4.1 Infections after Refractive Surgery
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4.1.1 Introduction

Nearly 1.3 million laser in situ keratomileusis (LASIK) procedures were performed in the United States during the year 2000. Although LASIK is a relatively safe procedure [1, 2], infection can be a rare but sight-threatening complication. Case reports of infection after LASIK have appeared periodically in the literature. A few descriptive reviews that have been published as part of articles reporting new cases recognize the importance of effective management of this potentially serious complication after LASIK [3–7]. In this chapter, we first present a general discussion on infection after LASIK, followed by relevant excerpts from our systematic review of published literature.

Infections after LASIK are rare. Although prophylactic postoperative broad-spectrum antibiotics like fluoroquinolones and tobramycin are routinely prescribed after almost every LASIK case, infections still occur. The frequency of LASIK infection reported in case series varies from 0.02 to 1.5%. Several large LASIK case series have reported no infectious complications. Early onset infections (within 1 week of surgery) are mainly caused by gram-positive bacteria (Staphylococcus aureus). Later onset infections (2–3 weeks after surgery) are mainly caused by atypical mycobacteria (Mycobacterium chelonae). Fungal infections (Candida, Fusarium) are rare and are usually late onset. In few cases, the infections may be polymicrobial.

Patients with infection after LASIK usually complain of pain, decreased or blurry vision, photophobia, irritation, or redness; however as many as 10% may be asymptomatic. Symptoms and signs such as pain, discharge, flap separation, epithelial defects, and anterior chamber reaction are strongly associated with gram-positive infections, and redness and tearing are more common with fungal infections. However, symptoms such as pain, photophobia, decreased vision, and irritation are nonspecific indicators of ocular surface disease, therefore may not have specific association with particular infections (bacterial, mycobacterial, or fungal). Infections after LASIK often present with inflammation in the corneal interface, which can mimic diffuse lamellar keratitis (DLK). Because of the DLK misdiagnosis, many cases may be initially treated with frequent topical corticosteroid therapy, and there may even be a transient improvement in the inflammation. However, unlike DLK, the inflammation associated with infections usually persists despite topical corticosteroids, and worsen with corticosteroid tapering. The appearance of an interface inflammation more than 1 week after LASIK should be presumed to be of an infectious etiology until proven otherwise. Although the DLK infiltrates may also coalesce, any focal infiltrate surrounded by inflammation should be presumed infectious until proven otherwise. Infections presenting early after LASIK are associated with more severe reductions in visual acuity. However, severe visual acuity reductions are more associated with fungal infections than with gram-positive or mycobacterial infections. Therefore, in cases of suspected infection, if no response or worsening is observed despite 7 days of broad-spectrum antibiotics, the possibility of a fungal infection should be considered.

Corneal infiltrates are present in almost all cases of infections after LASIK. The infiltrates are most commonly in the flap interface followed by infiltrates within the lamellar flap. Infiltrates in the stromal bed and flap margins are less common. An overlying epithelial defect may be present in a third of the cases. In most cases, corneal infiltrates are not accompanied by an epithelial defect. This is contrary to the dogma that an epithelial defect is necessary for the diagnosis of an infectious infiltrate. In other types of refractive surgery, epithelial defects usually serve as a portal for organisms to establish infections in the stroma. However, in LASIK patients, creating the lamellar flap may introduce organisms into the stroma, and an epithelial defect may not be necessary for infection to occur. Infection should be suspected if infiltrates are seen in LASIK patients, and antibiotic therapy should be commenced before an epithelial defect occurs. In severe infections anterior chamber reaction or flap melting may occur. Clinical features that should raise the suspicion of infection with mycobacteria after LASIK include a delayed onset of keratitis (>2 weeks after LASIK) and an indolent course. Presenting symptoms can include any of the following: pain, redness, photophobia, decreased vision, a “white spot” in the cornea, a foreign body sensation, and/or mild irritation. Presenting clinical signs include infiltrates in the corneal interface that can be either multiple white granular opacities <0.5 mm in diameter or single white round lesion (0.1–2 mm in diameter).