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A Case Report of Irregular Corneal Ring Lesion

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Abstract: Corneal ring shape opacity is usually known as corneal immune ring, a stromal infiltrate in ring shape and it has been associated with immune response involving antigen-antibody complex. Here we present a case of irregular ring opacity involving corneal subepithelial layer.
Keywords: Corneal ring, stromal infiltrate

INTRODUCTION

Corneal immune ring also known as Wessely ring. It had been discovered by Wessely during his experimental injection of antigen intrastromally into the cornea of a sensitized rabbit [1]. Subsequently, multiple cases of corneal immune ring with various etiologies have been reported [2-11]. The two main causes are either infection related such as bacterial keratitis, viral keratitis, fungal keratitis, acanthamoeba keratitis or non-infection related such as contact lens- induced and immune ring following phototherapeutic keratectomy[2]. Most of the corneal immune ring cause permanent ring opacity over the cornea. We would like to report a case of corneal ring lesion likely an immune ring which has been treated and completely resolved.

CASE REPORT:

A twenty-three years old woman presented to our ophthalmology department with one month's history of painful red left eye. She was a regular soft contact lenses user without any medical comorbidity. Apart from that, she had bilateral epiblepharon and she regularly trimmed her lower eyelashes. She had sought treatment from a private ophthalmologist prior to presentation and was prescribed with levofloxacin eye drop. The pain slightly improved but the eye redness did not resolve.

Therefore, she came to us for second opinion. The initial examination showed her left eye vision was 6/9 and there was an irregular cornea subepithelial ring opacity on the paracentral 6 o'clock region with the measurement of 3mm horizontally and 2mm vertically. There was also epithelial defect within the ring. The treatment of levofloxacin eye drop was continued and artificial tear was prescribed. Subsequently, the eye redness and pain improved. The epithelial defect healed however the corneal ring opacity persisted. Our impression then was that the corneal ring opacity was scarring due to infection. As for the epiblepharon, she underwent bilateral Hotz procedure.

During follow-up three months later, she complained of discomfort over the left eye. However, our examination did not show any new or worsening eye lesion. The left eye corneal ring opacity remained the same. Thus, we changed our impression that the corneal ring opacity was not a scar but possibly a focus of infection. A cornea scrapping was done and culture showed *corynebacterium diphtheria*. She was started on ointment oxytetracycline and polymyxin B. Her symptoms improved and the corneal ring opacity fainting and shrinking in size and completely resolved over five months' duration.

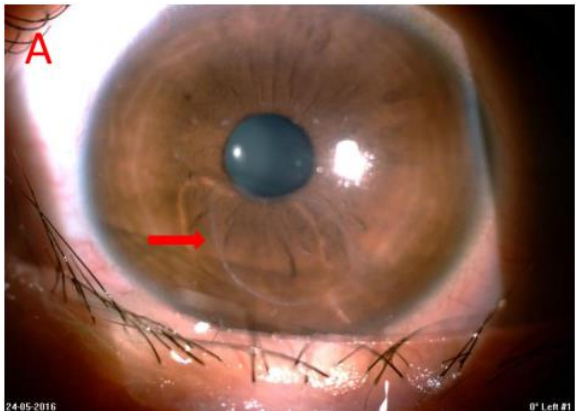

Fig. A: Persistent irregular oval shape corneal opacity after initial treatment with levofloxacin eye drop.

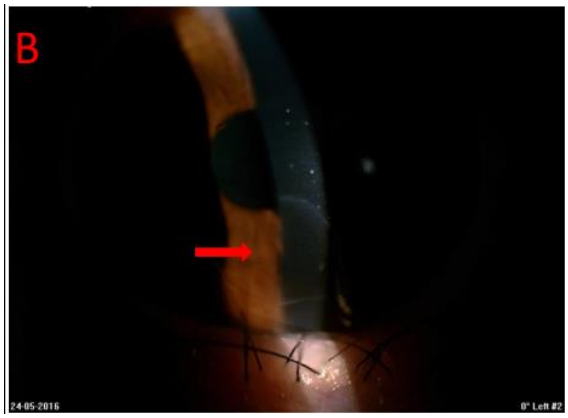

Fig. B: Superficial lesion without stromal infiltrate.

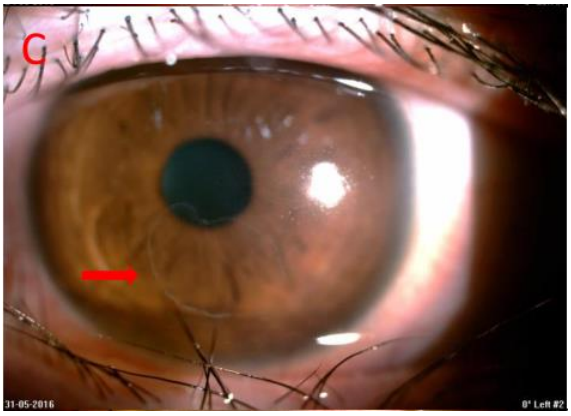

Fig. C: Faded corneal opacity after usage of ointment oxytetracycline and polymyxin B.

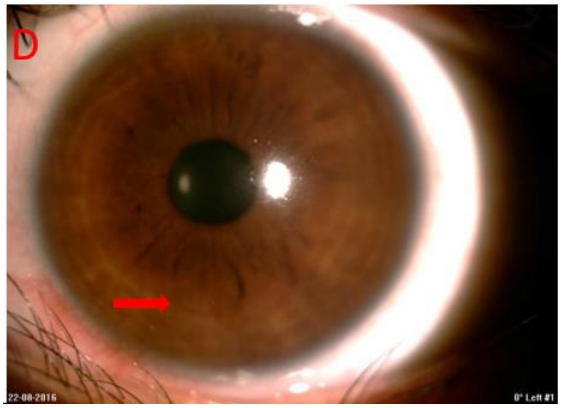

Fig. D: Corneal opacity constricted centripetally.

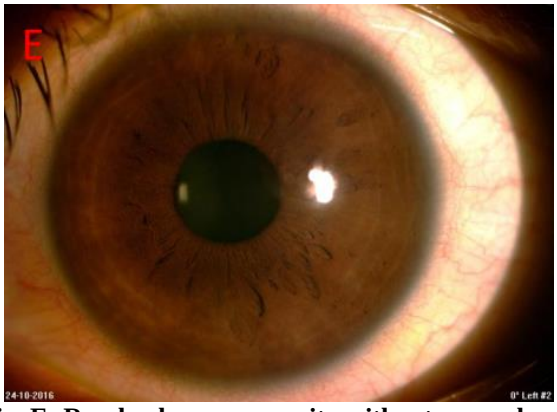

Fig. E: Resolved cornea opacity without corneal scar

DISCUSSION

The exact cause of irregular corneal ring opacity in our patient is unknown. This lesion has different features compared to a classical corneal immune ring. In our patient, the corneal ring opacity is superficial, irregular oval shape with no stromal infiltration, while the classical corneal immune ring is round shape with stromal infiltration.

The possible cause of the corneal ring opacity could be due to bacterial infection as patient was a regular user of contact lenses. This lesion has resistance to the levofloxacin eye drop but it has completely resolved with ointment oxytetracycline and polymyxin B. Even though the cornea scrapping showed *corynebacterium diphtheria*, but it may not be the causative organism of the ring opacity. This is because of the different clinical presentation in our patient as compared to ocular Corynebacterium infection reported by Chandler *et al.;* [12], Eguchi Hiroshi [13] and Rubinfeld *et al.;* [14].

Corneal immune ring secondary to regular contact lens usage could be the next possible cause. Contact lenses and infiltrative keratitis is considered as sterile infiltrate. The infiltrates has been suggested as a result of immune response toward bacterial endotoxin. Other postulated etiologies are hypoxia and immune response to the lenses' material or toxic reaction to the contact lenses' solutions [15]. It usually presents with small, superficial, circular infiltrates [16]. Corneal immune ring had been reported as a complication in patients using soft extended wear contact lenses [6].

Acanthamoeba keratitis mainly presents with corneal ulceration, diffuse stromal infiltration, and ring infiltration. Delayed in treatment usually leads to severe vision loss [9, 17]. In our patient, the cornea ring opacity persisted for three months without treatment but there was no worsening of lesion. Therefore, this etiology is less likely.

Immune stromal keratitis is a common chronic recurrent manifestation of herpes simplex virus [7, 15]. Stromal infiltration is the most common finding and usually present together with stromal edema and stromal haze. None of these three features was noted in our patient and there is no recurrent attack.

There are various different etiologies causing corneal immune ring leading to dilemma in management. Close follow-ups are required to prevent any delay in treatment since corneal immune ring may cause permanent cornea scarring and severe vision loss.

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