Evaluation of visual outcome of cataract surgery in an Indian eye camp

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Abstract

***Aim*—To evaluate the results of cataract surgery performed in a rural Indian eye camp.**

***Method*—The pre- and postoperative visual acuities and surgical complications were recorded prospectively in 6383 eyes undergoing cataract extraction for age related cataract in rural eye camps held in northern India in 1993–4. The best visual acuity and cause of poor outcome were recorded on 3908 eyes seen at 6 weeks' follow up.**

***Results*—Of 6383 operated eyes 94.8% had a visual acuity of less than 3/60 preoperatively, and 41% of the procedures were performed on patients who were bilaterally blind (less than 3/60 better eye). At discharge with standard aphakic spherical spectacles, 11.3% of eyes had an acuity of less than 6/60 (poor outcome), and 25.9% had an acuity of 6/18 or better. At 6 weeks' follow up 3908 eyes were examined (61.2%), of which, with best correction, 4.3% had poor outcome (acuity of less than 6/60) and 79.9% obtained 6/18 or better. Pre-existing eye pathology was responsible for poor outcome in 3.0% of eyes and surgical complications in 1.3% of eyes, of which corneal decompensation was the major cause (0.5%). In 237 eyes which received an intraocular lens implantation (IOL) in the camp, the visual acuity at discharge was 6/18 or better in 44.5% of eyes improving to 87.9% in the 157 eyes which were seen at 6 weeks' follow up. Poor outcome (less than 6/60) was seen in 5.7% of the eyes with an IOL at discharge improving to 1.9% at follow up.**

***Conclusion*—This evaluation suggests that it is possible to obtain acceptable results from cataract extraction with experienced ophthalmologists in well conducted Indian eye camps. Better correction of aphakia at discharge from the camp would improve the immediate visual results, which is important as a significant number of patients do not return for follow up. The use of posterior chamber IOLs in the eye camp by experienced ophthalmologists, appeared to give satisfactory results, although further evaluation with a larger series of cases and more surgeons is required before it can be recommended.**

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Worldwide there are estimated to be approximately 45 million blind people with a visual acuity less than 3/60 in the better eye. At least 80% of these people live in developing countries, and more than half are blind as a result of cataract.[1] Cataract blindness is particularly important in India where 81% of blindness and severe visual impairment is due to cataract[2] with one study showing an estimated 3.8 million people becoming blind from cataract annually.[3]

There are various strategies for increasing the number of cataract surgeries in developing countries. Surgical eye camps in rural areas provide inexpensive surgery close to where the majority of people live. The results of surgery in eye camps are often not evaluated, and the role of IOL implantation under camp conditions has been questioned.

Traditionally, the result of cataract surgical services is reported as the total number of cataract extractions performed each year. Although useful, these statistics have a limited value as it is not only the number of surgeries done that is of significance, but also how many individuals benefit and to what extent they benefit.[4] This audit looks at the visual outcome of patients undergoing cataract surgery in eye camps, and analyses the causes of poor visual outcome.

Patients and methods

The study included 6383 eyes with senile cataract which underwent cataract extraction with or without intraocular lens implantation (IOL) in eye camps conducted by the mobile eye services of Christian Medical College and Hospital, Ludhiana, over a 2 year period from January 1993 to December 1994. IOLs were not routinely available, but were used for patients requiring surgery for uniocular cataract, or for patients who were able and wished to purchase an IOL.

Before surgery, visual acuity was recorded using the WHO categories of visual impairment (Table 1). Surgery was performed under local anaesthesia. Postoperatively, patients were discharged on the fifth postoperative day, at which time the vision was recorded in aphakic eyes with +9 to +11.0 D spherical lenses. A follow up was conducted at the same camp site 4–6 weeks after surgery when vision was

Table 1 Pre- and postoperative visual acuity in the operated eye of 6383 cataract operations performed in eye camps 1993–4

	Preop		*Postop discharge*		*Postop 6 week follow up*	
Visual acuity	*n*	*%*	*n*	*%*	*n*	*%*
6/6–6/18	0	0	1654	25.9	3122	79.9
<6/18–6/60	17	0.3	4007	62.8	619	15.8
<6/60–3/60	314	4.9	349	5.5	52	1.4
<3/60–NPL	6052	94.8	373	5.8	115	2.9
Total	6383	100	6383	100	3908	100

Table 2 Pre- and postoperative visual acuity in the better eye of 6383 cataract operations performed in eye camps 1993–4

	Preop		Postop discharge		Postop 6 week follow up	
Visual acuity	n	%	n	%	n	%
6/6–6/18	1303	20.4	2502	39.2	3228	82.6
<6/18–6/60	1312	20.6	3390	53.1	560	14.3
<6/60–3/60	1150	18.0	294	4.6	59	1.5
<3/60–NPL	2618	41.0	197	3.1	61	1.6
Total	6383	100	6383	100	3908	100

Table 3 Best corrected visual acuity at 6 week follow up in 3908 operated eyes according to the surgical technique

	ICCE with specs		ECCE with specs		ECCE with PC-IOL	
Visual acuity	n	%	n	%	n	%
6/6–6/18	1463	78.1	1521	81.0	138	87.9
<6/18–6/60	306	16.3	297	15.8	16	10.2
<6/60–3/60	28	1.5	21	1.1	3	1.9
<3/60–NPL	77	4.1	38	2.0	0	0
Total	1874	100	1877	100	157	100

Table 4 Causes of visual acuity less than 6/60 in 167 eyes of 3908 operated eyes seen at 6 week follow up

	ICCE		ECCE		Total	
Cause of poor acuity	(n=1874)	%	(n=2034)	%	(n=3908)	%
Pre-existing pathologies:						
Optic atrophy	17	0.9	6	0.3	23	0.6
Old corneal opacity	21	1.1	7	0.3	28	0.7
Glaucomatous optic atrophy	7	0.4	6	0.3	13	0.3
Other anterior segment pathology	15	0.8	4	0.2	19	0.5
Other posterior segment pathology	17	0.9	16	0.8	33	0.8
Subtotal	77	4.2	39	1.9	116	3.0
Complications related to surgery:						
Corneal decompensation	10	0.5	10	0.5	20	0.5
Residual lens matter/PCO	0	0	10	0.5	10	0.3
Secondary glaucoma	9	0.5	0	0	9	0.2
Cystoid macular oedema	3	0.2	0	0	3	0.08
Retinal detachment	2	0.1	1	0.05	3	0.08
Endophthalmitis	1	0.05	1	0.05	2	0.05
Phthisis bulbi	1	0.05	1	0.05	2	0.05
Subtotal	26	1.4	23	1.1	49	1.3
Other causes unrelated to surgery	2	0.1	0	0	2	0.05
Total	105	5.6	62	3.1	167	4.3

recorded with best possible correction. The operated eye was examined and the cause of poor visual outcome (less than 6/60 best corrected) recorded.

Results

A total of 6383 patients with senile cataract were included in the study. There were 3225 (50.5%) men. The age range was 40–108 years.

Bilateral cataract was present in 61.4%, surgical aphakia in the fellow eye in 28.6%, unilateral cataract in 6.7%, and 3.3% patients had a cataract in their only eye. The cataract was mature in 85.9% (5483), hypermature in 3.9% (251), immature in 9.8% (625), and subluxated in 0.4% (24) of eyes.

Intracapsular cataract extraction (ICCE) was performed in 3274 (51.3%) eyes and extracapsular cataract extraction (ECCE) without IOL in 2882 (45.2%) eyes. An intraocular lens (IOL) was implanted in 237 (3.6%) eyes of which 232 were posterior chamber lenses and five had anterior chamber lens implantation due to posterior capsular tears. Accidental rupture of the posterior capsule occurred in 7.0% of the extracapsular procedures. The rate of vitreous loss was 5.6% in ICCE and 6.1% in ECCE.

The most frequent early postoperative complication was striate keratitis which occurred in 6.6% of ICCE cases and 8.4% of ECCE cases. Endophthalmitis occurred in two (0.03%) eyes, one after ICCE and the other after ECCE. Cystoid macular oedema (CMO) was diagnosed in three (0.05%) eyes at the 6 week follow up, all of which had an ICCE. Retinal detachment (RD) was diagnosed in three (0.05%) eyes, of which two eyes had ICCE and one ECCE with vitreous loss.

VISUAL OUTCOME AT DISCHARGE

Preoperatively, 94.8% of all operated eyes had visual acuity less than 3/60. Postoperatively 5.8% of eyes were less than 3/60 (Table 1).

At discharge with standard aphakic spectacles, poor visual outcome (less than 6/60) was seen in 11.2% of eyes after ICCE, 11.8% of eyes after ECCE without IOL, and 5.7% of eyes after ECCE with IOL, while good vision (6/18 or better) was found in 44.5% of the eyes which underwent ECCE with IOL, 29.4% having ECCE without IOL and 21.6% having ICCE with aphakic spherical glasses.

Before surgery, 41% of the operated eyes were in patients who were blind (less than 3/60 in both eyes). Postoperatively, 3.1% of patients remained blind. The net reduction in the number of blind people after 6383 cataract procedures was 2421 (38%) (Table 2).

VISUAL OUTCOME AT FOLLOW UP

Of the 6383 operated eyes, 3908 (61.2%) were examined at 6 week follow up. Of the patients who came for follow up, 87.9% of the eyes which had ECCE and IOL implantation attained 6/18 vision or better with best correction—81% of the eyes with ECCE alone and 78.1% of the eyes with ICCE (Table 3). Poor visual outcome (less than 6/60 best acuity) was found in 167 eyes (4.2%), occurring in 5.6% of ICCE, 3.1% of ECCE, and 1.9% of ECCE with IOL.

A comparison of the 3908 eyes seen at follow up with the 2475 who did not return, showed them to be similar in terms of age, sex, and intraoperative complication rates. More patients with preoperative blindness did not come for follow up (50.2% *v* 35.2%).

CAUSES OF POOR VISUAL OUTCOME

Of the 167 eyes with acuity less than 6/60 at follow up, 116 (69.5 %) (and 3.0% of all eyes) had pre-existing ocular pathology. Forty nine eyes (30.5%) (and 1.3% of all eyes) had poor outcome because of operative complications (Table 4). The prevalence of poor outcome at 6 weeks' follow up (acuity less than 6/60) as a result of surgical complications was 1.4% in the ICCE group and 1.1% in the ECCE group. Sequelae of vitreous loss and corneal decompensation were the major causes among the operative complications.

Discussion

Cataract is the leading cause of blindness in India. The management of cataract will remain surgical extraction until preventive methods are developed to reduce the progression of lens opacification. One of the accepted ways to increase uptake of cataract services is by extending ophthalmic care facilities to the rural areas through mobile eye units, thereby providing cataract surgical services close to where the majority of the people live. There is little published information on the outcome of cataract surgery in eye camps although several authors have reported their experiences with various methods of conducting camps.[5–10] This study attempts to evaluate the outcome of cataract surgery performed on a large scale in mobile eye units.

One of the most important factors for assessing the impact of cataract surgical services on national blindness programmes is to evaluate the number of "blind" patients (visual acuity less than 3/60 in the better eye) who regained vision after cataract surgery. The quality of cataract services can be assessed by the postoperative vision in the operated eye. In this study 94.8% of patients had a preoperative visual acuity less than 3/60 in the operated eye, and 41% of the operations were performed on bilaterally blind patients. After surgery, 197 (3.1%) of the 2618 patients remained blind at discharge, and thus vision was restored to 2421 "blind" patients. Of the 3908 (61.2%) operated eyes examined at follow up 35.2% of surgeries had been performed on bilaterally blind people and 1.6% remained blind after surgery. Those attending for follow up were similar in age, sex, and intraoperative complication rates to those who did not attend, but had a lower proportion of preoperatively bilaterally blind patients.

Results showed that at the fifth postoperative day, 25.9% of operated eyes had a visual acuity better than 6/18, compared with 79.9% at follow up. Discharge vision was taken only with spherical lenses (+9.0 to +11.0 Dsp) but at follow up a complete refraction using cylinders was performed. The difference is also due to immediate postoperative conditions such as striate keratitis, lacrimation, and photophobia which improve after discharge.

The operative complication rates were generally low. Vitreous loss occurred in 5.6% of eyes. Recent articles from developing countries have reported an incidence of vitreous loss of 6.4%–41%.[11–14] Lewallen and LeMesurier in Africa reviewed the extracapsular cataract extractions performed in Malawi and found a vitreous loss rate of 11%.[15] They concluded that, besides other factors, a higher incidence of vitreous loss in developing countries may be attributed to the differences in the type of cataract in these countries compared with cataracts in developed countries. The incidence of endophthalmitis was 0.03%, which is low.[16]

The outcome of cataract surgery depends on the preoperative ocular status, quality of surgery, and the postoperative correction of refractive error. Our study revealed that pre-existing ocular pathologies were responsible for two thirds of the cases of poor outcome in eyes with less than 6/60 at follow up. This shows that good patient selection is an important factor which affects the final visual outcome. At times, in spite of being aware of the bad prognosis, surgery is performed to salvage any remaining vision and prevent the eye from further deterioration.

Surgery for cataract blindness is undergoing a rapid transition. There is an increasing trend towards extracapsular cataract extraction (ECCE) with posterior chamber intraocular lens implantation (PC-IOL) in the developing countries following the example of developed countries.[17–20] In this series 51.3% eyes had ICCE, 45.2% ECCE, and 3.6% eyes had ECCE with IOL implantation. Visual rehabilitation was better in eyes with IOL. As the cases were not randomly assigned to the different techniques one cannot perform statistical comparisons; however, the good results obtained with ECCE/PC-IOL surgery suggest that this procedure can be performed by experienced eye surgeons in good eye camps on selected patients with acceptable results. It is important to evaluate the results of alternative techniques in different situations so as to select the most appropriate method.

This study included 6383 eyes operated for senile cataract over a 2 year period. As evident from the output of surgery, mobile eye units have a role to reduce the prevalence of cataract blindness especially in rural areas where there is a perpetual shortage of treatment facilities and medical personnel. The results suggest that cataract surgery performed in well organised eye camps is comparable with surgery done in well equipped hospitals, and the incidence of complications are within acceptable limits. The aim remains to reach more blind people and to provide an improved standard of visual rehabilitation.

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