RESEARCH ARTICLE

INCIDENCE OF INDUCED ASTIGMATISM AFTER PHACOEMULSIFICATION CATARACT SURGERY AT HITEC IMS

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ABSTRACT

Objective:

The Purpose of this study was to measure the induction of astigmatism after phacoemulsification.

Setting: *This study was done at HITEC-IMS Taxila, Pakistan for 5 months (Dec 2021 to April 2022).*

Method: *It is a prospective interventional study*

Results: *The occurrence of post operative astigmatism is minimum when patients were examined one month post operatively.*

Keywords:

Best Corrected Visual Acuity (BCVA), Cataract, Surgery Induced Astigmatism SIA, Keratometry readings, Phacoemulsification, Uncorrected Visual Acuity (UCVA)

INTRODUCTION

Cataract is one of the common causes of blindness and a decrease in vision. WHO is trying to alleviate this irreversible cause of blindness. ((WHO Vision 2020). 2013)[1]. The position, type, and other factors like corneal incision may cause surgery-induced astigmatism after cataract surgery. Temporal clean corneal incisions have been reported to generate only minor alterations to the corneal cylinder[2]. Donders was the first one to demonstrate that a change in corneal curvature is an unwanted outcome after cataract surgery. There have been various studies on corneal astigmatism and intracapsular cataract surgery. At the turn of the century, earlier surgical techniques began without sutures. Both these and later procedures, which used one or two massive gut sutures, resulted in an out-of-control prevalence of astigmatism[3]. Intra-Ocular Lens (IOL) power and medically induced astigmatism are the two main determinants of the refractive condition of the eye after phacoemulsification and intraocular lens implantation (PE+IOL) (SIA)[4].

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The surgeons intended to reduce postoperative refractive errors in order to meet rising patient demands. SIA remains a challenge in the postoperative period because the primary goal is to deliver successful visual rehabilitation. It is commonly recognised that only patients with 0.50 diopters (D) of astigmatism do not require spectacles for distance activities, and that the necessity for spectacles increases dramatically with each diopter of astigmatism[5]. Temporal clean corneal incisions have been reported to generate only minor alterations to the corneal cylinder. SIA following clean corneal incisions of sizes ranging from 3.2 mm to 5.2 mm has also been compared in several studies[6].

Modern cataract surgery aims for quick vision recovery and the best possible Uncorrected Visual Acuity (UCVA) with little post-operative astigmatism. Modern cataract surgery techniques allow for quick visual recovery, but Surgically Induced Astigmatism(SIA) is still a typical stumbling block to perfect vision[7].

OBJECTIVES:

The objective of the study was to measure the astigmatism being induced by phacoemulsification, one-month post operatively.

MATERIALS AND METHODS:

The study was conducted in a hospital setting. The study

design was prospective, interventional study.

The study was conducted at HITEC-IMS, Taxila during the time period of 5 months, from December 2021 to April 2022. A sample size of 80 patients who had cataracts, age between 40 to 75 years, were included in the study. The phaco technique was used for cataract surgery during the study time. The study was performed by the same surgeon to lessen the human error. A thorough anterior and posterior segment examination was conducted to rule out any co-morbidity.

Astigmatism was measured by keratometery before and one month after the surgery, and the results were compared.

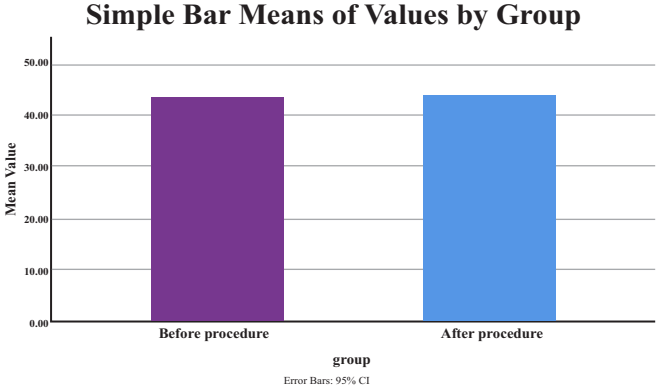
Statistical analysis:

SPSS 28 was used to do the statistical analysis. Paired sample t-test was applied to compare the results of means of pre-operative k readings and post-operative k readings. *p*-value <0.05 was statistically significant.

RESULTS:

A total of 80 patients were included in this study. Pre-means k reading value and post-means k reading value were calculated. The pre means K-reading value was (43.51 ± 1.62) and the post means k reading value was (43.75 ± 1.87). The *p*-value was found to be .072. *p*-value is insignificant after comparing both pre-operative and post-operative means.

Figure: 1



DISCUSSION:

This study was done at HITEC Hospital Taxila, the surgeon operated on 80 patients the incidence of post-operative astigmatism was minimum. This demonstrates that phacoemulsification causes only minor astigmatism. Our findings are supported by a number of other studies.

According to a study, a 2.8-mm corneal incision in phacoemulsification caused a relatively little corneal refractive shift on average, but there were variances depending on where the incision was made[8]. In light of prior studies, the corneal incision size has gradually reduced, and past studies have shown that a small incision size is associated with a fast recovery and less astigmatism. Although the size, location, and shape of the incision all affect the astigmatic axis shift, it has been shown that the incision size significant impact on SIA[9]. Modification of incision location such as incision in the steepest meridian of pre existing astigmatism highly reduces the chances of SIA[10]. Reduction of SIA also depends on the approach of surgical incision such as temporal incisions induce less SIA when compared to superior corneal or nasal incisions[11]. When observed over a longer length of time, it was discovered that a superotemporal (10-11 O'clock) 3.2 mm incision hardly generates any astigmatism or induces any substantial change in the existing preoperative astigmatism, i.e. less than 0.50 diopters in general[12]. One study utilised analysis of variance (ANOVA) to compare SIA in the right and left eyes, as well as between surgeons. There was no significant difference in SIA between surgeons in the first and sixth postoperative months ($p > 0.05$). Furthermore, SIA showed a statistically significant decrease from the first to the sixth month ($p = 0.003$)[13]. At 12 weeks after surgery, the mean SIA in the 3.5 mm incision group was 0.58 and 0.28 D, the SIA achieved in our study in the 3.5 mm incision group was lower than that reported by Barequet et al[13] and Khokhar et al[14]. Sheoran K et al., also reported that phacoemulsification cataract surgery also leads to compelling improvement in UCVA and BCVA after comparing pre and post-operative reading evaluations[15]. Almost all the studies in this area have shown that there is less incidence of astigmatism after phacoemulsification, so phacoemulsification is the best technique to remove cataract.

CONCLUSION:

On the basis of our study, we have found that phacoemulsification is the best method for managing cataract. It is suggested that where possible, this procedure should be adopted for cataract surgery and more eye specialists should be trained to learn this procedure.

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