Lacrimal Sac Diverticulum Presenting as a Lower Eyelid Mass with a Secreting Fistula

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Abstract
Lacrimal sac diverticulum are outpouchings of the lacrimal sac. Their various clinical symptoms complicate differential diagnosis. Here we report two patients of distinctive type of lacrimal sac diverticula. Each of them presented with a mass inferior to the medial canthus with a secreting fistula. Irrigation demonstrated lacrimal drainage system patency. The orificium fistula was located at lower palpebral conjunctiva. This distinctive type of lacrimal diverticulum had never been reported in the literature as we know. The mass had no apparent connection with lacrimal sac according to the results of computed tomography dacryocystography and B-scan ultrasonography. All patients underwent surgical exploration and mass removal under general anesthesia. The mass was confirmed as lacrimal sac diverticulum by pathological examination.

Keywords. Fistula; Lacrimal sac; Lacrimal cyst; Diverticulum

Lacrimal sac diverticulum is an outpouching that exhibits communication with the lacrimal sac. It is commonly asymptomatic and clinically undetected. But they can cause chronic tearing and discharge. The first description of lacrimal sac diverticulum was by Janin in 1772. Only a few cases had been reported in previous literature until now.

The lacrimal sac diverticulum may be of congenital, inflammatory and possibly of traumatic origin [1]. The common cause of congenital lacrimal sac diverticula is spontaneous rupture of the lacrimal sac in acute dacryocystitis [2]. The etiology for acquired lacrimal sac diverticula is a weakening of the lacrimal sac wall after trauma and inflammation [3].

In this study, we present two cases of peculiar type of lacrimal diverticulum consisting a secreting fistula and presenting as an eyelid mass. This is a new description of characteristics of a lacrimal diverticulum.

Case Reports

Case 1
A 3-year-old child had a violaceous mass that had been presented for 3 months in the left lower eyelid and medial canthus (Figure 1A). According to description of his parents, mild epiphora and mucopurulent discharge of left eye occurred at the outset. The child had a history of similar mass which had resolved spontaneously. No history of sinus or systemic disease, trauma, or facial surgery was found.

The overlying skin of mass was freely mobile but it appeared to be an attachment to the deeper tissues. The mass could not be reduced by external pressure. Besides the upper and lower lacrimal punctum, there was an orificium fistula located at lower palpebral conjunctiva of the left eye (Figure 1B). Once the mass was pressed, mucopurulent discharge did not regurgitate from lacrimal puncta as normal but from the orificium fistula. Irrigation of the nasolacrimal system was easily accomplished without any change in the size of the mass. The results of computed tomography dacryocystography and B-scan ultrasonography showed an independent lacrimal cyst located in the left lower eyelid.

Figure 1A: A mass was located at the left lower eyelid near inner canthus (first patient).

Figure 1B: Besides the upper and lower lacrimal punctum, there was an orificium fistula located at lower palpebral conjunctiva of left eye (first patient).
mucopurulent discharge of the left eye after the formation of the mass. No history of sinus or systemic disease, trauma, or facial surgery was found.

The mass could not be reduced by pressure. Apart from the upper and lower lacrimal punctum, there was an orificium fistula located at lower palpebral conjunctiva of left eye. Upon compression, mucopurulent discharge of the mass did not regurgitate from lacrimal puncta but from the orificium fistula. The lacrimal drainage system was patent during lacrimal irrigation. Computed tomography dacryocystography and B-scan ultrasonography detected there was an independent lacrimal cyst located in the left lower eyelid near inner canthus without apparent connection with lacrimal sac (Figure 2B).

The patient underwent a transcutaneous anterior orbitotomy via subciliary incision. The mass and its secreting fistula were completely excised (Figure 2C). There was no visible communication between the mass and the lacrimal sac. The mass was filled with mucopurulent materials. Pathological examination revealed a cystic mass lined by pseudostratified columnar and cuboidal epithelium with interspersed lymphocytes, plasmaocytes and granular leukocytes. The wall of the mass also consisted of fibrous connective tissue (Figure 2D).

The patient did not present epiphora or mass recurrence after 12 months of follow-up.

Case 2

An 8-month-old child presented a mass in the left lower eyelid and medial canthus over 6 months (Figure 2A). The size of the mass increased gradually. His parents complained epiphora and near inner canthus without apparent connection with lacrimal sac (Figures 1C and 1D).

Under general anesthesia, exploration was performed using a subciliary eyelid incision. The mass and its secreting fistula were completely removed. There was fibrotic tissue between the mass and the lacrimal sac without visible communication. The mass was filled with mucopurulent materials. Pathological examination revealed a cystic mass lined by pseudostratified columnar and cuboidal epithelium with interspersed lymphocytes, plasmaocytes and granular leukocytes. The wall of the mass also consisted of fibrous connective tissue.

No history of sinus or systemic disease, trauma, or facial surgery was found.

The mass could not be reduced by pressure. Apart from the upper and lower lacrimal punctum, there was an orificium fistula located at lower palpebral conjunctiva of left eye. Upon compression, mucopurulent discharge of the mass did not regurgitate from lacrimal puncta but from the orificium fistula. The lacrimal drainage system was patent during lacrimal irrigation. Computed tomography dacryocystography and B-scan ultrasonography detected there was an independent lacrimal cyst located in the left lower eyelid near inner canthus without apparent connection with lacrimal sac (Figure 2B).

The patient underwent a transcutaneous anterior orbitotomy via subciliary incision. The mass and its secreting fistula were completely excised (Figure 2C). There was no visible communication between the mass and the lacrimal sac. The mass was filled with mucopurulent materials. Pathological examination revealed a cystic mass lined by pseudostratified columnar and cuboidal epithelium with interspersed lymphocytes, plasmaocytes and granular leukocytes. The wall of the mass also consisted of fibrous connective tissue (Figure 2D).

The patient did not exhibit any tearing symptoms or mass recurrence after 12 months of follow-up.

Discussion

Clinical reports of lacrimal sac diverticula in previous literature are few. The patients with lacrimal sac diverticula are always asymptomatic. When diverticula become large enough, they can cause tearing, discharge and other severe symptoms. These cystic mass usually appear

Figure 1C: Axial computed tomography: A soft tissue mass was located in the lacrimal sac fossa (first patient).

Figure 1D: Axial computed tomography: Injection of contrast material from orificium fistula and normal lacrimal puncta (first patient). Red arrow: lacrimal diverticulum filled with contrast material; Blue arrow: normal lacrimal sac filled with contrast material.

Figure 2A: A mass was located at the left lower eyelid near inner canthus (second patient).

Figure 2B: Sagittal computed tomography: A soft tissue mass grew along the inferior orbital rim (second patient).

Figure 2C: Diverticulum that was completely excised (second patient).
Conservative therapy for lacrimal sac diverticula is just daily massage and expression of the diverticular contents. A conservative approach is not indicated when the diverticula tend to become infected [5,8]. Surgical therapy for lacrimal sac diverticula is to completely excise the diverticulum and suture the connecting opening in the lacrimal sac wall with the aid of an operating microscope [5]. The patency of the lacrimal drainage system should be demonstrated by irrigation. If the lacrimal duct is patent, a dacryocystorhinostomy would seem to be unnecessary. Two special cases in this article all underwent removing of diverticulum and its secreting fistula. Because no connection between diverticulum and lacrimal sac was found in the operation, dacryocystorhinostomy did not accomplish.

It is assumed that even a DCR without excision of the diverticulum, by improving the drainage of the lacrimal sac, might prevent the filling of a diverticulum, inducing its subsequent shrinkage [11]. I think this needs further clinical research.

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**References**


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**Figure 2D:** Haematoxylin-eosin stains revealed a cystic cavity lined by pseudostriatified columnar and cuboidal epithelium with interspersed lymphocytes, plasmaocytes and granular leukocytes. The wall of the mass also consisted of fibrous connective tissue (~200) (second patient).