

PRIMARY POSTERIOR CAPSULORHEXIS (PCCC) WITH ANTERIOR VITRECTOMY (AV) VERSES EXTRA CAPSULAR CATARACT EXTRACTION (ECCE) IN PEDIATRIC CATARACT SURGERY

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ABSTRACT

Purpose: To study the efficacy of PCCC+AV over ECCE in paediatric cataract surgery.

Methods : Records of 30 children (50 eyes) aged 2-9 years who had primary PCIOL implantation were reviewed. 30 eyes cataract were managed with PCCC and AV posterior capsul was left intact in 20 eyes (ECCE)

Results : Mean follow-up was 60 months significant PCO occurred in 20 eyes (100%) with ECCE group and intact posterior capsule. Yag capsulotomy was required in 12 eyes and membranectomy in 8 eyes. Visual axis remained clear in 27 of 30 eyes (90% that had PCCC+AV. visual outcome was similar in both groups.

Conclusion : Long term results of PCCC+AV are excellent over ECCE in children with pseudophakia.

Intra Ocular Lens (IOL) implantation in children has become more common because of progress in microsurgical techniques and modifications in IOLs. Posterior Capsule Opacification (PCO) is know common complication of IOL implantation after Cataract surgery. It is a major concern in young children because of its his incidence, early formation, and interference with the development of binocular vision. Several approaches has been used to manage the posterior capsule and confine PCO. Primary Posterior Capsulotomy (PPC) is being practiced since 20 years and is still widely performed. Pars Plana Lensectomy and vitrectomy, PPC with & without anterior viterctomy and Extra capsular cataract extraction (ECCE) without PPC is a old technique. Posterior Continuous Curvilinear Capsulorhexis (PCCC) with anterior vitrectomy (AV) is being practiced commonly. Primary Posterior Vertical Capsulotomy with

optic entrapment is a modified technique to prevent capsule opacification Neodymium : YAG (Nd. YAG) Laser Capsulotomy is difficulty in young children. Repeated Capsulotomies are required. Pars Plana Needling of the thick PCO and requiring General Anesthesia is a difficult process.

PCCC with AV is being compared with ECCE and its efficacy over ECCE technique, possible complications is being compared in both techniques and our experience over more than 5 years is being described.

Patients & Methods

50 Eyes of 30 children with Congenial Cataract between 2004 and 2009, who had primary PC IOL implantation were reviewed. 30 eyes cataract were managed with PCCC and AV (Group 1). Posterior capsule was left intact in 20 eyes who had ECCE technique (Group II). Children who were continuously followed up after surgery for 3 years were included in this study. The children who had known systemic disease such as rubella & albinism were not included in this study.

Age at surgery ranged from 2 yr to 9 years. Preoperatively, a thorough history was taken, and an ocular examination including cycloplegic refraction, fundus examination under anesthesia and biometry were done.

Informed consent was taken. All operations were performed under General Anesthesia and by the same surgeon (K.R.). Follow-up examination were performed at 1 weeks and 6 weeks and thereafter regular at 3/4 months interval for 3 years. During the postoperative examination and follow-up, particular attention was paid to the Posterior Capsule, Visual axis clarity, Pigmentory deposits on the optic, presence of synechiae and IOL position.

Surgical Technique

A 5.0 to 5.5mm Limbal tunnel incision was made in the superior part. The Anterior Chamber was filled with Sodium Hyaluronate. The Anterior Capsule was opened with a 26 G bent Needle and continuous anterior capsular rhexis was done, 5 to 5.5mm diameter. Hydrodissection and manual lens aspiration with a simcoe irrigation - aspiration was performed. The anterior chamber and capsular bag were refilled with Sodium Hyaluronate until the Posterior Capsule was flattened, A small hole in the Posterior Capsule at the centre was then made with the Bent 26 G Needle. This was followed by Primary Posterior continuous curvilinear capsulorhexis (PCCC) with a capsule holding forceps. The Posterior Capsulorhexis was smaller than the anterior and preferable 1.0 mm less in diameter. The IOL was implanted with help of Sinsky hook, first the inferior haptic was inserted in the bag followed by optic & superior haptic. Subsequently Anterior Vitrectomy was performed.

In the other technique (Group II). Extra capsular cataract extraction (ECCE) was done after initial anterior capsulorhexis. IOL was implanted in the bag and posterior capsule was left intact.

The limbal wound was closed with 2 interrupted 10-0 nylon sutures, and the anterior chamber was restored with balanced salt solution and tested for leakage in both groups. At the end of the operation, subconjunctival antibiotic/dexamethasone was injected. Further postoperative treatment included pilocarpine 2% once daily for 2 days, as well as antibiotic, steroid and nonsteroidal eye drops 6 times a day for the first week and 4 times a day for 6 week thereafter. The nonsteroidal anti-inflammatory drops were used for another month (both groups).

Results

30 eyes in group 1 and 20 eyes in Group II were followed-up after surgery for a period of 3 years. Included in this group were cases of congenital cataract only. Most of the 30 children presented with bilateral cataract. The cataracts were described as nuclear in 16, mature in 14 and sutural, subcapsular, or cortical in 20 eyes.

Primary PCCC with AV was performed uneventfully on 30 eyes in the series and ECCE in the rest 20 eyes. Although vitreous bulge was noted during surgery in 5 eyes (16%), the anterior hyaloid face remained intact and the IOL was implanted in all eyes and vitrectomy was performed. Postoperatively, the visual axis has remained clear in all 50 eyes to date.

Fibrin in the anterior chamber and fibrin deposits on the IOLs occurred in 3 eyes 10% in group 1 and 7 eyes (35%) in group II. The fibrin deposits resolved after the frequency of steroid drops was increased. 1 eye (3.3%) in group 1 and 4 eyes (20%) in group II had severe reaction and developed posterior synechias as a result of adhesion of iris to the anterior capsule; the inflammation persisted till the last follow-up. 3 eyes (15%) in group II had pigment deposit on the IOL surface and No eye in group 1.

Complete ACCC and PCCC were accomplished in all cases. The IOLs were implanted successfully in the capsular bag in all cases. The IOL position was documented as centered in all eyes.

Elschnig pearls were observed in 15 eyes (75%) in the ECCE group (II). Significant PCO occurred in all 20 eyes (100%) in ECCE group. Yag capsulotomy was required in 12 eyes (60%) and membranectomy in 8 eyes (40%).

5 eyes (15%) in Group 1 had Elschnig pearls but did not migrate behind the optic to cause secondary opacification or obstruction of the optical axis in Group 1. No additional procedures, such as Nd: YAG capsulotomy or posterior capsulotomy with vitrectomy, were performed in group 1.

No eyes in either group had visual axis opacification at the last follow-up. There was evidence of clinically significant cystoid macular oedema (CME) in 3 eyes (10%) in group 1. Long term results showed visual recovery similar in both groups.

Discussion

In Pediatric cataract surgery, opacification of the capsule is a concern and leaving the posterior capsule intact after IOL implantation in the capsular bag

predisposes eyes to PCO at very high rate. Therefore, it is always wise to manage the posterior capsule at the time of surgery.

Several surgical techniques to prevent or delay PCO have been described. Optic capture of the IOL after PCCC with out anterior vitrectomy. Another approach is PCCC with anterior vitrectomy to remove the vitreous scaffold for lens epithelial cell (LEC) migration. Koch and Kohnen and Vasavada and Desai emphasize the need to combine PCCC with AV.

The disadvantages of PCCC with AV is vitreous incarceration in hte wound and increased risk of Retinal detachment. CME is another complication but in children it is less. Although, PMMA IOLs are being used commonly but Foldable IOLs have gained popularity.

To decrease the risk of PCO we performed PCCC with AV and implanted a single-piece poly methyl methacrylate (PMMA) IOLs with a 5.0 mm optic and an overall length of 20.0 mm was used.

Although in our study 2 eyes (6.6%) showed mild IOL decentration in group I and non in group II this difference was not significant. There are reports from Vasavada and Trivedi upt 73% mild decentration.

In our series, there was difference between early and late postoperative inflammation between both the groups. In the ECCE group the reaction was more pronounced than the PCCC and AV group.

Postoperative BCVA was better in Group I but in the long term there was no significant difference. PCCC with Anterior Vitrectomy and IOL in the bag is a difficult technique that ensures successful management of the Posterior Capsule and maintains a clear visual axis over years. It is a challenging procedure and should be done by an expert surgeon in children cataract surgery.

The risk of undesired radial tear may be greater & size of the opening less predictable and the risk of vitreous loss may be greater with PCCC in children. The highly elastic properly of the pediatric capsule may be less capable to tears if tension is applied indirectly. It is important not to over fill the capsular bag with viscoelastic

creating tension of the posterior capsule. In this study the vitreous hyaloid face remained intact and no vitreous loss was encountered.

In straight posterior capsulotomy the incision is smaller than in anterior capsulotomy and less than the diameter of the IOL optic to ensure snug entrapment. The diameter of the posterior capsulotomy may play a role in PCO formation. Radio frequency diathermy is an alternativ method to PCCC in mature cataracts but Blue rhex also helps.

At 16%, synechia formation was less common in this series than has been reported earlier with the use of optic capture (14% to 100%). Synechia formation was regarded as a uveal inflammatory response, related mainly to direct to topic entrapment. By maintaining the structural integrity of the growing eye, complications such as cystoid macular edema or retinal detachment in our long-term follow-ups have not yet been encountered. No secondary glaucoma was noted in any of the eyes.

However, we emphasize that ECCE with intact PC should be discouraged and PCCC with AV is mandatory to decrease the risk for PCO in pediatric surgery.

In conclusion, primary PCCC with Anterior Vitrectomy (AV) was found to be a safe, although challenging, surgical technique that ensured a clear visual axis and IOL centration over the long term, while maintaining the vitreous. No additional procedures were required, there is considerable likelihood that the child will develop binocular vision, provided surgery is performed early with this technique. Additional study is needed to establish the safety and effectiveness of the procedure when performed by other surgeons before recommending its widespread application over Optic capture technique.

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