

# Prophylactic Use of Mitomycin – C on Haze Formation in Photorefractive Keratectomy

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**Purpose:** To study the results of prophylactic use of Mitomycin – C on corneal haze after photorefractive keratectomy (PRK).

**Material and Methods:** Sixty – four eyes of 32 patients with myopia were enrolled in this prospective study. All patients were between the ages 20 years and 37 years with simple myopia range 6.0 D to 9.0 D. All eyes underwent PRK with application of 0.02% Mitomycin – C for 20 seconds and irrigation with 20 ml of normal saline. Patients were examined 1, 3 and 6 months after surgery. A scale of 0 to 4+ was used to grade the haze.

**Results:** Pre-operatively, mean spherical equivalent refraction (SE) was -8.34 diopters (D) range (6.0 D to 9.50 D). All eyes were examined 1, 3 and 6 months after surgery. One month after PRK, 2 patients (3.12%) having myopia 8.5 D and above developed grade 0.5 to 1.0 haze. However, at 3 months this haze disappeared completely in one patient, whereas, the second one continued to show corneal haze grade 0.5 till 6 months postoperatively. All eyes had uncorrected visual acuity of 6/9 or better, whereas 53 eyes (82.81%) achieved uncorrected visual acuity of 6/6 or better.

**Conclusions:** To prevent haze development in high myopia, Mitomycin – C makes a useful adjunct to Excimer laser PRK. However, further studies with a longer follow-up are required.

There is always the risk of corneal haze development in patients with myopia greater than 6.0 D following photorefractive keratectomy<sup>1,3</sup> (PRK). Mitomycin-C 0.02% can prevent corneal haze in patients undergoing PRK. Mitomycin-C is an antibiotic with anti-metabolite properties that can inhibit keratocyte proliferation without affecting normal corneal cells. Mitomycin-C 0.02% has previously been used in the treatment of post-PRK corneal haze<sup>5</sup>. The cause of developing corneal haze may be due to the process of wound healing due to overproduction of keratocytes. Previous studies show the prophylactic use of Mitomycin – C for inhibition of haze formation in high myopia.<sup>5,6,8</sup>

## MATERIAL AND METHODS

64 eyes of 32 patients with a spherical equivalent of -6.0 D or above were enrolled in this non comparative, prospective interventional case series. Patients with

dry eye syndrome, anterior and posterior uveitis, lens opacities, history of severe eye injuries, ocular surgery, Keratoconus, corneal dystrophies, glaucoma, retinal disorders and systemic diseases like collagen vascular disorders or diabetes were excluded from study. Orbscan was done on every patient preoperatively to rule out ectatic corneal conditions and predict corneal thickness after PRK, which was over 350 microns.

All eyes underwent photorefractive keratectomy using topical anesthesia by a single surgeon.

After marking 7.0 mm to 8mm in diameter by a marker depending upon the pupil size, the corneal epithelium was removed by a mechanical scrape, using a spatula. In all cases the ablation zone was 7.0mm to 8.0mm including 5.5mm to 6.0mm central optical zone and a 1.5mm to 2.0mm transitional zone. Laser ablation was performed with the Technolas 217-C laser.

Mitomycin-C 0.02 % was applied to the ablated area immediately for 20 seconds using microspunge. Then both cornea and conjunctiva were irrigated with 20 ml of normal saline. Bandage contact lens was applied on the cornea and removed on day 4. Patients were advised to take Vigamox, Nevanac and Fluoromethalone (FML) 0.1 % eye drops 4 times a day for 4 days and all eye drops were to be discontinued after day4 except FML. All patients were advised to use FML eye drops 4 times a day for 1<sup>st</sup> month, 3 times a day for the 2<sup>nd</sup> month, twice a day for the 3<sup>rd</sup> month and once a day for the 4<sup>th</sup> month. The patients were advised to use artificial tears for irritation and discomfort as required.

Preoperative examination included best-corrected visual acuity (BCVA), manifest refraction, slit lamp examination, applanation tonometry, and corneal topography and dilated pupil examination of fundi for every patient. Bandage contact lenses were removed on day 4 after ensuring corneal healing. UNVA, BCVA refraction, slit-lamp examination, applanation tonometry, Orbscan were performed on every visit 1,3 and 6 months postoperatively. Corneal haze was evaluated using Hanna scale from zero (no haze) to +4 (Dense corneal haze).

**RESULTS**

Sixty-four eyes of 32 patients (9 males and 23 Females) with mean age of 30 years (range 21 to 39) underwent PRK. All eyes were examined 3 and 6 months after PRK. Pre-operatively, mean spherical equivalent refraction (SE) was -8.34 diopters (D) range (6.0 D to 9.50 D). Post-operatively 53 eyes (82.81%) achieved visual acuity of 6/6or better. Mean central corneal thickness was 560 micronspreoperatively and 357 microns postoperatively. At month 3 postoperatively, 37 eyes (57.81%) were within 0.5 D of emmetropia and 56 (87.5%) were within 1.0 D, while at 6 months the corresponding figures were 42 (65.62%) and 61 (95.31%) respectively. After3 months, UCVA was 6/9 or better in 58 (90.62%) eyes, and 6/6 or better in 47 eyes (73.43%). After 6 months post-operatively, all(100%) eyes had 6/9 or better, whereas 53 eyes (82.81%) had 6/6 or better. 2 patients (3.12%) with myopia (-8.50 D or more) lost one line due to persistent 0.5 grade haze. No other post-operative complication occurred in any case.

**DISCUSSION**

There is always a risk of developing corneal haze in

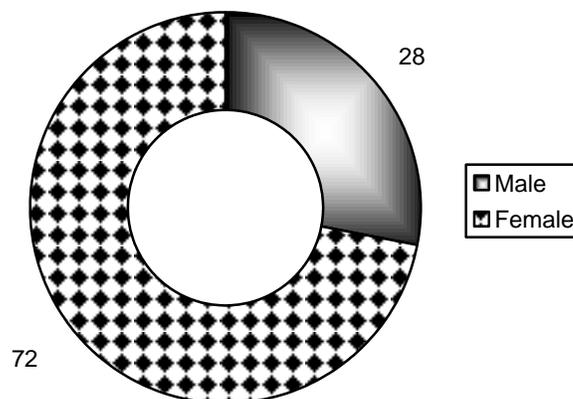


Fig. 1: Male - Female Ratio.

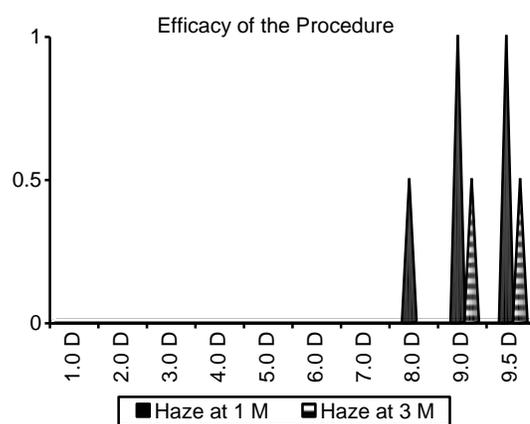


Fig. 2: Pre-op Refraction in Diopters.

patients with high myopia undergoing PRK, which may be enhanced by darker skin color and exposure to sunlight. Mitomycin-C with antimetabolite properties exerts cytotoxic effects through inhibiting DNA synthesis and is used mainly as a systemic chemotherapeutic agent. It is already being used in conjunction with glaucoma, pterygium surgery and in conjunctival or corneal neoplasm. It prevents the stromal keratocyte proliferation and thus inhibits sub epithelial fibrosis. The effects of Mitomycin - C has been studied in experimental models by Talamo et al,<sup>9</sup> Xu et al.<sup>10</sup> Majmudar et al<sup>5</sup> and Carones et al<sup>6</sup>and they have reported that prophylactic use of Mitomycin - C can eliminate the corneal haze after PRK and Radial keratotomy. Nassaralla BA et al<sup>11</sup> found mitomycin C to be effective in preventing sub epithelial corneal haze following radial keratotomy. Fazel E, Roshani L, Rezae L<sup>12</sup> also proved Mitomycin C be useful in

preventing frequency and severity of haze formation after PRK. Our results on a group of Pakistani patients with high myopia are comparable with the previous studies.

### CONCLUSIONS

To prevent haze development in high myopia, mitomycin - C in addition to pharmacological modulation of wound healing using Fluoromethalone, makes a useful adjunct to Excimer laser PRK. However, further studies with a longer follow-up are required.

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