British Journal of Ophthalmology, 1991, 75, 102–105

Outcome of cataract surgery in Central India: a longitudinal follow-up study

A Reidy, V Mehra, D Minassian, S Mahashabde

Abstract

An epidemiological follow-up study of patients who had intracapsular cataract extraction in a voluntary hospital and its associated eye camps in Central India has for the first time evaluated the outcome one year after surgery in terms of visual acuity, use of spectacles, and improvement in income and mobility. The findings indicate that under these fairly typical conditions, 92% of the cases have adequate vision of 6/18 or better one year after surgery. Information on high usage of spectacles and on considerable improvements in income and mobility after cataract surgery is also reported. The outcome for patients operated upon in eye camps was almost as favourable as for those operated upon in hospital. Although the small differences are not statistically significant, the comparative findings require cautious interpretation and give rise to the epidemiological issues which are briefly discussed in this paper.

International Centre for Eye Health, Institute of Ophthalmology, University of London, 27–29 Cayton Street, London EC1V 9EJ
A Reidy
D Minassian

Chattisgarh Eye Hospitals, Fafadih, Raipur, MP, India
V Mehra

Indore Eye Hospital, Indore, MP, India
S Mahashabde

Correspondence to:
Ms A Reidy

Accepted for publication
16 August 1990

It is estimated that approximately 1 million intracapsular cataract extractions are performed in India[1] each year, some in hospitals and a considerable number in eye camp facilities such as temporarily used schools and meeting halls. Yet nowhere in the ophthalmic literature is there a report of an epidemiological evaluation of the outcome of any of that surgery.

This paper reports the results of a study carried out from 1987 to 1989 in Raipur, Madhya Pradesh, in which patients were interviewed systematically and examined before surgery and then again a minimum of one year after the operation. The aim was to determine visual outcome of surgery in a hospital and four of its rural eye camps. It was also hoped to find information on the patients' use of aphakic spectacles and any changes in income and mobility due to regained sight.

Patients and methods

Patients were chosen for the study sequentially as they presented themselves during the recruitment period, and there were very few refusals. More patients were recruited from the four eye camps than from the hospital (ratio 5:1) to reflect the proportion of rural outreach-work to work at the hospital. This type of work load is typical of many voluntary hospital associations in India.

BASELINE ASSESSMENT

A full eye examination by standardised methods was carried out before surgery. It included measurement of visual acuity with glasses if worn and pinhole examination, funduscopy through the dilated pupil, and examination of the anterior segment of the eye with an illuminated magnifying loupe. A questionnaire on patient's income and mobility was administered by a trained survey worker.

OPERATIVE PROCEDURES

The surgical procedure adopted was a standard intracapsular cataract extraction under a magnifying loupe and with a minimum of three sutures. Conditions in eye camps and hospital were typical of similar well established voluntary health provisions in India. The surgeon in charge was a very experienced cataract surgeon.

Any complications during surgery were recorded, as were any necessary deviations from the standard routine of the surgical procedure. Postoperative assessment before discharge included recording of any complications and also refraction.

FINAL ASSESSMENT

Between 12 and 13 months after surgery each patient was located again and re-examined and interviewed. This was done in the home or neighbourhood of the patient in both the urban and rural areas.

Every effort was made to find the patients one year after surgery. This often meant visiting the patient's home in hard-to-reach rural areas more than once. None were lost to the study other than those who died. Ascertained information about use of glasses and improvement in mobility and income were confirmed through detailed interviews with relatives.

ASSESSOR AND ANALYSIS

An independent assessor (an in-state ophthalmic surgeon trained in basic epidemiology) was employed to monitor the fieldwork and to report on quality control.

The data were recorded on specially designed proformas, entered into a computer relational database in the hospital, and analysed by software developed at the International Centre for Eye Health at the Institute of Ophthalmology.

Results

Out of a total of 600 patients 547 were operated on by the same experienced ophthalmic surgeon. Surgery for the remaining 53 patients was shared among four other surgeons, so these cases are excluded from this report. Of the 547 patients included in the study 50 died during the follow-up period, leaving 497 patients. All of these were

Table 1 Age and sex distribution of the patients

	Age groups						
	<40	*40–49*	*50–59*	*60–69*	*70–79*	*80+*	*Totals*
Males	4	13	49	116	31	8	221
Row %	1·81%	5·88%	22·17%	52·49%	14·03%	3·62%	100·00%
Total %	0·73%	2·38%	8·96%	21·21%	5·67%	1·46%	40·40%
Females	8	19	65	181	46	7	326
Row %	2·45%	5·83%	19·94%	55·52%	14·11%	2·15%	100·00%
Total %	1·46%	3·47%	11·88%	33·09%	8·41%	1·28%	59·60%
Total	12	32	114	297	77	15	547
Row %	2·19%	5·85%	20·84%	54·30%	14·08%	2·74%	100·00%

successfully located and assessed one year after surgery.

No patient had an operation on the second eye within six months of the operation on the first. If the patient had surgery on the second eye within the year, this was not counted in the follow-up for evaluation purposes.

The age and sex distributions of the 547 patients who had surgery are shown in Table 1, where it can be seen that there were more females (326) than males (221) and that the largest number of patients for both sexes was in the 60–69 year age group. The patients operated on in eye camps were somewhat older than those operated on in hospital. The proportion of patients aged 60 years and older was 64% in the hospital operated cases and 73% in those operated on in eye camps.

Eighty-two persons had the operation performed in hospital and 415 in eye camps. This reflects to a great extent the workload of that type of voluntary hospital in Madhya Pradesh.

VISION ONE YEAR AFTER SURGERY

In four of the 497 surviving patients operated on by the same surgeon the exact visual acuity was unavailable at the time of data analysis leaving 493 cases fully documented.* Nine of these had preoperative complications such as corneal opacities or optic nerve damage from glaucoma and were not expected to show substantial improvement in vision after surgery. This left 484 surviving patients who had surgery and were expected to have adequate vision one year after surgery.

About 92% of these 484 patients (443 patients) had a corrected vision of 6/18 or better (95% confidence limits 89%–94%). A further 4·13% (20 patients) had vision of between 6/24 and 3/60. The remaining 4·3% (21 patients) had vision of less than 3/60 in the operated eye. The details are shown in Table 2 and Fig 1.

*These were cases where the illegible handwriting of the examiner could not be recorded. All other aspects of the ophthalmological examination and responses to the other questions showed that none of these patients were blind or visually impaired in the operated eye.

Table 2 Vision in the operated eye, one year after cataract surgery, by age. Comparison between hospital and camp operated cases

		Vision in operated eye				
Age		*6/18 or better*	*6/24/to 3/60*	*Blind <3/60*	*Worse than 6/18*	*Total*
0–59	Hospital	32	0	1	1	33
	%	96·97	0	3·03	3·03	
	Camp	112	2	4	6	118
	%	94·92%	1·69	3·39	5·08	
60+	Hospital	43	3	1	4	47
	%	91·49	6·38	2·13	8·51	
	Camp	256	15	15	30	286
	%	89·51	5·24	5·24	10·49	
All Ages	Hospital	75	3	2	5	80
	%	93·75%	3·75	2·50	6·25	
	Camp	368	17	19	36	404
	%	91·09	4·21	4·70	8·91	
	Totals	443	20	21	41	484
	%	91·53	4·13	4·34	8·47	

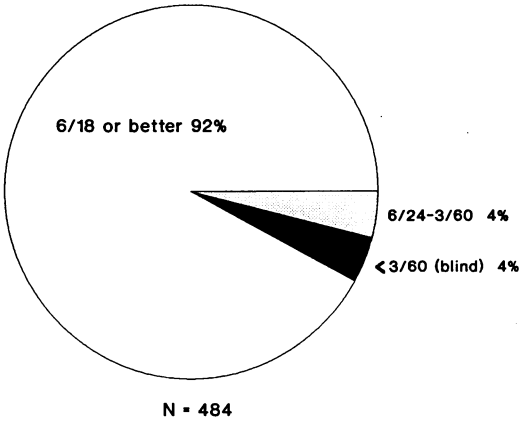

Figure 1: Corrected vision in the operated eye one year after surgery.

Fig 1.

When the vision in the non-operated eye was taken into account, the group of postoperative blind was reduced to 2·4%.

We are here using the World Health Organisation categories of <3/60 as blind, 3/60 to <6/18 as visually impaired (low vision, and 6/18 and above as adequate vision.)

CAMP AND HOSPITAL

The visual outcomes in the eye camp and in the hospital are compared in Table 2. Successful outcome (vision 6/18 or better in the operated eye) was 91% in the eye camp operated cases and 94% in the hospital operated cases. The corresponding unfavourable outcomes (less than 3/60 after surgery) was 2·5% for the hospital and 4·7% for the eye camp cases. The difference between eye camp and hospital was not statistically significant ($\chi^2=0·8$, d f=2, p=0·66).

If postoperative vision of <6/18 is taken to indicate unsatisfactory outcome, the incidence of this outcome was 6·25% in the hospital patients and 8·91% in the camps – a difference of 2·66%. When age is taken into account the percentage differences in outcome between hospital and camp were somewhat reduced, namely, 2·05% in the younger age group (0–59 years) and 1·98% in the older age group (60+ years). The details are shown in Table 2.

When age is taken into account for those operated cases with vision of <3/60 the difference between hospital and camps within the 0–59 year age group is reduced to a trivial 0·36% (Table 2).

PATIENTS VIEW OF THE OUTCOME OF CATARACT SURGERY

Improvement in eyesight

The patients' view of the improvement in sight after surgery was similar to the ophthalmological assessment. Of the 497 patients operated on by the same surgeon 453 (91·15%) thought that the operation had improved their vision. Another 5% thought that their vision was similar to its

Table 3 Improvement in income one year after cataract surgery (successfully operated cases)

	Age Groups			
	<50	50–59	60+	Totals
Males				
Total	17	44	116	177
Improved	13	29	69	111
% improved	76·47	65·91	59·48	62·71
Females				
Total	23	60	183	266
Improved	23	38	91	152
% improved	100.00	63·33	49·73	57·14
Males+females				
Total	40	104	299	443
Improved	36	67	160	263
% improved	90.00	64.42	53·51	59·37

preoperative state, and only 3% thought matters were worse.

Provision and usage of spectacles. Of the 497 postoperative cases 483 (97%) had been given glasses. The remaining 14 patients claimed that they had not received glasses and/or had promised to make their own arrangements for glasses but had failed to do so.

Of the group (483) who had been given glasses 65 patients (13%) did not use them, but the other 418 (87%) claimed to be wearing them regularly. Of this latter group 12 (3%) found the spectacles uncomfortable and in most cases this was claimed to be due to spectacle induced double vision.

Improvement in income. When asked about improvement in income 59% of the successfully operated patients claimed to have an improvement in income as a direct result of being able to see better after the operation. Figures for the camp and the hospital on this issue are similar. More males than females had an improvement in income, 62·7% as against 57·1%. However, this is not a startling difference and disguises some age group variation. All the females (23) in the under 50 year group claim an improvement in income compared with 76% (13) of the males in this age group. These findings are shown in Table 3.

Improvement in mobility, housework, and yard work. When questioned on mobility 95% of those operated on in hospital and 92·7% of those in eye camps claimed to have the advantage of increased mobility as a direct result of the improved sight from the operation. In the camp there were 10 cases where this information was incomplete or missing.

Housework. From the reaction of the males to this question at the pilot study stage we considered that in the main study we would ask these questions only of the females. After surgery 98·4% of the females considered that they had an improvement in their ability to do housework, and this considerable improvement was true for all age groups.

Yardwork. For the work outside the home but not directly related to income, such as yard cleaning and drawing fuel and water, all the males and 98% of the females claimed to be more competent at this and to be able to do more of it.

Perception of these factors before and after surgery. Interestingly the patients' perception of how their income and mobility were affected when their eyesight was poor owing to cataract was somewhat out of line with the advantages they claimed one year after surgery.

When again we consider successfully operated cases only and look at the perceived changes in income, we find that before the operation 71% of males thought that poor eyesight due to cataract did not affect their income or chances of earning some or more income. One year after the operation 52% of this group claimed that there was an improvement in their income owing to restored vision. In the case of females it was 63% who thought their income was unaffected by poor eyesight before the operation, and 49% of this group claimed to have an improvement in income on year afterwards.

Mobility. No male admitted to reduced mobility before the operation, but 77% claimed to have improvement in mobility afterwards. For women the figures in this case were 2% and 83% respectively.

Discussion

The primary aim of this study was to evaluate the visual outcome of cataract surgery one year after it had taken place in a typical voluntary ophthalmic service facility which had a good coverage of rural and urban populations in India and a substantial commitment to outreach surgical work in eye camps. A secondary aim of the study was to allow some fairly crude comparison of results between hospital and camp operated cases. For a comprehensive comparison a much larger study would be required whereby most of the suspect or possible prognostic factors largely concerning the patient and her/his home environment would be analysed simultaneously through logistic linear modelling so that a 'fairer' comparison with minimal confounding could be made. In our estimation, based on costs of this present study, such a comprehensive study would cost £100 000 and require a level of co-operation from elderly patients and their families which might deter many from coming for surgery, especially in rural areas.

When hospital and camp operations were compared, there was no significant differences between them in unfavourable outcome, (blindness, vision less than 3/60 in the operated eye one year after surgery). This does not necessarily mean that there is in fact no difference at all in the unfavourable outcome rates. Small differences would have less than a reasonable chance of being detected as significant in the study. However, if there was in fact a substantial difference, the study would have a good chance of detecting it as significant. For example, on the assumption that the unfavourable outcome was 2·5% in the hospital operated cases, and the unfavourable outcome was 10% or more in camp patients (that is, a difference of 7·5% or more), then the study would have a power of at least 90% (90%+ chance) of detecting the difference as statistically significant. The findings therefore indicate that the difference in unfavourable outcome is likely to be less than 7·5%.

Some of the observed difference in unfavourable visual outcome between hospital and eye camp could be explained by the higher proportion of elderly persons operated on in the camps. Thus age can be seen as a confounder. Diabetes could have been another possible confounder.

However, the sample did not include any known diabetics, and all the patients had routine urine sugar tests.

We can conclude that in skilful hands and with experienced and organised teams surgery in eye camp facilities such as schools and similar accommodation can give results comparable with surgery in a relatively well equipped hospital in similar circumstances in the same region of India.

The outcome of cataract surgery in other locations in India may be worse or possibly better than the findings reported in this study. There are no comparable published data that are based on sound epidemiological methods ensuring unbiased patient selection and complete or near complete follow up with minimal or no bias in ascertainment of the outcome one year after surgery.

Clearly the selection of patients for inclusion in a study of this kind should be random or sequential without bias and should span a reasonable period of time. Similarly, in order to minimise bias the outcome of surgery should be ascertained by adequately trained personnel (other than the surgeons who performed the operations) with systematic and consistent use of standardised methods of examination and/or interview. An independent assessor such as was employed in this study is of considerable importance. A common problem is incomplete follow-up – for example, less than 95% – which could easily give rise to large bias resulting in gross underestimates of poor outcome after surgery.

If data from other investigations are to be compared with the findings of this study it is essential to scrutinise the methodological base of these data and to ask how and to what extent the aforementioned sources of bias were dealt with.

We wish to express thanks to the following agencies for funding this research: Help the Aged (UK and India), Sight Savers (the Royal Commonwealth Society for the Blind), and the British Council for the Prevention of Blindness. We also thank Mr Rao of Chattisgarh Eye Hospital, for his work in the field.

1 Venkataswamy G. Ophthalmology in India, *Arch Ophthalmol* 1989; **107**: 931–2.