CYST OF DUCT OF KRAUSE'S GLAND*

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Cysts of Krause's glands usually occur as retention cysts in cicatricial conditions of the conjunctiva such as trachoma, or pemphigus (Stoewer, 1892; Thompson and Chatterton, 1905; Contino, 1960; Caocci, 1932) or after the scar caused by excision of chalazion (Paton, 1919). Giri (1936) and Butler (1907) reported cases wherein no conjunctival scarring was evident. The cysts occur in the upper fornix from distension of the duct, the result of blocking by inflammatory material (Wolff, 1951).

A cyst of the duct of Krause's gland is so rarely reported in the ophthalmic literature (Duke-Elder, 1952) that a description of a new case may be of interest. Clinically it was diagnosed as a conjunctival cyst, and only histopathological examination revealed its true nature.

Case Report

A 6-year-old boy had a painless swelling of the left upper lid which had gradually developed in the space of 6 months.

The left upper lid showed ptosis. On raising the upper lid a large, tense, smooth, transparent cystic swelling measuring 3×1.5 cm., which could be transilluminated, was seen projecting into the upper conjunctival sac (Fig. 1).

FIG. 1.—Cyst of duct of Krause's gland projecting into left upper fornix in a boy aged 6 years. Upper lid raised.

The right and left eyes showed trachomatous scarring of the palpebral conjunctiva and fornix. Both eyes were normal, with normal fundi. The visual acuity was 6/9. Conjunctival smears were negative for organisms.

The general condition of the patient was good. The family history revealed nothing of importance. There was no history of trauma, and no septic foci in the body. The

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blood total and differential counts were normal. The blood Wassermann reaction, Cassoni's test for hydatid cyst, and the tuberculin test were all negative. The faeces were free of parasites and the urine free of albumen and sugar. X rays of both orbits, the nasal sinuses, and the chest revealed nothing abnormal.

After a conjunctival incision of the upper fornix, the cyst was excised. Histopathological examination showed a cystic gland duct lined by two layers of epithelium (Fig. 2) but with no goblet cells. The subepithelial tissues surrounding the cyst showed chronic non-specific interstitial inflammation of Krause's glands (Fig. 3). The picture was consistent with that of a distension cyst of the duct of Krause's gland.

FIG. 2.—Cyst of duct of Krause's gland lined by two layers of epithelium. Note absence of goblet cells ($\times 120$).

FIG. 3.—Krause's gland acini in subepithelial tissues surrounding cystic duct, showing chronic non-specific interstitial inflammation of gland. Note ductule lined by two layers of epithelium.

The cyst was full of a clear, colourless, thin watery fluid, similar to tears. The fluid was alkaline in reaction. Culture proved the absence of organisms. On microscopical examination, the fluid was found to contain only a few degenerate epithelial cells. The biochemical analysis of the fluid showed the presence of protein material, sodium chloride, urea, sugar, and phosphates in the same percentage as in tears. A follow-up for 2 years showed no recurrence.

Discussion

A cyst of the duct of Krause's gland projecting into the upper conjunctival fornix is clinically diagnosed as a conjunctival cyst. Excluding cysts in

conjunctival naevi, larger cysts present in the lower fornix and are associated with gross microphthalmic deformities of the globe and parasitic cysts, whereas cysts of the upper and lower fornices may be cysts of the duct of Krause's gland, true conjunctival cysts, or lymphatic cysts.

Histopathological examination differentiates all these types of cysts. The conjunctiva is mostly covered by non-keratinized multi-layered epithelium containing goblet cells (Wolff, 1954). Krause's glands have small lumina which unite into a single duct, opening into the superior fornix (Duke-Elder and Wybar, 1961). The duct is lined with a double layer of epithelium, the inner layer being tubular, and the outer flattened (Wolff, 1951). Cysts of the duct of Krause's gland are lined by a double layer of epithelium which in some places undergoes atrophy and in others hyperplasia, so that great irregularities may occur (Duke-Elder, 1939).

Histopathological examination of seven other cases clinically diagnosed as conjunctival cysts of the upper and lower fornices showed the following features:

(1) and (2) Two large cysts, measuring 3×1.5 cm., projecting into the upper fornix and lined by two layers of epithelium without goblet cells were diagnosed as cysts of the duct of Krause's gland.

(3) A congenital cyst of the lower fornix measuring 2×1 cm., and containing clear fluid (Fig. 4) occurred in a new-born female baby. It appeared to have been formed by apposition of the conjunctival folds in the lower fornix.

FIG. 4.—Conjunctival cyst of right lower fornix present since birth in a female baby one month old.

(4) A cyst of the lower fornix, measuring 2×0.5 cm. accompanied by trachomatous scarring of the palpebral conjunctiva occurred in a 30-year-old man.

(5) and (6) Two implantation cysts, each measuring 2×1.5 cm. and containing clear fluid, occurred in the lower fornices about 4 months after conjunctival incisions to recess the inferior rectus muscle. True conjunctival cysts are characterized by the presence of non-keratinized multi-layered

epithelium containing goblet cells which may be present in larger or smaller numbers (Figs 5 and 6).

FIG. 5.—Conjunctival cyst seen in Fig. 4. Note non-keratinized multi-layered epithelium containing many goblet cells ($\times 90$).

FIG. 6.—Implantation conjunctival cyst of lower fornix, showing multi-layered epithelium and a few goblet cells ($\times 90$).

In the absence of goblet cells the multi-layered epithelium (Fig. 7) favours the diagnosis of a conjunctival cyst. In some areas the conjunctival epithelium may atrophy, becoming one or two layers.

(7) This cyst, measuring 2×2 cm., occurred in a 2-year-old boy. It projected into the upper fornix, and extended backwards into the orbit above the globe and was lined by one layer of endothelium (Fig. 8). There was a small upper palpebral conjunctival cavernous lymphangioma. It was diagnosed as lymphatic cyst.

FIG. 7.—Implantation conjunctival cyst of lower fornix, showing multilayered epithelium but no goblet cells ($\times 90$).

FIG. 8.—Lymphatic cyst projecting into upper fornix. Note single layer of endothelial lining cells ($\times 90$).

Summary

(1) Histopathological examination differentiates the different types of conjunctival cysts which may present in the upper and lower fornices. Cysts of Krause's gland duct are lined by two layers of epithelium containing no goblet cells.

(2) The presence of conjunctival trachomatous scars in the case here described points to the probable cause of the obstruction and distension of the duct.

(3) This is the first case of a cyst of the duct of Krause's gland to be reported from Egypt.

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