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Evaluation of Lasik in Correction of Myopia

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Abstract:
The study comprised of retrospective and prospective evaluation of 137 eyes treated with LASIK at Mahatme Eye Bank Eye Hospital, Nagpur India. Our results show that LASIK is safe, effective and predictable procedure in correcting myopia and myopic astigmatism in mild to moderate range. Most of our patients obtained excellent UCVA and were within +/- 1.0 D of intended correction.

Keywords: *Myopia, refractive surgery, Lasik, PRK, refraction, keratome, hansatome, spherical equivalent (SE) refraction, BSCVA (Best surgically corrected visual acuity)*

Introduction

LASIK stands for Laser assisted in situ keratomileusis. Since 1980s lasers have been tried to alter corneal curvature for improvement of refractive errors[1]. The development of excimer laser represents a major technological breakthrough in the utilization of lasers for correction of ametropia. Presently LASIK (Laser assisted in situ keratomileusis), PRK (Photorefr-active keratectomy), LASEK (Laser subepithelial keratectomy) etc are used for correction of myopia. They treat ametropia by employing 193 mm argon fluoride excimer laser to ablate the anterior corneal stromato a new radius of curvature to decrease myopia, hyperopia & astigmatism.First LASIK on human eye was performed by Pallikaris in 1990[2]. Since then this procedure has undergone extensive investigation and is now considered by many ophthalmologists to be reasonably safe and effective. LASIK has

become a common technique for treatment of low to moderate myopia worldwide often with more predictable and stable results than incisional keratotomy[3,4]. The present study aimed to find out safety, efficacy, predictability and visual outcome of LASIK.

Materials and Methods:

A prospective and retrospective evaluation was performed on 137 consecutive eyes (73 right eyes and 64 left eyes) of 78 patients after ethics committee approval. 21 were males and 57 were females. LASIK performed in Mahatme Eye Bank Eye Hospital, Nagpur, India between September 2004 and January 2006.

Inclusion criteria:

1. Age 18 to 45 years
2. Normal anterior segment
3. Stable refractive error for more than 6 months
4. Normal videokeratography i.e. not showing evidence of ectatic disease.

Exclusion Criteria :

1. Unstable refraction.
2. Corneal thinning disease
3. Presence of ectasia or any other corneal pathology
4. Past history of corneal surgery like refractive surgery or penetrating keratoplsty
5. Central corneal vascularization
6. Dry eye
7. Glaucoma
8. Small palpebral aperture
9. Sunken eyes
10. Monoocular patients
11. Patients with lid problems like blepheritis
12. Deep amblyopia
13. Retinal pathology markedly limiting visual performance
14. Presence of bleb after glaucoma filtering surgery
15. Systemic or ocular vascular disease
16. Autoimmune diseases as they might affect wound healing
17. Pregnancy and immunocompromised states

Counselling of patients: This has significance as unrealistic expectations are the most common causes of dissatisfaction after surgery. Care was taken to make patient understand that no refractive surgery is perfect and it may not be possible to achieve same quality of vision as with spectacles or contact lenses in all the cases.

Preoperative evaluation consisted of uncorrected visual acuity for both – distance and near; best spectacle corrected visual acuity, manifest and cycloplegic refraction, ocular dominance, keratometry, applanation tonometry, scotopic pupillary size, tear film break up time, blinking rate, Schirmer test when necessary, pachymetry, slitlamp examination and computerized videokeratography. In all patients, fundus photography was done using indirect ophthalmoscopy for screening the peripheral retina in order to rule out associated retinal pathology that might predispose to retinal detachment. A suspicious lesion was treated with laser or cryotherapy and in those patients surgery was postponed for 8 to 12 weeks.

Specialised Instruments: These included Hansatome, Microkeratome, Laser delivery system, Barraquer tonometer, Videokeratography, Pachymeter.

Surgical steps:

1. Corneal marking
2. Tonometry
3. Excimer Laser ablation
4. Repositioning of the flap

Observations:

The statistical analysis done by paired 't' test. The study included 137 eyes of 78 patients. The mean age (range in years) was 24.14 +/- 4.872 (SD) (Range 18 to 45 yrs)

Table 1 shows demography, visual acuity and preoperative refractive data

Table 1: Demographics of 78 patients in study group

Parameter	Patients
Bilateral cases	59 (75.64%)
Unilateral cases	19 (24.36%)
Women	57 (73.07%)
Men	21 (26.93%)

The mean follow up period of patients was 5.2 months – range being 1 to 12 months.

UCVA: Mean Uncorrected visual acuity improved 3 months postoperatively from 0.08 to 0.813. The mean UCVA was 0.813 +/- 0.238(SD) with range from 0.25 to 1.2 i.e. 6/24 to 6/5. 92.7% eyes had UCVA of 6/12 or better at 3 months and 56.93% eyes had UCVA of 616 or better.

BSCVA: Mean Best surgically corrected visual acuity 3 months postoperatively was0.963 +/- 0.378 (SD) with range from 0.33 to 1.2 (6/18 to 6/5). The mean BSCVA improved from mean preoperative BSCVA of 0.88.24. 24 eyes (17.5%) gained BSCVA while 109 eyes (79.5%) maintained preoperative BCVA. 4 eyes (2.91%) had loss of 1 line of preoperative BCVA but no eye lost more than 2 lines of BCVA.

Spherical equivalent refraction: The mean SE refraction at 3 months postoperatively was – 0.057 +/- 0.510 (SD) : range -1.5 to +1.5 and 132 eyes (96.35%) have SE within +/- 1.0 D.

Astigmatism: The mean postoperative cylinder was 0.0 +/- 0.518 (SD) while preoperatively it was -0.996 +/- 1.027 (SD). P value was <0.001

Safety Index: It is the ratio of mean postoperative BCVA to mean preoperative BCVA. This was 1.08 in our study.

Efficacy Index: It is the ratio of mean postoperative UCVA to mean preoperative BCVA was 0.91

Visual acuity & Refractive data of patients undergoing LASIK.is shown in table 2.

Table 2: Visual Acuity & Refractive data of patients undergoing LASIK

Criteria	Preoperative	Postoperative	P value
SE Refraction	-5.258 +/- 2.617 (SD) (Range 0 to – 11.25)	-0.05 +/-).51 (Range -1.5 to 1.5)	P < 0.001
Cylinder	-0.996 +/- 1.027 (SD) (Range -0.5 to -5)	0 +/- 0.518 (Range-1.75 to +1.75)	P < 0.001
UCVA	0.08 +/- 0.085 (0.02 to 0.5)	0.813 +/- 0.238 (0.25 to 1.2)	P < 0.001
BSCVA	0.887 +/- 0.170 (0.33 to 1.0)	0.963 +/- 0.378 (0.33 to 1.2)	P < 0.05

The above data is presented in graphs in Following **figure 1**.

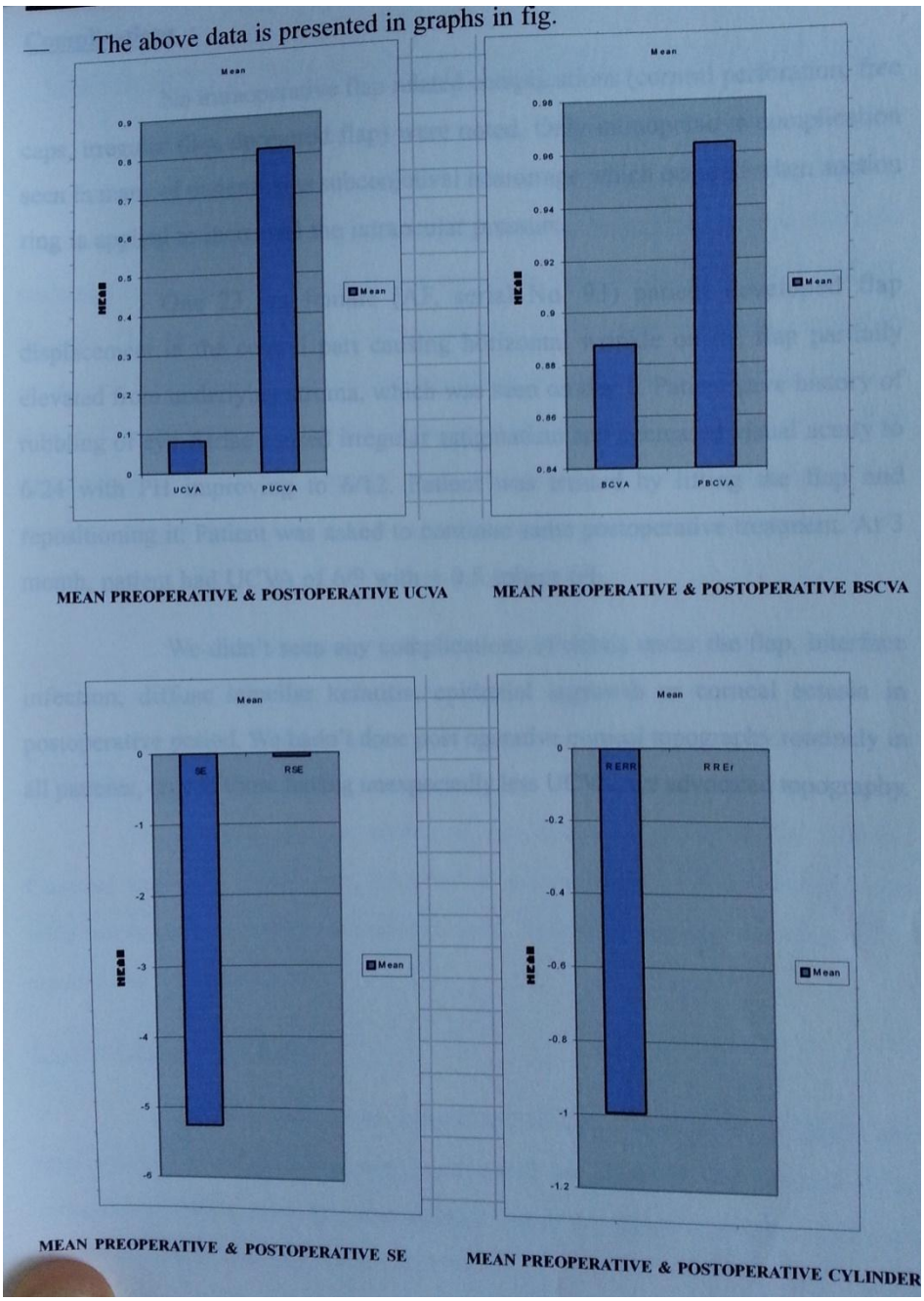
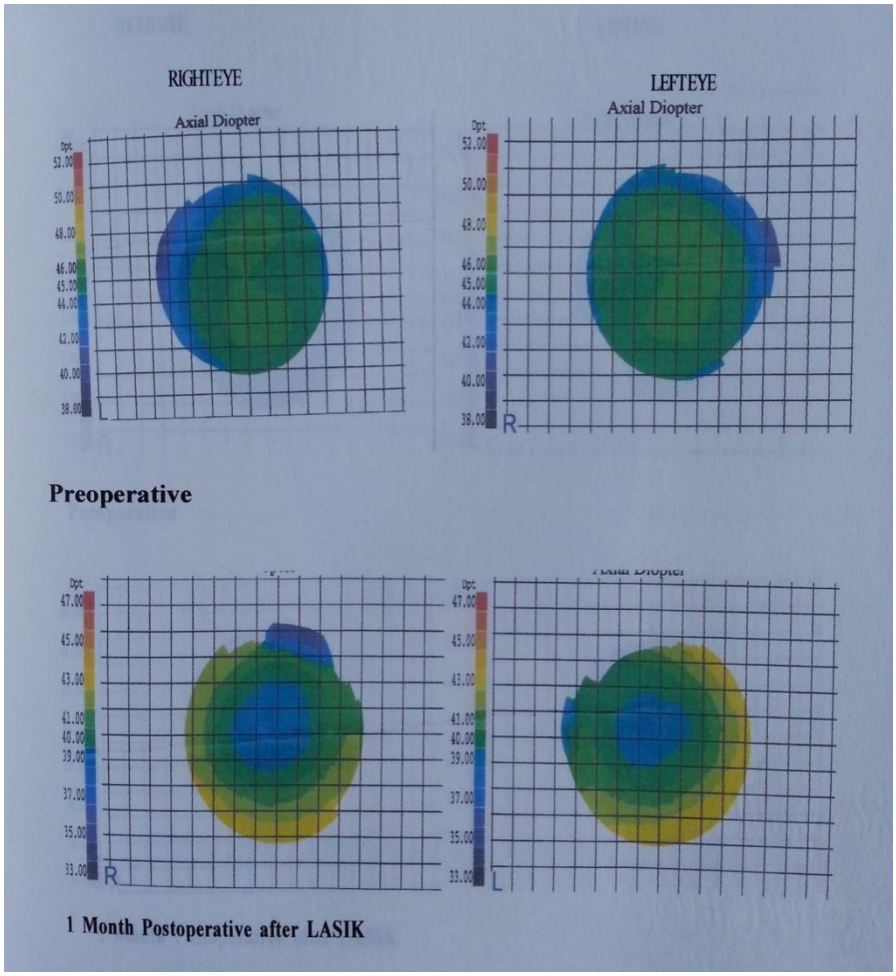


Figure 2 below shows preoperative videokerato graphs showing toric with the axis astigmatism in both eyes (-5/-0.5 x 180 in RE and -4.25/-0.5 x 180 in LE)

Postoperative videokerato graph shows central area of flattening with peripheral steepening.



Complications: No intra operative flap related complications like corneal perforation, free caps, irregular flap, decentered flap were noticed. Only intraoperative problem seen in many patients was subconjunctival hemorrhage which occurred when suction ring is applied to increase the intra ocular pressure. One 23 yrs female patient developed flap displacement in central part causing horizontal wrinkle on the flap partially elevated from underlying stroma, which was seen on day 2. Patient gave history of rubbing the eye. Striae caused irregular astigmatism and decreased visual acuity to 6/24 with Pin Hole vision improving to 6/12. She was treated by lifting the flap and repositing it. She was asked to continue same postoperative treatment. At 3 months she had UCVA of 6/9 with +0.5 sphere 6/6.

We didn't see any complication of debris under flap, interface infection, diffuse lamellar keratitis, epithelial in growth or corneal ectasia in postoperative period. Postoperative corneal topography was advised only if patient had unexpectedly less UCVA.

Discussion

137 eyes with mean SE of -5.25 +/- 2.517 (SD); range 0 to -11.25, were treated with LASIK. 1 patient had mixed astigmatism with refractive correction +1.5/-3.0 x 180 making SE zero. 56.9 % patients had UCVA of 6/6 or better. This points out to efficacy with an index 0.916 was good .also we observed gain of BCVA in 17.5% patients while 79.5% had no change in preoperative BCVA. The predictability also was good as 96.35% were within +/- 1 D range of SE. Stability was excellent for this myopic refractive surgery as patients were followed up to 12 months. The safety index of 1.08% indicate good safety of LASIK.

Ruiz et al[5] in their series of 130 eyes with mean SE -3.61 +/- 2.95 (range -0.25 to -18.25) and mean preoperative cylinder -1.15 +/- 1.31 (range zero to -8.0) treated with lasik reported mean postoperative sphere -0.22 +/- 0.32 (range +1.25 to -2.50) and mean postoperative cylinder of 0.35 +/- 0.4 (range 0 to 2). 67 % patients had UCVA of 6/6 or better and about 93% patients had UCVA 6/12 or better. 90% patients were within +/- 0.50D SE and 98% within +/- 1.0D SE. 17.1% patients gained 2 or more lines of BCVA while no eye lost 2 or more lines of BCVA.

El. Danasoury[6] in their series treated myopia in 62 eyes with 12 months follow up. The mean preoperative SE was -5.19 +/- 2.32 (range -2.0 to -14.0). Mean preoperative cylinder was -1.19 +/- 0.62 (range -05 to -3.0). the postoperative mean SE was -0.17 +/- 0.48 (range -1.5 to +1.5) and mean cylinder was -0.32 +/- 0.3 (range 0 to -1.25). 55% eyes had UCVA 6/6 or better, 85% eyes had UCVA of 6/12 or better. 91% eyes had SE within +/- 1.0D. No eye lost more than 2 Results of our study were quite similar to these two studies. In all the three studies, including ours, no corneal haze was seen in any case.

T. Salah[7] and co-workers and Knorz and colleagues demonstrated mean refractive change of -0.61D and +1.25D, respectively after 1 month of LASIK.

In our LASIK series only 1 patient had flap wrinkling secondary to rubbing of eye. Patient recovered well after reposition of flap. Postoperative rubbing of eyes is always to be avoided until flap gets adherent to underlying stroma. Performing the laser ablation beneath a lamellar flap of corneal tissue on posterior stroma preserves Bowman's layer and corneal epithelium; resulting in rapid visual recovery, very little pain and stability.

Conclusion:

Our study shows that LASIK is safe, effective and predictable procedurefor correcting myopia and myopic astigmatism in mild to moderate range, with no postoperative haze. Most of our patients achieved excellent UCVA and were within +/- 1.0D of intended correction. There is little pain or foreign body sensation in the eye after operation and has rapid visual recovery. Postoperative rubbing of eye is to be avoided in early postoperative period.

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