 27% of his paediatric patients19.

In view of high frequency of posterior capsule opacification many surgeons prefer to perform posterior capsulorrhexis as a primary procedure during cataract surgery to avoid future inventions. Buckley, et al prevented PCO by performing standard endocapsular technique, followed by pars plana anterior vitrectomy19. Gimbel has reported that heparin coated, single piece polymethyl methacrylate IOLs use with a mean follow up of 35.5 months prevented formation of PCO in his patients20. Acrylic lens (Acrysof IOL) use has also shown to decrease PCO incidence21. Lens edge design and intracameral heparin injection are also known to have effect on PCO formation. Advanced surgical techniques, such as anterior & posterior curvilinear capsulorrhexis with meticulous cleaning of the capsular bag, limited anterior vitrectomy if there is any vitreous herniation, all may help to reduce the incidence of PCO. De Broff reported that performing primary posterior capsule continuous curvilinear capsulorrhexis and IOL optic capture through the primary posterior capsulorrhexis can reduce the incidence of PCO22. As ways to combat PCO formation are in evolution, factors responsible for formation of PCO should be identified as it is the main cause of decrease in visual outcome and require further intervention after pediatric IOL implantation.

In our patients, visual outcome was not good in congenital or developmental cataracts. This was because of late presentation when deep-rooted amblyopia had already set in. On the other hand, results were better in traumatic cases as they presented earlier.

Fibrinous uveitis developed in 20.68% of our patients, which responded well to intensive steroid therapy. This is almost similar to that reported by Gupta who found it in 22% of his patients14. Vats and Banerji23 observed it in 25% while Akhtar and Waheed described it 25% of the bilateral and 66% of their unilateral cases17. It may lead to increase incidence of posterior synechiae and secondary pupil block glaucoma24.

Striate keratitis developed in two of our patients (6.89%), which resolved fairly rapidly. This is because of the obvious reason that cornea in children has tremendous reserve, having a very dense population of endothelial cells. However the challenge to maintain an adequate cell count in adult life needs to be investigated.

### DISCUSSION

Intraocular lens implantation in children has always been a subject of debate because of its various implications. It is now increasingly being practiced in Pakistan.

### Table 2: Postoperative complications of IOL implantation in children (n = 29)

<table>
<thead>
<tr>
<th>Complications</th>
<th>Number of eyes</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posterior capsule opacification</td>
<td>15</td>
<td>51.72</td>
</tr>
<tr>
<td>Fibrinous exudates formation</td>
<td>6</td>
<td>20.68</td>
</tr>
<tr>
<td>Synechiae formation</td>
<td>3</td>
<td>10.34</td>
</tr>
<tr>
<td>Striate keratitis</td>
<td>2</td>
<td>6.89</td>
</tr>
<tr>
<td>IOL dislocation</td>
<td>1</td>
<td>3.44</td>
</tr>
</tbody>
</table>

TOL = Intraocular lens
One of the frequent complications of cataract surgery in children, specially after extraction with IOL, is glaucoma. Zwaan, et al found it in 1% of his patients. We didn’t find any cases of raised IOP in our study. However, it cannot be claimed to be absent with IOL implantation as our follow up was too short to take notice of that. Akhtar and Waheed found it in 11% of their series as their follow up spanned over 10 years. Iris capture is a fairly common complication in pediatric patients, but in our study of 29 eyes we didn’t encounter this complication.

In general, management of childhood blindness is the priority in “Vision 2020: right to sight”. Childhood cataracts being one of the commonest cause of preventable blindness in childhood needed to be keenly focused. But no doubt, surgical management of the cataracts in children with IOL implantation has additional associated challenges. PCO, fibrinous exudations, cataract related amblyopia, post surgical amblyopia are the main factors which limit the better visual outcome in pediatrics age group. Particular care should be exercised in pediatric patients due to high rate of complications. Treatment of amblyopia, though a difficult task should be stared at the earliest. It should be the integral part of the management of young children. Visual results are better for bilateral incomplete lens opacities than unilateral complete lens opacities in congenital cases. Parent education and participation is vital in the management of these patients. Importance of occlusion therapy and treatment of amblyopia should be well emphasized to them. Regular follow-ups should be carried out for a long period of time to identify late complications such as posterior capsule opacification and glaucoma. Refraction should be repeated at regular intervals and glasses advised accordingly. Early examination of newborn siblings by ophthalmologist should be advised in congenital cases.

Final visual outcome can further be improved by parent’s guidance and motivation regarding management of amblyopia, proper prolonged follow-ups and early treatment of complications.

CONCLUSION
Fibrinous exudation and PCO are the main complications after IOL implantation in children. These together with amblyopia are also the main causes of limited visual outcome after pediatric IOL implantation.

REFERENCES


