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Idiopathic edematous punctal stenosis with chronic epiphora: preponderance in young women

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Abstract
Purpose To describe a previously unreported phenomenon of idiopathic edematous punctal stenosis (IEPS) with chronic epiphora, presenting almost exclusively in young female patients.
Methods A review of patients who presented with chronic epiphora and edematous punctal stenosis of unknown cause (IEPS) at the outpatient clinic of Soroka Medical Center between August 2011 and August 2015. Associated findings from clinical examination were recorded.
Results A total of 32 patients with IEPS were documented. There were 30 female and 2 male patients. Average age at diagnosis was 37.6 ± 13.4 years, range 19–63 years, median 35 years. Temporary alleviation of symptoms was reported in subjects treated with topical steroids (43.8%), tacrolimus ointment (15.6%), and matrix metalloproteinase inhibitors (3.1%). No improvement in symptoms was reported in 37.5% of patients. Symptoms were bilateral in 78.1% of the patients. Spontaneous resolution was achieved in only 6.3% (2/32).
Conclusions IEPS accompanied by chronic epiphora has not been characterized to date. Our data show a clear predominance of females, most of them in their fertile years.

Keywords Epiphora · Punctum · Edema · Women · Inflammation

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Introduction

Acquired punctal stenosis with excessive epiphora is a fairly common condition, ranging in incidence from 8 to 54.3% [1, 2]. It can result from numerous causes, including infections [3], trauma of the eyelid, tumors, lid malposition, blepharitis, aging, fibrosis secondary to insertion of a punctal plug, and autoimmune diseases [2, 4–7]. It has also been attributed to the toxic effect of some topical [8] and systemic medications, notably docetaxel (Taxotere, Aventis, Collegeville, PA) [9].

To our knowledge, the entity of idiopathic edematous punctal stenosis (IEPS) is a phenomenon that has not been characterized. We reviewed patients from our ophthalmology outpatient clinic who presented with chronic epiphora and edematous punctal stenosis. It was usually accompanied by conjunctival hyperemia, with no symptoms of itching or signs of chemosis.

Methods

A retrospective review of charts from the ophthalmology outpatient clinic of Soroka University Medical Center (SUMC), Israel, was conducted. Patients were predominantly from an urban environment. Data were collected on age, gender, follow-up time, results of complete eye exam using slit-lamp biomicroscopy, visual acuity (VA), medical history, topical and systemic treatments, and chlamydia culture results if available. All patients were examined by either Dr. A.S. or Dr. E.T., oculoplastic specialists.

Included in the review were patients with constant chronic epiphora lasting more than 3 months, both indoors and outdoors, accompanied by edematous punctal stenosis. Exclusion criteria included congenital canalicular obstruction, non-edematous puncti, allergic conjunctivitis, history of dacryocystitis, positive conjunctival microbial PCR results for C. trachomatis, signs of corneal dryness, inflammatory systemic diseases, previous treatment with topical eye drops, any previous chemotherapy treatment, and local irradiation.

The level of punctal stenosis was evaluated clinically by a visual grading system for the assessment of external lacrimal punctum, as described by Kashkouli et al. [4, 10].

The study was conducted in accordance with the Helsinki Declaration and the Soroka University Medical Center Institutional Review Board approval was obtained. Informed consent was not required.

Statistical analysis

The data were presented as categorical and count variables. The categorical data were expressed as the number and percent of patients in each category; the count variables were expressed as mean and standard deviation. Statistical analyses were performed with SPSS/WIN version 22 (SPSS Inc., Chicago, IL, USA).

Results

The charts of 32 patients with idiopathic edematous punctal stenosis seen in SUMC clinics between August 2011 and August 2015 included 30 females and 2 males; average age at diagnosis 37.6 ± 13.4 years, median age 35, range 19–63 years; mean follow-up time 11.2 ± 9.4 months, range 3–48 months, median 8.5 months.

Punctal involvement was bilateral in 25 of the 32 patients (78.1%) and unilateral in 7 patients: 5 (15.6%) in the right eye and 2 (6.3%) in the left eye. In all cases, the level of edema was the same in both the lower and upper puncta.

Conjunctival hyperemia was present in two-thirds of cases (22/32). Based on a grading system devised by Kashkouli et al. [4, 10], edematous punctal stenosis severity was recorded as grade 2 in 19 (59.4%) (defined as less than normal size but recognizable punctum) and grade 1 (Figs. 1, 2) in 13 (40.6%) patients, (papilla is difficult to recognize). History of drug or systemic allergy was reported in 6 cases (18.8%). Spontaneous resolution occurred in only 2 patients (6.3%). Nine of the 30 women (28.1%) were taking oral contraceptive pills, which they had begun months or years prior to the appearance of symptoms. Under slit-lamp examination, all patients exhibited normal tear breakup time with clear cornea, and none reported itching or had signs of chemosis. Lacrimal system irrigation was performed in 7 patients with grade 1 punctal stenosis and was patent to irrigation in all of them. Additional clinical data are summarized in Table 1.

Topical and systemic treatments are summarized in Table 2. All patients were initially treated with topical steroid eye drops for edema. Antibiotics were occasionally given initially as an infectious cause was suspected. Twenty-five patients (78%) also received topical antibiotics, and 16 (50%) were treated with

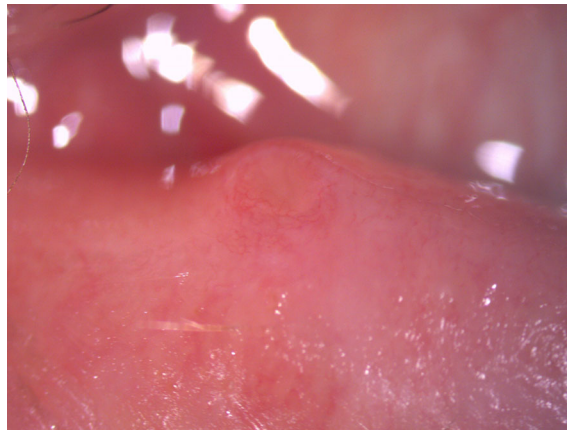

Fig. 1 Severely stenotic and edematous lower punctum. Note the conjunctival hyperemia

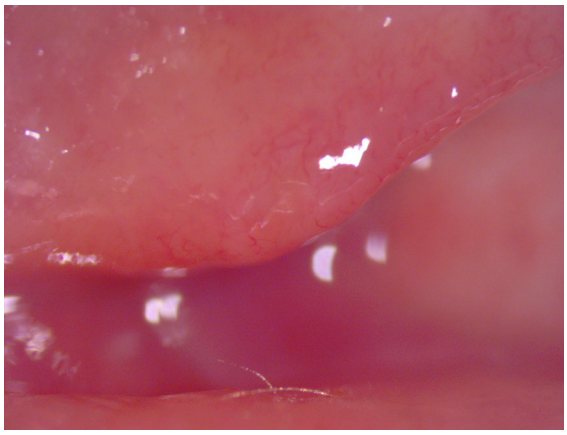

Fig. 2 Everted upper lid showing severely stenotic and edematous upper punctum and absence of punctal pit. No discharge or follicles is observed

Table 1 Clinical data of the 32 patients with idiopathic edematous punctal stenosis and chronic epiphora

Clinical data	*n* (%)
Gender	
Male	2 (6.3)
Female	30 (93.8)
Involved eyes	
Bilateral	25 (78.1)
Right eye	5 (15.6)
Left eye	2 (6.3)
Refractive alleviating treatment	
Topical steroids	14 (43.8)
Topical tacrolimus	5 (15.6)
Systemic MMPI	1 (3.1)
None	12 (37.5)
Conjunctival hyperemia	22 (68.8)
Spontaneous resolution	2 (6.3)
Smoking	6 (18.8)
Use of OCP[a]	9 (28.1)
History of allergy	6 (18.8)

MMPI matrix metalloproteinase inhibitors, *OCP* oral contraceptive pills

[a]Results apply to all 32 patients, including the two male patients

tacrolimus 0.03% ointment based on its anti-inflammatory properties. Temporary alleviation of symptoms was considered as treatment success, in which clinical resolution of epiphora and puncti appearance

Table 2 Topical and systemic treatments of the 32 patients with idiopathic edematous punctal stenosis and chronic epiphora

Treatment	*n* (%)
Topical	
Steroids	32 (100)
Antibiotics	25 (78.1)
Tacrolimus	16 (50)
Mast cell stabilizers	3 (9.4)
Antihistamines	2 (6.3)
Systemic MMPI	3 (9.4)

MMPI matrix metalloproteinase inhibitors

restitution to its original state without edema (grade 3) for a period of over 1 month was reported in 14 of the 32 patients (43.8%) who were treated with topical steroids, in 5 (15.6%) who used tacrolimus ointment, and in one patient (3.1%) after matrix metalloproteinase inhibitors. No improvement in symptoms with treatment—treatment failure, defined as residual edema and/or epiphora, reported in 12 of the 32 patients (37.5%), where punctal edema and stenosis remained without change.

Discussion

Chronic epiphora is a common complaint frequently encountered by ophthalmologists, especially those in oculoplastic practice. It is a potentially disabling and bothersome condition affecting daily functioning. Punctal stenosis, which causes chronic epiphora, has various known etiologies, but none of the known causes were found in the series of cases described here. Therefore, they were initially described as idiopathic. Although a biopsy would help confirm that this condition is idiopathic, it was not really relevant to perform in our cases as discussed below.

We used the grading system for external punctal stenosis than that described by Kashkouli et al. [4, 10]. However, the Kashkouli classification, while an excellent system to standardize grading of punctal stenosis, it may be less relevant since the grading assessment is also based on exudation, atresia or fibrosis, and no evaluation of punctal edema.

Reddy et al. [11]. reviewed 36 conjunctival biopsies in patients with presumed idiopathic punctal stenosis which underwent histopathological and/or direct immunofluorescence examination to determine underlying etiologies. Even though 11 biopsies demonstrated findings consistent with underlying immunological disorders, there was no description of whether punctal stenosis was edematous or only atresic due to cicatrizing disease. Furthermore, in this study biopsy was taken from tissue adjacent to the puncta, not the puncta itself, which in our cases would potentially cause more damage.

Lacrimal system irrigation was performed in only 7 of the 32 patients, because performing such a procedure in the swollen state of the puncta would cause great discomfort to the patient. In addition, the clinical appearance of the edematous puncta in our cases, subsequent resolution of epiphora and the decrease in edema after treatment may imply that the obstruction of the lacrimal system was at the punctal level and not further down. In IEPS, the punctum is clearly edematous, and therefore initial treatment was directed at reducing the edema, and this is best achieved using topical steroids. Additional treatment modalities such as punctoplasty and silicone intubation were considered in patients with severe punctal stenosis. However, such surgical interventions were not performed by the time the study was completed. Once edema resolved and there was no longer epiphora, there was no indication to perform lacrimal irrigation since patients were asymptomatic.

The finding of conjunctival hyperemia in two-thirds of the patients was not surprising since delayed tear clearance is associated with ocular surface inflammation [12]. The excessive epiphora may have set up a vicious cycle that exacerbated existing inflammation. Another explanation for the punctal edema and stenosis could be a generalized inflammatory condition involving the conjunctiva and puncti, or canalicular mucosal inflammation which was not advanced enough to the point of canalicular fibrosis and complete punctal obstruction.

The 6 patients (18%) in our study with a history of allergy did not constitute strong support for a direct relationship between IEPS and allergic conjunctivitis. While nearly half (43.7%) of the patients who were treated with topical steroids appeared to have symptomatic relief, in all cases relief was temporary and recurrences were common. Treatment was empirical in all patients, with steroids usually given as a first-line treatment. If they failed, treatment was typically switched to tacrolimus.

Ocular allergies are divided into acute (seasonal and perennial) and chronic (vernal, atopic, and giant papillary) [13, 14]. General allergic symptoms, such as itching, chemosis, stinging and giant papillary reaction, were not present in our patients, nor was there evidence of chronic exposure to antigenic stimuli. All patients stated that no recent changes were made to their daily routine. This is often seen in cases of allergic dermatoconjunctivitis where keratinization of the eyelid with punctal stenosis and edema are present [15]. Although 18.7% of our patients described past allergies, a diagnosis of allergic conjunctivitis in our patients was unlikely since none of the aforementioned symptoms were present.

One of the differential diagnoses was canaliculitis. The presenting symptoms of canaliculitis include epiphora, redness, and thickening of the canalicular portion of the eyelid margin. However, the erythema is quite noticeable and often there is pain, swelling of the eyelid and punctal regurgitation of canalicular contents, including discharge [3]. While topical steroids may temporarily improve symptoms, full resolution will only be achieved with curettage. This was not the case with our patients.

Ali et al. [16] presented a case series of idiopathic canalicular inflammatory disease that was demonstrated with ocular coherence tomography as a narrowing of the vertical canaliculus and mucosal edema. Although the canalicular inflammatory disease may appear clinically similar to IEPS at first, all patients progressed to end-stage disease with complete cicatricial closure of the puncta and canaliculi in spite of early recognition, treatment with steroids and mini-monoka punctal dilatation. In contrast, our patients responded well to steroids and tacrolimus or the disease was self-limited.

Old age is considered a risk factor for punctal stenosis, with increased prevalence reported in patients 40 years of age and older [2, 4, 17], and the majority of cases below 70 years of age [18]. The mean age of our cohort was 37.6 $\pm$ 13.4 years and the range 19 to 63 years, markedly lower than previously reported. Two patients experienced spontaneous resolution of the symptoms. It is possible that the disease process is ultimately self-limiting, and thus such an entity is not observed in older individuals. History of

cigarette smoking also did not seem to be a risk factor for IEPS since only 18% (6/32) were documented smokers.

The literature describes a mostly female predominance in punctal stenosis (63–71%) [4, 17–19], although Bukhari found no gender predilection [2]. The overwhelming female preponderance in our study, 93.8%, has not been reported in previous studies, perhaps because they included other etiologies of punctal stenosis while we included only IEPS. The reason for the female predominance is unknown, but could potentially be related to hormonal changes. The high percentage of female patients in their fertile and perimenopause years [20] further suggests a potential hormonal relationship. However, a relationship between oral contraceptives and symptoms was inconclusive since only 9 out of 30 female patients had begun using them months to years prior to the onset of symptoms.

One limitation of this study is its retrospective nature. A prospective trial may include all patients presenting with punctal stenosis and then selecting out those with clinically evident IEPS. Other limitations due to the retrospective nature of this study are missing or incomplete data (age not specified in 3 patients and no follow-up in 2 patients), no imaging except color photography, and lacrimal system irrigation performed in only 7 of the patients.

We presented a large group of patients that consisted almost exclusively of young females of reproductive age, suffering from chronic epiphora with edematous punctal stenosis. This condition is usually accompanied by conjunctival hyperemia, without the usual signs and symptoms of allergy. No etiology of an acquired punctal stenosis was found in any of the cases. While the most common form of punctal stenosis is idiopathic, in our case series, we describe a more specific condition of edema of the punctum, based on clinical findings. To our knowledge, this phenomenon has not been previously reported in the literature. Further, studies are required to elucidate the pathogenesis of this newly described IEPS phenomenon and develop the most suitable treatment.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

References

1. Mainville N, Jordan DR (2011) Etiology of tearing: a retrospective analysis of referrals to a tertiary care oculoplastics practice. Ophthalmic Plast Reconstr Surg 27:155–157
2. Bukhari A (2009) Prevalence of punctal stenosis among ophthalmology patients. Middle East Afr J Ophthalmol 16:85–87. https://doi.org/10.4103/0974-9233.53867
3. Freedman JR, Markert MS, Cohen AJ (2011) Primary and secondary lacrimal canaliculitis: a review of literature. Surv Ophthalmol 56:336–347. https://doi.org/10.1016/j.survophthal.2010.12.001
4. Kashkouli MB, Beigi B, Murthy R, Astbury N (2003) Acquired external punctal stenosis: etiology and associated findings. Am J Ophthalmol 136:1079–1084. https://doi.org/10.1016/S0002-9394(03)00664-0
5. Altan-Yaycioglu R, Canan H, Sizmaz S et al (2010) Nasolacrimal duct obstruction: clinicopathologic analysis of 205 cases. Orbit 29:254–258. https://doi.org/10.3109/01676831003739699
6. Soiberman U, Kakizaki H, Selva D, Leibovitch I (2012) Punctal stenosis: definition, diagnosis, and treatment. Clin Ophthalmol 6:1011–1018. https://doi.org/10.2147/OPTH.S31904
7. Ali MJ, Mishra DK, Baig F et al (2015) Punctal stenosis: histopathology, immunology, and electron microscopic features—a step toward unraveling the mysterious etiopathogenesis. Ophthalmic Plast Reconstr Surg 31:98–102
8. McNab AA (1998) Lacrimal canalicular obstruction associated with topical ocular medication. Aust N Z J Ophthalmol 26:219–223
9. Esmaeli B, Valero V, Ahmadi MA, Booser D (2001) Canalicular stenosis secondary to docetaxel (taxotere) a newly recognized side effect. Ophthalmology 108:994–995. https://doi.org/10.1016/S0161-6420(00)00640-0
10. Kashkouli MB, Nilforushan N, Nojomi N, Rezaee R (2008) External lacrimal punctum grading: reliability and interobserver variation. Eur J Ophthalmol 18:507–511
11. Reddy AK, Baker MS, Maltry AC et al (2017) Immunopathology and histopathology of conjunctival biopsies in patients with presumed idiopathic punctal stenosis. Br J Ophthalmol 101:213–217. https://doi.org/10.1136/bjophthalmol-2015-308291
12. Prabhasawat P, Tseng SC (1998) Frequent association of delayed tear clearance in ocular irritation. Br J Ophthalmol 82:666–675. https://doi.org/10.1136/bjo.82.6.666
13. Bielory L (2000) Allergic and immunologic disorders of the eye. Part II: ocular allergy. J Allergy Clin Immunol 106:1019–1032. https://doi.org/10.1067/mai.2000.111238
14. La Rosa M, Lionetti E, Reibaldi M et al (2013) Allergic conjunctivitis: a comprehensive review of the literature. Ital J Pediatr 39:18. https://doi.org/10.1186/1824-7288-39-18
15. Yanoff M, Duker JS (2013) Conjunctivitis: infectious and noninfectious. In: Rubenstein JB, Tannan A (eds) Ophthalmology. Elsevier, New York, p 1432
16. Ali MJ (2018) Idiopathic canalicular inflammatory disease: new disease description of clinical patterns, investigations, management, and outcomes. Ophthal Plast Reconstr Surg. https://doi.org/10.1097/IOP.0000000000001064

17. Viso E, Rodríguez-Ares MT, Gude F (2012) Prevalence and associations of external punctal stenosis in a general population in spain. Cornea 31:1240–1245. https://doi.org/10.1097/ICO.0b013e31823f8eca
18. Nemet AY (2014) The etiology of epiphora: a multifactorial issue. Semin Ophthalmol 00:1–5. https://doi.org/10.3109/08820538.2014.962163
19. Offutt WN, Cowen DE (1993) Stenotic puncta: microsurgical punctoplasty. Ophthal Plast Reconstr Surg 9:201–205. https://doi.org/10.1097/00002341-199309000-00006
20. Menopause—National Library of Medicine—PubMed Health. http://www.ncbi.nlm.nih.gov/pubmedhealth/PMHT0023140/. Accessed 6 Sep 2015