

ASSESSMENT OF VISUAL AND REFRACTIVE OUTCOMES BETWEEN THE CONVENTIONAL PHOTOREFRACTIVE KERATECTOMY AND TRANSEPIHELIAL PHOTOREFRACTIVE KERATECTOMY IN CORRECTION OF MILD TO MODERATE MYOPIA

Amir Aly Eldin Abou Samra, Hany Ahmed Helaly, Amr Ahmed Said, Ahmed khairy Barakat
Department of Ophthalmology, Faculty of Medicine, Alexandria University

Introduction

Myopia is a major global problem for vision and blindness, according to the World Health Organization.

Refractive surgery, which corrects ametropia, has changed a lot over the years and become one of the most common medical procedures.

The first surface ablation procedure (corrective eye surgery) to use a laser instead of a blade to remove the corneal tissue was Photorefractive Keratectomy (PRK).

By reshaping the outer epithelialized surface of the cornea, PRK uses excimer laser ablation to correct ametropia with up to 6 D of myopia, around 3 D of astigmatism and low-moderate hypermetropia.

Removing of the epithelium in (PRK) was performed by several techniques including conventional PRK which include mechanical and chemical methods , and by the excimer laser itself, which is called transepithelial PRK where the epithelium is removed by an excimer laser instead of alcohol and manual scraping.

Aim of the Work

The aim of this work was to compare visual and refractive outcomes between conventional PRK and transepithelial PRK in the treatment of mild to moderate myopia.

Patients and Methods

The study was conducted as a prospective interventional clinical study, which included 20 patients with 40 eyes mild to moderate myopia with or without astigmatism.

The eyes divided into (2) groups, group (A) included the eyes treated by conventional PRK using manual scrapping of the epithelium, while group (B) included the eyes treated by transepithelial PRK using the Amaris Excimer Laser.

Inclusion criteria:

Age 18 years or older with stable refraction, Mild to moderate myopia (-1.00 D to -4.00 D), Astigmatism (-0.25 up to -1.50) and BCVA of 6/6.

Evaluation of corneal tomography was performed used a Wave Light Topolyzer

In the Conventional PRK group, (In the mechanical group) the epithelium was removed manually in a centripetal fashion using a blunt hockey blade to a diameter of 9.00 mm.

In the Trans-PRK group the epithelium and stromawere ablated in a single step with continuous profile using the trans-epithelial PRK nomogram of the SCHWIND Amaris 1050RS excimer laser's ORK-CAM software

Statistical analysis of the data Datawere fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp)-Qualitative data were described using number and percent. The **Shapiro-Wilk** test was used to verify the normality of distribution Quantitative data were described using range (minimum and maximum), mean, standard deviation, median and interquartile range (IQR). Significance of the obtained results was judged at the 5% level.

Results

The study consisted of 20 patients (40 eyes), including 10 males, and 10 females. Their age range was 18-39 years old. Each patient had transepithelial PRK in one eye and conventional PRK in the other eye.

The visual outcomes of the surgery were evaluated by its effect on UCDVA, BCDVA, refraction and occurrence of corneal haze.

Comparison between transepithelial and conventional PRK according to BCDVA

The preoperative mean BCDVA was 1.05 ± 0.09 , and 1.05 ± 0.09 in the transepithelial PRK group and conventional PRK group respectively. There was no statistically significant difference between the two groups regarding the preoperative mean BCDVA ($p=1.0$).

The postoperative mean BCDVA was 1.0 ± 0.0 , and 1.0 ± 0.02 in the transepithelial PRK group and conventional PRK group respectively. There was no statistically significant difference between the two groups regarding the postoperative mean BCDVA ($p=0.317$).

There was no statically significant difference between the two groups regarding the safety index ($p=0.841$). Table (1)

Table 1: Comparison between transepithelial and conventional PRK according to BCVA (n = 40)

BCVA	Transepithelial PRK (n=20)	Conventional PRK (n=20)	Z	p
Preoperative				
Min. – Max.	1.0 – 1.20	1.0 – 1.20	0.000	1.000
Mean ± SD.	1.05 ± 0.09	1.05 ± 0.09		
Median (IQR)	1.0 (1.0 – 1.10)	1.0 (1.0 – 1.10)		
Postoperative				
Min. – Max.	1.0 – 1.0	0.90 – 1.0	1.000	0.317
Mean ± SD.	1.0 ± 0.0	1.0 ± 0.02		
Median (IQR)	1.0 (-)	1.0 (1.0 – 1.0)		
Safety Index	0.95 ± 0.04	0.95 ± 0.06	0.760	0.841

The postoperative mean manifest spherical equivalent was -0.11 ± 0.35 , and -0.33 ± 0.36 in the transepithelial PRK group and conventional PRK group respectively. There was a statistically significant difference between the two groups regarding the mean manifest spherical equivalent ($p=0.039$).

There was a statistically significant difference between the preoperative and postoperative mean manifest spherical equivalent in both transepithelial and conventional groups. ($p<0.001$). Table (2)

Table 2: Comparison between transepithelial and conventional PRK according to the mean manifest spherical equivalent (n = 40)

Spherical equivalent	Transepithelial PRK (n=20)	Conventional PRK (n=20)	Z	p
Preoperative				
Min. – Max.	-4.38 – -1.00	-4.5 – -1.00	1.172	0.241
Mean ± SD.	-2.63 ± 1.06	-2.48 ± 1.15		
Median (IQR)	-2.38 (-3.56 - -1.9)	-2.50 (-3.5 - -1.5)		
Postoperative				
Min. – Max.	-0.75 – 0.50	-0.75 – 0.75	2.061*	0.039*
Mean ± SD.	-0.11 ± 0.35	-0.33 ± 0.36		
Median (IQR)	-0.13 (-0.25 - -1.5)	-0.50 (-0.56 - -0.2)		
P_i	<0.001*	<0.001*		

Conclusion

- Both conventional and transepithelial PRK are effective corneal refractive surgery.
- The visual outcome of transepithelial PRK is a bit superior to conventional PRK which has a higher potential of postoperative residual refractive error and corneal haze.
- Both procedures are equally safe, but the transepithelial PRK has more effective and predictable results.