Case Report

Limbal Relaxing Incision for Treatment of Thermal Corneal Burns

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A 60 years old lady, who underwent phaco with lens implantation, received corneal burn from a hot phacoemulsification tip. After two months of surgery her ORBscan showed the corneal burn induced astigmatism of 5.0 D. Her vision was CF unaided and 6/24 with correction. Full thickness limbal relaxing incision was made and after 2 weeks her ORBscan showed very less astigmatism. After 6 weeks her ORBscan corneal topography showed astigmatism of just -0.3 D which was stable until her last follow up at 6 months and her visual acuity which was CF initially improved to 6/12 unaided. She was followed up for a period of six months with ORBscan, uncorrected and best corrected visual acuity. So we concluded that Limbal relaxing incision is a useful technique to reduce the high astigmatism induced by thermal corneal burns and to improve the visual outcome.

Key words: Limbal relaxing incision, corneal burn, astigmatism

Phacoemulsification, introduced by Charles David Kelman in 1967, refers to cataract surgery in which the crystalline lens of the eye's is emulsified and aspirated from the eye with an ultrasonic hand piece. The phaco probe has a tip made of titanium or steel and it vibrates at ultrasonic speed. The tip of the needle vibrates at an ultrasonic frequency to sculpt and emulsify the lens. The vibrating tip is hot. Because it vibrates at speed more than 40,000 per second. It is covered by a silicone sleeve. It is kept cool by the irrigating fluid flowing around it through the silicone sleeve.

Complications of phacoemulsification include rupture of the posterior capsule, posterior loss of lens fragments, posterior dislocation of IOL, supracho-roidal haemorrahge, corneal burn etc. Among all of these complications, preoperative corneal burn is relatively a common condition. This is caused by hot phaco tip.

MATERIAL AND MATHODS

A 60 years old lady, who underwent phaco with lens implantation, received corneal burn from a hot phaco tip (Fig. 1 and 2). After two months of surgery her ORBscan showed the corneal burn induced astigmatism of -5.0 D at 60. Her vision was CF unaided and 6/24 with correction due to high astigmatism of -5.0 D (Fig. 3). Full thickness limbal relaxing incision was made with 11 No blade at the site of contracture which was from 8 O'clock to almost 9:30 O'clock to reduce the contracture. Then two loose sutures were applied to just close the lips of the incision. As a result of that incision after 2 weeks her ORBscan corneal topography showed very negligible amount of astigmatism (Fig. 4). Regular follow ups were done with ORBscan and best corrected visual acuity recorded on every visit.

RESULTS

After 6 weeks her ORBscan corneal topography showed astigmatism of just 0.3 D which was initially 5.0 D (Fig. 4). It remained stable until the end of her follow up period of six months and her visual acuity which was CF initially improved to 6/12 unaided.

DISCUSSION

Corneal burn is relatively a common complication of phacoemulsification. It may occur due to hot phaco tip

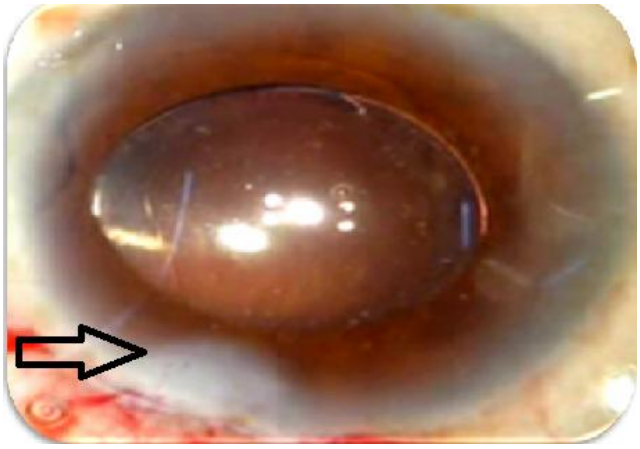

Fig. 1: After 2 months of phaco surgery showing corneal burn at the site of phaco incision.

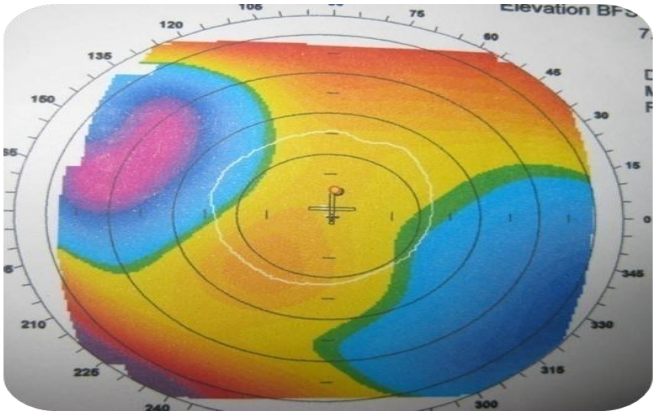

Fig. 3: After 2 months of phaco ORBscan corneal topography showed astigmatism of -5.0D

when accidently infusion is occluded or aspiration from the phaco prob is stopped during the surgery. Some of the burns occur during sculpting and some occur during fragment removal[1].

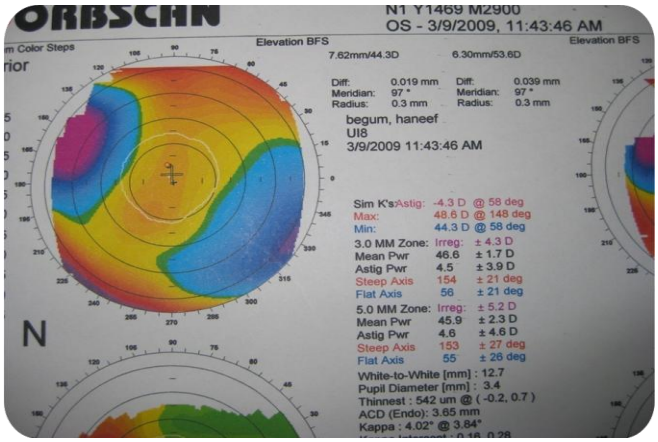

Fig. 2: 1st Post-op ORBScan showing astigmatism of -4.3 D.

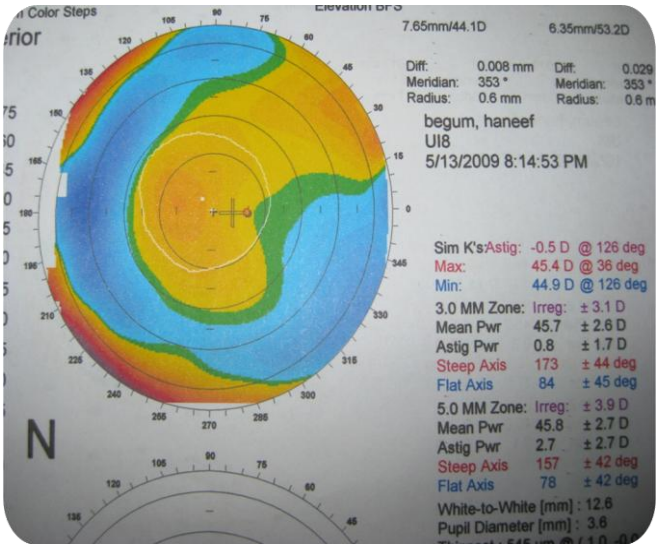

Fig. 4: 2nd Post-op ORBScan showing astigmatism of -0.5 D.

Full thickness relaxing incision may be useful to reduce astigmatism in some selected cases. It is given at the limbus with the help of 11 no blade or 15° knife to penetrate into the anterior chamber. Its role is very important in the cases where there is fibrosis and contracture of all the layers of cornea. Because astigmatism cannot be corrected without relieving the contracture. Other surgical options are radial keratotomy, PRK, LASIK, arcuate keratotomy, astigmatic keratotomy, and toric IOLs[2]. We decided to go for full thickness relaxing incision because there was fibrosis and contracture of all layers of cornea at the incision site along with thinning due to the thermal burn. The incision was 5-6 mm almost at the same area where there was steepening shown on ORBscan. It is slightly different than the limbal

relaxing incision (LRI), which consists of paired partial thickness incisions at opposite sites given at the time of cataract surgery or as an independent separate procedure.[3] They usually correct astigmatism up to 8 diopters but generally are reserved for 0.5 to 4 diopters of astigmatism. They are made using a DSP Gills Pop-Up micrometer knife (LRI knife). The degree of arc was determined and assessed using the modified Gills nomogram[4]. A 6 mm incision is required for each diopter of astigmatism up to 2 diopters. To correct between 2 - 3 diopters, LRI's of 8 mm in length are used.

Limbal relaxing incisions have gained much acceptance among the cataract surgeons where it is often combined with the cataract operation to minimize pre-existing astigmatism[5]. The incisions can be done as a part of cataract surgery or at any time after that. This result in better post-operative vision without spectacles.[6] The procedure can also be used in individuals in which primary refractive error is astigmatism. Incisions are made at the opposite sites of the cornea, following the curve of the iris, causing a slight flattening in that direction[7]. As the incisions are outside of the field of view, they usually do not cause glare and other visual effects that result from other corneal surgeries like Keratotomy. They are simpler and less expensive than laser surgery such as FemtoLASIK, LASIK or PRK. Good results usually do not require the location and length of the incisions to be highly precise, and the incisions can easily be extended later if the visual acuity is not improved and the original procedure did not correct all of the astigmatism.[8] In our case full thickness limbal relaxing incision was made with 11 No blade at the site of contracture. As a result of that incision after 2 weeks ORBscan corneal topography showed very negligible amount of astigmatism. Regular follow ups were done and on every ORBscan and best corrected visual acuity was recorded. It remained stable until the end of her follow up period of six months and her visual acuity which was CF initially improved to 6/12 unaided.

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REFERENCES

1. **Bradley MJ, Olson RJA.** Survey about phaco-emulsification incision thermal contraction incidence and causal relationships. **Am J Ophthalmol.** 2006; 141: 222-4.
2. **Naeser K, Behrens JK, Naeser EV.** Quantitative assessment of corneal astigmatic surgery: expanding the polar values concept. J Cataract Refract Surg. 1994; 20: 162–8.
3. **Kaufmann C, Peter J, Ooi K, Phipps S, Cooper P, Goggin M. Limbal relaxing incisions versus on-axis incisions to reduce corneal astigmatism at the time of cataract surgery. J Cataract Refract Surg. 2005; 31: 2261-5.**
4. **Roman S, Auclin F. Baudouin C** Limbal relaxing incisions to correct preexisting astigmatism during cataract surgery **J Fr Ophtalmol.** 2009; 2: 390-5.
5. **Ouchi M, Kinoshita S.** Prospective Randomized Trial of Limbal Relaxing Incisions Combined with Microincision Cataract Surgery **J Refract Surg.** 2009; 26: 1-6.
6. **Kohnen T, Klaproth OK**. Correction of astigmatism during cataract surgery **Klin Monbl Augenheilkd.** 2009; 226: 596-604.
7. **Budak K, Friedman NJ, Koch DD.** Limbal relaxing incisions with cataract surgery. J Cataract Refract Surg. 1998; 24: 503-8.
8. **Müller – Jensen K, Fischer P, Siepe U.** Limbal relaxing incisions to correct astigmatism in clear corneal cataract surgery. J Refract Surg. 1999; 15: 586-9.