Contact Lens Update
CLINICAL INSIGHTS BASED IN CURRENT RESEARCH

Article Review: Neuropathic corneal pain following LASIK surgery: a retrospective case series

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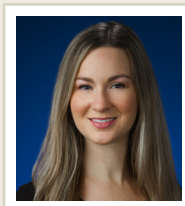

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Moshirfar M, Bhavsar UM, Durnford KM, et al. Neuropathic corneal pain following LASIK surgery: a retrospective case series. Ophthalmol Ther. 2021;10(3):677-689.

While transient symptoms related to dry eye disease following LASIK is common, a small subset of patients may develop neuropathic corneal pain characterized by severe, persistent ocular pain where symptoms are in excess of objective clinical findings. Neuropathic corneal pain may be debilitating, have a significant impact on quality of life, and may lead to worsening of neuropsychiatric conditions. This retrospective case series focuses on the prevalence of neuropathic corneal pain following LASIK, the challenges of diagnosis, potential risk factors for its development, and the necessity of a multi-specialty, individualized approach to management.

Diagnosis and incidence of neuropathic corneal pain following LASIK

Diagnosis of corneal neuropathic pain is challenging due to the variation of symptoms which patients may exhibit, in combination with minimal to no objective clinical findings that support symptomatology. Subjective symptoms include the unifying feature of severe ocular pain which may be chronic or persistent, photophobia, sensitivity to air, and foreign body sensation. Neuropathic corneal pain results not from an acute stimulus that actives nociceptors on the corneal surface, but from alteration to the neurosensory pathway resulting in the sensation of pain. Peripheral or central sensitization, or a combination of both mechanisms may lead to neuropathic corneal pain where in the absence of a stimulus, the cell body and nerve terminal of either the first order (peripheral) or second order (central) neuron display spontaneous activity. Differentiation of central from peripheral sensitization can be determined through the application of a topical ocular anesthetic agent. If following instillation of topical anesthetic, the individual's pain symptoms improve, peripheral sensitization is in part a cause of the individual's pain. Individuals who have no change to their perception of pain following instillation of a topical anesthetic agent have a component of central sensitization. Differentiating peripheral from central sensitization may help to inform treatment.

The development of neuropathic corneal pain following LASIK is rare. In a 26-year period, 18 cases were identified from 16,000 LASIK procedures performed by a single surgeon, or approximately one in 900 cases. The average onset of neuropathic corneal pain following LASIK was 9.6 months, with symptomatic onset ranging between two and 24 months following surgery.

Review of risk factors

Understanding and identifying potential risk factors for the development of neuropathic corneal pain following LASIK may inform and add to the overall risk/benefit analysis in consideration of laser keratorefractive procedures. In this case series of those individuals who developed corneal neuropathic pain following LASIK, 50% of patients had a pre-existing history of treated neuropsychiatric disorder including anxiety, depression, ADHD, panic disorder, and bipolar disorder, 33.3% of patients had a history of an autoimmune condition, 22.2% had a diagnosis of functional pain syndrome, and 27.8% had a history of hypothyroidism. Demographic risk factors for development of neuropathic corneal pain following LASIK included being female and Caucasian. In individuals who developed neuropathic corneal pain, femtosecond laser was used to create the flap in 83.3% and microkeratome in 16.7%. The average age of patients who developed neuropathic corneal pain post-LASIK was 39.5, with a range from 22 to 62 years. All individuals who developed neuropathic corneal pain following LASIK had uncomplicated procedures with unremarkable postoperative course and best corrected post-operative visual acuity of 20/20 in each eye.

Management of neuropathic corneal pain following LASIK

In this case series, management of neuropathic corneal pain included preservative-free artificial tears, topical ocular steroids, and topical ocular immunomodulators, in addition to antidepressants, anti-convulsants, and pain medications. Ten individuals, or 55.6% of the population reported improvement in their symptoms following treatment with an individualized, multi-faceted, multi-specialty approach. Previous studies have identified contact lenses (scleral or soft bandage), vitamin supplementation, and electrical stimulation of the trigeminal ganglion as being beneficial in the management of neuropathic corneal pain. New therapeutic agents which target maintenance, development, and survival of corneal neurons may play a role in management of neuropathic corneal pain, but were not incorporated into the treatment strategy of individuals in this case series. Additionally, co-management of neuropathic corneal pain involves working closely with an individual's psychologist or psychiatrist, clinicians with whom eye care providers may not have existing, well-established relationships.

Bottom Line

Neuropathic corneal pain following LASIK is a rare but debilitating condition. The authors advise on validating patient symptoms of severe ocular pain after LASIK, even in the setting of limited to no evidence of corneal or conjunctival pathology, and consideration of neuropathic corneal pain in the differential diagnosis of these individuals. Risk factors for development of neuropathic corneal pain related to demographics and past medical history should be identified prior to undergoing LASIK. Specific inquiry regarding history of neuropsychiatric conditions, autoimmune conditions, functional pain conditions, and hypothyroidism, with confirmation that individuals with a positive medical history are being actively managed by the appropriate provider(s), should be included in the pre-operative assessment. For individuals who develop neuropathic corneal pain following LASIK, a multi-specialty, individualized approach to treatment is required to maximize long term quality of life.