INTRACAPSULAR CATARACT EXTRACTION WITH ANTERIOR CHAMBER INTRAOCULAR LENS IMPLANTATION IN A DEVELOPING COUNTRY

*FO OLATUNJI
Lecturer, Ophthalmology Department, Faculty of Health Sciences, University of Ilorin, Nigeria
Honourary Consultant Ophthalmologist, Department of Ophthalmology, University of Ilorin Teaching Hospital, P. M. B. 1459, Ilorin, Kwara State, Nigeria
E-mail: drfolatunji@yahoo.co.uk

S KIRUPANANTHAN
Consultant Ophthalmologist and Medical Director, ECWA Eye Hospital, Kano, Nigeria
Medical Advisor, Christophel Blinding Mission, Kano, Nigeria

ABSTRACT

Aim: To assess the visual outcome of cataract extraction with ACIOL implantation in a Nigerian hospital.

Methods: The visual outcome of 50 eyes of 42 patients aged 40 years and above, out of 212 eyes that underwent intracapsular cataract extraction (ICCE) and anterior chamber intraocular lens (ACIOL) implantation, were reviewed retrospectively. The follow-up period ranged from 3 months to 2 years. The operation was carried out with a loupe and standard IOL (multiflex open loop ACIOLs of 19.00 DS).

Result: Good visual outcome of 6/6 to 6/18 was recorded in 27 (54%) eyes and 6/24 to 6/60 was recorded in 14 (28%) eyes. Poor visual outcome of <6/60 was recorded in 9 (18%) eyes. The complications accounting for poor visual outcome in the 9 eyes were uveitis in 5 eyes and endophthalmitis, tilted IOL, pigment deposit on IOL and IOL decentration in one eye each.

Conclusion: ICCE with ACIOL, when well performed gives good visual outcome, and it should be preferred to spectacle correction of aphakia. However, in view of the advantages ECCE has over ICCE, ICCE should be replaced by ECCE. Where there are no facilities for PCIOL, ECCE can be performed with a surgical loupe and a secondary implant done later.

Key words: ACIOL implantation, ICCE, ECCE, PCIOL, developing countries, aphakia

INTRODUCTION

The WHO estimate of world blindness in the year 2002 was 37 million.[1] Approximately half of the blindness in most countries, especially in Africa, is due to cataracts.[2] The precise figure of the incidence of cataract blindness in Africa is not known, but it is estimated that 600,000 Africans develop cataract blindness every year.[3] The surgical rate in Africa for cataract is the lowest in the world![4] The increase in cases of cataract blindness in the face of a low cataract surgery rate in Africa is indicative of the need for an increase in the volume of cataract surgery in Africa.

Virtually all the surgeons trained to perform cataract surgery in Nigeria and in many other developing countries up to the late 1980s and early 90s were trained to do intracapsular cataract extraction (ICCE).[5] Furthermore, a class of ophthalmic care specialists — diplomates, are being trained to carry out less sophisticated procedures that can be performed in secondary health facilities. It is however doubtful if these secondary level health facilities in which most of them will work can afford an operating microscope and other materials needed for PCIOL implantation. Even at tertiary level, only very few ophthalmic centres can provide all the basic requirements for a PCIOL implant and deal with its most common complication — posterior capsule opacification (PCO). To the best knowledge of the authors, none of the public hospitals in Nigeria is equipped with a YAG laser to treat PCO. Worse still, majority of the patients cannot easily access these

* *Author for correspondence*

centres. The problem of PCO, with a potential incidence rate of between 28% to 50%,[6,7] may be a reason for a cataract surgeon in a secondary or primary level eye facility in a developing country to prefer ICCE to ECCE. The foregoing realities informed a recent call not to abandon the ICCE procedure in developing countries at the present time.[8]

Uncorrected aphakia was found to be responsible for 9% of blindness in a study in northern Transvaal, South Africa.[9] Similarly, studies by Cook et al.[10,11] conducted in Kwazulu, South Africa and by Hogeweg et al[12] in Nepal showed poor visual rehabilitation by aphakic glasses. In the Nepal study, out of 235 aphakic patients followed up for between 1 to 10 years, only 23% wore glasses which were in good condition, 25% had lost or broken their glasses, 31% were wearing scratched or repaired glasses, 5% never received glasses at all, while 16% were dissatisfied with their glasses.[12]

Anterior chamber intraocular lenses (ACIOLs) have been implanted for more than 40 years[13] but fell to a back-up role in the developed world due to poor results associated with the older (closed-loop) types.[14-17] Favorable results currently being reported about the modern multiflex open-loop ACIOLs[17,18] are of particular significance to developing countries because ICCE is and may continue to be widely performed for some time in developing countries.[5] The above fact is obvious from the paucity of human and material resources required to replace this older method with the state-of-the-art ECCE method or phacoemulsification with PCIOL implantation. ACIOLs offer a unique advantage in developing countries. The technically less difficult procedure of ICCE with ACIOL insertion can be performed using a loupe. This obviates the need for a microscope and visual impairment from PCO is avoided. Aphakic patients can also have secondary ACIOL implants. The major fear of ACIOLs, especially in blacks with a higher propensity for more severe tissue pigmentary reaction, stems from the possibility of severe uveal reaction, which may compromise the gains of the surgery. Reports of ACIOL implantation in South Africa and Nepal show a wide difference in the incidence of uveitis (33% and 1.4% respectively).[19,20] There is a need, therefore, for further evaluation of visual outcome and complications of ACIOL among different black populations.

METHOD

The records of all the surgeries performed at the ECWA Eye Hospital, Kano between January 1994 and December 1998 were reviewed. A total of 8,321 cataract extractions (excluding combined cataract extraction and trabeculectomy) were performed. Two hundred and twelve of these had ACIOL implanted for aphakic correction. Three consultants and one trainee surgeon performed the surgeries. All the surgeons had limited experience with ACIOL implantation. All the patients were Nigerians. The ECWA Eye Hospital is a missionary hospital situated in Kano, a cosmopolitan city in the northern part of Nigeria. The patients were mainly from Kano city while others came from neighboring towns and other parts of Nigeria. The inclusion criteria in this report were:

1. Patients aged 40 years and above who had cataract extraction with ACIOL insertion.
2. A minimum follow-up period of 3 months

The exclusion criteria were:

1. Patients aged below 40 years
2. Patients with complicated cataract or pre-operative corneal pathology

Records of pre-operative assessment were obtained from the patients' cards. This included visual acuity (VA), intraocular pressure (IOP), and slit lamp examination. All the patients except 2 who had secondary IOL insertion had a pre-operative VA varying from 'finger counting' at 3 metres to light perception. All the patients had a pre-operative IOP of less than 21 mm Hg and no signs of uveitis.

SURGICAL PROCEDURE

All the surgeries were performed under local anaesthesia (facial and retro-bulbar block) using a loupe. A fornix-based conjunctival incision was made. A beveled anterior limbal incision was then made and the anterior chamber entered. A cryo probe was used to deliver the lens. The pupil was constricted using intra-cameral pilocarpine (0.13 mg/ml pilocarpine in BSS), then irrigated. The anterior chamber was reformed by an air bubble except when there was a positive vitreous pressure, in which case a viscoelastic gel (Viscomet) was used. The ACIOL was inserted into the anterior chamber and adjusted. The wounds were closed by 8/0 virgin silk suture. At the completion of the surgery, a subconjunctival injection of 20mg genticin and 2mg dexamethasone was given. A topical antibiotic and steroid compound was also instilled and the eye padded. The patients were admitted for 4 days at the end of which they had a post-operative refraction before being discharged. They were to be reviewed at 2 weeks, 8 weeks, 3 months and 6 months after being discharged.

Two types of lenses were used: (I) PMMA 4-point fixation kelman one-piece open loop IOL, and (ii) PMMA 3-point fixation kelman flexible one-piece open loop lens. The primary outcome factors assessed were:

1. Visual acuity (poor outcome was defined as a VA of less than 6/60).
2. Persistent post-operative uveitis (defined as uveitis persisting for more than 6 weeks).

3. Post-operative complications
   a. persistent hyphaema (persistent for more than 1 week)
   b. raised intraocular pressure (lasting for more than 6 weeks)
   c. persistent corneal oedema (lasting for more than 6 weeks)

RESULTS

Only 50 out of 212 eyes had visual acuity recorded for at least 3 months and were included in the study. There were 31 males and 11 females. The mean age was 55.4 years (range 40 -70 years).

Forty-eight eyes had ACIOL as a primary procedure while 2 eyes had a secondary implant. Eight patients had bilateral IOL implant. Forty-one eyes had ICCE while 9 eyes had ECCE. The follow-up period ranged from 3 months to 2 years.

Twenty-seven eyes (54%) had a post-operative visual acuity of 6/6-6/18, while 14 eyes (28%) had a VA of 6/24-6/60. Two eyes had a vision of 5/60 while 7 eyes had vision of less than 3/60 (fig. 1).

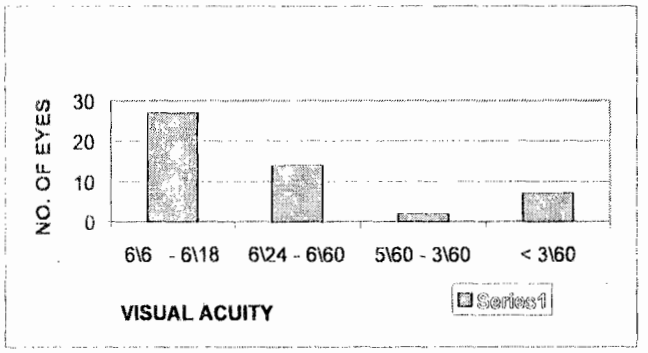

Figure 1. Visual outcome

Thirty eyes (60%) had best corrected visual acuity while twenty eyes (40%) had uncorrected visual acuity recorded.

Visual outcome was poor in 9 eyes of 7 patients. Uveitis was the associated condition in 4 out of the 9 eyes. Out of the remaining 5 eyes, 2 had tilted IOL; one had endophthalmitis; one had pigment deposit on the IOL and one had decentration of IOL associated with raised IOP (table 1). Table 2 compares the visual outcome of the present study with the WHO guidelines for monitoring the outcome of cataract surgery.

Uveitis accounted for the visual outcome of 6/36 in 2 eyes and 6/60 in 3 eyes. It was also responsible for the poor visual outcome of 5/60 in 1 eye and <3/60 in 3 eyes (table 3).

Six eyes (12%) had vitreous loss. Five of them had good final visual outcome. The sixth eye developed uveitis at 3 months post-operation. The vision before uveitis developed was 6/18. However, in all patients who had vitreous loss alone, none had a VA of less than 6/36 at three months (table 3).

Table 1. Conditions associated with poor visual outcome (VA <6/60)

Associated Condition	No. of Eyes
Uveitis	4 (8%)
Tilted IOL	2 (4%)
Endophthalmitis	1 (2%)
Decentered IOL with raised IOP	1 (2%)
Pigments on IOL	1 (2%)
Total	9 (18%)

Table 2. Comparison with who guideline to monitor the outcome of Cataract Surgery

	WHO guidelines		Study Outcome
Post-operative Acuity	Available Correction (Recommended)	Best Correction (Recommended)	50 eyes at 3-24 months post-op
Good 6/6-6/18	80+%	90+%	54%
Borderline <6/18-60	15-%	5-%	28%
Poor <6/60	5-%	5-%	18%
Total	100	100	100%

Table 3. Visual outcome of patients who had uveitis and those who had vitreous loss

Patients Who Had Uveitis		Patients Who Had Vitreous Loss	
Visual Acuity	No. of Eyes	Visual Acuity	No. of Eyes
6/36	2 (4%)	6/18	2
6/60	3 (6%)	6/24	2
5/60	1 (2%)	6/36	1
<3/60	3 (6%)	<3/60	1
Total	9 (18%)	Total	6

COMPLICATIONS

The intraoperative complications were hyphaema in 2 patients and vitreous loss in 6 patients. In the early postoperative period, one patient had endophthalmitis. There was iris capture in 2 patients, which was treated conservatively. Tilted IOL occurred in 5 patients and persistent pigment deposit on IOL in one patient. There was shallow anterior chamber in 2 patients; one associated with corneal touch.

Uveitis which was the commonest postoperative complication encountered occurred in 9 eyes. It was also the commonest cause of poor visual outcome. Only one eye had raised intraocular pressure (IOP), which persisted for six months and was associated with IOL decentration.

DISCUSSION

This is a retrospective study of 42 patients, 8 of whom were enrolled for a pilot study of ACIOL in Kano. The pilot study was aborted due to very poor follow-up compliance. Patients gave the address of their relatives living in Kano city but it was found that many of them actually came from other towns that are far from Kano and therefore could not adequately comply with the follow-up schedule. Like many studies done in developing countries, the problem of follow-up compliance has limited the sample size of this study as well as the follow-up period. A follow-up period of six months was preferred but only 35 eyes satisfied this condition. The follow-up ranged from 3 months to 2 years.

Good visual outcome of 6/6-6/60 was achieved in 82% of the patients. In the South African study,[19] 99% of the patients were in this category. However, the result is comparable to the visual outcome (89.6%) recorded 2-4 weeks postoperatively after ECCE and PCIOL implantation at the National Eye Centre (NEC) Kaduna, Nigeria.[21] In the NEC study, 169 patients were operated on at an eye camp organized for the training of surgeons in ECCE and PCIOL implantation. The operations were performed under the microscope and the IOL power was calculated with the keratometer and A-scan ultrasound.

When the result of the present study is compared with the recommended target set by WHO (table 2), many more of our patients are in the borderline and poor outcome category. A similar picture was shown by the NEC study with 37%, 53% and 10% in the good, borderline and poor categories respectively.

In the study by Cook [22] in Sierra Leone, 744 patients who had PCIOL were followed up for 4 weeks or less. An uncorrected visual acuity of 6/6 to 6/18 was reported in 41.7% while <6/18 to 6/60 was reported in 27.1% of the patients. Thus, a good visual outcome of 6/60 or better was recorded in 68.8% of their patients. Similarly, in a study by Egbert and Buchanan[23] in Ghana in which 77 patients who had PCIOL were followed up for 12 to 29 months, 53% had a VA of 20/20 to 20/40, while 22% had a VA of 20/50 to 20/100. Thus, 75% of the patients had good visual acuity of 20/20 to 20/100 while 25% had a VA of 20/200 or worse. Though in the Ghanaian and Sierra Leonean studies, the IOL type, the follow-up period and the sample size were different compared to the present study, thus negating their direct comparison, an idea of the general success rate of cataract surgery with PCIOL in West Africa can be obtained. A good visual outcome of 82% in the current study compares well with results obtained in other West African countries.

In the South African IOL study[18] and the current study, 33% and 18% of the patients respectively had uveitis; however, 4 out of the 9 (44%) patients who had uveitis in the current study had poor visual outcome. The relatively poorer visual outcome of the patients who had uveitis in the present study compared to the South African IOL study[19] may be due to the greater effect of uveitis on vision. In the South African study, most uveitis was reported to be mild. Uveitis in the current study may have been more severe than in the South African study, and the lower incidence (18%) observed may be due to under-reporting of the less severe cases.

The limited experience of the surgeons in ICCE and ACIOL implantation may also contribute to a relatively poorer visual outcome. Drolsum et al.[24] found that problems with IOL implantation and pigment effusion during surgery were among the significant risk factors for an inflammatory response after ECCE and PCIOL insertion. Therefore, the difficulty experienced during implantation due to the limited experience of the surgeons may have contributed to the more severe uveal reaction seen in this study. This learning curve effect is also indicated by the fact that the eyes which had poor visual outcome and most of the uveitis were among the first few patients who had ACIOL implantation. In spite of the above factors however, the greater impact of uveitis on visual outcome in the current study may be due to a more severe uveal reaction to the ACIOL in our population.

Five out of the six eyes which had vitreous loss had good visual outcome (table 3). This suggests that vitreous loss may not be a major contributor to poor visual outcome in the short term.

CONCLUSION

ICCE with ACIOL when well performed gives good visual outcome and should be preferred to spectacle correction of aphakia. However, in view of the advantages ECCE has over ICCE, ICCE should be abandoned for ECCE. Where there are no facilities for PCIOL, ECCE can be performed with surgical loupe and a secondary implant performed later.

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