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The effect of manual sutureless small incision cataract surgery on corneal astigmatism

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Article History:	Abstract
Received on: 15-11-2019 Revised on : 05-01-2020 Accepted on : 22-01-2020	<p>The aim of this study to evaluate the effect of small incision cataract extraction surgery on corneal astigmatism after 1 month of follow up. This prospective study included 20 participants who were diagnosed with cataract and during the surgery superior manual small incision was done under local anaesthesia furthermore, posterior chamber intraocular lens (IOL) implantation was performed. The result showed that about 15% of patients developed astigmatism after the operation.</p> <p>Keywords: Refraction (R), keratometry of the cornea (K1, K2), manual small incision cataract surgery (MSICS), posterior chamber lens (PC L), surgically induced astigmatism (SIA).</p>
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Introduction

According to the World Health Organization (WHO), cataract is the most common cause of blindness in the world [1]. Also, it is a major cause of visual disability all over the African continent [2]. The most common surgery that used in third world countries for cataract extraction is the suture less (MSICS) [3-4].

Patients and Methods

A prospective study included 20 patients were diagnosed with cataract, in Alwohda Hospital in Derna. The surgical approach was made by superior tunnel sclera frown incision of 5mm in length, About 2mm from the limbus, By using a diamond keratome which was entered from both sides of clear cornea about 1,5mm into anterior chamber. The internal incision was enlarged sideways to 8 mm with insertion of PCL with hydration of side port, and cautery of conjunctive. The operations were done under retrobulbar

local injection of 2% lidocaine and all of them were done by one surgeon. All patients were assessed before the surgeries for astigmatism. Moreover, all patients were followed up for one month and monitored for appearance of astigmatism by using auto RK.

Results

20 patients (20 eyes) with cataract were involved, 12 (60%) were males, while 8 (40%) were females a male to female ratio of 3:2 (Figure 1). The mean age of patients was 59.35±7.04 years range from 45 to 70 years. The most represented age groups were those of 55-64 years (Figure 2).

	Sphere		Cylinder	
	Mean± SD	Range	Mean± SD	Range
Preoperative Refraction	3.93 ± 6.37	0.00 to -24.00	1.37 ± 1.08	-0.00 to -4.5
Postoperative Refraction	0.93 ± 0.98	0.00 to -3.500	1.94 ± 1.18	-0.50 to -5.0

Gender of patients

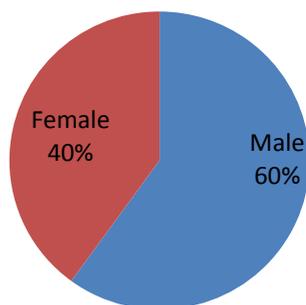


Figure 1. The Gender of patients

Age of patients

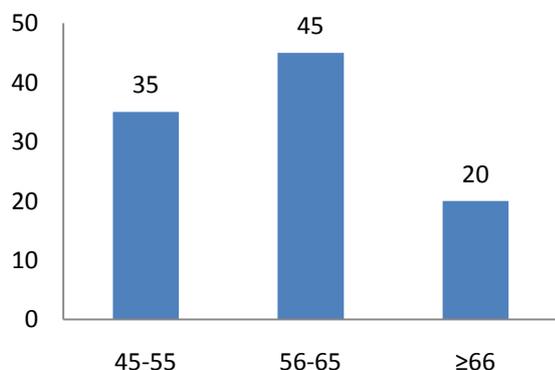


Figure 2: Age of patients

The mean preoperative sphere refraction was 3.93D ±6.37 ranged from -0.00 to -24.00 D, while the mean postoperative sphere refraction was 0.93D ±0.98 ranged from -0.00 to -3.50 D. There was significant relationship between preoperative sphere refraction and Postoperative sphere refraction (t=2.089, P= 0.050)(table 1).

The mean preoperative Cylinder refraction was 1.37D±1.08 ranged from -0.00 to -4.5D, while the mean postoperative cylinder refraction was 1.94D±1.18 ranged from -0.50 to -5.0D. There was significant relationship between preoperative cylinder refraction and postoperative cylinder refraction (t= -2.86, p=0.010) (table1).

Table 1: Preoperative and Postoperative Refraction in participants in this study.

In total, 75% of patients with preoperative astigmatism greater than 0.50D. while 90% of patients with postoperative astigmatism greater than 0.50D.(figure 3).

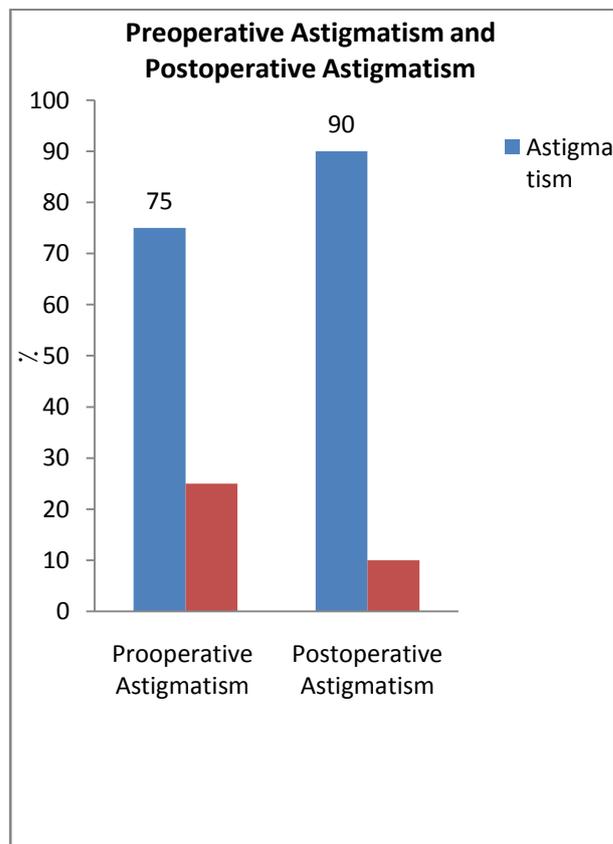


Figure 3: pre and post-operative astigmatism changes in participants in this study.

The mean K1 of the cornea preoperative was 43.09±1.21 ranged from 40.80 to 45.80mm and the mean K2 of cornea preoperative was 43.9725±1.35 ranged from 41.11 to 46.30mm. The average of preoperative K among patients was 43.52±1.25 ranged from 40.95 to 46.00.

The mean K1 of the cornea postoperative was 43.37±1.42 ranged from 40.50 to 46.00mm and the mean K2 of cornea postoperative was 44.49±1.59 ranged from 41.08 to 47.60mm. The average of postoperative K among patients was 43.90±1.35 ranged from 41.50 to 46.20. There is also significant relationship between the pre and post operative average k (t= -3.25, p= 0.004).

Table 2: preoperative and postoperative Keratometry in participants in this study.

	Preoperative		Postoperative	
	Mean± SD	Range	Mean± SD	Range
The Keratometry of cornea (K1)	43.09 ± 1.21	40.80 to 45.80 mm	43.37 ± 1.42	40.50 to 46.00 mm
The keratometry of cornea (K2)	43.97 ± 1.35	41.11 to 46.30 mm	44.49 ± 1.59	41.08 to 47.60 mm

Discussion

In this study we used superior sutureless MSICS, which was about 8mm in length with PCL insertion furthermore we followed up the participants for 1month after the operation, we have found that there was a significant increase in the post-operative astigmatism approximately 15%. Generally, the postoperative astigmatism is affected by the site, size and shape of incisions used in MSICS [5]. According to Sekharreddy, Sugantharaj and Hegde(2019) [6] their study found that supratemporal incisions had a mean SIA of 0.8032D ± 0.322, however, the temporal incisions had a mean SIA of 0.3826D ± 0.142, comparing by our results showed that the mean SIA value for patients who underwent superior approach MSICS was 1.94±1.18 D. Malik et al.,2012 [7] stated that the mean SIA value of

0.75±0.4067 D for cataract patients who underwent temporal approach MSICS. All those patients had preoperative astigmatism. Our results showed SIA value was 1.94±1.18 D. Which is more than that were in the previous studies. According to Burgansky et al (2002), [8], the percentage of SIA increases with the length of the incision . The results of this study showed that, the mean of SIA was 0.6 + 0.3 D for a 6 mm incision ,0.75 +0.67 D for a 6.5 mm incision and 1.36 + 0.77 D for a 7 mm incision. our study found that the value of SIA was greater than which stated in Burgansky et al (2002) study's due to the larger length of incision in it. In view of the above, our results were consistent with the view of superior approach MSICS produce higher mean SIA than a temporal approach.

Conclusion

A significant increase in the post-operative astigmatism found in approximately 15% of the cases. The mean SIA was more than that stated by other studies which may be due to the size of incision (length of superior incision 8.0 mm) However, further study is needed by using the same Technique (superior sutureless MSICS) but smaller incision (6.5-7.0 mm) and more number of patients to find out the change in surgical induced astigmatism based on the size of Incision.

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