



Late Onset Interface Calcium Deposition Following LASIK



Angela C. Chen¹, Nathaniel P. Pelsor, OD², Kaidi Wang, MD³, Ben J. Glasgow, MD¹, Anthony J. Aldave, MD¹

¹Stein Eye Institute, David Geffen School of Medicine at UCLA, Los Angeles, CA, USA, ²Talley Eye Institute, Evansville, IN, USA, ³Virginia Mason Medical Center, Seattle, WA, USA

Learning Objectives

To report a novel clinical entity characterized by bilateral calcium deposits in the flap interface following uncomplicated laser in situ keratomileusis (LASIK).

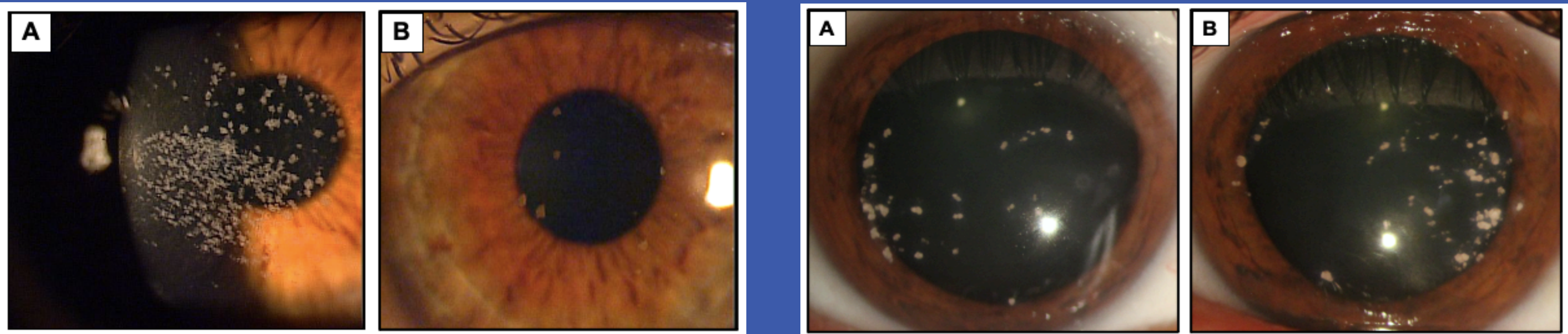
Case Descriptions

- Two unrelated healthy young men who underwent LASIK in both eyes at 20 (case 1) and 44 (case 2) years of age were diagnosed with bilateral, white anterior stromal opacities five years after LASIK surgery.
- Slit lamp examination and anterior segment optical coherence tomography demonstrated that the opacities were located at the level of the LASIK interface in both eyes of both cases, with most opacities located at the temporal edge of the flap in each eye of case 2.
- The deposits resembled dystrophic deposits located in the LASIK flap interface in individuals with granular corneal dystrophy type 2.
- A deposit from case 2 demonstrated birefringence using polarization microscopy and staining with Alizarin red, indicative of calcium bearing crystal.
- The serum calcium level was borderline elevated in case 1 and within normal limits in case 2.

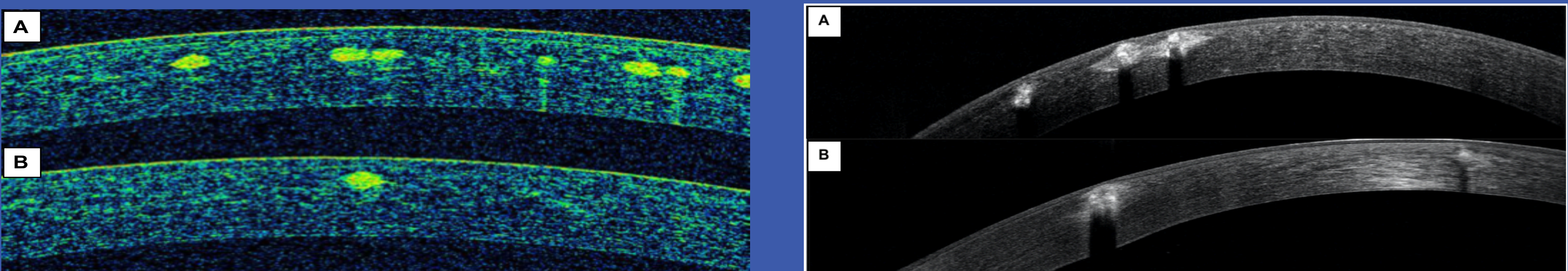
Case 1

Case 2

Slit Lamp Photographs:



Anterior Segment Optical Coherence Tomography Images:



Granular Corneal Dystrophy Type 2 vs. Calcium Deposits in the LASIK interface

	LASIK-exacerbated Granular Corneal Dystrophy Type 2	Calcium Deposits in the LASIK interface
History of corneal opacities prior to LASIK	Yes	No
Family history of a corneal dystrophy	Yes	No
Laterality	Bilateral, may be symmetric or asymmetric	Bilateral, asymmetric
Distribution of opacities in the cornea	Central (axial)	Majority along the flap edges
Characterization of opacities	Stellate-, snowflake-, or icicle-like opacities in the superficial/mid stroma ± lattice lines in the deeper stroma	Larger, white opacities that have thickness, thus elevating the overlapping flap, and with surrounding haze
AS-OCT findings	Variably shaped opacities without significant shadowing posterior to the opacities	Spindle-shaped opacities with shadowing posterior to the opacities due to size and density
Gene involved	TGFB1 (codon 124)	None

Discussion

- Superficial calcific corneal deposition has been associated with ocular surface inflammation, various medications, ocular injury, ocular surgeries, and systemic diseases affecting calcium metabolism.
- Calcium may deposit due to an increase in the local concentration of calcium or phosphorus, an increase in pH, or an alteration in tear osmolality.
- Because the concentrations of calcium and phosphate in the aqueous humor are near solubility limits under physiological conditions, calcium precipitation may be triggered by local changes in pH, sudden evaporation, and/or an increase in the local concentration of either calcium or phosphate ion.¹⁹
- In the individuals reported, perhaps a condition leading to a local increase in ionized calcium resulted in subsequent deposition.

Conclusion

As the etiology and management of calcific and dystrophic interface deposition after LASIK are distinct, it is important for clinicians to differentiate the two entities.