

Deposits and Neovascularization After Implantation of Intrastromal Corneal Rings

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CASE PRESENTATION

Nine years ago at the age of 46, a woman underwent the insertion of Intacs (Addition Technology, Inc.) in her right eye for the treatment of keratoconus. The surgeon was relatively inexperienced with this procedure. The patient subsequently noticed a progressive “clouding” with an arcuate shape that became more visible over time.

The patient is referred for further evaluation and management. On examination, the most notable findings are corneal neovascularization and stromal opacification produced by a white material filling a tunnel anterior to the temporal ring segment (Figure). What would you offer to this patient by way of explanation and management?

—Case prepared by Alan N. Carlson, MD.



Figure. Progressive cellular proliferation adjacent to the Intacs segment.

BRIAN S. BOXER WACHLER, MD

The significant findings are lamellar channel deposits and superior neovascularization. The former are benign; they do not affect corneal health but can cause cosmetic concerns. Lamellar channel deposits can sometimes cause glare if the ring segment is located close to the pupil or if the pupil is large. These deposits are more likely to occur in wide versus narrow channels. In the figure, the ring segment is located quite temporally in the periphery, so it is unlikely to be causing glare, which makes the device’s removal medically unnecessary. If the patient is concerned about cosmesis, however, the seg-

ment could be explanted, and some (but probably not all) of the deposits will resorb over time.

The neovascularization appears to be superficial rather than in the channel itself. The absence of stromal opacification in the region of the nasal segment supports this impression. Assuming that the vessels are indeed superficial, I would recommend observation. If they are in the channel, however, then I would consider explanting the nasal Intacs segment.

If the patient wears soft contact lenses, she should use a design with a high oxygen content to avoid oxygen stress that could promote the further growth of blood

vessels. If she is wearing rigid contact lenses, it would be important to verify that they fit well.

PAUL J. DOUGHERTY, MD

The patient is developing late inflammation from a temporal Intacs device in her right eye. Not to be confused with hypocoelular scarring,¹ late bacterial infection,² or channel haze,³ corneal inflammation after the implantation of one of these devices is a poorly described phenomenon, but it is likely a corneal foreign body reaction to the segment that places the patient at risk of corneal melting. In this case, the inflammation probably occurred only at the temporal segment because of its proximity to the limbal vasculature.

I have seen one case of corneal inflammation not associated with vascularization in an inferior channel after epithelium-on corneal collagen cross-linking (CXL; procedure not approved in the United States). CXL was performed 1 week after the implantation of a superior and an inferior ring segment. The patient developed corneal melting and significant irregular astigmatism despite treatment with high doses of a topical steroid and removal of the inferior segment 1 week after CXL. I have also seen a case of bilateral corneal inflammation, superior vascularization, and corneal melting around the temporal Intacs device 1 year after its implantation that required bilateral explantation of the temporal device despite the use of a high-dose topical steroid. The patient maintained the therapeutic effect with the nasal ring segment only.

In this case, I would have the patient begin using a high-dose topical steroid (1% prednisolone acetate hourly while awake) and monitor her closely. At the first sign of melting, I would recommend removal of the temporal ring segment. Assuming her refraction was stable and her BCVA was reasonable, 6 months after the device's explantation, I would consider offering the patient a Visian TICL (STAAR Surgical Company; not FDA approved) if she wished to decrease her dependence on contact lenses. Otherwise, I would offer a rigid gas permeable lens for visual rehabilitation.

BRADLEY D. FOURAKER, MD

The whitish material adjacent to the intrastromal corneal ring is lipid deposited by the stromal keratocytes.^{4,5} The crystals are deposited in the small open space that is formed by the separation of the stromal tissue, and the density of the material is greater the thicker the ring segment. These deposits typically do not extend significantly toward the visual axis; they are most commonly nasal to the Intacs segment rather than in the temporal or anterior area.⁶ The deposits tend to dissipate over

time, but their duration is related to the thickness of the device: the lipid fades less quickly in eyes with the larger ring segment. The deposits neither impair vision nor cause any physiological damage to the cornea. It is worth noting that they tend to dissipate almost entirely after the removal of the Intacs, in case the patient is greatly concerned about the cosmetic appearance of her eye.

The blood vessels have entered through the wound and do not appear to be of any significance. If the vessels continue to grow, they can be removed mechanically, or they can be cauterized with an argon laser at the limbus. ■

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