

Complications of Cataract Surgery at the University Teaching Hospital, Benin City, Nigeria

CU Ukponmwan, MBBS, FMCOPhth, FWACS, EU Ogborogu, MBBS, W Ovienria, MBBS

University of Benin Teaching Hospital, Benin City, Nigeria

SUMMARY

Objective: To find out the complications of cataract extraction and their effect on visual outcome at the University Teaching Hospital, Benin City, Nigeria

Materials and methods: Three hundred and seventy eyes (370) that had cataract extraction at University of Benin Teaching Hospital from July 2007 to December 2008 constitute the study subjects. Their case notes were retrieved and data including operative complications analysed. The commonest type of surgery was extracapsular cataract extraction with intraocular lens implant. The follow up period was six months.

Results: There were 181 males and 189 females with a male to female ratio of 1:1. The age range was 4 to 95 years (mean age 41.1 years). There was no intraoperative complication in 311 (84.0%) eyes. The commonest intraoperative complication was posterior capsular rent in 31 (8.4%) eyes. The commonest early post operative complication was striate keratopathy in 158 eyes. Endophthalmitis occurred in 2(0.6%) eyes with fair visual outcome. The commonest late postoperative complication, cystoid macular oedema (CMO) occurred in 9 eyes followed by posterior capsular opacification(PCO) in 6 eyes. The visual outcome was fair in 6 eyes with cystoid macula oedema and poor in 5 eyes with posterior capsular opacity. There was a significant association between the eyes with late post operative complications and the development of poor vision $p < 0.0001$.

Conclusion: The commonest intraoperative complication was posterior capsular rent with or without vitreous loss while the commonest intraoperative complication was striate keratopathy. Visual outcome was not significantly affected by the early postoperative complication, but was significantly affected by late

postoperative complication. Proper management of operative complications will help in reducing their adverse effects on the eye.

Key words: cataract surgery, operative, complications, visual outcome

INTRODUCTION

Vision loss from unoperated cataract represents an estimated 50% or more of the global burden of blindness¹. The usual treatment is surgical cataract extraction with intraocular lens implant. The causes of poor visual outcome after surgery can be classified as pre existing eye disease, surgical or post operative complications, refractive errors and late post operative complications.² In most population-based studies, inadequate refractive correction and surgical complications were the causes of poor visual outcome² Poor vision after surgery is caused by inadequate correction of post operative refractive error, failure to detect preexisting diseases or surgical complications² It is estimated that about 25% of poor outcomes of cataract operations performed in developing countries annually are due to surgical complications.³

Proper management of operative complications will help in reducing the visual loss from these complications. Golgate and Kulkarni⁴ in a comparison of cataract surgery in a base hospital and in peripheral eye camps reported vitreous loss and posterior segment pathology to be the main causes of low post operative vision.

Various studies from Nigeria have reported complications from cataract extraction to include rupture of the posterior capsule, vitreous loss, striate keratopathy, posterior capsular opacities, uveitis, elevated intraocular pressure and others.⁵⁻¹⁰ Sanjay et al¹¹ in a study on cataract surgeries in Nepal reported that 21% of the patients

developed PCO while Nwosu⁷ and Adepoju⁹ reported 7.3% and 23%, respectively.

The aim of this study is to investigate the complications of cataract extraction at the University of Benin Teaching Hospital, Benin City, determine their effect on visual outcome and to suggest ways to reduce the incidence and adverse effects of these complications.

MATERIALS AND METHODS

All consecutive patients who had cataract surgery in the Ophthalmology Department of University of Benin Teaching Hospital (UBTH) from July 2007 to December 2008 were included in this study. Patients excluded from the study were those below 4 years of age due to poorly assessed visual acuities, patients who had combined trabeculectomy and cataract extraction with IOL, eyes with no perception of light pre operatively and patients with incomplete records. These patients constitute the same subjects in our study of visual outcome of cataract surgery.

The patients were followed up for 6 months postoperatively. All patients' files were retrieved, recorded and analyzed. Three hundred and seventy eyes (370) of 358 patients were included in the study. Demographic data such as age, sex, occupation, tribe, associated systemic/ocular conditions, preoperative and post operative visual acuity, systemic and ocular examination findings, type of surgery done and the type of intraocular lens inserted were noted.

There is a standard protocol used in the department for the pre and postoperative management of all patients for cataract surgery. The patients included in this study were prepared using this protocol and patients who did not meet these criteria were excluded from the study.

The patients were admitted and prepared one day before surgery. General physical and ocular examinations were performed. The eye was dilated with tropicamide or cyclopentolate. Local anaesthesia (facial and retrobulbar) using 2% lignocaine or xylocaine with or without adrenaline and 0.5% bupivacaine was used for adults while general anaesthesia was used for children. All operations were performed with operating microscopes. No biometry was done because the equipment was not available. The intraocular lens power was calculated from the previous refraction of the patient in the affected eye if available or the other eye or the lens was selected from a standard stock available in the hospital.

Standard extra capsular cataract extraction (ECCE) with posterior or anterior chamber IOL (PCIOL/ACIOL) was mostly done. A fornix based conjunctival flap was used. A

limbal incision was made superiorly. Viscoelastic material was used to maintain the anterior chamber depth and ringer's lactate was used as irrigating fluid. The IOL inserted was a single piece intraocular lens and the power was between +18.5 and +22.5D. Anterior chamber IOL (AC IOL) was inserted in patients with preoperative subluxated or dislocated cataract or intraoperative rupture of the posterior capsule. Subconjunctival injection of ceftazidime 100mg, gentamicin 20mg and dexamethasone 4mg was given at the end of the operation, ciprofloxacin or chloramphenicol, tropicamide and dexamethasone or bethamethasone eye drops were instilled at the end of surgery. Postoperative medication included topical antibiotics, steroid, mydriatic such as ciprofloxacin, chloramphenicol, bethamethasone, tropicamide, oral acetazolamide, analgesic and ascorbic acid.

Patients without complications after surgery were discharged the next day. Post-operative visual acuity was assessed using the Snellen's chart with or without pinhole (PH) on 1st day post operative (1st DPO), 1 week, 6 weeks, 3 months and 6 months. Post-operative refraction was done at 6 weeks. The visual acuity was classified according to World Health Organization's recommendation of: Good being 6/6-6/18, borderline (fair) <6/18-6/60 and poor <6/60⁸. In our study, IOP measurement was carried out pre- and post-operatively. Post-operative IOP recorded on the 1st day, 1st week, 6th week, 3rd month and 6th month were used.

The complications were classified into intra-operative complications; early post-operative complications for complications occurring within 6 weeks of surgery; and late post-operative complications for problems occurring 6 weeks after surgery.

The data was then analyzed using EPI info 13. Frequencies, mean and chi square were calculated. P value ≤ 0.05 was taken as significant.

RESULTS

There were 358 patients included in the study, and the total number of eyes was 370. There were 346 unilateral cases and 12 bilateral cases. Forty patients were lost to follow up at the end of 6 months. Children less than 4 years of age were excluded from the study.

There were 181 male and 189 female patients; the male to female ratio was approximately 1:1. The age range was 4 to 95 years with a mean age of 41.1 years.

The mean preoperative intraocular pressure (IOP) was 13.3 mmHg, 349 (94.3%) eyes had IOP within the normal range of 10 – 21mmHg. 5 (1.4%) eyes had IOP greater than 21mmHg.

Post-operatively, on the 1st day following surgery, 18 (4.8%) eyes had IOP greater than 21mmHg. By the 6th month after surgery, 297 (90%) eyes of the remaining 330 eyes had IOP within normal range. Only 21 (6.4%) eyes and 4 (1.2%) eyes had IOP less than 10mmHg and greater than 21mmHg respectively. Also, the mean IOP progressively increased from 10.2mmHg on the 1st post-operative day to 13.2mmHg on the 6th post-operative month. The difference between the mean pre-operative IOP of 13.3mmHg and the mean IOP of 13.2 mmHg at 6 months post- operatively was not statistically significant $p > 0.05$.

Forty eyes (10.2%) eyes were lost to follow up at the end of 6 months, consequently late post-operative complications were not recorded for these eyes.

Table 1 shows the intra-operative and post- operative complications, 311 (84.0%) had no intra-operative complications. The commonest intra-operative complication was posterior capsular rent in 31 (8.4%) eyes with associated vitreous loss in 25 (6.8%) eyes.

Table 1. Intra-operative and early post-operative complications

Complications	No. of eyes	%
<i>Intraocular Complications</i>		
Stripping of Descemet membrane	18	4.3
Hyphema	8	2.2
Posterior capsular rent without vitreous loss	6	1.6
Posterior capsular rent with vitreous loss	25	6.8
Zonular dehiscence	1	0.3
Retrobulbar haemorrhage	1	0.3
No complication	311	84
Total	370	100
<i>Early Post-operative Complications</i>		
Striate keratopathy	158	42.7
Cortical remnants	33	8.8
Shallow anterior chamber	12	3.2
Post-operative uveitis	11	3
Conjunctival discharge	9	2.4
Iris prolapse	7	1.9
Elevated IOP	5	1.4
Pupillary capture	2	0.6
Endophthalmitis	2	0.6
No post op complications	131	35.4
Total	370	100

The commonest early post-operative complication was striate keratopathy which occurred in 158 (42.7%) eyes followed by cortical remnant in 33 (8.8%) eyes, shallow anterior chamber in 12 (3.2%) eyes and uveitis in 11 (3.0%). Endophthalmitis and pupillary capture were seen in 2 eyes each. There was no early post- operative complications in 131 (35.4%) eyes. The striate keratopathy resolved within a few days with proper management (topical steroids) and had no effect on the visual outcome.

There was no late post-operative complication in 299 (90.6%) eyes. The commonest late post-operative complication was cystoid macular oedema (CMO) which occurred in 9 (2.7%) eyes followed by posterior capsular opacification (PCO) and elevated IOP in 6 eyes (1.8%) each. The visual outcome for 6 out of the 9 eyes with CMO was fair, 5 out 6 eyes that had PCO had poor visual outcome. Elevated IOP did not seem to have any immediate effect on the visual outcome. There was a significant association between eyes with late postoperative complication and poor visual outcome < 0.0001 .

The visual outcome was good in 218 (72.9%) out of the 299 eyes without late post-operative complications and 222 (67.3%) of 330 eyes at 6 post-operatively. There was a significant association between eyes without complications and good vision $p < 0.0001$.

DISCUSSION

The prevention of intra-operative and post-operative complications during and after cataract surgery and the proper management of these complications when they occur remain an important determinant of the visual outcome following cataract surgery. Surgical complications can to some extent be prevented by good practice and good surgical technique. When complications occur proper management is crucial to reduce the possibility of poor outcome.³

Pre-operatively, 94% of eyes had IOP within the normal range of 10 - 21mmHg with a mean IOP of 13.3 mmHg. Some of these patients were known glaucoma patients with IOP controlled on medications. The IOP was greater than 21mmHg in 1.4% of eyes. These eyes had complicated cataract and elevated IOP, and had a poor response to conventional IOP lowering drugs. Post-operatively, on the 1st day, 40.8% of eyes had IOP less than 10mmHg and 4.8% of eyes had IOP greater than 21 mmHg and were commenced on aggressive antiglaucoma therapy. This was better than the 9.3% of eyes on the 1st day and 4.7% of eyes on the 5th day

post-operatively with an IOP greater than 21mmHg recorded by Adio et al.⁶ in their study in Port Harcourt, Nigeria.

There was a gradual reduction in the number of eyes in both categories (< 10mmHg and > 21mmHg) so that by the 6th post-operative month, 90% of 330 eyes had IOP between 10 – 21mmHg. Only 1.2% of eyes had IOP above 21mmHg and they were known glaucoma patients with poor compliance with their medications. This was better than the 6% recorded by Olusanya et al¹² in their study on visual recovery in children after cataract surgery.

The most common intra-operative complication was posterior capsular rent which was seen in 8.4% of eyes and vitreous loss which was seen 6.8% of these eyes. This was lower than that of 12% of vitreous loss by Olatunji et al,¹³ but higher than other findings from Nigeria of 6.3% by Adepoju,⁹ 4.9% by Nwosu⁷ and 4.7% by Adio.⁶ Chirambo¹⁴ from Malawi reported that 3.4% of the patients in their study had posterior capsular rent. Posterior capsular rent and vitreous loss has also been found to be the commonest intra-operative complication by other authors from Nigeria.^{6,13,15}

There was no intra-operative complication in 84% of eyes and this was comparable to Adio's report of 88.4%.⁶ The incidence of capsular rupture and vitreous loss is lower (1-2%) in high income countries and is probably due to the use of phaco-emulsification and earlier intervention.³ In low and middle income countries the incidence is higher.¹⁶ This is also shown in our study and is probably due to the fact that cataract surgeries in developing countries are more complicated due to late presentation of the patients, couching and the use of traditional eye medications. Couching results in a subluxated or dislocated lens, uveitis, synechiae formation and more manipulation during surgery, thus increasing the risk of capsular rupture and vitreous loss. The use of traditional eye medication also results in uveitis, synechiae formation and a complicated cataract, thus increasing the risk of capsular rupture and vitreous loss during surgery. Proper management of these cases with anterior vitrectomy and insertion of an intraocular lens will lead to a better visual outcome.

The commonest early post-operative complication, striate keratopathy which was seen in 42.7% of eyes, is lower than that of 53.1% reported by Adio,⁶ but higher than that of 25.4% and 9.8% reported by Adepoju⁹ and Bekibele,⁸ respectively. The other post-operative complications such as uveitis, cortical remnant, pupillary capture have also been reported by other studies on complications of cataract surgery.⁵⁻⁹ Uveitis is a common complication of cataract extraction which occurred in 3.0% of eyes in this study and

is lower than that of 48.8% of recurrent uveitis reported by Nwosu⁷ and 16.4% by Bekibele.⁷

Eruchalu¹⁷ had complications in 119 eyes (3.6%) with striate keratitis accounting for 30.6% of eyes and hyphaema in 10.6%. Hyphaema was not seen as a post operative complication in this study and this may be due to proper cauterization of bleeding vessels and adequate irrigation of blood during surgery.

Endophthalmitis which is a vision threatening and dreaded complication of cataract surgery was seen in two patients in this study. The visual outcome was fair in both patients because of early recognition and intensive management. The reported incidence of endophthalmitis in Nigeria varies from 4.9% by Bekibele⁸ to 8.7% by Akinsola.¹⁰ There was no endophthalmitis in most of the studies from Nigeria.^{5,7,9} The incidence has been reported to be between 0.13% and 0.7% .¹⁸

Adequate measures should be taken before, during and after surgery to prevent the development of endophthalmitis. Proper preparation of the patient including reducing risk factors that increase the presence of bacteria on ocular surface such as blepharitis, conjunctivitis, canaliculitis, lacrimal duct obstruction, contact lens wear, and ocular prosthesis in the other eye, use of 5% povidone iodine eye drops, use of aseptic technique, injection of intracameral cefuroxime post-operatively will help to reduce the occurrence of endophthalmitis.¹⁹

Effective management of complications such as capsular rupture is also important. Early recognition and proper management of endophthalmitis with intravitreal vancomycin and either ceftazidime or amikacin is important to achieve good or fair visual outcome as in this study where both patients had fair visual outcome. Diabetic patients should be properly controlled before surgery. One of the patients with endophthalmitis in this study was diabetic.

Early postoperative complications were not recorded in 35% of eyes and were higher than that of 25.6% reported by Adio.⁶ These early complications did not affect the final visual outcome significantly as almost all the patients except two (who developed bullous keratopathy) had clear cornea by the end of the first postoperative week after the administration of subconjunctival and/or topical steroids.

The commonest late postoperative complication was cystoid macula oedema (CMO) which occurred in 2.7% (9) of eyes. Six (1.8%) of these eyes had fair (6/18 – 6/60) visual outcome. CMO was not recorded in most other studies. PCO and elevated IOP were seen in 1.8% (6) of eyes each.

Table 2. Late post-operative complications and final visual outcome

Complications	No of eyes	%	Final visual outcome			
			Good	Fair	Poor	Nil Rec VA
Cystoid macular oedema	9	2.7	-	6	3	-
Elevated IOP	6	1.8	3	2	1	-
Posterior capsular opacification	6	1.8	-	1	5	-
Pupillary membrane	3	0.9	1	2	-	-
Ocular hypotony	2	0.6	-	-	2	-
Bullous keratopathy	2	0.6	-	-	2	-
Phthisis bulbi	1	0.3	-	-	1	-
Lost IOL	1	0.3	-	-	1	-
Retinal detachment	1	0.3	-	-	1	-
NIL	299	90.6	218	49	16	16
TOTAL	330	100	222	60	32	16
Lost to follow up	40	10.8				

Olusanya¹² in his study in children after cataract surgery recorded 41.1% of PCO and 6% of elevated IOP. Nwosu⁷ recorded 7.3% while Singh¹¹ recorded 0.5%. Visual acuity can be improved in eyes with posterior capsular opacities by performing an Nd Yag laser capsulotomy or a surgical capsulotomy using a 25G capsulotomy needle²⁰

Late post-operative complications were not recorded in 90.6% (299) of eyes. Out of these, 218 eyes had good visual outcome. This represented 72.9% of eyes without late postoperative complications and 66.1% of the total eyes at 6 months post operatively. This further underscores the fact that late post-operative complications affect the final visual outcome more adversely than early post-operative complications.

Good surgical skills and proper management of intra-operative complications are necessary for achieving a good visual outcome following cataract surgery. Post-operative management is as important as the surgery itself since prompt and proper management of early post-operative complications will prevent late post-operative complications and poor visual outcome. Regular monitoring of cataract surgical outcomes is important as it is associated with a reduction in the incidence of complications.²¹ Proper management of complications should be incorporated into training programmes as this will improve the visual outcome after cataract surgery.

CONCLUSION

The commonest intraoperative complication in this study was posterior capsular rent with or without vitreous loss while the commonest early postoperative complication was striate keratopathy. Visual outcome in this study was not

significantly affected by the early post-operative complications, but was significantly affected by late post-operative complications, it is, therefore, important to manage these complications properly to prevent visual loss.

REFERENCES

- 1 Parajasegaram R. Importance of monitoring cataract surgical outcomes. *Journal of Community Eye Health* 2002; 15: 49-50.
- 2 Dandona L, Limburg H. What do we mean by cataract outcomes? *Comm Eye Health Journal* 2000;13: (35), 35-36.
- 3 Yorston D. Cataract complications. *Comm. Eye Health Journal* 2008; 21:(65), 1-3.
- 4 Gogate P, Kulkarni AN. Comparison of cataract surgery in a base hospital and in peripheral eye camps. *Community Eye Health Journal* 2002; 15: (42), 26-27.
- 5 Umeh RE, Onwasigwe EN, Ozoh GA, Onwasigwe E N, Okoye OI., Umeh OC, Cataract intervention surgery: A community approach. *Nig J. Ophthalmol* 2000; 8:17-20.
- 6 Adio AO, Awoyesuku E. Early experience with intraocular lens implantation surgery in University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria. *Port Harcourt Medical Journal* 2007; 1:178-85.
- 7 Nwosu SNN, Onyekwe CO. Intraocular lens implantation surgery in Onitsha, Nigeria. *Nig J Ophthalmol* 2002;1: 5-9.
- 8 Bekibele CO. Evaluation of the outcome of ECCE surgery with PC IOL at Ago-Iwoye, Ogun State, Nigeria. *Nig J Ophthalmol* 2001; 9: 32-36.
- 9 Adepoju FG, Owioye JFA, Ademola-Popoola DS. Assessments of one year follow up of patients with ECCE_PCIOL surgery at Ilorin Teaching Hospital, Kwara

- State, Nigeria. *Nig J Ophthalmol* 2004; 12: 65-67.
- 10 Akinsola FB, Hassan AA, Majekodunmi AA, Adefule-Ositelu AO, Onakoya AO, Aribaba OT. Post-operative complications of cataract surgery seen over a 5 year period (Jan 1998-Dec 2002). *Nig Qt J Hosp Med* 2004; 14: 56-59.
 - 11 Singh SK, Dahal T, Sharma D. Early results of cataract surgeries in Mechi Eye Centre in Nepal. *Comm Eye Health J* 2002; 15 (42): 28-29.
 - 12 Olusanya BA, Baiyeroju AM, Fajola AO. Visual recovery after cataract surgery in children. *Nig J Ophthalmol* 2006; 14 (2): 46-51.
 - 13 Chirambo MC . Country-wide monitoring of cataract surgical outcomes. *Community Eye Health Journal* 2002; 15: 58-59.
 - 14 Olatunji FO, Kirupananthan S. Intracapsular cataract extraction with anterior chamber intraocular lens implantation in a developing country. *Nig J Ophthalmol* 2006; 14: 13-17.
 - 15 Mpyet C. Extracapsular cataract extraction with intraocular lens implantation in leprosy and non leprosy patients: Visual outcome and complications. *Nig J Ophthalmol*. 2006; 14:9-12.
 - 16 Kothari M, Thomas R, Parikh R, Braganza A, Kuriakose T, Muliya J. The incidence of vitreous loss and visual outcome in patients undergoing cataract surgery in a teaching hospital. *Indian J Ophthalmol* 2003; 51:45-52.
 - 17 Eruchalu UV. Minimizing the complications of cataract surgery. *Nig J Ophthalmol* 1993; 2(1): 6-11.
 - 18 Marmalis N, Kearsley L, Brinton E. Postoperative endophthalmitis. *Curr Opin Ophthalmol* 2002; 13: 14-18.
 - 19 Niyadurupola N, Astbury N. Endophthalmitis.: Controlling infection before and after cataract surgery. *Comm Eye Health J* 2008; 21: (65) 9-10.
 - 20 Waziri Erameh J M, Omoti AE, Pedro-Egbe CN. Non laser management of post –extraction opacification of the posterior capsule. *Nig J Surgical Sciences* 2007; 17: 101-104.
 21. Limburg H, Forster A, Gilbert C, Johnson GJ, Kyndt M, Myatt M. Routine monitoring of the outcome of cataract surgery. Part 2: Results from eight study centres. *Br J Ophthalmol* 2005; 89 (1): 50-52.