WORLD VIEW

Visual outcome after high volume cataract surgery in Pakistan

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Aim: To determine the visual outcome and factors influencing visual outcome after cataract surgery in an urban charity hospital in Pakistan.
Methods: A series of selected outpatients were examined who had undergone cataract surgery in the preceding 24 months.
Results: 181 patients aged 45–82 years were examined. The type of cataract operations they had had were extracapsular cataract extraction (ECCE) only in 50% (91), phacoemulsification (phaco) only in 11% (20), ECCE with intraocular lens (IOL) in 17% (31), and phaco with IOL in 22% (39). At presentation, 49.7% (90) had poor functional vision; after refraction 68% (123) had a good visual outcome. Functional vision in eyes undergoing ECCE with IOL was good in 77% (22) and with phaco with IOL in 71.8% (28). After refraction a higher proportion of eyes with IOL surgery (93%) had a good outcome than those with non-IOL surgery (53%). Uncorrected refractive error, present in 75.5% (68), was the commonest cause of poor functional vision.
Conclusion: This study demonstrates that it is possible to obtain good results with IOL surgery in the developing world. Increasing cataract surgery with IOL implantation should reduce the number of eyes with poor functional vision after cataract surgery. More attention should be directed towards ensuring that successful outcomes are indeed being realised by continued visual monitoring postoperatively.

Cataract is the main cause of avoidable blindness worldwide, with the developing world accounting for three quarters of this blindness.[1] In 1997 approximately 10 million cataract operations were performed globally but despite this cataract blindness is thought to be increasing by 1–2 million/year.[2] To address this increasing backlog, significant progress is being made in increasing the output of cataract surgical services in many developing countries.[3] However, it is becoming evident that the outcome of cataract surgery is not always good, and much more attention needs to be given to this aspect of surgical services.[4] Recent population based studies undertaken in several countries show that 40–75% of people who have had cataract surgery have a presenting visual acuity of less than 6/18 in the operated eye, and 21–53% have less than 6/60.[5–7] The aim of this study was to determine the visual outcome of patients who had cataract surgery in a high volume eye hospital in Pakistan, and to identify reasons for a poor outcome.

The study was undertaken in the LRBT Free Eye Hospital in Lahore, Pakistan, which is a very well equipped 80 bedded eye hospital. It is funded by non-government charity organisations and the private sector. The hospital is primarily meant for poor patients who are treated free of cost, and no one is denied treatment because they cannot afford to pay. Affluent patients are actively encouraged to give a donation to the hospital. There are 18 full time ophthalmologists, five of whom are fellowship trained consultants and the remainder are trainees: all operate on cataract patients using standard microsurgical techniques. Both inpatient and day case cataract surgeries are performed. All patients are examined on the first postoperative day on a slit lamp, and are routinely followed up at 1 week and after 1 month. If there is low postoperative visual acuity and/or the patient expresses a desire for improvement in acuity, a refraction is performed by the hospital optometrist. The average annual outpatient attendance is 200 000. In 1998 a total of 7606 cataract extractions were performed, and the type of surgery was as follows: extracapsular cataract extraction (ECCE) without intraocular lens (IOL) in 43.5% (3306); ECCE with IOL in 19.9% (1516); phacoemulsification without IOL (phaco) in 13.2% (1001), and phaco with IOL in 22.1% (1683); 84% of all cataract operations during 1998 were on individuals aged 45–82 years, and 44% of operations were on males. IOLs were not routinely available free of cost, except those available through donation.

METHODS

The study was undertaken over a 3 week period in July 1999, and was limited to individuals aged over 40 years who had had cataract surgery within the preceding 24 months, and who returned for outpatient appointments. Patients excluded from the study were those who had surgery for traumatic cataracts, or who had other ocular procedures performed at the time of cataract extraction. A simple recording form was developed to record the following: age, sex, type of cataract operation, length of time since the operation; pre-existing eye disease; visual acuity as the patient presented ("functional vision"—that is, with or without glasses) and after refraction, and findings on examination. Levels of visual acuity after cataract surgery were categorised using the WHO guidelines—that is, good outcome was defined as 6/6–6/18, borderline outcome as <6/18–6/60, and poor outcome as <6/60. A database was created in Epi-Info 6.04 for analysing the data. All examinations

Table 1 Category of visual loss in the operated eye before and after refraction

		Functional vision		After refraction	
Outcome	Level of VA	No	%	No	%
Good	6/6-6/18	69	38.1	123	68.0
Borderline	<6/18-6/60	21	11.6	31	17.0
Poor	<6/60	90	49.7	22	12.2
Not assessed		1	0.6	5	2.8
Total		181	100	181	100

Table 2 Category of visual loss in the operated eye before refraction

Outcome	Level of VA	ECCE + IOL (n=31)		Phaco + IOL (n=39)		ECCE only (n=91)		Phaco only (n=20)	
		No	%	No	%	No	%	No	%
Good	6/6–6/18	22	71.0	28	71.8	13	14.3	6	30
Borderline	<6/18–6/60	4	12.9	8	20.5	9	9.9	0	0
Poor	<6/60	4	12.9	3	7.7	69	75.8	14	70
Not assessed		1	3.2	0	0	0	0	0	0
Total		31	100	39	100	91	100	20	100

Table 3 Category of visual loss in the operated eye after refraction

Outcome	Level of visual acuity	ECCE + IOL (n=31)		Phaco + IOL (n=39)		ECCE only (n=91)		Phaco only (n=20)	
		No	%	No	%	No	%	No	%
Good	6/6–6/18	29	93.5	36	92.3	47	51.6	11	55.0
Borderline	<6/18–6/60	2	6.5	2	5.1	24	26.4	5	25.0
Poor	<6/60	0	0	1	2.6	16	17.6	3	15.0
NA		0	0	0	0	4	4.4	1	5.0
Total		31	100	39	100	91	100	20	100

NA = not assessed.

were performed by one observer (AM), and all refractions were performed by one hospital based optometrist.

RESULTS

A total of 181 patients were examined. Their ages ranged from 45–82 years and 53% were male. Almost half the patients had had cataract surgery within the preceding 6 months, and two thirds were examined within 1 year of surgery. The type of cataract operations they had had were as follows: ECCE without IOL 91 (50%); ECCE with IOL 31 (17%); phaco without IOL 20 (11%); phaco with IOL 39 (22%). This reflects the type of cataract surgery routinely performed in 1998–9. Only a few individuals had had bilateral surgery, and each eye was counted separately.

Visual acuity results in the operated eye are shown in Table 1, which gives the functional visual acuity, and the acuity after refraction. The findings show that almost half the eyes had a poor functional visual acuity (that is, less than 6/60); after refraction over two thirds had a good visual outcome (that is, 6/18 or better). The levels of visual acuity before and after refraction by type of cataract surgery are shown in Tables 2 and 3. The data show that eyes with IOLs have better levels of visual acuity before refraction than those without IOLs, with 50/70 eyes (71%) achieving a good outcome compared with 19/111 eyes (17%) without IOLs. The outcome in eyes operated on using phaco and those undergoing ECCE were similar, but the numbers were small. Overall, a high proportion of eyes had a good outcome with IOL surgery (93% after refraction), which was higher than in eyes not having IOLs (53%). Only one eye with an IOL had a poor outcome (1.4%), compared with 17% of eyes not having IOLs.

It is likely that some eyes had potentially sight threatening disease before surgery (Table 4). Ten eyes had corneal opacity before surgery, and most of these had non-IOL surgery. The main reasons why IOLs were not inserted in these eyes other than cost could relate to patient selection (that is, it was realised that the outcome would be poor, and so an IOL was not inserted), or to operative complications as a result of compromised view of the anterior chamber. The majority of eyes undergoing IOL implantation had no sight threatening eye disease before surgery.

Table 5 lists the causes of poor functional outcome. In 12 eyes pre-existing eye disease was thought to be responsible for the poor outcome. In this study the operating notes were not reviewed for surgical complications, but several eyes that had undergone ECCE without IOL had ruptured posterior capsules. Three of these eyes had cystoid macular oedema on biomicroscopy, suggesting complicated surgery. The commonest cause for a poor functional outcome was an uncorrected refractive error. In 11 eyes the posterior capsule was opaque enough to warrant posterior capsulotomy.

Table 4 Pre-existing eye disease by type of operation

	ECCE with IOL (n=31)	Phaco with IOL (n=39)	ECCE only (n=91)	Phaco only (n=20)	Total
Corneal opacity	1	1	7	1	10
Glaucoma	0	1	3	0	4
Branch vein occlusion	0	0	1	0	1
Squint/amblyopia	0	0	1	0	1
Trichiasis	0	0	1	0	1
Pterygium	1	0	0	0	1
Diabetic retinopathy	1	0	0	0	1
Retinal detachment	0	2	0	0	2
Macular degeneration	0	0	0	1	1
Trachoma	0	0	0	1	1
Total	3 (9.7%)	4 (10.3%)	13 (14%)	3 (15%)	23 (12.7%)

Table 5 Causes of poor visual outcome in eyes with a functional visual acuity of <6/60 (n=90)

Cause	Details	No
Selection	Serious pre-existing eye disease	12
Operation	Cystoid macula oedema	3
Refraction	Significant refractive error	68
Follow up	Thick posterior capsule	11
		94*

*Total more than 90 as some eyes had more than one cause for a poor outcome.

DISCUSSION

The findings of clinic based studies of the visual outcome of cataract surgery need to be interpreted carefully, as patients who come back to the clinic may not represent all those who had surgery, which will bias the findings. For example, patients with problems and poor vision may be more likely to re-attend for follow up than those who are pleased with the visual result. On the other hand, patients who live far away may not be able to afford to re-attend for follow up, even if they have a poor outcome. The findings will therefore be biased in a way that is difficult to assess. However, clinic based assessments have the advantage of being easy and quick to carry out, and useful information can be obtained. Although our sample was opportunistic it seems to be representative in terms of the type of cataract surgery performed in the hospital in 1998–9 (for example, 39% in our sample had cataract surgery with IOL compared with 41% of all patients having surgery). It was, however, not representative in terms of sex, as 53% of the sample were male compared with 44% of those having cataract surgery. This may reflect the fact that in an Islamic society it is easier for males to travel than it is for females.

The World Health Organization in a workshop on "Outcome in prevention of blindness programmes" in 1998 recommended the development of a simple method to monitor and evaluate outcome following cataract surgery in terms of visual acuity, which can be assessed with full spectacle correction (best vision) or with available correction (presenting vision).[8] The purpose of such a tool would be to identify causes of poor outcome of cataract surgery. These could be pre-existing eye disease, surgical or postoperative complications, refractive errors, and late postoperative complications. Knowing the cause of poor outcome will enable eye surgeons and centres to address these causes and improve outcome.

Selection for surgery

In this study 12 patients with a poor outcome (7%) had ocular co-morbidity which may have been present before cataract extraction. However, it is often worth operating on eyes with pre-existing diseases, particularly eyes with age related macula degeneration, where the field of vision can be improved by cataract extraction. One limitation of this study was that preoperative visual acuity and data on ocular findings were not available.

Operative reasons for poor outcome

In this study three eyes with a poor outcome had clinically evident cystoid macula oedema, and two of these eyes had ruptured posterior capsules. Several other eyes in which an IOL had not been implanted also had ruptured posterior capsules. These eyes may have been intended for IOL surgery, but an IOL was not inserted, as surgery was complicated. In developing countries large numbers of hypermature and Morgagnian cataracts are encountered; this, combined with the recognised weaker zonules of hypermature cataracts, contributes to the greater risk of posterior capsule rupture and vitreous loss.[9] Posterior capsule rupture rates of 10% and 11.3% have been reported in African studies,[10 11] which is considerably higher than the rate of 4.4% reported in the National Cataract Surgery Survey of UK.[12] In our study it was not possible to say with any certainty to what extent surgical complications contributed to the findings—ideally a study of this nature should link postoperative findings in the clinic to operating theatre notes.

Refractive reasons for poor outcome

Uncorrected refractive error was the single commonest cause of a poor visual outcome in this study. Without knowing the visual status of the other eye it is not possible to precisely comment on the reasons for this, as many of the study eyes may have been second eyes where the first eye had not had an IOL inserted. Previous studies have shown that functional vision is particularly important in developing countries as aphakic glasses are frequently lost, broken, or simply not worn.[13] The visual rehabilitation offered by IOLs is, therefore, highly desirable in these settings.

Follow up and visual outcome

Several eyes had thickened posterior capsules, requiring posterior capsulotomy. In this study visual acuities were measured at different intervals following surgery, and this may have influenced the findings. Ideally visual acuity should be measured in all subjects at the same time interval after surgery.

The great improvement in vision among operated individuals after refraction points to the need for adequate follow up services among aphakics and pseudophakics. Many of these people have less than satisfactory, but correctable, vision. They may be attributing their poor vision to a failure of cataract surgery, and discouraging others from seeking it. We advocate that after cataract surgery much more attention should be directed towards ensuring that successful outcomes are being realised to the greatest possible extent. A greater priority should be given at the outset to maximise visual results. All patients should have a thorough preoperative examination before surgery, to exclude significant other pathology. ECCE without IOL should be discouraged, as rates of posterior capsule opacification are high, and the long term visual results may be poorer than with standard ICCE. One rationale for non-IOL ECCE surgery is that the patients can return for secondary IOL implantation when they can afford it, but in reality this rarely, if ever, happens. Individual surgeons should monitor their intraoperative complications and the visual outcome of their surgery.

In summary, this study confirms that good visual results are possible after ECCE with IOL and phaco with IOL in the developing world. However, despite excellent facilities and skilled surgeons the poor in the community are deprived of the visual benefit of IOLs, mainly because of their inability to afford them. It is, therefore, important that affordable IOLs of good quality are made widely available, with cost sharing or cross subsidy, so that IOLs are available to all irrespective of their ability to pay.[14] In India, the Aravind Hospital system is testimony to this.[15]

A recent review of LRBT's hospital records shows that in the year 2000–1 the percentage of patients having IOL surgery had increased to 76% as a result of this study. The administration aims to increase IOL use to 100% by purchasing low cost IOLs of good quality.

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REFERENCES

1 **Thylefors B**, Negrel AD, Pararajasegaram R, *et al*. Global data on blindness: an update. *Bull World Health Organ* 1995;**73**:115–121.
2 **World Health Organization**. *Global initiative for the elimination of avoidable blindness*. Geneva: WHO, WHO/PBL/97.61
3 **Limburg H**, Vasavada A, Muzumdar G, *et al*. Rapid assessment of cataract blindness in urban district of Gujarat. *Indian J Ophthalmol* 1999;**47**:135–41.
4 **Foster A**. Cataract—a global perspective: output, outcome and outlay. *Eye* 1999;**13**:449–53.
5 **Pokharel GP**, Selvaraj S, Ellwein LB. Visual function and quality of life outcomes among cataract operated and unoperated blind populations in Nepal. *Br J Ophthalmol* 1998;**82**:606–10.
6 **He M**, Xu J, Li S, *et al*. Visual acuity and quality of life in patients with cataract in Documen County, China. *Ophthalmology* 1999;**106**:1609–15.
7 **Dandona L**, Dandona R, Naduvilath TJ, *et al*. Population based assessment of the outcomes of cataract surgery in an urban population in southern India. *Am J Ophthalmol* 1999;**127**:650–8.
8 **World Health Organization**. Informal consultation on analysis of blindness prevention outcomes. Geneva: WHO, WHO/PBL/98.68.
9 **Lewallen S**, Le Measurier RT. Extracapsular cataract surgery in developing countries. [Letter] *Arch Ophthalmol* 1993;**111**:18–19.
10 **Cook NJ**. Evaluation of high volume extracapsular cataract extraction with posterior chamber lens implantation in Sierra Leone, west Africa. *Br J Ophthalmol* 1996;**80**:698–701.
11 **Egbert PR**, Buchanan M. Results of extra capsular cataract surgery and intraocular lens implantation in Ghana. *Arch Ophthalmol* 1991;**109**:1764–8
12 **Desai P**, Minnassian D, Reidy A. National cataract surgery survey 1997–8: a report of the results of clinical outcomes. *Br J Ophthalmol* 1999;**83**:1336–40.
13 **Yorston D**, Foster A. Audit of extracapsular cataract extraction and posterior chamber lens implantation as a routine treatment for age related cataract in east Africa. *Br J Ophthalmol* 1999;**83**:897–901.
14 **Brian RG**. Bringing the benefits of cataract surgery to the third world. *Ophthal Clin N Am* 2000;**13**:141–50.
15 **Natchiar G**, Robin AL, Thulasiraj RD, *et al*. Attacking the backlog of India's curable blind. The Aravind Hospital model. *Arch Ophthalmol* 1994;**112**:987–93.