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Original Article

Patient's Perception Regarding Vision Related Quality of Life in Immediate Sequential and Delayed Sequential Bilateral Cataract Surgery

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Abstract:

Cataract is the main cause of visual impairment and treatable blindness in the world and surgery can restore normal sight to the patients. In bilateral cataract patient, surgery in the second eye is as important and meaningful as surgery in the first eye and it can be performed by immediate sequential (ISBCS) and delayed sequential bilateral cataract surgery (DSBCS). There is no statistically significant difference in surgical complications, visual acuity or long term self-perceived visual function between these two methods. To adopt surgical procedure, to improve the patient's satisfaction and to improve the quality of services, patient opinion should be a great concern. This evaluative study was done to find out various recommendations and suggestions from patients regarding merits & demerits of both types of cataract surgery that will be helpful for the decision-maker and administrator for future practice of cataract surgery in Canada. In this study, vision related quality of life improved in both groups. Participants in DSBCS group experienced different types of difficulties during the gap period between first eye and second eye cataract surgery i.e. visual imbalance between the two eyes and difficulty in driving. They recommended and suggested that cataract surgery wait time should be reduced and the difficulties experienced during the gap period can be eliminated by adopting ISBCS procedure.

Key words: Cataract, ISBCS, DSBCS, Surgery.

Introduction:

Cataract is the leading cause of visual impairment and treatable blindness worldwide. The risk of cataracts increases with each decade of life starting around age forty[1]. In the United States, cataracts account for approximately 50% of visual impairment in adults over the age of 40, affecting 24.4 million Americans, or about 1 in every 6 people in this age range and the number of people with cataract is forecasted to double from 24.4 million to about 50 million by the year 2050[1]. Szigiato et al.[2] analyzed Ontario health insurance plan billing service claims between 2000 and 2012 for the yearly number of cataract surgeries and found that per 1000 people with cataract, the rate of cataract extraction decreased by 14.6% from 2006 to 2012 and the mean wait times for cataract surgery increased 28.5% from 2009 to 2013. The cause is likely multifactorial, including limited operating resources, and the 5.9% decrease the number of cataract surgeon per 100,000 total population. Immediate sequential bilateral cataract surgery (ISBCS), where surgery on both eyes of the same patient is performed on the same day has been an issue of contention since the days of Jacques Daviel, who performed the first extracapsular cataract surgery in 1747 as ISBCS. In delayed sequential bilateral cataract surgery (DSBCS), surgery on both eyes of the patient is performed with an interval of weeks, months or longer between the two surgeries. During most of the 20th century many problems such as retinal detachment, endophthalmitis, surgical corneal endothelial damage etc. plagued the procedure, preventing serious adoption of ISBCS. Beginning in the 1990's these problems were progressively resolved because of better phacoemulsification machines, ophthalmic visco-surgical devices and better surgical techniques. Javed et al. determined that after cataract surgery the mean

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overall vision improved, and majority of patients appear to have improved patient-reported vision related quality of life (VR-QoL)[3]. Serrano et al. showed that there was no significant difference in surgical complications, visual acuity, or long-term self-perceived visual function between ISBCS and DSBCS[4]. Both surgeries, ISBCS and DSBCS significantly improve patients' quality of life and visual acuity; and ISBCS further may deliver certain additional benefits at the individual and societal levels as well[5]. Lundstrom et al. state that self-assessed visual outcomes and satisfaction with vision were better after second-eye surgery than after first-eye surgery[6]. Harrer et al. found that patients achieved marked improvements in vision-related activity limitation, and satisfaction with vision in bilateral cataract surgery group than unilateral cataract surgery group. Contrast sensitivity and stereopsis were significant factors affecting improvement in vision-related quality of life in bilateral group[7]. Foss at el. reported that some binocular functions such as stereopsis are associated with risk of falling and visual function; and especially stereopsis, improved after second eye cataract surgery. Surgery in the second eye is as important and meaningful as surgery in the first eye for bilateral cataract patient. Despite better outcome of the first-eye cataract surgery, second eye cataract surgery shows further improvement in vision related quality of life[8]. Lansingh et al. reported that ISBCS providing faster rehabilitation, improved visual outcomes and vision-related quality of life, and cost and time savings[9]. This study was carried out to see patient's perception regarding vision related quality of life in ISBCS & DSBCS.

Materials and Methods:

This evaluative study was conducted in School of Health Services Management, Ryerson University Canada. Ethical clearance was taken from Ryerson ethical board (REB). Patients with bilateral cataract and underwent cataract surgery in both eye were enrolled in the study. Surgeries were performed from January 2018 to September 2018. Patients who were enrolled had voluntarily consented to participate in the study. Consent was taken over phone from the operated patient's data sheet. Patients suffering from any surgical complications, post-operative visual impairment and any ocular comorbidity were excluded from the study. Total 50 patients were interviewed, 25 from ISBCS group and 25 from DSBCS group. Structured questionnaire for both groups were used to collect the data. There were six same questions in each group. In DSBCS group, two extra questions were added, as there was a gap period (weeks or months) between first eye and second eye surgery. DSBCS group patients had two different experiences after first eye cataract surgery and after second eye cataract surgery. Questionnaire includes four closed-ended questions and two open-ended questions for explanation. After getting consent, patient's name, date of birth, date(s) of surgery (surgeries), patient's ID, type of surgical procedure, patient's suitable date and time for interview were recorded in a MS-Excel spreadsheet by surgical coordinators and medical office manager. ISBCS group patient was interviewed by a trained volunteer. DSBCS group patients were interviewed in-person at surgical centre by surgical coordinators. Interview missed by a patient was contacted for up to three times and after that the patient was excluded from the study. And next patient was enrolled from prefixed patient datasheet. Research objectives were explained to every respondent. All six questions were read out to patient before taking their answer. Question's answers were written on questionnaire sheet chronologically. After taking all six answers, interviewer seek the final comments from the patient and ask them anything more they want to say regarding the surgical procedures and their vision-related quality of life. Participant vision related quality of life was assessed by asking different difficulties patient usually experience due to cataract. All participants were asked four types of difficulties they have or not before cataract surgery and after cataract surgery. These are- i. reading small print (i.e., medicine bottle labels, food labels); ii. driving (i.e., seeing traffic signs, street signs, traffic, people); iii. performing leisure tasks (i.e., playing games, watching TV); and iv. seeing steps, stairs or curbs (going up or down). By asking theses questions participant's near, intermediate and distant vision were assessed those are responsible for their vision related quality of life. On behalf of the study team, interviewer ended the interview, and expressed gratitude to respondent for sharing their experiences, and for their patience and valuable time. Quantitative data of patient's age, gender and difficulties the cataract patients suffered before cataract surgery and after cataract surgeries, and their preferences regarding cataract surgical procedure was analyzed in R Commander. Qualitative data of patient's individual experience after cataract surgeries, how cataract surgeries affect their life, their opinion to choose cataract surgical procedure, and their final comments regarding cataract surgery was analyzed in NVivo program. Ethical approval was given by Ryerson Research Ethics Board Review.

Results:

Quantitative data:

Fifty patients were interviewed in the study, 25 from each DSBCS and ISBCS group. Mean age of all participants in the study population was 68.2 years, and mean age of ISBCS and DSBCS group was 67.96 years and 69.28 years respectively (Table I).

Table I: Distribution of respondent according to their age and gender.

			Paired differences								
							95% Confidence Interval				
			n	%	Mean	Sd	lower	upper	t	df	p-value
Age		DSBCS	25	-	69.28	7.29	-3.45	6.09	0.56	45.35	0.58
		ISBCS	25	-	67.96	9.33					
		Total	50	-	68.62	-	66.26	70.98	58.37	49.00	<2.2e-16
Gender							-0.41	0.17	-0.84	47.98	0.41
	Female	DSBCS	10	40	0.40	0.50					
		ISBCS	13	52	0.52	0.51					
		Total	23	46							
	Male	DSBCS	15	60							
		ISBCS	12	48							
		Total	27	54							

Among 50 patients 23 (46%) were female. In DSBCS group 10 (40%) participant's were female and in ISBCS group 13 (52%) participants were female. There was no statistically significant mean difference (p>0.05) in vision related difficulties among two groups of patients after cataract surgery (Table II). Difficulties in near, intermediate, and distant vision which are responsible for vision related quality of life among the participant in both groups were similar after surgery.

Table II: Difficulties before cataract surgery and after both eye cataract surgery in both DSBCS and ISBCS group. Independent samples t-test (Welch Two sample t-test).

		Mean					95% Confidence Interval	
	Variables	DSBCS	ISBCS	t	df	p-value	lower	Upper
Before	Reading	0.80	0.60	1.55	46.15	0.13	-0.06	0.46
Cataract	Driving	0.54	0.50	0.28	46	0.78	-0.25	0.34
Surgery	Leisure task	0.36	0.40	-0.29	47.98	0.78	-0.32	0.24
	Seeing steps	0.48	0.44	0.28	48	0.78	-0.25	0.33
After both	Reading	0.08	0.08	0	48	1.00	-0.16	0.16
Eye	Driving	0.08	0.04	0.59	41.89	0.56	-0.10	0.19
Cataract	Leisure task	0.04	0.04	0	48	1.00	-0.11	0.11
Surgery	Seeing steps	0.12	0.08	0.46	46.52	0.65	-0.13	0.21

Alternative hypothesis: true difference in means is not equal to zero.

After both eye cataract surgery difficulties in reading, driving, leisure task, and seeing steps was improved in both DSBCS and ISBCS group (Table III). Mean of the differences was statistically significant (p<0.05) before cataract surgery and after cataract surgery in both groups. Only there was no statistically significant (p = 0.16) difference in mean of driving variable. Driving difficulties were not improved after first eye cataract surgery in DSBCS group.

Table III: Difficulties before cataract surgery and after cataract surgery in both DSBCS and ISBCS group. Paired t-test.

Procedure	Steps	Variables	Sample estimates: Mean of the differences	t	df	p-value	95% Confidence Interval lower	Upper
DSBCS								
	Before	Reading	0.32	3.36	24	0.003	0.12	0.52
	surgery and	Driving	0.17	1.45	23	0.16	-0.07	0.41
	after first eye	Leisure task	0.24	2.75	24	0.01	0.06	0.42
	surgery	Seeing steps	0.24	2.75	24	0.01	0.06	0.42
	Before	Reading	0.72	7.86	24	0.04e-7	0.21	0.71
	surgery and	Driving	0.46	3.82	23	0.08e-3	0.20	0.63
	after both eye	Leisure task	0.32	3.36	24	0.003	0.12	0.52
	surgery	Seeing steps	0.36	3.67	24	0.001	0.16	0.56
ISBCS								
	Before	Reading	0.52	5.10	24	0.03e-4	0.31	0.73
	surgery and	Driving	0.46	4.41	23	0.02e-3	0.24	0.67
	after both eye	Leisure task	0.36	3.67	24	0.001	0.16	0.56
	surgery	Seeing steps	0.36	3.67	24	0.001	0.16	0.56

All the participants in ISBCS group preferred ISBCS procedure and 92% of participants in DSBCS group preferred DSBCS group (Table IV). Mean of the differences in group DSBCS and ISBCS was statistically significant (p = 1.15e-14).

Table IV: Patient preference by procedure

Mean in group DSBCS	Mean in group ISBCS	t	df	p-value	95% Confidence Interval lower	Upper
0.92	0.00	16.61	24	1.15e-14	0.81	1.03
DSBCS = 1, ISBCS = 0						

Qualitative data:

Participant's open ended questions answers were analyzed in NVivo software. After both eye cataract surgery, 76% participants in DSBCS and 80% participants in ISBCS group experienced improved vision with no problem. Fifty two percent participant in ISBCS group experienced better vision with no problem in first week of surgery and 48% experienced better vision with a little bit problem in first week of surgery.

Sixty percent of DSBCS patient experienced different types of difficulty during the gap period between first and second eye cataract surgery and among them 48% suffered imbalance in vision between two eyes (Table V). One eye was seeing better than the other and it was difficult to adjust. There was headache and bad depth perception and was hard to get used to.

Eighty percent participants in DSBCS and 88% participant in ISBCS group mentioned that both eye cataract surgery have a good effect on their life and they express their experience in different ways.

Table V: Vision related experience after cataract surgery in both DSBCS and ISBCS group.

Vision related experience	Gap period between 1st eye and 2nd eye cataract surgery in DSBCS group.	First week of both eye surgery in ISBCS group.	After both eye cataract surgery in DSBCS and ISBCS		Effect of both eye cataract surgery on life	
	Percentage DSBCS	Percentage ISBCS	Percentage DSBCS	ISBCS	Percentage DSBCS	ISBCS
Feel better	20					
Experienced difficulties	60					
Improved vision with no problem		52	76	80		
Improved vision with some difficulties		48	24	20		
Feel good					80	88
Feel bad					20	12
Imbalance between two eyes	48					
Photosensitivity	4	4	8	8	4	4
Blurry vision	4	4	4	4	4	
Some discomfort & pain			4		4	
Tearing			4		4	
Shadow			4		4	
Eye swelling		4		4		
Double vision				4		4
Frequent use of eye drops	4	20				
Burning eye sensation		12				
Itching		4				
Worst experience						4
No comment	20					

Forty four percent of the participants in DSBCS group prefer surgery in different days due to safety and precaution. Fifty six percent of participant in ISBCS group prefer ISBCS due to specific reason or benefit (Table VI). Sixteen percent of the participant in DSBCS group mentioned DSBCS is easy and convenient, on the other hand 32% of the participant in ISBCS mentioned ISBCS is easy and convenient.

Table VI: Causes of patient preference regarding surgical procedure in both DSBCS and ISBCS group of patients.

Causes of patient preference	DSBCS (In percentage)	ISBCS (In percentage)
Safety and precaution	44	-
Easy and convenient	16	32
Eye drops use	08	08
Personal functional reason	20	-
Influence from other	-	04
No comment	12	-
Specific reason(s):	-	56

Participants make valuable suggestions and recommendations regarding cataract surgery procedures which will help policy maker (Table VII).

Table VII: Participant's recommendations and suggestions.

1. Wait time should be eliminated to reduce risk. Doctor office should set less time gap between the two interventions.
2. Patient should do cataract surgery as soon as possible; sometimes patient takes too much time to do surgery but should do earlier.
3. Twenty percent patient raised the issue of expense and affordability. Surgery is very expensive, and it would be great if it became more affordable.
4. Sixty percent participant in ISBCS group commented on Ontario Health Insurance Plan (OHIP) coverage. Among them 80% suggested to increase OHIP coverage to cover all the expenses.
5. Twenty percent commented on quality of OHIP covered lens. They commented that the lens provided by OHIP coverage is not of better quality and intraocular lens should be standard for all patients.

Discussion:

After both eye cataract surgery, the mean overall vision, patient-reported vision related quality of life and patients' quality of life was improved in both DSBCS and ISBCS group. That was similar or equivalent to Javed et al, Serrano et al, and Malvankar et al, studies[3-5]. Mean differences of difficulties in near, intermediate and distant vision before cataract surgery and after both eye cataract surgery in both DSBCS and ISBCS group was highly statistically significant (p-value < 0.05). Eighty percent (80%) participants in DSBCS and 88% participants in ISBCS group mentioned that both eye cataract surgery have a good effect on their life.

In binocular vision, two eyes work together to produce a binocular depth perception and stereopsis. Depth perception helps orient the body in space. In stereopsis wherein two separate images from two eyes are successfully combined into one image in the brain and detect faint objects is clearer and more distinct. Stereopsis is a significant factor affecting improvement in vision-related quality of life. Binocular vision becomes reduced due to reduced vision in one eye (cataract). Foss at el. reported that some binocular functions such as stereopsis are associated with risk of falling and visual function. Stereopsis improved after second eye cataract surgery. Driving difficulties was not improved after first eye cataract surgery in DSBCS group. DSBCS group patient's experienced different types of difficulty during the gap period between first and second eye cataract surgery and among them 48% suffered imbalance in vision between two eyes. One eye was seeing better than the other and it was difficult to adjust. Participants suffered headache, bad depth perception, and was hard to get used to at first after 1st eye cataract surgery in DSBCS group. Participants also faced discomfort, a bit difficult in vision and a bit difficult to deal with every day work in that group[8].

Project was designed to take all the consented participant's interview over phone, but it was not maintained in DSBCS group. DSBCS group participants were interviewed by surgical coordinators at the surgical centres as per direction of their ophthalmologist. There were three interviewers. Two interviewers were related to surgical centres and one volunteer was McMaster university student. So, interviewers' level of knowledge was not at a same level. Neutral volunteers would be a good preference for this type of study to avoid biasness. Regarding open ended questionnaire like- tell us your vision related experience or tell us how your life was affected after both eye cataract surgery and the causes behind the choice of surgical procedure preference or final comments regarding cataract surgery; participants answered differently in their own language and experience. That was the strongest part of the study to know the patient's perception directly regarding vision related quality of life, but it was very hard to coding of different opinions. It will be easier to coding their opinion on specific pre-fixed perceptions by putting those under the open-ended questions. Another limitation was that sample size was small to know the total population perceptions regarding vision related quality of life. Multi-centered hospital-based study with neutral volunteers would be the best one.

It is widely argued that increased community participation in government decision making produces many important benefits to the society. The Canada Health Act states that the primary objectives of Canadian health policy are to protect, promote or restore the physical and mental well-being of resident Canadians and to facilitate reasonable access to health services regardless of financial or other barriers. Provincial governments proposed health care reform strategies that include decentralized funding and increased public participation in decision making. Communities all over the country are willing to participate in health-care and social-service decision making. In this study participants contributed to make various recommendations and suggestions that will be helpful for the decision-maker and administrator for future practice of cataract surgery in Canada (Table VII).

Conclusion:

Vision related quality of life improved after both eye cataract surgery in both DSBCS and ISBCS groups. Participants in DSBCS group experienced different types of difficulties during the gap period i.e. visual imbalance between the two eyes and difficulty in driving. Participants recommended and suggested that cataract surgery wait time should be reduced and the difficulties experienced during the gap period between first eye and second eye cataract surgery can be eliminated by adopting ISBCS procedure. It is the time to take consideration and initiative to evaluate OHIP coverage for cataract surgery procedure expenses and OHIP covered quality of lens. Multi-centre hospital-based study with large number of patients can make strong recommendations regarding government decision making.

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