Extra-Ocular Muscle Weakness After Cataract Surgery and Effects on Quality of Life

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ABSTRACT

Background: Even the cataract is known as minor surgery, but its post-operative complication can affect the patient's daily life activities. Present study was designed to find out the post-operative complication related to extra-ocular muscle weakness after cataract surgery and its effects on activities of daily life. **Methods:** This cross-sectional observational study was conducted at the Institute of Ophthalmology LUMHS and Sindh Institute of Ophthalmology. The data was taken from 100 patients undergoing cataract surgery. The inclusion criteria were both genders (male and female), age >30 years and the patient with cataract surgery. The post-operative complications and the post-surgical quality of life were measured in follow-up. The quality of life is measured by asking questions about reading difficulties in small prints, fine handwork like sewing, knitting, reading newspapers books or computer screens, recognizing people from a distance, taking part in sports and watching television. **Results;** Fifty percent of participants reported dryness after cataract surgery followed by lacrimation (48%) and the majority of them had redness after cataract surgery. The quality of life in females had been affected due to complications of post-cataract surgery. Less than half the participants had complications in extraocular muscles after cataract surgery among them, 35% had reported difficulty moving the eye upward, difficulty moving the eye downward (26%) and difficulty moving the eye upward and outward(22%). **Conclusion** The complications after cataract surgery affect the quality of life. The extraocular muscle after cataract surgery is affected in about twenty percent of patients. The quality of life of female participants is affected more than male participants.

Keywords: cataract surgery, diplopia, extra-ocular muscles, quality of life

1. Introduction

The human eye is very complex and delicate organ with so many particular components and processes , the eye ball is composed of three layers, the outer layer consists of the cornea and the sclera, the center layer is responsible for holding the blood supply and also iris and pupil, and inner layer, or the retina layer, the eyelid is the outside portion of the human eye which predominately for assurance and maintenance of eye and its basic function and movements, The cornea of the eye is the generally protecting component of the eye but works as the lens, there are nerves transmit signals for vision to the brain.[1] the muscle of the eye incorporates the extra-ocular muscle which controls the outside movements and intraocular muscle which for the accommodation of pupil, the intraocular muscle incorporate ciliary muscle, sphincter pupillae Extra-ocular muscle contain superior rectus, inferior rectus, rectus, superior and inferior oblique muscle.[2] There are numerous eye diseases ranging from minor changes to visual loss incorporating retinopathy, cataract, macular oedema glaucoma, visual impairment, strabismus, and refractive error.[3] Cataract happens when the clear lens of the eye becomes cloudy, driving to slow loss of vision which can eventually leads to visual impairment. Universally visual

doi.org/10.31838/hiv23.03.336 Received: 14.11.22, Revised: 17.12.22, Accepted: 19.01.23.

deficiency influences roughly 45 million individuals. Cataract visual impairment can have a major negative impact on the quality of more seasoned people's lives and can result in troubles with day-by-day living activities, Cataract surgery is the most general surgical strategy performed in medication, the advance in technology-enabled cataract surgery to be most secure and most predictable eye surgery, the method included in cataract surgery are intra and extra-capsular cataract extraction, mini-nuc, phaco-section, sandwich, phaco-emulsification. Most of the patients who experienced surgical strategies have questions with respect to the postoperative self-care activities, the foremost common concerns were wound care pain management, everyday activity level complication, symptom management, rate of complication may exceptionally from patient to and place to place, post-surgical complication can be distinguished into early and late complication, these complication are expulsive discharge, intraocular discharge, damage to inferior oblique, iris prolapse bullous keratopathy and numerous more.[4] Cataract is the second most common cause of visual impairment after the refractive error. Most of the cases are well treated by surgery, which leads to good visual outcomes.[5] Cataract visual impedance, is characterized as the gradually over several years more vision that's not corrected by the wearing deteriorate quickly in a few individuals, cataract can cause glare trouble with night driving with multiple pictures in the eye which can impact the quality of vision a few individuals with cataract complain of spots in their vision seeing haloes around shining light and failure to see well in brightly lit room or daylight, the color vision may become washed out or blurred, visual impairment can have the major negative impact on the quality of the more seasoned individuals and can result in trouble with day by day living activities.[6] The perfect anesthesia would be one that gives adequate pain relief during surgery and postoperatively, is easy to give and has a minimal complication, The anesthesia might be local or General, and the larger part of patients are operated under local anesthesia (penetration, topical, intracameral) the penetration anesthesia is given as retrobulbar or peri bulbar or sub-tendon's block,[7] the common strategy of applying topical anesthesia are by eye drop with intracameral lidocaine infusion at in gel shape.[8] Yet, instead of decreased chances of complications with cataract extraction surgery, there are somewhat chances of getting the pre-operative as well as postoperative complications, depending on the method of anesthesia, i.e., peri bulbar hemorrhage, optic nerve damage, extra-ocular muscle involvement and injury to the nerve supply to the inferior rectus. [9] Peri bulbar and retinacular procedures are related to the risk of complications related to ocular muscle injury.[10] The nerve innervating the inferior oblique muscle is vulnerable to injury during the anesthetic injection. The inferior oblique muscle's nerve may have been destroyed during cataract surgery, or the anaesthetic may have been injected straight into the nerve. The damaged eye had an immediate hypotropia and the fundus intorsion as a result of this.[11] It was hypothesised by the researchers that the retrobulbar infusion had injured the inferior rectus muscle, but meanwhile, they also proposed that bridle-suture injury may have caused the superior rectus muscle to fibrosis. The inferior rectus muscular paralysis can be explained by either bupivacaine hydrochloride myotoxicity or direct damage caused by the infusion needle to the inferior rectus muscle's nerve, which enters the muscle's tissue from the posterior third.[12] It is suggested that a side effect of sub-tenon's local anesthesia is rectus muscle damage.[13]

Injury to extra-ocular muscle during cataract surgery is the most common cause of diplopia following it.[14] The most common cause of double vision after cataract surgery is extra-ocular muscle restriction or paresis caused by surgical trauma or an aesthetic myotoxicity.[15] Another possibility is that local anesthesia might lead to muscular degeneration as well as the hypertrophy of the pretentious muscle.[16] The diplopia after cataract surgery is treated either with a conventional approach or surgical procedures. [17] Even if the cataract is known as minor surgery, its post-operative complication can affect the patient's daily life activities. The present study was designed to find out the post-operative complication related to extra-ocular muscle weakness after cataract surgery and its effects on activities of daily life. This study observed the problems related to weakness of eye muscles and will help us in future for further physical therapy studies and its therapeutic intervention.

2. Methodology

This cross-sectional observational study was conducted at the Institute of Ophthalmology LUMHS and Sindh Institute of Ophthalmology. The study Duration was 3 months. The data was taken from 100 patients. The sampling technique was a Non-probability Convenience technique. The inclusion criteria were both genders (male and female), age >30 years and the patient with cataract surgery. The exclusion criteria were the patients with other eye conditions/diseases. , endophthalmitis bacterial infected patient, cataract cases combined with other eye surgery and other intraoperative complications.

The post-operative complications and the post-surgical quality of life were measured in follow-up. The quality of life measured by asking the questions about reading difficulties in small prints, fine handwork like sewing, knitting, reading newspapers ,books or computer screens, recognizing people from a distance, taking part in sports and watching television

The data was collected through the brief questionnaire on the basis of our research to rapidly assess the problem they are having. The data analyzed on IBM SPSS version 23.0

3. Results

In this study, the mean age of participants was 56.5.1±10 years, the range of age was 32 to70 years

and 43% were males and 57 % were females. In this study, 55% of participants had glare caused by headlights and sunlight, while 45% had no such complaint. Thirty-nine percent, complained about seeing rings or halos around lights, while 61% had no such complaint. Among the study population, 58% had complaints of blurred vision, and 42% had a clear vision. **(Table 1)**

Table 1: Descriptive statistics of the study population		
Age in years (Mean ±SD)		56.5.1±10
Gender		
Males (%)		43%
Females (%)		57%
glare caused by headlights or sunlight	Yes	55%
	No	45%
Seeing rings or halos around lights	Yes	39%
	No	61%
blurred vision	Yes	58%
	No	42%

In this study, 50% of participants reported dryness after cataract surgery followed by lacrimation (48%). The redness after cataract surgery, was eminent in 81%, while 19% found no redness in the operated eye. **(Table 2)**

Table 2: Frequency of complications after cataract surgery		
Complications after surgery	Yes (%)	No (%)
Dryness after surgery	50	50
Lacrimation after surgery	48	52
Redness after cataract surgery	81	19

In this study, more than half the participants, i.e., 63% had complained of eye pain after cataract surgery. **(Figure 1)**

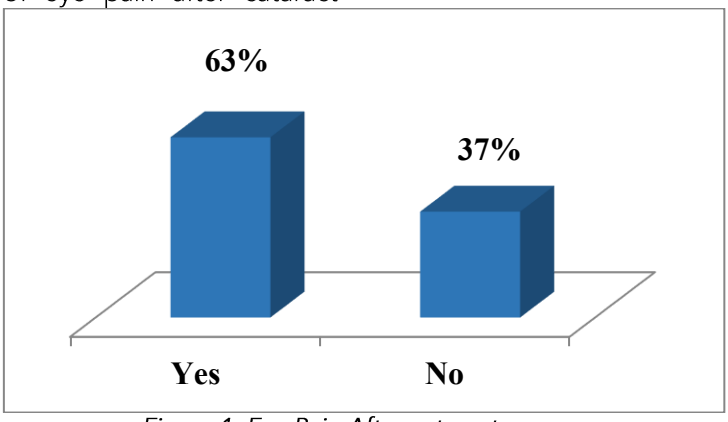

Figure 1: Eye Pain After cataract surgery.

In this study, regarding reading small prints, male and females participants were equally affected. The quality of life related to post-operative period, had been affected more in female patients as compared to the male patients, but the differences were not statistically significant at 0.05. Overall, only 10 to 18% reported life being affected. **As shown in Table 3**

Table 3: Effects of post-cataract surgery complications on Quality Of Life.					
Activities		Male	Female	Total	P value
Reading small prints	Yes	18	32	50	0.15
	No	25	25	50	
Fine handwork like sewing, knitting	Yes	16	22	38	0.88
	No	27	35	62	
Reading newspapers, books or computer screens	Yes	15	16	31	0.46
	No	28	41	69	
Recognizing people from a distance	Yes	20	30	50	0.54
	No	23	27	50	
Taking part in sports	Yes	10	7	17	0.14
	No	33	50	83	
Watching television	Yes	15	19	34	0.80
	No	27	38	65	
Reading traffic signals, street signs or upcoming cars	Yes	16	30	46	0.12
	No	27	27	54	

In this study, out of 100 patients having extraocular complications, 35% of had reported difficulty moving the eye upward, 26% had difficulty moving the eye downward and 22% had difficulty moving the eye

upward and outward. Details are shown in **Table 4.** In this study, 14% of participants had diplopia after cataract surgery. As shown in **Figure 2**

Table.4: Complications in Extraocular Muscles After Cataract Surgery.			
Duration of symptoms	Yes (%)	No (%)	Total (%)
Difficulty moving eye upward	35	65	100
Difficulty moving eye downward	26	74	100
Difficulty moving eye upward and outward.	22	78	100

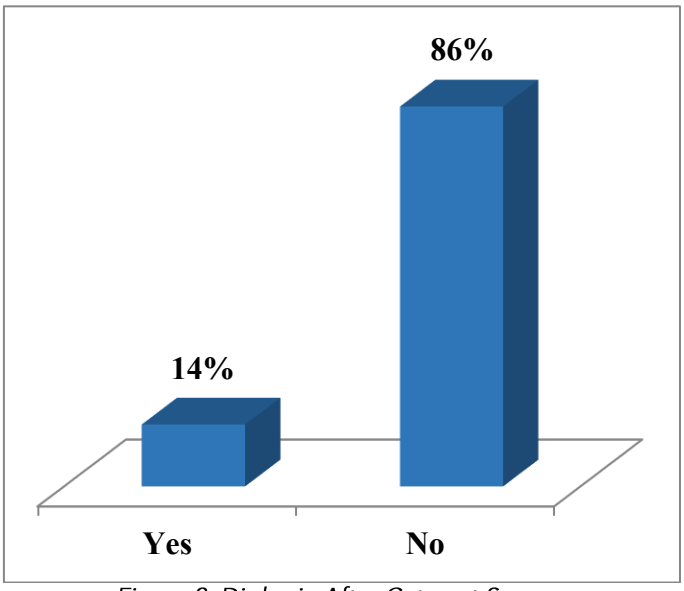

Figure 2: Diplopia After Cataract Surgery

4. Discussion

In our research study which was cross sectional observational study. The purpose of our study was to determine impact on Activity of daily life due to affected muscle after cataract surgery.

The results that we got from data collection were about 20 % of patients presented with affected Activity of daily life postoperatively. The age we categorized was 30 to 70 years and an average of that was around 56. In comparison with males (43%) and females (57%) most affected were females.

To a certain extent, in line with the present study, Assad Azeem Mirza, et al. (2020). [18] carried out research in the Pakistani village of Nawabshah Sindh. One hundred fifty individuals had cataract surgery, and the complications they experienced during and right away after the operation were examined. Postoperative problems were significantly associated with gender, with females experiencing greater postoperative complications than males (P-value = 0.001).

In the present study, the complications occurring in extra-ocular muscles affect eye movements in such a way that upward eye restriction 35%, downwards eye restriction 26% and upward and outward restrictions 22%. After cataract surgery, the diagnosis of the superior rectus over action was made, confirming that precise observations are necessary for the correct diagnosis. The presentation of the strabismus and patterns of motility function pointed the diagnosis in the direction of a muscle over action. An accurate diagnosis guarantees that the patient will receive the proper management and that their quality of life will improve as anticipated.[9]

In our present research as per our data collection patients had symptoms of redness of the eye 81%, lacrimation 48% and dryness 50%., while diplopia in only 14 %. We find out whether the quality of life is affected or not by asking questions about difficulties in reading books, watching television, taking part in sports, recognizing people from a distance and doing fine hand work. In a research study, a total of 3% of patients who came to the orthoptic clinic following cataract surgery developed diplopia. Extraocular muscle restriction/paresis, which was one of the underlying reasons, was 25%.[15]

Similar to the present study, a quick checklist was used by McNamara P, et al.[19] to gauge the quality of life after cataract surgery and examine how distorted near vision affected daily tasks. At week two, 61.1% of those who answered their uncorrected near vision had an impact on their capacity to perform tasks somewhat or a lot. Among these 61.1 percent, 11 patients said their vision was negatively affecting their quality of life a lot. In contrast to the present study, Owsley C, et al. [20] revealed that cataract surgery improved, watching TV. Reading difficulties and seeing from distant places. However, the specialists may be able to increase exposure and surgical success by controlling the patient's eye and eyelid movements during cataract surgery. Strategies to lessen fear during surgery may be successful in lowering pain and discomfort and reducing intraoperative problems.[21]

5. Conclusion

The complications after cataract surgery affect the quality of life. The extra ocular muscle after cataract surgery is affected in about twenty percent of

patients. The quality of life of female participants is affected more than male participants.

The complications of cataract surgery affect activities such as reading small prints, Fine handwork like sewing, knitting, reading newspapers, books or computer screens, recognizing people from a distance, taking part in sports, watching television, reading traffic signals, street signs or upcoming cars. part in sports, watching television, reading traffic signals, street signs or upcoming cars.

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