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ORIGINAL RESEARCH

An interventional study of visual Outcomes of Congenital Cataract Surgery in 3 to 8 years old paediatric patients

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ABSTRACT

Background: Congenital cataract usually present as a whitish reflex called leukocoria in eye. It requires early detection and treatment to prevent permanent visual impairment from amblyopia and aim of this study is to determine outcomes of congenital cataract surgery in a tertiary care hospital.A total of 192 eyes of 120 patients of age group 3-8 years with visually significant congenital cataract (≥3 mm in diameter) underwent cataract surgery with posterior chamber foldable intraocular lens implantation were enrolled in this interventional study. Posterior capsuletomy with anterior vitrectomy was performed in all cases. The span of study was 01 year duration. The minimum follow up of patients was 6 months. In follow-up period post-operative treatment, management of surgical complications, amblyopia therapy and assessment of visual acuity was done. Final outcome of congenital cataract surgery in terms of improvement in visual acuity was assessed at the end of 6th month. The study was performed at GMC, Dungarpur. At the end of study 51% of patients achieved good vision and the better visual outcome is significantly higher in younger age groups. Fibrinous reaction was the most common complication occurred in this study. This study concludes that timing of the congenital cataract surgery is the most important factor for visual prognosis.

Keywords- Paediatric patients, congenital cataract surgery, visual acuity.

INTRODUCTION

Childhood blindness is a priority of Vision 2020: the Right to Sight, the global initiative to reduce the world's burden of avoidable blindness[1,2]. Globally there are estimated 1.5 million blind children, almost three-quarters of them living in developing countries[3]. The prevalence of blindness in children is estimated to be about 10 per 10,000children[4]. Various studies across the globe show one third to half of childhood blindness is either preventable or treatable[5]. Cataract is the leading treatable cause of childhood blindness in children[6,7].

Worldwide 5 –20% of the blindness in childrenis due to congenital cataract and the global incidence of congenital cataracts has been reported to be 1 – 15/ 10,000 live births[7]. A hospital based study showed that 54.7% of the children are visually handicapped and 23% of them are becauseof congenital cataract[8].

Congenital cataract usually present as a whitish reflex called leukocoria in eye. The morphology of cataract is important because it may indicate a likely etiology, mode of inheritance and effects on vision[9]. Congenital cataract requires early detection and treatment to prevent permanent visual impairment from amblyopia ('lazy eye')[10]. Earlier cataract surgery with adequate visual rehabilitation contributes a better visual outcome[11].

Optimal surgical treatment of the pediatric cataract requires a procedure that will provide a clear optical axis. The visual axis may be obstructed by posterior capsule opacification, inflammatory membranes, thickening and opacification of the hyaloid face, and proliferation of the lens epithelial cells12. Leaving the posterior capsule intact in children predisposes to an un-acceptably high rate of capsule opacification13, 14. To reduce the rate of visual axis opacification in the post operative period posterior continuous

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curvilinear capsulorhex is with anterior vitrectomy, has become the gold standard in the treatment of congenital cataract15.This procedure will give a clear visual axis with a reduce rate of visual axis opacification and postoperative need of YAG LASER capsulotomy. Along with posterior capsulotomy and anterior vitrectomy implantation of posterior chamber intraocular lenses (PC – IOL) in children is becoming more common and better accepted procedure throughout the world[16].

There are various postoperative complications encountered in children after surgery. Increased reactivity of uveal tissue in children causes formation of membranes, fibrinous reaction and posterior synechie. It may results in pupillary block and cause raised intraocular pressure postoperatively[17].

The rationale of this study is to determine the outcomes of congenital cataract surgery in a series of patients in tertiary care hospital.

MATERIALANDMETHODS

A total of 192 eyes of 120 patients aged 3 to 8 years with visually significant congenital cataract (≥ 3mm diameter) treated for 01 years and followed up for 6 months were included in this interventional study. The study was performed at GMC Dungarpur with the collaboration of paediatric & ophthalmology department. Informed consent was taken from the guardians. Exclusion criteria were other congenital anomalies like microphthalmia and microcornea, history of intrauterine infections, traumatic cataract, congenital glaucoma, nystagmus, ptosis, strabismus, retinal pathologies and fundal dystrophies, systemic disorders like galactosemia, hyper and hypoglycemia and complicated surgeries. After detailed history patients were examined thoroughly and relevant investigations were done. Ophthalmic checkup including visual acuity, slit lamp examination of anterior and posterior segment, keratometery, B-scan ultra-sonography and intraocular lens power calculation wherever possible were done. Un-cooperative children were examined under general anesthesia before surgery for keratometry and intraocular lens power calculation. Intra ocular lens power was calculated by using SRK II formula.

Pre operatively dilatation of pupil was done by using cyclopentolate 1% and phenylepherine 2.5%. Under general anesthesia and sterilized draping supero-temporal limbal incision of 3mm wasmade with surgical knife no.3.2. A viscoelastic agent was injected to maintain the anterior chamber depth and facilitates easy entry of instruments with less surgical trauma during surgery. Anterior capsulorrhexis was done by a bent 26 gauge needle or utrata forceps according to the elasticity of anterior capsule. Lens matter aspiration was done by means of an irrigation-aspiration hand piece. After aspiration of lens matter posterior chamber foldable acrylic intraocular lens was implanted in the bag on posterior capsule. Posterior capsulotomy and anterior vitrectomy was performed. Incision was closed by one interrupted 10-0 monofilament nylon suture and an air bubble is injected so as to maintain anterior chamber depth postoperatively.

One drop of topical atropine 1% and an antibiotic was instilled and pad applied. Dressing removed after 24 hrs. Systemic antibiotics were given for five days after surgery. Topical antibiotics, steroids and cycloplegic were given in the follow-up period for six weeks.

Patients were followed on 1st post operative day and 1stpost operative week for early postoperative complications and thenpatientswerefollowedafter1 month, 3 months and 6 months. Visual acuity was assessed using the Lea symbols and ETDRS charts depending on the age, intelligence and cooperation of child. Amblyopia therapy was given to those whose visual acuity was greater than Log MAR 0.5. The therapy was given according to the age and density of amblyopia. Occlusion of normal eye with better visual acuity was done by means of a patch applied to that eye. Hours of patching depends on the age of the child. These patients were followed at one month interval to monitor the improvement of vision. Final visual acuity was assessed at 6months and considered to be good if it ranged between Log MAR 0.0 to 0.5.

RESULTS

A total of 192 eyes of 120 patients with visually significant congenital cataract were included in this study. Out of 120 patients, 70(58.3%) were males and 50(41.6%) were females. Regarding site of eye, 102 (53.1%) left and 90(46.9%)right eyes were involved.

Mild to moderate anterior chamber inflammation (up to Grade +2 anterior chamber cells and flare) was seen in 25 (13%) eyes on first post-operative day. Patients were treated with topical prednisolone aceatate 1% and cyclopentolate 1% and were closely followed. Anterior chamber inflammation was completely settled after 2 weeks. Severe anterior chamber inflammation (Grade +3 to +4 anterior chamber cells and flare) with papillary membrane was seen in 30 (15%) eyes on first postoperative day. They received topical and systemic steroids treatment for 2 weeks along with atropine 1% Inflammation settled down in 20 (10%) children while 10 (5%) children underwent YAG laser membranectomy. Surgical membranectomy was not required as children were cooperative. They were repeatedly followed after one week and prolonged steroid treatment was given for one month. Postoperative inflammation was well controlled in both the age groups and there was no visually significant complication after treatment.

Raised intra ocular pressure was seen in 10 (5.2%) eyes at first post operative week. Those patients were treated with topical anti glaucoma medications (beta blockers) and followed after one week to check intra ocular pressure. Intraocular pressure was settled down

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after one week with topical medication and didn't rise within the follow up period.

Pupillary deviation was seen in8 (4.1%) eyes. This was due to trauma to iris at the time of surgery. Intraocular lens(IOL) capture was observed in 4(2%) eyes. Decentration of intra ocular lens was seen in 9 (4.6%) eyes. Small upward decentration was seen in these cases and none of the IOL decentrations was visually significant or a true dislocation and no eye required surgical repositioning of the IOL.

Loose corneal scleral sutures were seen in 4 (2%) patients. Those sutures were removed under sedationin younger children and at slit lamp in older and cooperative children.

Table1: Final best corrected visual acuity in children after congenital cataract surgery at 6 months with respect to age groups(n=192)

Age Groups (Years)	Final Best Corrected Visual Acuity		Total
	Good	Not Good	
3 to 5 years	96(96%)	4(4%)	100
6 to 8 years	2(2.2%)	90(97.8%)	92
Chi-Square=84.4 P=0.0005			

Final outcome of best corrected visual acuity was assessed at the end of 6th month after surgery. Mean BCVA at first month was 0.8±0.15, at 3 rd month was 0.7 ± 0.19 and at 6th month was 0.5 ± 0.25. Mean best corrected visual acuity (range BCVA log Mar0.0 to 0.5) was observed in 51% (98/192) while not good (BCVA> 0.5) was observed in 49% (94/192) cases. BCVA was significantly better in 3 to 5 years of age as compared to 6 to 8 years of age.

There were no severe complications encountered after surgery such as post operative endophthalmitis, retinal detachment, glaucoma or significant postoperative inflammation with lens deposits or synechias.

DISCUSSION

Congenital cataract is the most common cause of visual impairment in children because of sensory deprivation during the period of visual maturation18. Its etiology is multi-factorial and among the various risk factors, most important is the age of child. Management of the posterior capsule, aggressive amblyopia therapy, and refractive management are major factors governing the ultimate visual outcomes of congenital cataract surgery15. Many surgical procedures have been used to reduce the rate of posterior capsular opacification in children. Posterior chamber intraocular lens implantation with posterior capsulotomy and anterior vitrectomy is the most accepted surgical procedure in management of congenital cataracts16.

The age at which anterior vitrectomy and posterior capsulotomy should be performed is controversial. Many studies have different results. Basti et al performed primary posterior capsulotomy with anterior vitrectomy in children younger than 8 years14. Dahan and Salmenson recommended posterior capsulorhexis and anterior vitrectomy in children younger than 8 years19. Vasavada and Desai suggested that anterior vitrectomy with posterior continuous curvilinear capsulorhexis was desirable in children with congenital cataracts younger than 5 years20. In our study we performed anterior vitrectomy and posterior capsulotomy in all cases so as to minimize the rate of visual axis opacification and to achieve early postoperative visual rehabilitation.

In our study after treatment of postoperative complications and amblyopia therapy 51% of eyes achieved good best corrected visual acuity (BCVA). It ranges from 0.0 to 0.5 Log MAR. Vision was not improved in 49% eyes despite proper management of complications and aggressive amblyopia therapy. The results of good visual acuity after congenital cataract surgery are variable. Kim et al reported improved visual acuity in 51.7% of patients7. Lai et al showed improvement in 50% of patients21. Magnusson et al reported 50% of children achieved improvement in vision after surgery22.

In follow-up period visual acuity was not improved during the 1st month but in subsequent follow-ups most of the patients achieve good vision with mean value of Log MAR 0.5. Magnusson et al also showed a mean value of Log MAR 0.5 at the end of follow ups22.

Improvement in visual acuity after congenital cataract surgery was seen in patients who presented in younger age. In younger age group of 3-5 years 96% of children achieved good vision as compared to older age group of 6-8 years in which only 2% achieved good vision. In older age groups late intervention was the cause of decreased vision because of form deprivation due to cataract during the sensitive period of visual maturation. This showed that visual outcome following cataract surgery depends on the age and earlier cataract surgery is beneficial in achieving good vision11.

Moderate anterior chamber inflammation was seen in 13% and severe inflammation was seen in 15%of eyes. Keech et al reported 10% of eyes developed inflammation and secondary membrane formation23. Zwaan et al reported 13% of eyes developed fibrinous membranes after surgery24.Raised intra ocular pressure was seen in 5% of eyes. Ondraaek and Lokaj reported raised intro-cular pressure in 4.3% of cases25.Pupillary deviation was seen in 4.1% of eyes. Ondraaek and Lokaj reported pupillary deviation in3.8%ofeyes25.IOL capture was observed in 2%of eyes. Luo et al observed IOL capture in 2.6% of patients26.

CONCLUSION

This study demonstrate that early congenital cataract surgery is a safe procedure and beneficial in achieving good visual acuity.

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REFERENCES

1. **Gogate P, Gilbert C.** Blindness in children: a worldwideperspective.Community Eye Health. 2007; 20: 32-33.
2. **Chak M, Wade A, Rahi JS.** British Congenital Cataract Interestgroup. Long-term visual acuity and its predictors after surgeryforcongenitalcataract:findingsoftheBritishcongenitalcataract study. Invest Ophthalmol Vis Sci. 2006; 47: 4262-9.
3. **SethiS, Sethi MJ,SaeedN, KundiNK.**Patternofcommoneye DiseasesinchildrenattendingoutpatienteyedepartmentKhyber Teaching Hospital. Pak J Ophthalmol. 2008; 24: 166-71.
4. **MahdiZ,MunamiS,ShaikhZA,AwanH,WahabS.**Patternof eye diseases in children at secondary level eye department inKarachi. Pak J Ophthalmol. 2006; 22: 145-51.
5. **GogateP,GilbertC,ZinA.**SeverevisualimpairmentandBlindness in infants: causes and opportunities. Middle East A frJ Ophthalmol. 2011; 18: 109-114.
6. **ChandnaA,GilbertC.**Whenyoureyepatientisachild. CommunityEyeHealth.2010;23:1-3.
7. **KimKH,AhnK,ChungES,ChungTY.**Clinical outcomes ofsurgical techniques in congenital cataract. Korean JOphthalmol. 2008; 22: 87-91.
8. **Butt IA,JalislM,WaseemS,AbdulMoqeet,Inam-ul-HaqM.**Spectrum of congenital and developmental anomalies of eye. Al Shifa J Ophthalmol. 2007; 3: 56-60.
9. **AmayaL,TaylorD,Russell–EggittI,NischalKK,LengyeD.**Themorphologyandnaturalhistoryofchildhoodcataracts.Surv Ophthalmol. 2003; 48:125-44.
10. **SethiS,SethiMJ,HussainI,KundiNK.**Causesofamblyopiain children coming to ophthalmology out-patient department,Khyber Teaching Hospital, Peshawar. J Pak Med Assoc. 2008;58: 125-8.
11. **YeHH,DengDM,QianYY,LinZ,ChenWR.**LongtermVisual outcome of dense bilateral congenital cataract. ChinMedJ (Engl). 2007; 120: 1494-7.
12. **NishiO.**Fibrinousmembraneformationontheposteriorchamber lens during the early postoperative period. J Cataract Refract Surg. 1988; 14: 73-7.
13. **BenEzraD,CohenE.**Posteriorcapsulectomyinpediatric Cataract surgery; the necessity of a choice.Ophthalmology.1997;104:2168–74.
14. **BastiS,RavishankarU,GuptaS.**Resultsofaprospectiveevaluation of three methods of management pediatric cataracts.Ophthalmology. 1996; 103: 713-20.
15. **PetricI,LonèarVL.**Surgicaltechniqueandpostoperative Complications in pediatric cataract surgery: retrospective analysis of 21 cases.Croatian Medical Journal. 2004; 45: 287-91.
16. **AstleWF,AlewenahO,IngramAD,PaszukA.**SurgicalOutcomes of primary foldable intraocular lens implantation inchildren: understanding posterior opacification and theabsence of glaucoma. J Cataract Refract Surg. 2009; 35: 1216-22.
17. **KarimanF,AliJavadiM,RezaJafarinasabM.**Pediatric Cataract surgery.IranJOphthalmicRes.2007;2:146-53.
18. **KaulH,RiazuddinSA,YasmeenA,MohsinS,KhanM, Nasir IA, et al.**A new locus for autosomal recessive congenitalcataract identified in a Pakistani family. Mol Vis. 2010; 16:240-5.
19. **Dahan E, Salmenson BD.**Pseudophakia in children:precautions,techniques,andfeasibility.JCataractRefractSurg.1990; 16: 75-82.
20. **VasavadaA,DesaiJ.**Primaryposteriorcapsulorhexiswith andwithout anterior vitrectomy in congenital cataracts. J Cataract Refract Surg. 1997; 23: 645-51.
21. **LaiJ,YaoK,SunZH,ZhangZ,YangYH.**Longtermfollow-upof visual functions after pediatric cataract extraction and intraocular lens implantation. Zhonghua Yan Ke Za Zhi. 2005; 41:200-4.
22. **MagnussonG,AbrahamssonM,SjostrandJ.**Changesin visual acuity from 4 to 12 years of age in children operated for bilateral congenital cataract. Br J Ophthalmol. 2002; 86: 1385-9.
23. **KeechRV,TongueAC,ScottWE.**Complicationsaftersurgeryfor congenital and infantile cataract. BrJOphthalmol.1989;108: 136-41.
24. **ZwaanJ,MullaneyPB,AwadA,al-MesferS,WheelerDT.**Pediatric intraocular lens implantation. Surgical results and complications in more than 300 patients. Ophthalmology. 1998;105: 112-8.
25. **OndraaekO,LokajM.**VisualoutcomeaftercongenitalCataract surgery. Longterm clinical results. Scripta Medica(BRNO). 2003; 78: 95-102.
26. **LuoY,LuY,LuG,WangM.**Primaryposteriorcapsulorhexiswith anterior vitrectomy in preventing posterior capsuleopacificationinpediatriccataractmicrosurgery. Microsurgery.2008; 28: 113-6.