

Full Length Research Paper

Reasons for the delay of surgical treatment among patients with age-related cataracts in urban Chongqing, China

Xiaofan Chen¹, Chunlin Chen¹, Rongdi Yuan^{1*}, Yao Zhang² and Jian Ye^{1*}

¹Department of Ophthalmology, Research Institute of Field Surgery, Daping Hospital, Third Military Medical University, Chongqing 400042, China.

²Department of Epidemiology, College of Preventive Medicine, Third Military Medical University, Chongqing 400042, China.

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This prospective study sought to determine the demographic and socioeconomic factors that predicted the delay of cataract surgery in patients suffering from hyper-mature or mature cataracts in urban Chongqing, China. A total of 576 patients who had mature or hyper-mature age-related cataracts were interviewed to determine the reasons why a delay in their cataract treatment had occurred and to identify factors associated with the delay. These data were collected in urban Chongqing, China from 1st January, 2008 to 31st December, 2008. The major factors associated with the delay of surgical treatment included the following: a diagnosis of an “immature” cataract; partially intact vision; unawareness of presence of cataract. The amount of time in which cataract surgery was delayed was associated with age, medical insurance, and eye examination ($P < 0.05$). Aging, lack of medical insurance, and an annual eye examination were all factors that impeded cataract patients from seeking cataract surgery. In order to convince patients to receive timely cataract surgery, it is important that individuals 50 years of age and older have an annual eye examination and are educated about cataracts and the importance of cataract surgery, as well as the expansion of medical insurance coverage.

Key words: Cataract, surgery, prospective, delaying, urban.

INTRODUCTION

Cataract is the leading cause of blindness in the world and has caused blindness in approximately 25 million people and severe visual impairment in another 110 million people (Apple and Peng, 2000). The number of people blinded by cataracts continues to rise worldwide among the elderly. Significant efforts have been made to increase the accessibility of cataract surgery, especially in developing countries, in which 90% of cataract blind live (Brian and Taylor, 2001; Thylefors, 1998). Despite many people who have cataract blindness in developing countries, the demand for surgery is often low (Bassett et

al., 2005; Jadoon et al., 2007; Mpyet and Dineen, 2005; Zhao and Jia, 1998). Poverty and lack of medical conditions are major factors that account for the limited use of cataract surgery (Jadoon et al., 2007; Johnson and Goode, 1998; Kessyand and Lewallen, 2007; Melese and Alemayehu, 2004; Rabi, 2001; Rotchford et al., 2002; Sapkota et al., 2004; Shah, 2005; Snellingen et al., 1998; Zhang et al., 2005).

In China, there are about 2.5 million people who have cataract blindness, 70% of whom live in rural areas and cannot access timely treatment because of economic and medical barriers (Li et al., 1999; Wu et al., 2008; Zhang et al., 2005; Zhao et al., 1998). As a result, greater attention has been given to assuring timely treatment in rural regions. Until now, surgery has been the only available treatment for cataracts (He et al., 2007). Phacoemulsification has been used in surgeries around the world ever

*Corresponding author. E-mail: yejian1979@126.com, fastmotion@yeah.net. Tel: 86-23-68757825, Fax: 86-23-68757834.

since Kelman invented the first phacoemulsification machine in 1967. This technique allows surgeons to operate on cataracts during the initial and immature phase of development rather than having to wait until the cataracts are in a mature state. The use of this technique has improved patients' quality of life (Desai et al., 1999; Stenevi et al., 1997). This has become the mainstream surgical technique for cataract removal in urban China.

However, in our clinic, we found that often urban patients received surgery until they were suffering from mature or hyper-mature cataracts. And in China, there are not economic and medical barriers in most urban regions. Why did they delay their cataract surgery and not accepted surgery on the initial or immature cataracts? Few studies have systematically examined the reasons why urban cataract patients delay surgery (Shah, 2005; Zhang et al., 2005). Furthermore, the number of individuals in urban areas with cataract blindness continues to rise in conjunction with the expanding elderly subpopulation and rural urbanization. It is important to identify and address the reasons why urban patients delay cataract surgery. So the purpose of this study was to determine the reasons why these delays occurred and to identify the associated demographic and socio-economic factors in cataract patients in urban Chongqing, China. As one of four municipalities directly under the central government in China, residents of Chongqing experience average medical and economic conditions in relation to inhabitants in other areas of China. So the study in Chongqing may be with some representativeness to reflect other areas situation in China.

PATIENTS AND METHODS

This study was designed as a prospective, consecutive case-series survey. From 1st January, 2008 to 31st December, 2008, 576 urban patients 50 years of age and older who were suffering from mature or hyper-mature cataracts received cataract surgery at four tertiary hospitals and four secondary hospitals in Chongqing, China. The tertiary hospitals were as follows: Daping Hospital of The Third Military Medical University, The Second Affiliated Hospital Chongqing Medical University, Wujing Chongqing Zongdui Hospital, and Chongqing Third People's Hospital. The secondary hospitals were as follows: Jiangbei First People's Hospital of Chongqing, Shapingba First People's Hospital of Chongqing, Chongqing Iron and Steel Company General Hospital, and the Staff-worker Hospital of Chongqing Machine Tool Factory. All of the above-mentioned hospitals were located in urban Chongqing.

The examination team consisted of eight ophthalmologists and eight nurses who were trained interviewers. Pre-operatively, all of the patients underwent ophthalmologic examinations, including uncorrected visual acuity (UCVA), best-corrected visual acuity (BCVA), keratometry, slit-lamp examination, intraocular pressure (IOP) by Goldman application tonometry, indirect fundus examination, and endothelial cell densitometry (ECD). Postoperative examinations were done including UCVA, BCVA, spherical equivalents (SE), slit-lamp examination, IOP, indirect fundus examination at 1day, 7days, 14 days, 1 month and 3 months.

The ophthalmic nurses measured the patients' visual acuity using an Early Treatment Diabetic Retinopathy Study tumbling-E Chart (Precision Vision, Villa Park, IL) at a 4 m distance. Visual acuity was

recorded as patients could correctly identify the smallest line on which the orientation of at least 4 of 5 characters. If patients could not correctly identify the top line at 4 m, the distance between the patients and the chart was reduced to 2 m, and if they still could not correctly identify, the distance was reduced to 1 m counting fingers, hand movements, and light perception were tested if they still could not identify correctly. The patients' pinhole-corrected vision was recorded, if the presenting visual acuity was $< 6/12$. After their intraocular pressure was tested using standard methods, the ophthalmologists identified the type and severity of the cataracts by dilating the patients' pupil. The diagnostic criterion used for identifying a mature cataract was opaqueness in all of the proteins in the lens (Riordan-Eva and Whitcher, 2007). To be diagnosed as a hyper-mature cataract, the cortical proteins had to have become liquid; this liquid may have escaped through the intact capsule, leaving a shrunken lens with a wrinkled capsule (Vaughan and Asburys, 2007). All patients' cataracts are age-related cataracts which induced by aging (Vaughan and Asbury's, 2007). Patients were excluded from this study if their cataracts were congenital or had been induced by trauma or other ocular or system diseases, such as diabetes, etc.

The questionnaire given to each of the patients consisted of questions on gender, age, education, annual income, medical insurance, annual eye examinations, history of eye problems, self-report of systems diseases, the date that cataract surgery was recommended, and the date that cataract surgery was scheduled. The patients were also asked how they learned about cataract surgery: by an ophthalmologist, the media, or other cataract patients. A series of questions about why patients delayed cataract surgery were also included in the questionnaire and included the following options:

- (1) Previously told that the cataract was too "immature" to operate on;
- (2) Partially intact vision;
- (3) Unawareness of presence of cataract;
- (4) Fear about the surgery/did not trust the physician;
- (5) Could not afford treatment;
- (6) Presence of other diseases;
- (7) Misinformation about cataract surgery from the media;
- (8) Lack of time for surgery;
- (9) Too old to undergo an operation.

Ethical approval for this study was obtained from institutional review boards of all the above-mentioned hospitals. Oral informed consent was obtained from the patients preoperatively, and it took the patients approximately 10 to 20 min to complete the questionnaire.

Statistical analysis

All of the data were analyzed using SPSS for Windows, Version 13.0 (SPSS Inc, Chicago, IL, USA). The number of patients who delayed having cataract surgery was analyzed by gender using chi-square tests. The relationship between the amount of time surgery was delayed and the various characteristics of the patients was analyzed by using multinomial logistic regressions. A result with a $P < 0.05$ value was considered to be statistically significant.

RESULT

There were 3,045 urban patients 50 years of age or older who underwent age-related cataract surgery in the above-mentioned hospitals between 1st January, 2008 and 31st December, 2008. Of these patients, 607 were

Table 1. Percentage of patients who delayed age-related cataract surgery by age.

Age	Female		Male		Overall	
	Total	Delayed surgery (%)	Total	Delayed surgery (%)	Total	Delayed surgery (%)
50~59	271	18.8	228	28.5	499	25.1
60~69	670	15.5	586	14.8	1256	16.8
70~79	533	18.4	499	17.8	1032	18.3
≥ 80	142	32.4	116	31.0	258	31.8
Overall	1,616	20.3	1,429	19.5	3,045	19.9

*The odds of delaying cataract surgery for women relative to men was 1.05 (P =0.59).

Table 2. The factors associated with the delay in time for cataract surgery.

Factor	Delay time of cataract surgery						
	1 month < time ≤ 12 months		12 months < time ≤ 36 months		> 36 months		
	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P	
Ages (years)	50-59	1		1		1	
	60-69	2.1(1.0~4.1)	0.039	3.0(1.4~6.4)	0.005	4.4(1.8~10.6)	0.001
	70-79	2.3(1.1~4.8)	0.019	3.3(1.5~7.2)	0.002	3.3(1.3~8.2)	0.01
	≥80	27.1(3.4~214.9)	0.002	30.0(3.6~250.2)	0.002	70.0(8.1~602.8)	0.000
Medical insurance	Yes	1		1		1	
	No	1.3(0.7~2.6)	0.411	2.6(1.3~5.4)	0.008	3.5(1.6~7.7)	0.002
Eye examination	Yes	1		1		1	
	No	2.1(1.0~4.1)	0.038	3.8(1.7~8.4)	0.001	5.2(1.9~14.4)	0.001

suffering from mature or hyper-mature cataracts, accounting for 19.9% of the cataracts treated. Among this subset of patients, 576 (95.0%) completed the questionnaire. The records for 33 patients who declined to answer the questions about why they delayed cataract surgery were excluded from the analyses. The mean delay time between the recommendation for cataract surgery by an ophthalmologist and the scheduling of cataract surgery was 18.01 months (range: 6 days -10 years).

Among patients 60 years of age and older, the percentage of patients who delayed cataract surgery increased with age; however, the percentage of patients of 60 years young who delayed cataract surgery was lower than that of patients 80 years of age and older. Although, the percentage of women delaying cataract surgery was higher than that of men, it was not statistically significant (OR = 1.05; P = 0.59) (Table 1). The reasons patients delaying cataract surgery were as follows: patients were previously told that cataracts were too "immature" to operate on (167 patients; 29.0%), partially intact vision (104 patients; 18.1%), unawareness of presence of cataract (86 patients; 14.9%), lack of trust in and/or fear of surgery (52 patients; 9.0%), cannot afford treatment (46 patients; 8.0%), other diseases (40

patients; 6.9%), Misinformed by the media (35 patients; 6.1%), lack of time for cataract surgery (29 patients; 5.0%), too old to undergo surgery (17 patients; 3.0%). The means of learning about cataract surgery were as follows: (1) through others (467 patients; 74.1%); (2) through doctors (90 patients; 15.6%); and (3) through media (59 patients; 10.2%). The amount of time in which cataract surgery was delayed was significantly associated with age, medical insurance, and eye examination results (P < 0.05) (Table 2). Demographic variables, such as gender, education, income, and visual acuity in the other eye were not associated with the delay of cataract surgery.

DISCUSSION

We had previously believed that the main reasons urban patients in developing countries do not accept cataract surgery were economic difficulties, the high cost of surgery, lack of ophthalmologic surgeons, deficient knowledge of cataract diagnosis and treatment, and gender discrimination (Brian and Taylor, 2001; Busbee et al., 2002, 2003; Dhaliwal and Gupta, 2007; He et al., 2007; Jadoon et al., 2007; Johnson et al., 1998; Kessyand

and Lewallen, 2007; Lewallen and Courtright, 2002; Melese et al., 2004; Mpyet et al., 2005; Rabi, 2001; Rotchford et al., 2002; Sapkota et al., 2004; Shah, 2005; Shrestha et al., 2004; Snellingen et al., 1998; Xu, Zhu et al., 2002; Zhang et al., 2005). However, in our study, we found that only 7.99% of urban patients could not afford treatment; thus, economic difficulties were not the major barrier. The main reasons patients received surgery till cataracts were mature or hyper-mature were as follows: patients were previously told that cataracts were too "immature" to operate on (29.0%), patients still had partial vision (18.1%), and patients were unaware of their cataract (14.9%). The majority of the cataract patients learned about cataract surgery only through other cataract patients; only 15.6% of the patients learned of the surgery through a doctor. This indicates that the information available about cataract surgery was limited in this region. We believe that most of the delays in cataract surgery could be avoided by providing the public with better education about this procedure. In this study, most patients improved their vision acuity post operatively. And we also found that the number of patients 80 years of age and older who delayed cataract surgery was higher than that for patients less than 60 years of age. The finding for this age group was higher than for patients between 70 and 79 years of age, while the patients with the fewest number of delayed surgeries were between 60 and 69 years of age. It may be that, in general, older patients (that is, those ≥ 80 years of age) have been retired for many years. So their requirements for vision acuity are usually lower. Also, the prevalence of cataracts among people less than 60 years of age is relatively high compared to those greater than 60 years of age. It may be that those in the lower age group do not ascribe much importance to their decreasing visual acuity and do not have time for surgery because they are at work. We recommend greater education about the importance of timely cataract surgery for these younger patients so that they are more likely to have timely surgery to restore their visual acuity and allow for increased work productivity.

Although, we observed the same trend in our data, it was not statistically significant. Using multinomial regression models, we found that age, medical insurance, and an annual eye examination were significantly associated with the delay in time for cataract surgery. Specifically, the delay was longer if the patient was older and did not have medical insurance or access to facilities providing eye examinations. In our study, only 43.4% of the patients had medical insurance and 19.6% had an eye examination in the last year. We believe it is essential to expand medical insurance coverage and provide annual eye examinations for people greater than 50 years of age in Chongqing, China.

One of the limitations of this study is that we did not use a standardized questionnaire, although, some of our questions were similar to those in published questionnaires. We intend to improve our questionnaire in future surveys

so we can better answer the questions posed in this study among patients with cataracts living in urban areas of China. Although, this study does not fully explain the epidemiology of patients who delay having cataract surgery in China, it does provide a good model for a larger, multi-center study in China and other developing countries.

In conclusion, the findings from our investigation in Chongqing are similar to other regions in China. It is possible that other developing countries face the same situation. Aging, lack of medical insurance, and lack of access to annual eye examinations impede cataract patients from having surgery in urban Chongqing. To encourage patients to have cataract surgery in time to improve their quality of life, it is important to encourage annual eye examinations for people greater than 50 years of age, expand medical insurance coverage, educate people about cataracts and correct misinformation about cataract surgery.

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