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Case Report

Supernumerary lacrimal puncta: A case report

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ABSTRACT

Supernumerary lacrimal puncta are rarely reported, though they are not exceptionally rare. We propose to present a case of intermittent tearing (epiphora) which on slit-lamp examination revealed unilateral three lower lacrimal puncta, only one of which remains functional.

1. Introduction

Supernumerary puncta, punctum reduplication, accessory puncta and double puncta are all terms to define more than one lacrimal punctum, a congenital anomaly which is under-reported. Only 22 cases had been documented till 1901, as reported by Schoute.[1] It is estimated that 11 in every 60,000 people have supernumerary puncta.[2,3] They are often overlooked during slit lamp examination because of their subtle appearance and they usually have an asymptomatic profile.[4]

The main lacrimal gland, a serous acinar gland, is divided into two lobes by the lateral expansion of the aponeurosis of the Levator Palperal Superioris muscle into a palpebral lobe and the main orbital lobe. Excretory ducts pass from the main lobe into the palpebral lobe from which 10-12 ducts continue downwards emptying into the conjunctival fornix. The lacrimal drainage system comprises of the upper and lower puncta, lacrimal canaliculus, the lacrimal sac and the naso-lacrimal duct. The lacrimal puncta are located at the summit of lacrimal papillae, which are at the junction of ciliary and lacrimal portions of lid margins.

They have a diameter of approximately 0.3 mm and are located about 6.5 mm (lower punctum) and 6.0 mm (upper punctum) from the medial canthus. Normally they are not visible unless lids are everted. The canaliculi pass vertically for about 2 mm, then turn medially at right angles to run horizontally for 8 mm. In about 90% of population, the two canaliculi join to form a common canaliculus. A small mucosal flap named valve of Rosenmuller overhangs the junction of the common canaliculus with the lacrimal sac. The lacrimal sac measuring about 10-12 mm lies in the lacrmal fossa formed by the lacrimal bone and frontal process of maxillary bone. It continues inferiorly into the naso-lacrimal duct (12-18 mm) which runs downwards, backwards and laterally to open into the inferior nasal meatus, being partially covered by a mucosal fold, valve of Hasner.

The lacrimal apparatus is derived embryologically from the surface ectoderm. Lacrimal gland is formed from around 8 cuneiform epithelial buds (cords) arising from the conjunctival sac by the end of 2 months of gestation. Neural crest cells aggregate at the tip of the buds and differentiate into acini while vaculation in the cord cells leads to the formation of ducts. The ectoderm of nasolacrimal furrow which extends from the medial angle of the eye to the region

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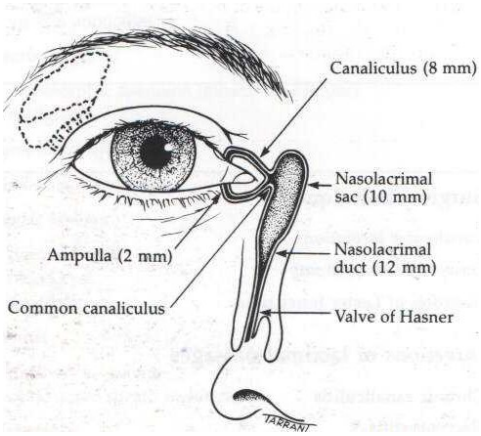

Fig. 1: The anatomy of the nasolacrimal duct system (Image courtesy: Internet)

of the developing mouth forms a solid cord which later gets canalized. The upper part forms the lacrimal sac while the lower part forms the nasolacrimal duct. Some ectodermal buds arising from the medial margins of the eyelids canalize to form the canaliculi. Disturbances in the

morphogenetic processes may lead to anomalies like multiple canaliculi and punctae, abnormal diverticulae and blockage of nasolacrimal duct.

Tear pools in the lacus lacrimalis medial to the lower puncta, then enters the upper and lower canaliculi through the puncta via capillary action and suction. With each blink, the orbicularis oculi muscle compresses the ampullae resisting reflux and simultaneously forces tears down the nasolacrimal duct by positive pressure. When the eyes open, negative pressure is created due to the expansion of the canaliculi and sac and this draws tears into the sac.[5,6]

2. Case description

An eighteen-year-old male presented to the Ophthalmology O.P.D. with the complaint of intermittent tearing (epiphora) from the left eye since the past 3 years. On slit-lamp examination, it was discovered that the left lower eyelid had 3 lacrimal puncta. One of these punctum was in normal position and was normal in appearance (Figure 2 Punctum No. 01). The second punctum (Punctum No. 02) was 3 mm internal to the former, nearer the medial canthus while the third (Punctum No. 03) was 2 mm inwards to this, with a slit-like appearance.

The puncta dilator could be advanced 2 mm into the lateral punctum while only 1 mm into the other two. On syringing, it was observed that the two puncta separately communicated with the lacrimal sac through separate

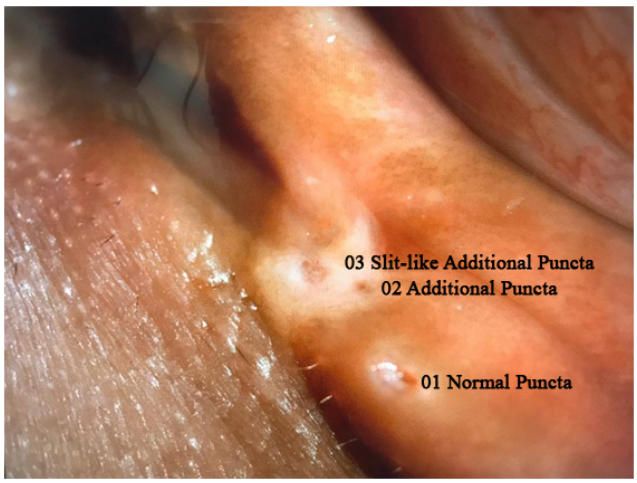

Fig. 2: Picture showing the three lower lacrimal puncta in the patient

canaliculi while one of them communicated with the other. The upper punctum of the left eye and the upper and lower puncta of the right eye appeared to be of normal size and anatomy.

1. On injecting fluid through one puncta (Figure 3 Punctum No.1), the stream of fluid was ejected through one of the other two puncta (Figure 3 Punctum No.2).
2. A trial of passage of topical anaesthetic drops via the canaliculi to the throat resulted in numbness only on the left side, implying that the canalliculi were patent on the left side.
3. Jones dye test revealed patency of the nasolacrimal route of the left eye.
4. The fluorescene disappearance test revealed more rapid clearance from the left eye in comparison to the right eye.

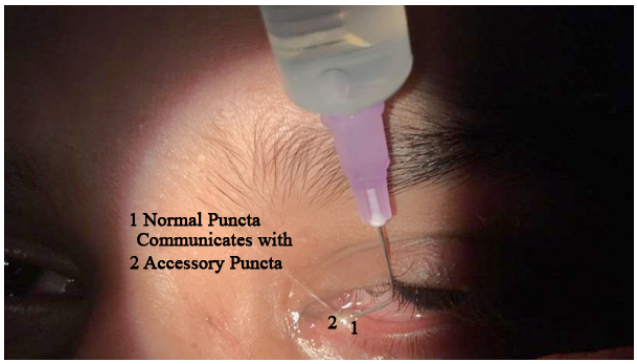

Fig. 3: Lacrimal Syringing of Left LowerPuncta in the patient

3. Discussion

The anomalies of puncta and canaliculi are infrequently reported, although they are not exceptionally rare.[2,3] Supernumerary puncta are found more frequently in the lower lid. Upto four puncta have been observed. The accessory puncta may open either into the normal canaliculus or into an additional one. Other developmental anomalies of the lacrimal passages, such as, nasolacrimal duct obstruction, lacrimal fistula, lacrimal sac diverticulum, absence of upper canaliculus, atresia of upper punctum and anomalies in the shape and position of punctum maybe associated.[7–9] Hereditary transmission of these anomalies has been recorded. These anomalies are thought to arise from incomplete separation of the epithelial core or by failure of canalization between the conjunctival sac and nasal cavity at the time of development.[10–12]

A supernumerary punctum may have a shared canaliculi or the canaliculi may be replicated for each punctum. This can be confirmed by canalicular probing, dacrocystography, a specialized imaging technique that uses radio-opaque injections in the drainage system or dacroscintigraphy, a dynamic tear drainage measurement using technetium 99.[13,14] Dacrocystography and dacroscintigraphy were not explored for this case, as the patient was relatively asymptomatic and the benefits of the procedures would be purely for academic reasons. Accessory puncta are typically located on the lower lid medial to the normal puncta with a slit-like appearance. Accessory slit puncta rarely function because they usually lack papillae and surrounding musculature while a true reduplicated punctum will possess these features.

4. Conclusion

Nasolacrimal system aims at maintaining clear optics by lubricating ocular surface. Patients with supernumerary puncta can be easily identified with lid eversion during routine slit-lamp examination. Although patients maybe asymptomatic, a supernumerary punctum should be considered in the work-up of a patient with excessive tearing. Identifying them may additionally explain the inefficacy of diagnostic pharmaceutical agents or topical medications and may assist in redirecting the management with instructions for punctal pressure while instilling eye drops. A supernumerary punctum should be considered in a work-up of a patient with epiphora as double puncta maybe associated with compromised canalicular function.

5. Source of Funding

None.

6. Conflict of Interest

The author(s) declare(s) that there is no conflict of interest.

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