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ORIGINAL INVESTIGATION



Mini-monoka stenting for patients with perennial allergic conjunctivitis

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ABSTRACT

Purpose: To assess the effectiveness of mini-monoka (MM) stenting in treating patients with perennial allergic conjunctivitis (PAC) and punctal stenosis.

Methods: A retrospective case analysis was performed on 20 patients (40 eyes) who suffered from PAC with punctal stenosis who underwent MM (FCI Ophthalmics, Pembroke, MA, USA) stenting.

Results: Nineteen patients (95%) were females, with an age range of 19–66 years (average 40.6 ± 25.4 years). All 20 patients (100% of eyes) had signs of PAC and punctal stenosis. All 20 patients (40 eyes) had received previous topical treatment including steroids. Nineteen patients (95% of eyes) had significant improvement in their allergy symptoms (tearing and conjunctival inflammation) following MM stenting.

Conclusions: Stenosis of the punctum may play a role in the relapsing symptoms in PAC. MM stenting is a simple, safe, effective, and relatively non-invasive treatment option for the management of PAC in the presence of punctal stenosis.

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Mini-monoka stenting; allergic conjunctivitis; chronic allergic conjunctivitis; perennial allergic conjunctivitis; punctal stenosis

Introduction

At least 20% of the population are annually affected by ocular allergy, and the incidence is increasing every year.^{1–4}

The most common forms of ocular allergy include seasonal allergic conjunctivitis (SAC) and perennial allergic conjunctivitis (PAC).⁵ The specific allergens to which the patient is allergic differ between these groups. SAC is usually caused by airborne pollens, and signs and symptoms usually manifest in the spring and summer, generally subsiding during the winter months. PAC, as the name implies, can occur throughout the year with exposure to perennial allergens (dust mites, fungi, animal epithelial, and/or occupational allergens).⁵

The signs and symptoms of PAC include ocular pruritus, redness hyperemia, tearing, watery discharge, burning, and conjunctival chemosis. Eyelid edema is also common. Symptoms are usually bilateral. The diagnosis of PAC is clinical, based upon a suggestive history and consistent signs and symptoms.^{5,6}

Acquired punctal stenosis may result from a variety of causes.⁷ Chronic inflammation has been widely identified as a cause of acquired punctal stenosis.^{7,8}

Patients who are suffering from frequent episodes of allergic conjunctivitis are often treated with topical medications including artificial tears, anti-histamines, and steroids, which may exacerbate the punctal stenosis.^{7,9}

The purpose of this study was to assess the efficacy of mini-monoka (MM) stenting in patients suffering from PAC and punctal stenosis.

Methods

A retrospective case analysis was performed on 40 eyes of 20 patients who suffered from PAC with punctal stenosis who underwent MM stenting. The study was approved by an Institutional Review Board and adhered to the current declaration of Helsinki.

Results

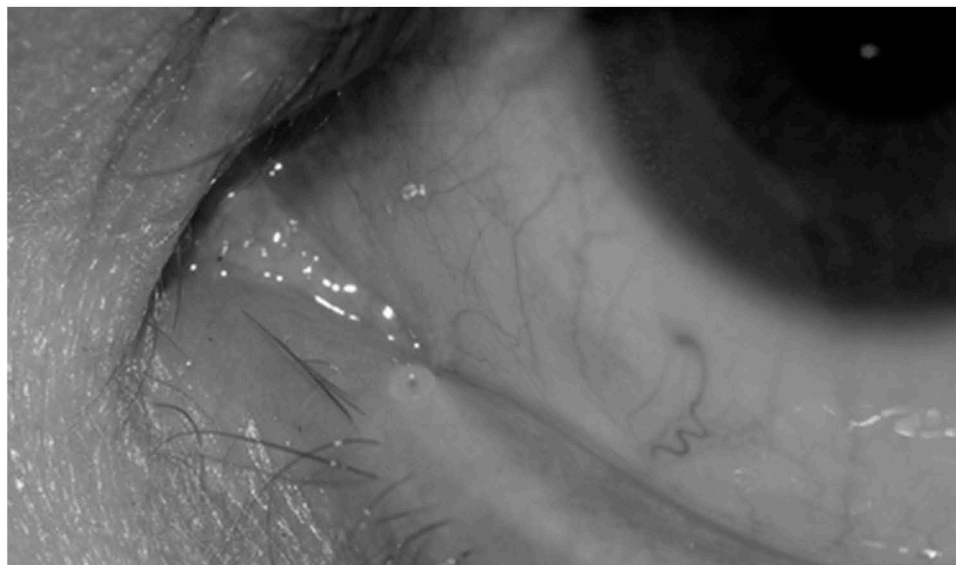
Clinical findings

Ninety-five percent of the patients were females. Mean age of the patients was 40.6 ± 25.4 years (range 19–66 years).

Clinical presentation included various combinations of conjunctival hyperemia, chemosis, epiphora grade 3–4 according to the Munk scale¹⁰, mild photophobia, pruritus, and eyelid edema. Hundred percent of affected eyes with PAC also had punctal stenosis with external lacrimal punctum (ELP) grade 2 according to the Kashkouli et al.¹¹ ELP grading. Signs and symptoms occurred throughout the year with exposure to perennial allergens and no seasonal, climate, or atopic variation.



(a)



(b)

Figure 1. (A) mini-monoka insertion (B) mini-monoka head (plug).

Treatment history

All 40 eyes in our study had received previous topical treatments for PAC. Topical therapies included topical glucocorticoids (95% of eyes), antihistamine/vasoconstrictor combination products (20% of eyes), and topical immunosuppressive drugs (5% of eyes). Hundred percent of patients in our study suffered from persistent symptoms from their allergic conjunctivitis without relief even after prolonged therapy with various topical treatments.

Mini-monoka

All patients underwent MM insertion without incisional punctoplasty under local anesthesia by an oculoplastic surgeon (MEH). The MM silicone stent (FCI Ophthalmics, Pembroke, MA, USA) consists of a silicone tube with an outside diameter of 0.64 mm, a head (plug) that ensures stable meatic fixation of the probe. The head consists of an oval collarette, a hollow body linking the collarette to the bulb, and a bulb fixed to the silicone tube (Figure 1). The MM

comes with a long silicone tube which is usually cut to a length of 10–15 mm as the punctal portion and proximal canalicular portion are most crucial for this condition. Following punctal dilation, the MM is threaded into the punctum and canaliculus. The plug head is inserted by applying gentle force with a forceps or a punctal probe. A standard punctoplasty incision is not necessary.^{12–14}

Outcomes

Thirty-eight of 40 eyes (95% of patients) had significant improvement in their symptoms secondary to PAC following this procedure. The follow-up period after the MM insertion ranged from 10 to 22 months (average of 18 months). Earliest stent removal was at 3 months from the date of surgery. In all patients, stent was removed under topical anesthesia in office settings. There was no use of topical therapy while MM was in place. Forty eyes (100% of patients) had punctal stenosis which resolved completely after the MM insertion. Improvement in symptoms was demonstrated as follows: 24 eyes (60% of patients) exhibited chronic papillae pre-insertion; following insertion of MM, only 2 eyes (5%) continued to demonstrate papillae. Thirty-two eyes (80%) suffered from conjunctival hyperemia; following insertion of MM, hyperemia resolved in all but one patient. Twenty-eight eyes (70%) suffered from chronic tearing which resolved completely after the MM treatment, with Munk scale¹⁰ grade 0 for all patients. None of the patients had any postoperative complications due to the stent. We assume the patients continued to do well after the follow-up period, as they generally tend to return if symptoms recur.

Discussion

The immunopathology of PAC is complex. Previous studies have shown a high frequency of associated atopic history, raised serum and tear IgE levels, increased tear histamine concentration, and the presence of eosinophils and degranulated mast cells in the conjunctiva in patients with allergic conjunctivitis.^{15,16} In addition, variations in the cytokine profile have been reported in allergic eye disease.¹⁷

In contrast to other allergic diseases, there is no standard algorithm in the treatment of PAC. Topical treatments which our patients received for PAC included vasoconstrictor/antihistamine combinations, glucocorticoids, and immunosuppressive agents.⁹

Sanchez et al.⁹ reviewed the management of allergic conjunctivitis. They recommended minimizing contact

of the causal allergen with the conjunctiva and controlling the symptoms produced by the allergic inflammatory process. The authors also discussed different drugs or combinations of drugs that can be used for the treatment of symptoms – including topical antihistamines, topical corticosteroids, and immunosuppressive.

Topical medications containing both an antihistamine and a vasoconstrictor are widely available without a prescription. These topical medications might be beneficial in the short term or for episodic use only. In our cases, these medications had little, if any, continued effect over time, and regular use for longer than 2 weeks can often lead to rebound hyperemia secondary to the vasoconstrictor component.^{9,18}

Immunosuppressive drugs such as topical cyclosporine and tacrolimus have been used off-label and in highly varied dosing schedules and concentrations for persistent ocular allergic disease.^{19–21} While these agents may be potentially effective in controlling allergic conjunctivitis, there are no clear guidelines for the use of these agents, and efficacy data from randomized trials comparing them with topical glucocorticoids are lacking.⁹

Topical glucocorticoid preparations may be helpful in controlling symptoms in refractory patients. However, prolonged steroid use can lead to potentially serious side effects that can be vision threatening, and their use should be supervised closely by an ophthalmologist. Topical glucocorticoids should only be used for short courses of therapy of a maximum of 2 weeks duration. If necessary, the treatment course with topical steroids can be extended but only under close supervision by an ophthalmologist with regular follow up. Ocular side effects from glucocorticoids include cataract formation, elevated intraocular pressure, glaucoma, and secondary infections.⁹

Mantelli et al.²² discussed the changes in the ocular surface following chronic use of preservative-containing eye drops. They report that long-term use of topical therapies may induce ocular surface allergic reactions, dry eye-like reactions, and epithelial damage causing progressive ocular discomfort. Patients suffering from PAC require long-term topical treatments, and may be at higher risk of suffering from toxic effects from preservative-containing drops. Therefore, preservative-free topical steroids can be useful in these situations.²²

In light of this concern of exacerbating PAC with a toxic allergic reaction, 20% of patients in our study received preservative-free glucocorticoids drops.

It is quite possible that the long term-use of preservatives contained in topical medications contributed to the signs and symptoms in our patients. The topical preservative effect is dose and time dependent and all

of our patients had received prolonged therapy.²³ This in turn may have also contributed to the development of punctal stenosis as a toxic allergic response.⁷ However, even when patients in the study received preservative-free topical therapies, they only achieved permanent relief of their symptoms with MM stenting.

Kashkouli et al.⁷ investigated the causes of acquired external punctal stenosis, and found chronic inflammation to be a significant cause of punctal stenosis. Chronic inflammation as seen in PAC could result in inflammatory membrane formation, conjunctival epithelial overgrowth, and keratinization of the walls of the punctum, thereby contributing to the punctal stenosis we observed.

To our knowledge, the connection between punctal stenosis and persistent, relapsing PAC has not been previously discussed.

In patients with PAC who present with punctal stenosis, we believe that the stenosis of the punctum plays a major role in the relapsing symptoms of the disease. The lack of clearance of inflammatory mediators may cause a worsening cycle of inflammation and stenosis. Patients with PAC may develop toxic effects from using multiple preservative-containing drops. Therefore, preservative-free topical steroids can be useful in these situations.

Basic principles guiding the treatment of punctal stenosis include: creating an appropriate opening, maintaining the position of the punctum against the lacrimal lake, enhancing tear access from the lacrimal lake to the opening of the punctum, and preserving lacrimal pump functioning.¹²

We performed a non-incisional stenting with MM tube insertion to prevent re-stenosis. We prefer this method over the standard snip punctoplasties as it is an atraumatic method to enlarge the punctum. We prefer to not incise the punctum in the presence of significant conjunctival inflammation. Finally, it is possible the small silicone tube attached to the Monoka plug facilitated tear flow through the canaliculus which may play a role in the early relief of symptoms.

Conclusion

Hundred percent of the patients (40 eyes) in our study had punctal stenosis which resolved completely after the MM insertion. Subsequently, 95% of our patients (38 eyes) had significant improvement in their PAC symptoms after this procedure. These symptoms included conjunctival papillae, hyperemia, and tearing. Prior to MM insertion, 60% of patients suffered from chronic papillae; 80% suffered from hyperemia; 70% suffered from chronic tearing. After the insertion of

MM, only 5% of patients continued suffering from papillae, only 5% continued to have hyperemia, and in 100% of patients, the chronic tearing resolved completely.

The presence of punctal stenosis and PAC is comparable to the chicken or the egg question. Does punctal stenosis lead to the inflammatory condition due to decreased tear outflow? Or does the inflammation of the conjunctiva cause the puncta to become stenotic? While it may be difficult to determine what was primary and what was secondary, in our opinion, once punctal stenosis occurs, it worsens the inflammatory cycle in the eye.

This study has several limitations. First, it was retrospective with a non-uniform system for categorizing symptom severity. Patients were examined by several different physicians over a period of time. The decision and timing of placing the MM stent was not standardized. Treatment regimens were also not uniform prior to MM placement. Once patients failed to improve on topical treatment regimens, they were referred for MM stenting.

However, even with all these limitations, we feel that the overwhelmingly positive outcomes were a direct result of inserting a MM stent. All of the patients in our study had severe allergic conjunctivitis with symptoms readily apparent to both patient and physician. It was also quite obvious to both patients and physicians that prolonged relief with various topical regimens, including steroids, was not achieved. Some patients may have also suffered from toxic allergic conjunctivitis due to multiple topical medications. Ultimately, they only achieved relief with MM stenting. Once patency was re-established in the punctum, both physician and patient noted the obvious reduction in redness and tearing, and topical medications were subsequently discontinued. Further prospective studies might establish a standard treatment regimen and optimal timing of MM placement in these patients. Our preliminary experience suggests that that MM stenting is a safe, effective, simple, and relatively non-invasive treatment strategy for the management of PAC in the presence of punctal stenosis.

Disclosure statement

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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