

## Hyperopic Lasik Correction ,Out come ,Complication

Zeinab A . Bakry, Ismail M .Abdel latif,Mohammed H .Elagouz,Alahmady H  
.Elsman

### Abstract

**Introduction:** Hypermetropia is a condition in which parallel light rays come to a focus in a point behind the retina without accommodation.

Hyperopic LASIK (H-LASIK) is performed in the form of annular ablation in the peripheral cornea to increase the steepness of central part of the cornea to achieve the desired refractive effect. Most of published studies indicate reasonable predictability for low to moderate hyperopic corrections up to +4 D in most series , but with less satisfactory results for the correction of higher order treatments<sup>(1,3,4)</sup>.

**Aim of the work:** Evaluation of the results and complications of LASIK in hypermetropic patients.

**Patient and Methods:** cross-sectional data analysis of consecutive Retrospective treated 100 eyes from 50 consecutive hyperopic patients were analyzed. Excimer ablation for all eyes was performed using a mechanical microkeratome ( Moria) and an Allegretto excimer laser platform. the data was analyzed according to refractive outcome in terms of refractive predictability, efficacy, and safety.

**Results:** . More than 90% of the eyes (90 eyes) achieved a postoperative CDVA equal to the preoperative CDVA, No eye lost more than 1 lines of CDVA ,4 eyes gained 1 or more line more than CDVA

### Key words

Hypermetropia –Pentacam -Pachymetry – Keratometry

### Introduction

Hypermetropia is a condition in which parallel light rays come to a focus in a point behind the retina without accommodation.

The recent techniques of corneal refractive surgery for hyperopia include: photorefractive keratectomy (PRK) and laser in situ keratomileusis (LASIK). With the success of excimer laser ablation for treatment of myopia and astigmatism, investigation into the ability to treat hyperopia was a logical step, The main advantage of LASIK over PRK is a presumably attenuated wound healing response causing less regression compared with PRK as a result of the overlying flap and preservation of the corneal epithelium and Bowman's layer, Other advantages include earlier postoperative stabilization of refraction, less

postoperative patient discomfort, faster improvement in visual acuity, less stromal haze formation, shorter duration of postoperative medication use, and easier enhancement procedures<sup>(2,3,4)</sup>.

Hyperopic LASIK (H-LASIK) is performed in the form of annular ablation in the peripheral cornea to increase the steepness of central part of the cornea to achieve the desired refractive effect. Most of published studies indicate reasonable predictability for low to moderate hyperopic corrections up to +4 D in most series , but with less satisfactory results for the correction of higher order treatments<sup>(1,3,4)</sup>.

Complications can occur with hyperopic LASIK, as they can with myopic LASIK. Both procedures have

several complications. retreatment may be necessary to correct postoperative refractive defects, such as under- or overcorrections, regression, or surgically induced astigmatism, which can be associated with patient dissatisfaction.

The incidence of LASIK retreatment is variable, ranging from 5.5% to 28%<sup>(5,6,7)</sup>.

### Patients and Methods

The study included 100 eyes of 50 patients who had LASIK correction of Hypermetropia at using Allegretto 200. The pre-operative and post-operative examination include : uncorrected distance visual acuity (UDVA) ,subjective manifest refraction, corrected distance visual acuity (CDVA),cycloplegic refraction , slit lamp biomicroscopy& keratometry(K)

Pre-op-evaluation included the routine evaluation of lasik subjects (Pachymetry , pentacam corneal topograghy )

### Results

Demographics. 100 eyes of 50 patients underwent LASIK for hyperopia.

( **Table 1**): shows the baseline characteristics and demographics of all patients included in the study.

All patients had bilateral laser treatment. All eyes were seen at least 6 months postoperatively.

Parameter	Value
Patients/eyes	50/100
Male/female	24/26
Preoperative UCVA Mean Range	0.17 ± 0.11 (0.05 : 0.5)
Preoperative CDVA Mean Range	0.68 ± 0.20 (0.4 : 1.00)
Preoperative MRSE Mean Range	4.11 ± 1.77 (1.25 : 7.16)
Preoperative M refraction Mean Range	3.65 ± 1.87 (0.25 :6.62)
Follow up months	6 months

Manifest refraction (MR) will be converted to manifest refraction spherical equivalent(MRSE) .

### Inclusion Criteria:-

1- included in this study hyperopic patients and patients with hyperopic astigmatism up to +4 .

2- Able and Willing to give written informd consent and comply with the requirement of the study protocol .

**The examination at each visit includes:** UDVA,CDVA,manifest refraction,slit lamp examination ,applanation tonometry and keratometry.

Outcome measures included : accuracy (attempted versus achieved correction ), efficacy( pre- versus post-operative UDVA and CDVA), stability ( average pre and post- operative MRSE at each follow up visit ,and safety(flap & ablation related complications ).

The results will be analysed statistically

Table ( 1 ) : Demographics and baseline characteristics .

**Visual Acuity:** The mean UDVA improved from  $0.17 \pm 0.11$  (0.05:0.5) preoperatively to  $0.68 \pm 0.20$  (0.4:1.00) at the last followup examination.

Figure (1) shows the cumulative UDVA and CDVA after LASIK compared with the preoperative CDVA .At the last follow-up visit 22 eyes (22%) can see 1.00 . likewise , 84 eyes (84%) can see 0.5 without correction and 86 eyes (86 %) with correction and all eyes can see 0.4 .

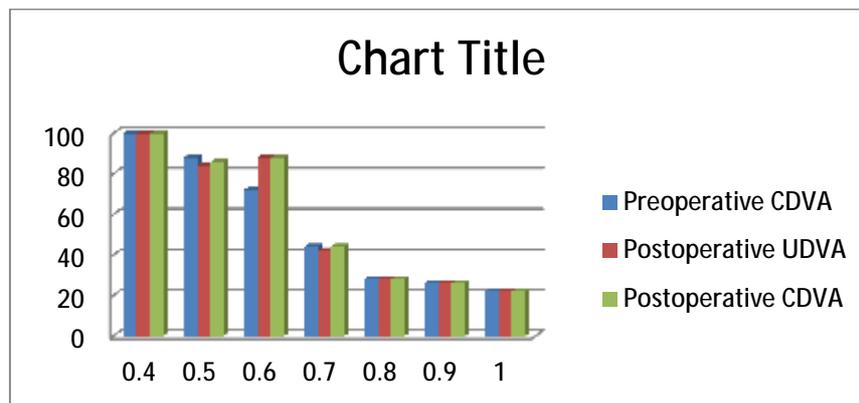
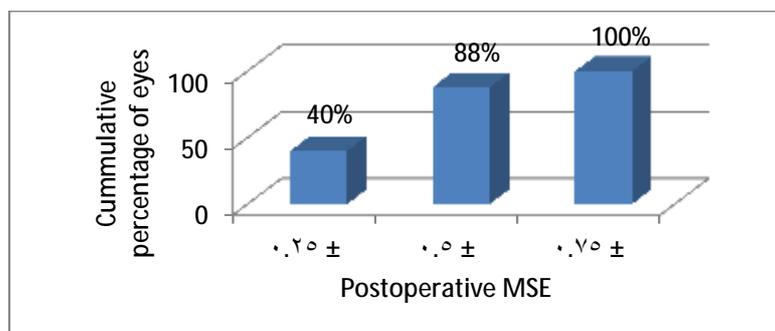


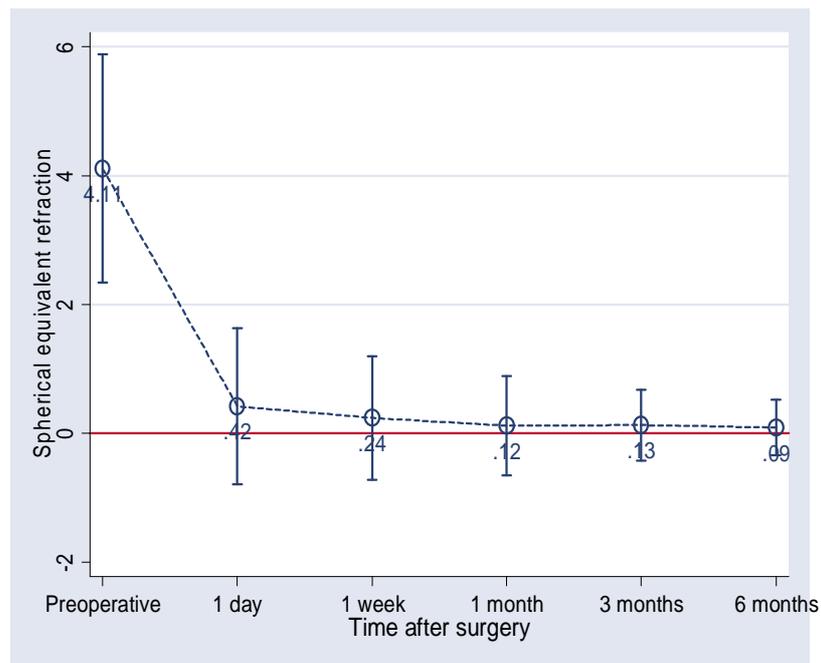
Figure (1) Efficacy of hyperopic LASIK at the last follow-up visit. Cumulative percentage of eyes with UDVA and CDVA at each Snellen line of vision.

**Accuracy:** At the end of the follow up, the postoperative MRSE was within  $\pm 0.50D$  in 88 eyes (88%) and within  $\pm 0.75D$  in 100 eyes (100%). None of the eyes had an MRSE beyond 1.00D of emmetropia (Figure 2)



(Figure 2) :Manifest spherical equivalent (MSE) at the last follow-up visit.

**Stability:** The mean MRSE was relatively stable throughout follow-up (Figure 3). Refractive stability was attained at the first postoperative month and the mean residual refractive error remained relatively stable at each follow-up visit.



(Figure 3) :Stability of hyperopic LASIK.

## Discussion

Concerning the efficacy: At the last visit, 22.00% of eyes attained a UDVA of 1.00 and 88.00% had a UDVA of 0.5 or better. The results reported by Zadok et al. <sup>(8)</sup> the results of H-LASIK in the first 92 consecutive eyes of 50 patients with up to +10.25 diopters (D) of hyperopia. The uncorrected visual acuity (UCVA) was 0.5 or better in 85.7%, and 1.00 or better in 29.3%. And in study reported by Carmina Franz G. Quito et al. <sup>(8)</sup> At the end of follow-up, 26.47% had a UDVA of 1.00 and 94.12% had a UDVA of 0.5 or better

In concerning to accuracy: in our study, the mean attempted hyperopic correction was  $3.65 \pm 1.87D$  and correction was  $3.40 \pm 1.80D$ . MRSE at the last follow-up visit of 40.00% and 88.00% of the study eyes was within  $\pm 0.25D$  and  $\pm 0.5D$  of the intended MRSE, respectively, which reflects the refractive accuracy of hyperopic LASIK using the ALLEGRETTO 200, in Carmina Franz G. Quito et al. <sup>(8)</sup> Manifest refractive spherical

equivalent (MRSE) was within  $\pm 0.50D$  of the target refraction in 55.88% and within  $\pm 1.0D$  in 85.30% of the study eyes

In concerning to stability Refractive stability was noted at the first postoperative month. Other published works reported refractive stability after the first month <sup>(9)</sup>, at 3 months <sup>(11)</sup>, and at 6 months <sup>(10,12)</sup>. Regression was also noted at various postoperative periods.

In concerning to safety in our study, more than (90.00%) had no change in CDVA throughout follow up. Six eyes with preoperative MRSE of +6.00 D lost 1 line of CDVA. The loss of CDVA lines observed could be due to the high amount of corneal steepening which induced significant degree of optical aberration leading to degradation of image quality.

## Summary

& LASIK is presently the most widely performed refractive procedure, but it is not appropriate for all patients. Optimal results are achieved through

proper patient selection, education, examination, and consent. A complete understanding of the risks of the procedure and the effects of pre-existing ocular conditions are critical in selecting patients for surgery.

& A basic medical tenet is that it is better to prevent a complication than to treat it. This is perhaps magnified with LASIK,

& We suggest that hyperopic correction should be based on the manifest spherical equivalent treatment may produce manifest undercorrection, and therefore we advise that the patient should be warned about lower predictability, and suggest basing conclusions on the arithmetic mean calculated from the preoperative manifest and cycloplegic spheres.

## Refrence

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