

Primary anterior chamber intraocular lens implantation in Jos, Nigeria

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ABSTRACT

Introduction: Following vitreous loss during cataract surgery, a variety of lens options exist when the intraocular lens cannot be placed in the capsular bag. Most surgeons however consider the flexible open-loop anterior chamber intraocular lens and the trans-sclerally sutured posterior chamber intraocular lens to be the most acceptable alternatives. In our hospital we implant an anterior chamber intraocular lens when faced with inadequate capsular support which usually occurs following a posterior capsule rupture with vitreous loss. The risk of a poor visual outcome is greater with vitreous loss.

Objective: To review our experience with primary anterior chamber intraocular lens implantation in Jos.

Methods: Retrospective analysis of medical records of a consecutive series of primary anterior chamber intraocular lens implantations carried out in the Jos University Teaching Hospital, Jos over a 5 year period from January 2004 - December 2009. Eyes with complicated or traumatic cataracts, ocular co-morbidity and cases of combined surgery were excluded from the analysis of visual outcome.

Results: There were 119 cases of primary anterior chamber intraocular lens implantations during the study period. The case files of 100 eyes of 96 patients were available for review. Inadequate capsular support following posterior capsule rupture was the commonest indication for implanting the anterior chamber intraocular lens. Visual outcome was analysed in 76 eyes that met the inclusion criteria. Ninety six percent had an unaided visual acuity of less than 6/60 at presentation. Postoperatively 45% had a best corrected visual acuity of 6/18 or better, 40% <6/18 – 6/60 and 18% <6/60. The commonest postoperative complication was corneal oedema.

Conclusion: Our results indicate a less than satisfactory visual outcome with primary implantation of anterior chamber intraocular lenses. Caution should be exercised when implanting an anterior chamber intraocular lens following complicated cataract surgery, particularly in the absence of appropriate vitrectomy equipment.

Key Words: Anterior chamber intraocular lens, Vitreous loss, Cataract surgery

INTRODUCTION

Intraocular lenses are essentially of two designs; anterior and posterior chamber lenses¹. The posterior chamber lenses are used in extracapsular cataract extraction or phacoemulsification and they are considered clearly superior to anterior chamber lenses². However, in situations where a Posterior Chamber Intraocular Lens (PC IOL) is contraindicated during cataract surgery, an anterior chamber lens can be used. Examples include when there is loss of posterior capsular support during surgery, in an eye with a (sub) luxated lens as well as in selected cases of secondary implantation^{2,3}.

Anterior chamber intraocular lenses are commonly used when vitreous loss occurs though it has been suggested that implantation of a PC IOL in these cases is not only possible but preferable⁴. The PC IOL may be placed in the sulcus if the capsular-zonular rim is intact or sutured to the sclera in the absence of adequate sulcus support⁴. Insertion of an Anterior Chamber Intraocular Lens (AC IOL) is however technically easier than fixation of a posterior chamber lens with sutures^{3,4}. The initial closed loop AC

IOLs used during the 1970s and 1980s were associated with several problems that led to their condemnation⁵⁻⁷. Advances with modern AC IOL designs in the 1990s have however led to a decrease in the incidence of these complications⁵⁻⁷. These AC IOLs are flexible, open loop and one-piece lenses⁶ and they now provide a safe and effective alternative to sewn in PC IOLs^{3,5}.

MATERIALS AND METHODS

The study is a retrospective study of primary AC IOL implantations carried out at the Jos University Teaching Hospital, a tertiary health centre located in Jos, North-central Nigeria. All cases of primary AC IOL implantation carried out from January 2005- December 2009 were identified from the theatre register and the case files retrieved. The following data were then obtained; age, sex, preoperative Visual Acuity (VA), type of cataract, type of surgery and surgical complications, grade of surgeon (fellow or resident), preoperative and postoperative intraocular pressure and postoperative VA at discharge and at one week. Results of postoperative refractions were

also recorded. Eyes with ocular comorbidity, complicated or traumatic cataracts and cases of combined surgery were excluded from the analysis of visual outcome.

All operations were carried out under local anaesthesia except for four children that had general anaesthesia. Cataract extraction was done via a limbal incision (conventional extracapsular cataract extraction) or a scleral tunnel incision (manual small incision cataract surgery). With vitreous loss, a sponge and scissors vitrectomy was carried out, the pupil constricted using 4% pilocarpine drops and a peripheral iridectomy done. The AC IOL was then implanted. A modern flexible, open-loop, one piece PMMA anterior chamber intraocular lens (Eye-O-Care lenses made by Polymer Technologies Limited, Gujarat, India) measuring 12.75mm was used in all the cases. Wound closure was with five stitches of 9/0 nylon with Extracapsular Cataract Extraction (ECCE) while two stitches were applied when a scleral tunnel incision was made.

After discharge patients were reviewed at one week, four weeks, eight weeks and then at three monthly intervals. Some however had more frequent visits if their clinical condition warranted it. Visual acuities were analysed according to the World Health Organization definitions of good (6/18 or better), borderline (less than 6/18–6/60), or poor (less than 6/60) outcomes. Refractions were done at or after 8 weeks. Data analysis was carried out using EPI info 2004 version 3.2.2.

RESULTS

There were 1418 intraocular lens implantations during the period under review with 119(8.4%) of these being primary AC IOL implantations. The case files of 100 eyes of 96 patients were available for review. Hospital records of the remaining 19 patients could not be traced. Mean age of the patients was 59.6years (SD 19.44), range 4-90 years and the male: female ratio was 1.5:1. Mature cataract was the commonest type of cataract seen (Figure 1).

Surgeries were done by several surgeons including fellows and residents in training. Forty nine per cent of the surgeries were done by fellows and 51% by residents. ECCE was the commonest surgical modality accounting for 66% of cases. Twenty eight (28%) eyes had Manual Small Incision Cataract Surgery (MSICS) and 6 (6%) eyes had intracapsular cataract extraction. Lack of adequate capsular support following rupture of the posterior capsule was the commonest indication for primary AC IOL implantation accounting for 92% of cases. Dislocated lenses accounted for the remaining.

Intraoperative complications encountered were not related to the insertion of the AC IOL but to the surgery itself. Posterior capsule rupture with vitreous loss was the commonest intraoperative complication occurring in 96 (96%) cases. Posterior capsule rupture without vitreous

loss occurred in one (1%) eye while vitreous loss alone was documented in three (3%) eyes.

Postoperative complications occurred in 57 eyes with several eyes having more than one complication (Table 1). The commonest postoperative complication was corneal oedema (38%). There were two cases of bullous keratopathy with AC IOL explantation carried out in one case. Uveitis-glaucoma-hyphaema syndrome was recorded in one eye. A diagnosis of this was made following a slit lamp examination and gonioscopy. Residents accounted for 56% of the complications while fellows accounted for 44%. This difference was however not statistically significant using the χ^2 test with a p value of 0.9 (OR 1.62, 95% CI).

Visual outcome was analysed only in eyes that had uncomplicated, non-traumatic cataracts and no ocular comorbidity (Table 2). These eyes were 73 (73%) in number. Refraction results for 16 eyes at 8 weeks were not available as the patients were lost to follow up. Twenty four eyes (42%) had a good outcome, 23(40%) eyes a borderline outcome and 10 (18%) eyes a poor outcome. The causes of poor outcome included glaucoma, bullous keratopathy and hyphaema.

Mean duration of follow up was 264 days. Forty seven per cent of the patients were lost to follow up after three months.

Figure 1: Types of cataract

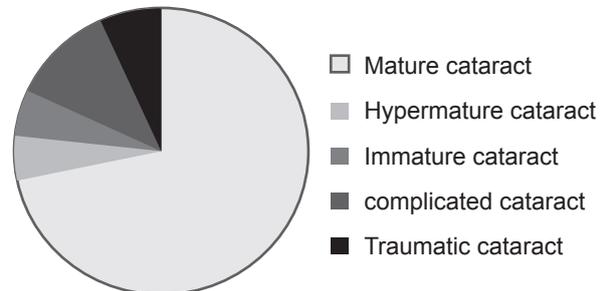


Table 1: Postoperative complications

Complication	Frequency No. (%)
Bullous keratopathy	2 (3)
Raised intraocular pressure	7 (9)
Distorted/Updrawn pupil	22 (29)
Hyphaema	7 (9)
Corneal edema	29(38)
UGH syndrome	1 (1)
Uveitis	8 (10)
AC IOL dislocation	1 (1)
Total	77 (100)

UGH= Uveitis-glaucoma-hyphaema
AC IOL = Anterior chamber intraocular lens

Table 2: Preoperative and postoperative visual acuity

Category of VA	Preoperative VA No. (%)	VA at 1 week No. (%)	VA at 6 weeks No. (%)	BCVA No. (%)
< 6/60	70(96)	38(52)	18(32)	10(18)
6/60-< 6/18	2(3)	29(40)	27(47)	23(40)
≥ 6/18	1(1)	6(8)	12(21)	24(42)
Total	73(100)	73(100)	57(100)	57(100)
Lost to follow up			16	16

BCVA; best corrected VA at 6 weeks

DISCUSSION

Although there are a variety of lens options which exist for patients who lack adequate capsular support for a bag-fixated or sulcus-fixated posterior chamber lens (iris-fixated retropupillary AC IOLs, iris-sutured PC IOLs, iris claw AC IOLs, flexible open-loop AC IOLs, and trans-sclerally sutured PC IOLs), most surgeons consider the flexible open-loop AC IOL and the trans-sclerally sutured PC IOL to be the most acceptable alternatives⁵. In our centre, due to a lack of surgical skill for trans-scleral suturing of a PC IOL, we implant an AC IOL if capsular support is inadequate. Inadequate capsular support following posterior capsule rupture with vitreous loss was the commonest indication for primary AC IOL implantation in this series. This compares with the review by Pojda *et al*⁸.

When vitreous loss occurs during cataract surgery, there is a greater risk of a poor visual outcome and a rise in the incidence of postoperative complications^{4,9-11}. In operating theatres without vitrectomy equipment, the risk of a poor outcome would be even higher⁹. Also implantation of an AC IOL after vitreous loss is associated with a poorer visual outcome than implantation of a PC IOL^{12,13}. In our series the proportion of eyes with a good outcome is comparable to 48% and 43% reported for eyes that had primary AC IOL implantation in the studies by Shah *et al*¹⁴ and Fasih *et al*¹⁵. It however contrasts with other studies^{8,16,17} where final visual acuities of at least 6/12 in over 70% were reported. This difference may be due to the fact that in our series vitrectomy was done using sponge and scissors which is less efficient than the vitrectomy machine¹⁵. The sponge and scissors technique and an 18 gauge needle were the main techniques of vitrectomy in the study by Shah *et al*¹⁴ while Fasih *et al*¹⁵ used sponge and scissors. This may explain our comparable visual outcome. When vitreous is lost during cataract surgery, sufficient vitreous cleaning is necessary to obtain a favorable result in primary AC IOL implantation¹⁵.

Caution should also be exercised during complicated cataract surgery as such eyes are already at a significantly greater risk of complications such as cystoid macula oedema, postoperative inflammatory glaucoma and endothelial cell loss¹⁵. A secondary AC IOL implantation may therefore be considered if further trauma to the eye is likely with a primary implantation. In the series by Fasih *et al*¹⁵ comparing complications after primary and secondary AC IOL implantation following complicated ECCE, eyes that had secondary AC IOL implantation had more favorable visual outcome than eyes that had primary AC IOL implantation. The difference was however not statistically significant.

Several of the complications known to occur after vitreous loss are also seen with the use of anterior chamber lenses¹⁶. Glaucoma, uveitis, and corneal disease are all increased after vitreous loss and these complications are also seen with the use of AC IOLs in uncomplicated cataract surgery¹⁶. Corneal oedema was the commonest postoperative complication in this series. Greater corneal endothelial cell loss occurs in eyes concurrently treated with anterior vitrectomy and in eyes with anterior chamber lenses¹⁸. Our finding is higher than the 6% reported by Donaldson *et al*⁵ but lower than 53% documented by Fasih *et al*¹⁵. Two per cent of the eyes in this review eventually developed bullous keratopathy with explantation of the AC IOL in one case. A number of other series^{5,15,16} in contrast to our finding recorded a higher incidence of bullous keratopathy.

The other complications encountered in this series appear to have been as a result of vitreous loss, though the presence of the AC IOL may have aggravated the clinical picture. Uveitis-Glaucoma-Hyphaema (UGH) syndrome is now rare with current AC IOLs. These newer AC IOL models have more flexible haptics and yield less fibrosis and angle damage and thus a lower incidence of raised intraocular pressure⁵. Our results compares with 1% reported by Collins and coauthors⁴ and 1.6% reported by Fasih *et al*¹⁵. We did not document any case of retinal

detachment or cystoid macular oedema. This is comparable with the study done by Kwong and coauthors¹⁸. Pearson *et al*⁸ however reported an incidence of 21% for cystoid macular oedema and 12.5% for retinal detachment while Bergmann and Laatikainen³ documented cystoid macular oedema in 12.5% of eyes they reviewed but no case of retinal detachment.

There are a few limitations of this study. It was not possible to compare the outcome of primary AC IOL implantation with other alternative methods of addressing inadequate capsular support during surgery since these are not done in our centre. Also, the visual outcome is confounded by the fact that the eyes reviewed had a sub-optimal vitrectomy and surgeries were performed by various surgeons including residents in training. Lastly, close to 50% of the patients in this series were lost to follow-up after three months. As a result some postoperative complications may have been missed. Poor follow-up has been the experience not only in Nigeria but Africa as a whole¹⁹⁻²¹. This will obviously affect the documentation of long term complications and visual outcome.

In conclusion, this study reveals a less than satisfactory visual outcome following primary AC IOL implantation in our environment. We advise that care should be taken when implanting an AC IOL following vitreous loss especially when appropriate vitrectomy equipment is not available. The surgeon may consider a secondary implantation if a primary implantation would likely cause more complications and result in a poor visual outcome.

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