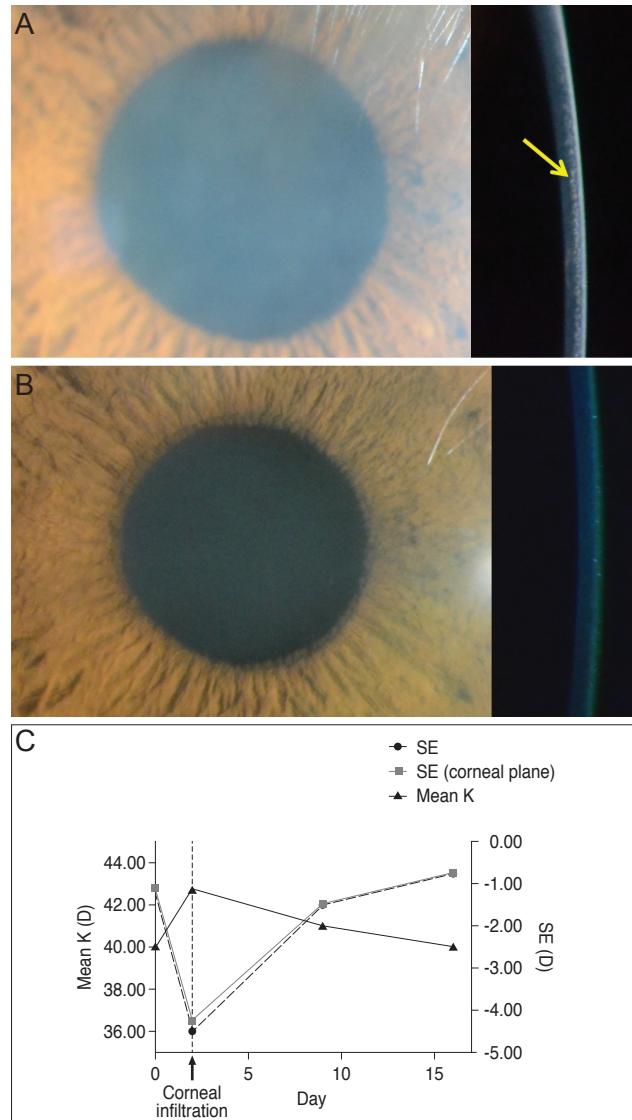


## Thermal Ocular Surface Injury from Cooking Oil: Delayed Onset Transient Corneal Infiltration and Myopic Shift

Dear Editor,

Thermal ocular surface injury is common in daily life and presents as epithelial loss, localized edema, and neovascularization in the cornea. Most symptoms occur immediately after the injury and improve within 24 to 48 hours [1]. Transient myopic shift is mostly induced by drugs or blunt eye trauma. We present delayed onset transient anterior corneal infiltration and myopic shift after thermal ocular surface injury from hot cooking oil.

A 27-year-old man complained of ocular discomfort after hot cooking oil splashed in his right eye. He had undergone laser epithelial keratomileusis in both eyes 3 years previous. On examination, uncorrected visual acuity in both eyes was 20 / 20, and intraocular pressure was within the normal range. The pH in his right conjunctival sac was 7.0 after copious irrigation. Mild conjunctival injection and punctate corneal epithelial erosion in the right eye were observed in the slit lamp examination. Spherical equivalent was -1.125 D sph in the right eye and -0.75 D sph in the left eye. Mean keratometric (K) value was 40.00 diopters (D) in his right eye and 39.75 D in his left eye according to an auto refractive keratometer (ARK-510A; Nidek, Gamagori, Japan). After 2 days, he presented with decreased vision in the right eye. His uncorrected and corrected visual acuities in the right eye were 20 / 250 and 20 / 50, respectively. Slit lamp examination revealed diffuse anterior stromal infiltration and mild edema in his right cornea (Fig. 1A). There were no corneal epithelial defects or anterior chamber reaction in the right eye. Central corneal thickness using noncontact specular microscopy (SP-3000P; Topcon, Tokyo, Japan) was 548  $\mu$ m in the right eye and 426  $\mu$ m in the left eye. Spherical equivalent and mean K value in his right eye changed to -4.50 D sph and 42.75 D, respectively. Localized inflammatory reaction associated with oil splashing thermal injury was suspected, and he was treated with topical prednisolone 1.0% combined with levofloxacin 0.5%, 8 times a day. In addition, 30 mg of systemic pred-



**Fig. 1.** (A) Diffuse anterior stromal infiltrate appeared 2 days after thermal ocular surface injury due to cooking oil (yellow arrow). (B) Stromal infiltrate disappeared after topical and systemic steroid treatments (day 16). (C) The changes in spherical equivalent (SE) and mean keratometric (K) value during ocular thermal burn treatment. Most changes in myopia and central corneal steepening occurred in conjunction with significant corneal infiltration. The changes in K value were well matched with the changes on refraction of the corneal plane. D = diopters.

nisolone was administered once a day and was tapered for 3 weeks. After 16 days, uncorrected visual acuity in the right eye returned to 20 / 20. Spherical equivalent was -0.75 D sph, and mean K value was 40.00 D. Anterior stromal infiltration was completely resolved (Fig. 1B).

This is a first case report of delayed onset transient corneal infiltration and myopic shift after thermal ocular sur-

face injury. Considering the onset of corneal infiltration, the cause of corneal infiltrate in this case appears to be delayed type hypersensitivity (DTH) reaction. DTH reaction takes 2 to 3 days to develop, and foreign materials act as haptens that conjugate with proteins, the complex of which combines with T lymphocytes, leading to an inflammatory response [1,2]. A previous study showed that oxidized cooking oil enhanced DTH in mice [3]. Further experimental study is needed to reveal the maturation of dendritic cells and to determine whether the DTH is triggered after cooking oil exposure. Transient myopic changes were mostly induced from sclera-choroidal inflammation or changes in the lens-iris diaphragm [4]. An increase in K value occurred during corneal inflammation in this case. When back-calculation was applied using the clinical history method, the change in K value was well matched with the change in refraction of the corneal plane (Fig. 1C) [5]. Corneal thermal injury may cause collagen shrinkage and induce a transient steepening in the central cornea, as in conductive keratoplasty.

In conclusion, we described a rare case of delayed onset transient corneal infiltration and transient myopic shift following a cooking oil burn. Clinicians should keep in mind delayed corneal changes though no ocular abnormalities are observed immediately after thermal ocular surface injury related with cooking oil.

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## Conflict of Interest

No potential conflict of interest relevant to this article was reported.

## References

1. Krachmer JH, Mannis MJ, Holland EJ, editors. *Cornea*. St. Louis: Elsevier Mosby; 2011. p. 1178-80.
2. Black CA. Delayed type hypersensitivity: current theories with an historic perspective. *Dermatol Online J* 1999;5:7.
3. Ogino H, Sakazaki F, Okuno T, et al. Oxidized dietary oils enhance immediate- and/or delayed-type allergic reactions in BALB/c mice. *Allergol Int* 2015;64:66-72.
4. Herbst CP, Papadia M, Neri P. Myopia and inflammation. *J Ophthalmic Vis Res* 2011;6:270-83.
5. Hoffer KJ. Intraocular lens power calculation for eyes after refractive keratotomy. *J Refract Surg* 1995;11:490-3.