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CASE REPORT

Bilateral canaliculitis following SmartPLUG insertion for dry eye syndrome post LASIK surgery

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Abstract
Background Dry eyes are a common symptom following LASIK corneal refractive surgery. Treatments include topical lubricants to supplement the tear film, and punctal occlusion to reduce tear outflow. Canaliculitis is a recognised complication of punctal plugs, but has not previously been described following insertion of newer generation semi-permanent intra-canalicular plugs, such as the SmartPLUG.
Methods Case report.
Results We describe a 60-year-old female who underwent bilateral LASIK surgery leading to aggravation of her dry eye syndrome. She was managed with the insertion of semi-permanent intra-canalicular moldable silicone SmartPLUGs. She subsequently developed bilateral canaliculitis requiring bilateral canaliculotomy.
Conclusions To the best of our knowledge, this is the first report of bilateral canaliculitis following intra-canalicular SmartPLUG insertion. This case illustrates that punctal occlusion with the newer generation intra-canalicular plugs carries a risk of canaliculitis and that irrigation is not always effective in removing these devices.

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Keywords Canaliculitis · LASIK · Punctal occlusion · Punctal plugs

Introduction

Dry eyes are a common symptom following LASIK corneal refractive surgery [1]. In a retrospective review of 161 eyes in 101 patients with ocular complaints following refractive surgery, 30% had dry eye syndrome [2]. Treatments include topical lubricants to supplement the tear film, and punctal occlusion to reduce tear outflow [1, 3, 4]. Punctal occlusion can be achieved by permanent destructive methods such as cauterisation; although temporary (e.g. collagen plugs) or semi-permanent (e.g. umbrella-type silicone plugs) treatments are generally preferred [3–6].

Recently, SmartPLUG (Medennium Inc., USA), has become popular for semi-permanent occlusion. SmartPLUG is an innovative device used to occlude the punctum and proximal canaliculus. Inside the ampulla and canaliculus the plug shrinks in length and expands in width to occlude the lumen.

Canaliculitis is a recognised complication of punctal plugs, but has not previously been described following insertion of newer generation intra-canalicular plugs such as the SmartPLUG [5–9]. We report a case of bilateral canaliculitis following SmartPLUG insertion for dry eye post LASIK surgery.

Case report

A moderately myopic 60-year-old female with a pre-existent history of untreated, mild dry eye syndrome underwent uncomplicated bilateral laser in-situ keratomi-

leusis (LASIK). Following successful surgery, her dry eye symptoms were exacerbated, requiring her to use hourly topical lubricants (Celluvisc, Allergan, USA). Despite some improvement, her symptoms persisted and 7 months following LASIK she had bilateral lower lid temporary punctal collagen plugs inserted. These provided a significant benefit; therefore SmartPLUGs were subsequently inserted into both lower lid canaliculi.

Following SmartPLUG insertion her symptoms remained well controlled for 1 year, with only twice daily topical lubricants (Celluvisc); at which stage she developed further ocular discomfort and complained of a mucous discharge predominantly from the right eye. On examination, no cause for her symptoms was noted; in particular there was no mucocele or sign of infection and no evidence of dry eye syndrome. Irrigation of both lower puncti revealed good flow into the nose.

She was reviewed 2 months later at which time pus was seen exuding from the right lower lid punctum, with associated canalicular inflammation, consistent with canaliculitis. She was treated with topical chloramphenicol and oral flucloxacillin. Following several courses of oral antibiotics which failed to resolve the infection, a right sided canaliculotomy was undertaken. Pus was removed per-operatively from the canaliculus, from which Staphylococcus aureus was cultured. The SmartPLUG was not recovered from the canaliculus, and had presumably been flushed through the nasolacrimal duct system during previous irrigation. Since it was felt that the SmartPLUG had led to the right canaliculitis, the left lower canaliculus was again syringed, revealing good flow into the nose.

Within 2 weeks, her right eye infection had resolved. However, a month later she developed left lower lid canaliculitis requiring canaliculotomy. Interestingly, despite two previous successful left lower canaliculus irrigations, the SmartPLUG was recovered from the proximal aspect of the left canaliculus (Fig. 1). Culture of pus from the left canaliculus again produced growth of Staphylococcus aureus. The left sided canaliculitis also resolved within 2 weeks of surgery and the patient's dry eye symptoms have subsequently been controlled with topical lubricants.

Fig. 1 SmartPLUG recovered from left canaliculus

Discussion

To the best of our knowledge, this is the first report of bilateral canaliculitis following SmartPLUG intra-canalicular plug insertion. This case illustrates that punctal occlusion with the newer generation intra-canalicular plugs such as SmartPLUG, carries a risk of canaliculitis. Previous cases have been reported of canaliculitis following insertion of the older generation punctal plugs [7–9].

Intra-canalicular plugs may predispose to infection by leading to stasis or obstruction of tear flow, whereas punctal plugs may lead to the formation of biofilms [5–9]. In addition, despite the fact that punctal/intra-canalicular plugs are designed to be inert, it remains possible that they may act as a foreign body inciting a localised inflammatory reaction, thereby increasing the risk of infection within the canaliculus. It is clear from our case that intra-canalicular plugs may not occlude the lumen sufficiently to prevent patency to irrigation and it remains a concern that SmartPLUGs may not be removed by simple irrigation, despite this being the method recommended by the manufacturers; making it difficult to confirm clinically that the plug has been successfully removed. A recent study has been reported corroborating our findings of canaliculitis and difficulty of removing these plugs by irrigation [10].

Whilst we believe that temporary or semi-permanent occlusion devices have a place in the management of dry-eye syndrome in those subjects where a spontaneous recovery is expected, for others who will require long-term therapy, permanent occlusion or newer therapies such as topical cyclosporin-A, may be safer alternatives.

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