

Original article

Factors affecting the time lag to the second eye cataract surgery in a hospital-based population

Charu Malik,¹ Manjit S Bhatia,² Upreet Dhaliwal³

Departments of Ophthalmology^{1,3} and Psychiatry,² University College of Medical Sciences,
University of Delhi, India

Abstract

Introduction: Cataract can be treated successfully, yet patients delay surgery. Surgery in one eye may not promote surgery in the second. **Objectives:** To determine the time lag to the second eye cataract surgery and identify the factors that affect it. **Materials and methods:** This study was conducted at an ophthalmology out-patient department of a teaching hospital and was an observational, cross-sectional study. Consecutive patients of over 45 years who had had cataract surgery in one eye and had visually significant senile cataract in the other were categorized into those that requested sequential surgery (Group 1) and those that refused (Group 2). The relevant history and vision were recorded. A questionnaire was used to seek possible responsible factors that determined the refusal for the second surgery. **Statistical analysis:** Categorical variables were compared between groups using the chi-square test and continuous variables using the Student t-test. Factors significantly affecting the time lag were subjected to the analysis of covariance. **Results:** Of the 250 patients of the study, only 104 (41.6 %) requested the second eye surgery, less than one-fifth within one year. Thirteen patients from Group 2 presented with complications of hypermaturity in the second eye. The average time lag was 2.39 ± 2.19 years. It was significantly more in Group 2 patients ($p = 0.024$) who also reported more barriers (2.75 ± 1.23 versus 1.58 ± 1.10 ; $p = 0.005$). The factors that increased the time lag were older age ($p = 0.028$), extra-capsular surgery ($p < 0.001$), and being able to manage after the first surgery ($p = 0.011$) in Group 1, and eye-camp ($p = 0.021$) or extra-capsular surgery ($p < 0.001$) in Group 2 patients. **Conclusions:** One-fifth of the patients reported back for sequential surgery within one year. Patients who refused surgery had more barriers; most were related to the first surgery and should be anticipated by compassionate ophthalmic professionals after surgery in the first eye.

Keywords: cataract surgery, barriers, sequential cataract extraction

Introduction

The cataract backlog is increasing every year (Zeng et al, 2011; Rao et al, 2011; Murthy et al, 2010; Murthy et al 2008)). Studies have

identified the barriers to uptake of cataract surgery (Rao et al, 2011; Khanna et al, 2011; Dhaliwal & Gupta, 2007; Vaidyanathan et al, 1999), but these are usually studied in the context of the first eye surgery. We continue to see patients operated in one eye but then presenting after a considerable time lag, sometimes with hypermaturity-induced complications in the

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Address for correspondence:

Dr Upreet Dhaliwal, MS

Professor of Ophthalmology

University College of Medical Sciences

University of Delhi

Email:upreetdhaliwal@yahoo.com



other eye. Thus, surgery in one eye may not promote the take-up of surgery in the other. Though the second eye surgery restores stereopsis and improves quality of life (Lamoureux et al, 2011; Lundstrom et al, 2001; Castells et al, 2000; Lundstrom et al, 2000), there is a significant unmet need (Castells et al, 2000). This study seeks to determine the time lag to the second eye cataract surgery and the factors that influence the lag.

Material and methods

This cross-sectional study was conducted in the Ophthalmology out-patient department of a teaching hospital. Data from the department revealed that of the 647 post-cataract surgery patients seen over 17 months, 287 (44.4 %) had undergone unilateral surgery; thus, a sample size of 250 patients was set. Consecutive patients aged over 45 years who had had cataract surgery in one eye and had a vision of < 20/60 due to senile cataract in the other eye were recruited. They were categorized into those that requested sequential cataract surgery regardless of the lag since the first eye surgery (Group 1), and those that presented for follow-up for four months or more after the first eye surgery but refused the second, necessary sequential surgery (Group 2). Patients not willing to participate, those with the main cause of impaired vision in the second eye other than cataract, or patients with a decreased hearing or cognitive function such that they would be unable to understand the questionnaire or cooperate with the examination procedure were excluded.

After the Institutional Ethical Committee clearance and informed written consent from the study participants, the relevant history and Snellen's vision were recorded. A questionnaire on barriers to cataract surgery (Dhaliwal & Gupta, 2007) was administered. To ensure uniformity and reliability of data collection, the interviews were conducted by the same person (CM) in a separate room away from other people.

Statistical analysis

Data was entered into an excel worksheet; averages and standard deviations were calculated for the continuous variables. The groups were compared for differences between categorical variables (gender; rural/urban residence; years of schooling; occupation at present; living alone; type and place of surgery in first eye; who paid; presenting vision; and individual barriers) using the chi square/Fisher exact test. The continuous variables (age, time lag to second eye surgery, and number of barriers per patient) were subjected to the Student t-test.

Factors found significant on univariate analysis were subjected to the analysis of covariance. The time lag was taken as an dependant variable, the continuous variables were taken as covariants, and categorical variables as factors. Significance was calculated at 0.05 % level.

Results

Two hundred and fifty consecutive patients presenting between 1st December 2008 and 31st March 2010 were included in the study. One hundred and four (41.6 %) requested the second eye cataract surgery (Group 1), while 146 (58.4 %) refused it (Group 2). Table 1 shows the demographic profile, Table 2 the visual parameters.

Intraocular lenses had been implanted in 240 patients (96.0 %), of which two were anterior chamber lenses. Many (120; 48.0 %) paid for the first surgery themselves; for 46 patients (18.4 %), their children paid; three (1.2 %) borrowed money from friends; eighty-one (32.4 %) underwent surgery free of cost at eye camps. The two groups were statistically comparable for fund sourcing ($p = 0.166$). Fifteen patients (13 from Group 2) presented with hypermaturity-related complications in the second eye (phacolytic glaucoma: $n = 8$; phacomorphic glaucoma: $n = 7$).

The average lag since the first eye surgery was 2.39 ± 2.19 years (range 0.02 - 16; median = 2 years). Only 18.4 % of patients requested the second eye surgery within one year of the first

eye surgery. The time lag to the second eye surgery was significantly more for Group 2 patients (Group 1: 1.96 ± 2.05 years; Group 2: 2.62 ± 2.67 years; $p = 0.024$). Table 3 shows the demographic factors that significantly affected the time lag. In Group 1, the time lag was not influenced by gender ($p = 0.948$), rural/urban residence ($p = 0.281$), years of schooling ($p = 0.246$), occupation, ($p = 0.62$), place of the first surgery ($p = 0.198$), aphakia/pseudophakia in the eye operated first ($p = 0.45$), who paid for the first surgery ($p = 0.167$), and living alone ($p = 0.599$). There was a positive correlation between the age and time lag ($p < 0.001$). In Group 2, the time lag was not influenced by gender ($p = 0.96$), urban/rural residence ($p = 0.308$), occupation ($p = 0.166$), aphakia/pseudophakia in the eye operated first ($p = 0.360$), living alone ($p = 0.790$), or vision in the eye with the cataract (p

$= 0.310$). However, patients with lower literacy levels had a longer lag ($p = 0.003$) and there was a positive correlation between age and time lag ($p = 0.007$).

Overall, the number of barriers varied from 0 - 6 per patient (average 2.27 ± 4.24). Group 1 patients had 1.58 ± 1.10 barriers (0 - 4 barriers per patient); Group 2 had significantly more: 2.75 ± 1.23 barriers (1 - 6 barriers per patient; $p = 0.005$). Table 4 shows a comparison of barriers; in Group 2 patients, individual barriers did not influence the time lag; however, in Group 1, the time lag was greater when the patient could manage routine work ($p = 0.001$), and when distance and non-availability of transport were reported as barriers ($p = 0.013$ each). Factors found significant on univariate analysis were subjected to multivariate analysis; Table 5 shows the factors that were significant thereafter.

Table 1: Comparison of demographic features between the two groups

Socio-demographic parameters	Group 1 (requested second eye cataract surgery) N = 104	Group 2 (refused second eye cataract surgery) N = 146	P value
	Number (%)	Number (%)	
Gender: Females	57 (54.8)	91 (62.3)	0.235
Age (years)	Average 62.58 ± 7.64	Average 64.49 ± 8.37	0.389
Place of residence: Urban	102 (98.1)	136 (93.2)	0.067
Schooling			
Nil	55 (52.9)	73 (50.0)	
Class 1-5	6 (5.8)	22 (15.1)	
Class 6-10	21 (20.2)	26 (17.8)	0.016
Class 11 - graduation	13 (12.5)	22 (15.1)	
> 15 years, professionals	9 (8.6)	3 (2.1)	
Occupation at present			
Nil	62 (59.6)	93 (63.7)	
Unskilled labour	25 (24.0)	31 (21.2)	
Skilled labour	14 (13.5)	20 (13.7)	0.863
Business	0	0	
Professional	3 (2.9)	2 (1.4)	
Living alone			
No	100 (96.2)	129 (88.4)	0.025
Type of surgery			
ECCE*	13	38	
MSICS†	58	81	
Phacoemulsification	33	27	0.007
Place of surgery			
Government Hospital	88 (84.6)	93 (63.7)	
Private Hospital	5 (4.8)	18 (12.3)	0.003
Free Eye Camp	11 (10.6)	35 (23.9)	

*ECCE: conventional extra-capsular cataract extraction

†MSICS: manual small incision cataract surgery

Table 2: Comparison of presenting vision between groups

Visual function	Group 1 (requested second eye cataract surgery) N = 104 Number (%)	Group 2 (refused second eye cataract surgery) N = 146 Number (%)	P value
Presenting vision in the eye operated first for cataract			
< 20/400	6 (5.8)	9 (6.2)	P = 0.024
< 20/200 to ≥ 20/400	3 (2.9)	16 (10.9)	
< 20/60 to ≥ 20/200	51 (49)	86 (58.9)	
≥ 20/60	44 (42.3)	35 (23.9)	
Presenting vision in eye with cataract			
< 20/400	59 (56.7)	62 (42.5)	P = 0.043
< 20/200 to ≥ 20/400	11 (10.6)	31 (21.2)	
< 20/60 to ≥ 20/200	34 (32.7)	53 (36.3)	

Table 3: Factors that significantly affected the time lag to the surgery in the second eye

Parameter	Time lag Average ± SD	p value
Group 1: Patients who requested the second eye surgery		
Type of surgery performed in the first eye		
ECCE*	4.28 ± 3.91	<0.001
MSICS†	2.07 ± 1.33	
Phacoemulsification	0.81 ± 0.86	
Presenting vision in the eye operated first for cataract		
< 20/400	2.58 ± 0.49	0.013
< 20/200 to ≥ 20/400	4.11 ± 0.84	
< 20/60 to ≥ 20/200	2.35 ± 2.49	
≥ 20/60	1.25 ± 1.30	
Presenting vision in the eye with the cataract		
< 20/400	2.42 ± 2.328	0.011
< 20/200 to ≥ 20/400	2.27 ± 2.295	
< 20/60 to ≥ 20/200	1.10 ± 0.967	
Group 2: Patients who refused the second eye surgery		
Place of surgery for first eye		
Government hospital	2.30 ± 2.027	0.042
Private hospital	2.63 ± 1.11	
Eye camp	3.46 ± 3.015	
Who paid for first eye surgery?		
Self	1.93 ± 1.70	0.025
Children	3.21 ± 2.09	
Others	1.75 ± 0.00	
Free	3.07 ± 2.72	
Type of surgery		
ECCE*	4.45 ± 3.08	< 0.001
MSICS†	2.32 ± 1.53	
Phacoemulsification	1.00±0.85	
Presenting vision in the eye operated first for the cataract		
< 20/400	1.46 ± 1.14	0.001
< 20/200 to ≥ 20/400	3.57 ± 3.99	
< 20/60 to ≥ 20/200	3.04 ± 2.04	
≥ 20/60	1.52 ± 1.57	

*ECCE: conventional extra-capsular cataract extraction

†MSICS: manual small incision cataract surgery

Table 4: Comparison of barriers between groups

Barriers	Group 1 (n = 104)	Group 2 (n = 146)	p value
	(requested the second eye cataract surgery) Number (%)	(refused the second eye cataract surgery) Number (%)	
Attitudinal barriers			
Can manage routine work	62 (59.6)	101 (69.1)	0.045
Can see with other eye	53 (50.9)	68 (46.5)	0.632
Worry about cost	11(10.5)	42 (28.7)	<0.001
Cataract not mature	6 (5.7)	21 (14.3)	0.025
Preoccupied with work	4 (3.8)	22 (15.0)	0.003
Fear of blindness	0	11 (7.5)	0.003
Fear of complications	0	10 (6.8)	0.006
Old age	0	6 (4.1)	0.040
Am female	0	2 (1.4)	0.540
Fear death	0	1 (0.7)	-
Barriers related to service delivery, cost and affordability			
Insufficient income	7 (6.7)	20 (13.6)	0.067
Bad experience with other eye surgery	5 (4.8)	20 (13.6)	0.026
Myth about seasonal contraindication	0	15 (10.2)	0.001
No one to accompany	2 (1.9)	13 (8.9)	0.019
Systemic contraindications	1 (0.9)	10 (6.8)	0.027
Distance	2 (1.9)	6 (4.1)	0.473
No transport available	2 (1.9)	4 (2.8)	0.706

Table 5: Factors that significantly affected the time lag to the second eye cataract surgery (multivariate analysis)

Factor	Regression coefficient	95% confidence interval	p-value
Group 1 (Patients who requested the second eye cataract surgery)			
Age (in years)	0.058	0.006 - 0.109	0.028
Type of surgery			
ECCE*	2.394	1.120 - 3.667	< 0.001
MSICS†	0.486	-0.482 - 1.453	0.321
Phacoemulsification	-		
Barriers reported			
Can manage: No	- 1.080	- 1.904 - - 0.256	0.011
Can manage: Yes	-		
Group 2 (Patients who refused the second eye cataract surgery)			
Place of surgery			
Government Hospital	- 1.151	- 2.336 - 0.034	0.057
Private Hospital	- 1.950	- 3.596 - - 0.304	0.021
Free Eye Camp	-		
Type of surgery			
ECCE*	2.485	1.138 - 3.831	< 0.001
MSICS†	0.482	-0.672 - 1.637	0.410
Phacoemulsification	-		

*ECCE: conventional extra-capsular cataract extraction

†MSICS: manual small incision cataract surgery



Discussion

Only one-fifth of our patients reported for sequential cataract surgery within the first year; the corresponding figure from the West is higher (one-third patients; Hoffmeister et al, 2007; Hanning & Lundstrom, 1998; Javitt et al, 1995; Claridge et al, 1995). Several reports point to poor binocular function when there is a cataract in one eye, and second-eye surgery improves visual function and mobility orientation (Lundstrom et al, 2001; Lundstrom et al, 2000; Javitt et al, 1995; Elliot et al, 2000; Laidlaw et al, 1998). These advantages can be used to motivate patients to present early for the second eye surgery, and the advantages are greater when the time lag between the two surgeries is shorter (Lundstrom et al, 2000; Hoffmeister et al, 2007). Our concern with delay in the second eye surgery relates to the complications that might ensue. Fifteen of our patients (6.0 %) presented with hypermaturity-related complications that mandated emergency surgery. Though the proportion of such patients is low, this finding is significant since these patients had accessed surgery in the past but did not access it again at the right time. Thus, there is a need to disseminate information about the second eye surgery. Ophthalmic professionals could advocate it at the time of discharge after the first eye surgery. Authors argue that the second eye surgery should not be offered indiscriminately in view of scarce financial and manpower resources (Castells et al, 2000; Sach et al, 2010; Black et al, 2009). However, studies reveal that telling a patient the cataract is not ready for surgery is a major barrier; the patient may never return, coming only when complications supervene (Dhaliwal & Gupta, 2007; Vaidyanathan et al, 1999). Many more of the patients who refused the second eye surgery in this study reported 'cataract not mature' as a barrier. Patients could be given a definite date for follow-up so that the second eye surgery is not delayed to the point of complications.

Despite the fact that there are advantages to getting both eyes operated sooner rather than later, patients globally seem reluctant to report for the second eye surgery (Castells et al, 2000; Hanning & Lundstrom, 1998; Javitt et al, 1995; Claridge et al, 1995). Of all the patients with operable cataract seen in our study, only 42 % were ready for the second eye surgery. This rate is lower than reported in the literature (Castells et al, 2000; Hanning & Lundstrom, 1998; Javitt et al, 1995; Claridge et al, 1995). In order to understand the reasons for such a delay, we studied factors that might influence the delay.

Older patients in both groups had significantly longer time lags. Age has been described as a barrier to even the first eye cataract surgery (Dhaliwal & Gupta, 2007; Castells et al, 2000; Hoffmeister et al, 2007). Probably, unlike younger patients, who need binocularity because they are socially or occupationally active, older people are easily content with monocular vision (Castells et al, 2000; Hoffmeister et al, 2007). When the influence of other factors was removed, age ceased to be significant in patients refusing the second eye surgery. In this group none of the barriers (attitudinal or barriers related to service delivery, cost and affordability) were significant on multivariate analysis. This finding differs from studies identifying barriers to cataract surgery in general, where attitudinal and service delivery factors mainly influence the decision against surgery (Dhaliwal & Gupta, 2007; Vaidyanathan et al, 1999). Possibly, where the second eye surgery was concerned, our patients faced multiple, interrelated barriers, or their barriers were other than the ones we tested. Nevertheless, they had many more barriers than the patients who requested the second eye surgery. Surgery-related parameters seem to play an important role in determining the delay for the second eye surgery. In our study, having had surgery in eye camps made a significant number of patients delay surgery in the other eye. We

speculate that these patients were not actively looking for ophthalmic care; it was coincidence that an eye camp team came to their area. Thus, they may not actively seek surgery for the other eye. Such patients can be helped if regular outreach services are provided at the same location by the same provider, year after year (Finger et al, 2011). Patients who had undergone conventional extra-capsular cataract extraction (ECCE) had longer time lags; perhaps, greater comfort after suture-less surgery (MSICS and phacoemulsification) contributes to a shorter lag (Wertheim & Burton, 2002). This finding, that surgical factors are important contributors to the delay for the second eye surgery lays the onus squarely on ophthalmic professionals. They could advise their patients, during discharge after the first eye surgery, about the need for a timely second eye surgery. Improvement of outreach services might allow quality eye surgery at patients' doorsteps, but follow-up services should be ensured.

One of the limitations of this study is that it was hospital-based; thus, the barriers to the second eye surgery may not be applicable to the community at large. Secondly, we used a closed-ended questionnaire for assessing barriers; some barriers may have been missed.

Conclusion

Only one-fifth of the patients who had undergone cataract surgery in one eye reported back for the sequential cataract surgery within one year. Patients who refused the second eye surgery had significantly more barriers than the ones who had requested it. The major factors that increased the time for the second eye surgery included older age, being able to manage, having undergone ECCE in the first eye, and the first eye surgery having been performed in an eye camp. Our study adds to the global body of evidence that patients need to be actively motivated to present early for the second eye surgery.

References

- Black N, Browne J, van der Meulen J, Jamieson L, Copley L, Lewsey J (2009). Is there overutilization of cataract surgery in England? *Br J Ophthalmol*;93:13-7.
- Castells X, Alonso J, Ribo C, Nara D, Teixido A, Castilla M (2000). Factors associated with second eye cataract surgery. *Br J Ophthalmol*; 84:9-12.
- Claridge KG, Francis PJ, Bates AK (1995). Should second eye surgery be rationed? *Eye*; 9:47-9.
- Dhaliwal U, Gupta SK (2007). Barriers to uptake of cataract surgery in patients presenting to a hospital. *Indian J Ophthalmol*;55:133-6.
- Elliott DB, Patla AE, Furniss M, Adkin A (2000). Improvements in clinical and functional vision and quality of life after second eye cataract surgery. *Optom Vis Sci*;77:13-24.
- Finger RP, Kupitz DG, Holz FG et al (2011). Regular provision of outreach increases acceptance of cataract surgery in South India. *Trop Med Int Health*. doi: 10.1111/j.1365-3156.2011.02835.x. [Epub ahead of print]
- Hanning M, Lundstrom M (1998). Assessment of the maximum waiting time guarantee for cataract surgery: The case of a Swedish policy. *Int J Technol Assess Health Care*;14:180-93.
- Hoffmeister L, Roman R, Comas M, Cots F, Bernal-Delgado E, Castells X (2007). Time-trend and variations in the proportion of second-eye cataract surgery. *BMC Health Serv Res*.;7:53. Available from <http://www.biomedcentral.com/1472-6963/7/53>
- Javitt JC, Steinberg EP, Sharkey P, Schein OD, Tielsch JM, Diener M (1995). Cataract surgery in one eye or both, a billion dollar per year issue. *Ophthalmology*;102:1583-93.
- Khanna R, Pujari S, Sangwan V (2011). Cataract surgery in developing countries. *Curr Opin Ophthalmol*;22:10-4.



Laidlaw DAH, Harrad RA, Hopper CD, Whitaker A, Donovan JL, Brookes ST et al (1998). Randomised trial of effectiveness of second eye cataract surgery. *Lancet*;352:925-9.

Lamoureux EL, Fenwick E, Pesudovs K, Tan D (2011). The impact of cataract surgery on quality of life. *Curr Opin Ophthalmol*;22:19-27.

Lundstrom M, Brege KG, Floren I (2000). Impaired visual function after cataract surgery assessed using the Catquest questionnaire. *J Cataract Refract Surg*; 26:101-8.

Lundstrom M, Strenjevi U, Thorburn W (2001). Quality of life after first and second eye cataract surgery. *J Cat Refract Surg*; 27:1553-9.

Murthy GV, Vashist P, John N, Pokharel G, Ellwein LB (2010). Prevalence and causes of visual impairment and blindness in older adults in an area of India with a high cataract surgical rate. *Ophthalmic Epidemiol*; 17:185-95.

Rao GN, Khanna R, Payal A (2011). The

global burden of cataract. *Curr Opin Ophthalmol*; 22:4-9.

Sach TH, Foss AJ, Gregson RM, et al (2010). Second-eye cataract surgery in elderly women: a cost-utility analysis conducted alongside a randomized controlled trial. *Eye (Lond)*; 24:276-83.

Vaidyanathan K, Limburg H, Foster A, Pandey RM (1999). Changing trends in barriers to cataract surgery in India. *Bull WHO*; 77:104-9.

Wertheim M, Burton R (2002). Immediately sequential phacoemulsification performed under topical anesthesia as day case procedure. *Br J Ophthalmol*; 86:1356-8.

Zheng Y, Lavanya R, Wu R, Wong WL, Wang JJ, Mitchell P, et al (2011). Prevalence and causes of visual impairment and blindness in an urban Indian population: the Singapore Indian Eye Study. *Ophthalmology*; 118:1798-804.

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