

CHANGES IN OCULAR ABBERATIONS AND RETINAL IMAGE QUALITY USING RAY TRACE TECHNIQUE AFTER CATARACT SURGERY.

Gamal Mohamed Omar Khedr, Karim Mahmoud Nabil, Hazem Wahid Kandil, Ahmed Moustafa Mohamed Hassan Mohamed

Department of Ophthalmology, Faculty of Medicine, Alexandria University

INTRODUCTION

The surgery of cataract is challenging in all the world as cataract itself is one of the most common reason of blindness and it comes as number two in the causes of vision impairment. Dysfunctional Lens Syndrome is the crystalline lens changes that took place lens due to age changes. The dysfunctional lens index is measurement of how the lens is performing objectively. A ray-tracing aberrometry system can measure (DLI) in patients with nuclear cataracts. The wave front analysis main function is isolating lower order aberrations effect and higher order aberrations, in addition to the contribution of the aberrations on optical quality. The optical system quality parameters include the Strehl ratio, (PSF), and (MTF). Point Spread Function is defined as spatial light that is distributed from a point source imaged on the retina. The modulation transfer function is contrast of image divided by the contrast of object.

AIM OF THE WORK

To study the changes in ocular wavefront aberrations and the effect on retinal image quality post phacoemulsification in senile cataract patients using iTrace® wavefrontaberrometer.

PATIENT AND METHODS

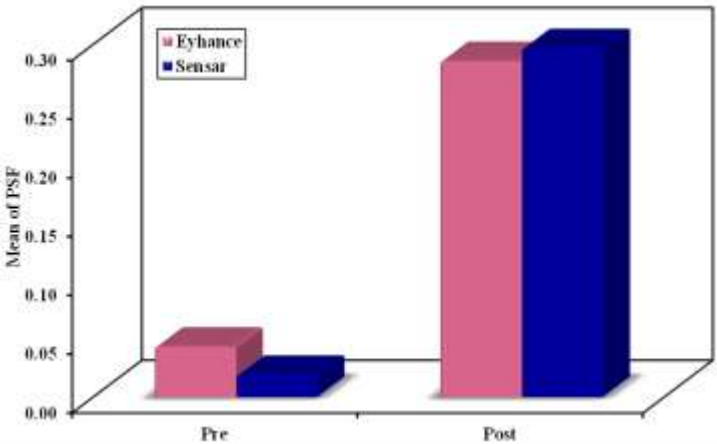
A total of 50 eyes were enrolled in this prospective, comparative clinical study. The Eyhance IOL and the Sensor 1 piece IOL were implanted in 25 patients each. Preoperative biometry was performed using IOL Master 700 and IOL diopter power was calculated using the Barrett Universal II.

An experienced surgeon performed cataract surgery for all patients using standard technique of phacoemulsification through a 2.4 mm clear cornea temporal incision and a 5.5-6.5 mm centered capsulorhexis. The outcome variables that were analyzed for all patients included preoperative and postoperative measurement of uncorrected distance visual acuity (UDVA), corrected distance visual acuity (CDVA), and. Distance visual acuity was converted to log MAR for analysis. All patients were tested with i-Trace aberrometry) at far. Pupils were dilated for evaluation of MTF, PSF, total aberrations, HOAs total, LOAs total.

RESULTS

Table 1: Comparison between the two studied groups according to PSF:

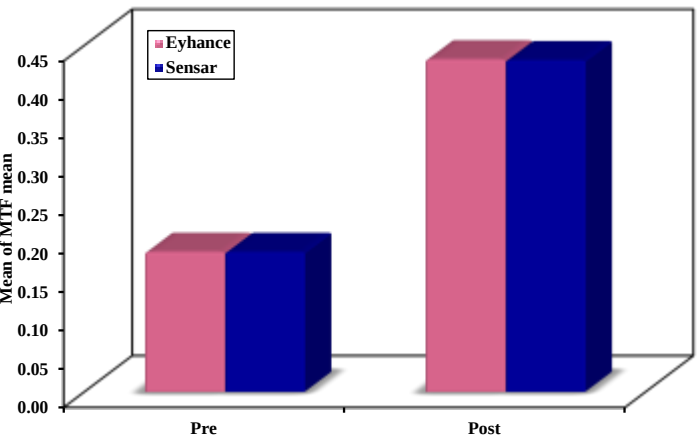
PSF	IOL type		U	p
	Eyhance (n = 25)	Sensar (n = 25)		
Pre				
Min. – Max.	0.002 – 0.190	0.002 – 0.077	204.50*	0.036*
Mean ± SD.	0.043 ± 0.050	0.019 ± 0.017		
Median (IQR)	0.022 (0.015 – 0.036)	0.014 (0.009 – 0.029)		
Post				
Min. – Max.	0.051 – 0.632	0.042 – 0.773	312.00	0.992
Mean ± SD.	0.286 ± 0.171	0.297 ± 0.219		
Median (IQR)	0.244 (0.203 – 0.310)	0.212 (0.120 – 0.455)		
Z ₀ (p ₀)	4.346* (<0.001*)	4.374* (<0.001*)		



Comparison between the two studied groups according to PSF

Table 2: Comparison between the two studied groups according to MTF mean

MTF mean	IOL type		U	p
	Eyhance (n = 25)	Sensar (n = 25)		
Pre				
Min. – Max.	0.109 – 0.328	0.091 – 0.316	308.00	0.930
Mean ± SD.	0.182 ± 0.060	0.182 ± 0.060		
Median (IQR)	0.161 (0.142 – 0.218)	0.184 (0.117 – 0.224)		
Post				
Min. – Max.	0.247 – 0.635	0.256 – 0.676	308.00	0.930
Mean ± SD.	0.432 ± 0.128	0.431 ± 0.108		
Median (IQR)	0.454 (0.324 – 0.492)	0.392 (0.345 – 0.504)		
Z ₀ (p ₀)	4.346* (<0.001*)	4.375* (<0.001*)		



Comparison between the two studied groups according to MTF mean

CONCLUSION

I trace wavefrontaberrometer is an important device by using ray tracing technology for assessing the ocular aberrations and the retinal image quality of the cataractous patients. As a non-invasive method, I trace wavefrontaberrometer has shown great advantage in assessing the quality of vision of patients.