Case Report

Blunt Trauma after LASIK

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Abstract : **We present 6 cases of blunt trauma after uneventful laser in situ keratomileusis (LASIK). The trauma was strong enough to cause macular edema in 2 cases, which led to a transient decrease of visual acuity, and 1 case had partial loss of the flap. No cases had rupture of the globe. This evidences that LASIK surgery may not increase the risk of rupture of the globe after blunt trauma.**

Key words : LASIK, Trauma

เรื่องย่อ : **การได้รับอุบัติเหตุภายหลังการทำผ่าตัด LASIK**

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การศึกษานี้เป็นการวิเคราะห์ผู้ป่วยที่ได้รับอุบัติเหตุกระแทกที่ตาภายหลังการทำผ่าตัด LASIK 6 ราย โดยแรงกระแทกนั้นรุนแรงพอที่จะทำให้เกิดการบวมของจอประสาทตา 2 ราย และมีการฉีกขาดของชั้นกระจกตา 1 ราย แต่ไม่พบว่ามีการฉีกขาดของตัวลูกตาโดยตรง รายงานนี้ยืนยันว่าความแข็งแรงของลูกตาภายหลังการทำผ่าตัด LASIK ไม่ได้ลดลงจนทำให้ความเสี่ยงของการเกิดการฉีกขาดของลูกตาจากอุบัติเหตุการกระแทกเพิ่มขึ้น

คำสำคัญ : การผ่าตัดแก้ไขสายตา, อุบัติเหตุ

INTRODUCTION

Laser vision correction has become popular worldwide. The laser changes the shape of the cornea by shaving the tissue off. Therefore, the cornea becomes thinner than before. There has been a lot of debate concerning ocular integrity after the procedure especially in terms of ocular trauma. We report a case series of blunt ocular trauma during the early postoperative period following LASIK.

CASE REPORT

Six patients who underwent successful laser in situ keratomileusis (LASIK) are included in this report. All cases had a calculated residual stroma greater than 250 microns. All cases had a perfect result with an uncorrected visual acuity of 20/20 after the surgery. Blunt trauma occurred in one eye of each patient in the early post-operative period (4 to 6 weeks after LASIK). The causes of the trauma was a direct

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hit by a punch (knuckle) in 2 cases (involved in fighting), car accident in 3 cases and a fall in 1 case. The trauma was severe in 3 cases, which led to macular edema in 2 cases and partial flap loss in 1 case. No eyes had any sign of rupture of the globe. There was a flap fold in all cases, but only 1 case had severe flap displacement. Surgical management was performed in 2 cases by floating the flap with hypotonic solution to reduce the fold and repositioning the flap to the proper place. The case that had partial flap loss was given contact lenses and waited 3 days until the epithelium grew over the area of the defect. A slight haze was found in the area of flap loss. All cases had a final BCVA of at least 20/32. Table 1 shows a summary of the details in all 6 cases.

Table 1. A summary of the details of the 6 cases

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Age (year)	24	33	35	45	16	25
Sex	Male	Male	Male	Female	Male	Male
Pre-op refraction	-4.25	-4.50 -1.00 x 10'	-5.00 -0.75 x 150'	-6.50 -0.75 x 90'	-5.25	-7.50 -1.25x145'
Pre-op BCVA	20/20	20/20	20/20	20/20	20/20	20/20
Pre-op thickness	500	495	520	550	560	525
Last follow up before trauma	1 month	1 week	4 weeks	4 weeks	1 week	4 weeks
Post-op. refraction	0.00 -0.50 x 90'	0.00	0.00	0.00	0.25	0.50
Post-op. BCVA	20/20	20/20	20/20	20/20	20/20	20/20
Post-op. thickness	420	400	450	420	465	420
Duration of trauma	6 weeks	4 weeks	5 weeks	6 weeks	3 weeks	5 weeks
Type of blunt trauma	Fighting (punch)	Fighting (punch)	Fall	Accident (Car)	Accident (MCA)	Accident (Car)
UCVA post-trauma	20/40	20/160	20/40	20/200	20/160	20/32
BCVA post-trauma	20/25	20/160	20/32	20/200	20/160	20/25
Flap displacement	No	Severe	No	No	Mild	No
Flap fold	Grade 1	Grade 4	Grade 1	Grade 1	Grade 3	Grade 1
Cornea	PEE 1+	PEE 4+	Normal	Inferior haze	PEE 2+	Normal
Other eye examination	Normal	Subconj. Hem	Normal	Inferior flap loss	Normal	Subconj. Hemr.
Macular edema	Yes	Yes	No	No	No	No
Management	Observe	Reposition	Observe	Observe	Reposition	Observe
Final UCVA	20/20	20/60	20/20	20/32	20/32	20/20
Final refraction	0.00	N/A	0.00	0.00 -1.50x180	0.00+-0.50 x180	0.00 0.25x125
Final BCVA	20/20	20/32	20/20	20/25	20/25	20/20

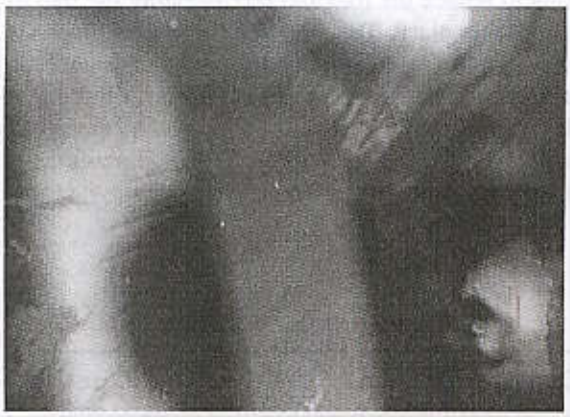

Figure 1. Show severe fold in case 2.

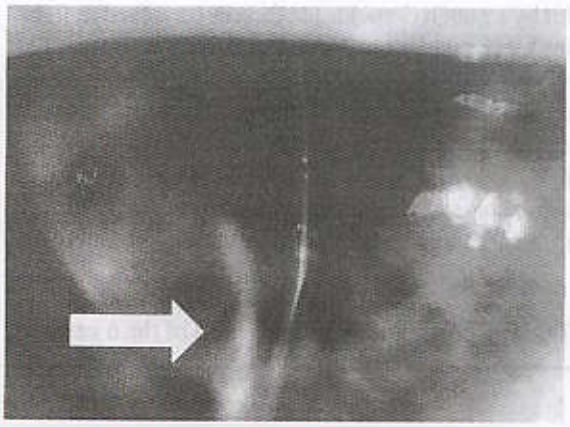

Figure 2. Show inferior flap loss (arrow) in case 4.

DISCUSSION

There have been several reports about ocular integrity after refractive surgery.[1-3] Many reports have shown the difference between incisional refractive surgery and laser refractive surgery.[3-5] It has been proven that the incisional refractive surgery such as radial keratotomy weaker the cornea which leads to increased susceptibility to rupture of the globe after trauma.[6-8] A previous report has been published concerning lacerated cornea in the post LASIK eye.[9] But the trauma in that report was penetrating injury, in which the tissue was susceptible to laceration. No previous report concerning blunt injury has been published. All lamellar refractive surgery is recommended to leave a residual stroma of more than 250 microns to ensure ocular integrity.

We present a case series of blunt trauma 4-6 weeks after LASIK surgery. The trauma was strong enough to cause retinal edema in 2 cases and partial flap loss in 1 case but the cornea and the eye were still intact. A flap stria or a fold was a sign of localized flap displacement and in some cases, the flap spontaneously returned to the proper position. In those cases, the fold was very mild and did not involve the visual axis; reposition of the flap or elimination of the fold was not indicated and the fold can be left to resolve by itself.

Ocular integrity after LASIK is strong enough to protect the globe from blunt injury in these cases even as early as 4 weeks post-operation. The corneal flap is the most susceptible part to injury. Intrastromal negative pressure produced by endothelium cell activity and from the glycosminoglycans (GAGS) of the ground substance in the corneal stroma is responsible for holding the flap to the stromal bed. This stromal pressure is approximately 50 to 60 mmHg in the normal cornea.[10] Any force that overcomes this pressure can cause the displacement to the flap. This movement of the flap can somehow absorb forces that directly hit the cornea. These could be an advantage to the cornea with a flap because it may reduce the amount of damage that could occur. The integrity of the rest of the cornea underneath the flap is mainly dependent on the residual stroma.

We believe that in the eye which has undergone LASIK procedure, the globe is no more susceptible to rupture than a normal eye which receives blunt trauma. However, the corneal thickness remaining should be calculated before the procedure to prevent excessive removal of tissue which may cause weakening of the cornea.

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