UNUSUAL CORNEAL LESION FOLLOWING HERPES OPHTHALMICUS*†‡

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Case Report

In April, 1962, a 29-year-old woman sustained an attack of herpes zoster ophthalmicus in the right eye. The positive physical findings included an oedematous right upper lid, hyperaemic right conjunctiva, clear cornea, and positive aqueous flare with medium-sized keratic precipitates. The visual acuity was 20/50. She had a typical right supra-orbital vesicular eruption, but there was no cutaneous involvement of the nose. The lesions were associated with severe pain. Treatment included protamide injections and topical and oral steroids. The visual acuity returned to 20/20 within the month with subsidence of the iridocyclitis.

The patient was not seen again for one month. Her right cornea then showed a dense disciform keratitis. Local steroids were reinstituted and the lesion progressively cleared so that the patient had only the residue of a foreign body sensation related to recurrent breakdown of the disciform keratopathy. For this reason she was referred for further examination and therapy.

In October, 1962, physical examination revealed a central sub-epithelial and superficial stromal opacity. Two smaller stromal nebulae were noted in the lower temporal and upper temporal quadrant of the right cornea. The epithelium overlying these opacities appeared to be within normal limits. The visual acuity was 20/40. The left eye was normal.

During the following year the patient's best corrected visual acuity decreased to 20/100. This change was accompanied by a slight increase in the opacity of the lesion and more frequent recurrence of the foreign body sensation (Fig. 1*a*).

These events prompted surgical intervention, and on October 9, 1963,

FIG. 1(*a*).—Pre-operative photograph of sub-epithelial lesion in a case of herpes zoster ophthalmicus.

FIG. 1(*b*).—Appearance of eye several weeks after 8 mm. lamellar keratoplasty.

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an 8-mm. lamellar corneal transplant was performed. The post-operative course was uneventful, and the patient has since been asymptomatic (Fig. 1*b*).

On July 5, 1965, the corrected visual acuity was 20/20, and no new or recurrent signs or symptoms were noted.

Pathology

The corneal epithelium in the superior portion of the lamellar button was thickened and the deeper layers were oedematous. Bowman's membrane was interrupted and the epithelium was found to extend through the break into the superficial layers of the stroma and along the inner aspect of Bowman's membrane (Fig. 2). The superficial corneal lamellae in this area were fragmented, thin, and irregular. There was an irregular cleft between the degenerated stroma and the overlying epithelium. The inflammatory reaction was minimal although some necrotic material was observed between Bowman's membrane and the stroma in some areas. In the centre of the cornea was a crater lined with corneal epithelium (Fig. 3).

FIG. 2.—Corneal epithelium extending through a break in Bowman's membrane and along its posterior aspect. Haematoxylin and eosin. $\times 125$.

FIG. 3.—Crater in cornea lined by epithelium with a pillar extending from its centre. Haematoxylin and eosin. $\times 125$.

The epithelial layer was intact although in one area it was reduced in thickness to a one-cell layer. A pillar of epithelium (Figs 3 and 4) extended from the centre of this crater towards one edge where it became continuous with the surface epithelium (Fig. 5). As a result, a space lined by surface epithelium was isolated within the superficial layers of the stroma. The surface epithelium was separated from the underlying stroma by a cleft containing some cellular debris and occasional inflammatory cells. The stromal lamellae in the central area were irregular and fragmented. Bowman's membrane was broken in a number of places. Inflammatory infiltration, however, was minimal. The epithelium extended beneath Bowman's membrane (Fig. 6), and the prominence of the extension paralleled the size of the stromal pouch which it created. The area near the edges of the

FIG. 4.—The central pillar of epithelium is more prominent and approaches one edge of the crater. Haematoxylin and eosin. $\times 125$.

FIG. 5.—The pillar of epithelium has become continuous with the edge of the crater isolating a space lined with epithelium within the stroma. A cleft separates the corneal epithelium from the stroma. Haematoxylin and eosin. $\times 125$.

FIG. 6.—Surface epithelium extending through a small break in Bowman's membrane and surrounding the "cystic space" within the stroma. Haematoxylin and eosin. $\times 125$.

lesion showed fewer breaks in Bowman's membrane. Finally, both epithelium and Bowman's membrane could be followed along and were then found intact (Fig. 7). At this level an isolated "cystic space" lined by surface epithelium was observed in the superficial layers of the corneal stroma.

FIG. 7.—Surface epithelium and Bowman's membrane continuous above the stromal cyst. Haematoxylin and eosin. $\times 160$.

Discussion

After an attack of herpes zoster ophthalmicus a lesion which was described as a disciform keratitis developed. As resolution occurred, the patient developed semi-translucent areas within the cornea. The most prominent of these developed within the visual axis. For visual reasons and because of the recurrent irritation, the patient was treated with a lamellar keratoplasty.

Histological examination of the surgical specimen revealed an extension of surface epithelium into the anterior layers of the corneal stroma through breaks in Bowman's membrane. The progressive and recurrent history of foreign body sensation given by the patient undoubtedly related to the several breaks in Bowman's membrane and the thin layer of corneal epithelium overlying them.

In the numerous descriptions of corneal lesions following herpes simplex and herpes zoster, we have found no account of a "cystic" lesion resembling that found in our patient. Extensive descriptions of herpes simplex keratitis, herpes zoster keratitis, and their sequelae have been published, but we have been unable to duplicate this lesion in our historical survey. Paton (1926) described in detail the clinical appearance of what he believed to be the primary corneal lesion in zoster. His illustrations show a sub-epithelial infiltration which may result in vesicular formation and secondary infection and ulceration. In other instances the sub-epithelial infiltration may remain as the sole manifestation in the cornea of a previous zoster ophthalmicus. Histopathological descriptions of the corneal lesions (Sulzer, 1898; Edgerton, 1945) encompass a wide variety of the manifestations of chronic inflammation, but none appears to resemble the lesion in our patient.

The breaks in Bowman's membrane filled with corneal epithelium and the formation of a cyst-like space are interesting. Whether a similar pathogenic mechanism could account for the progressive undermining which occurs in other corneal ulcers is not known.

Of some additional interest in our patient was the occurrence of residual nebulae in the cornea after an attack of herpes zoster ophthalmicus which did not involve the naso-ciliary nerve. Instances of this kind have been previously recorded (Paton, 1926; Doggart, 1933).

Summary

The clinical and histopathological features of the sub-epithelial infiltrate which occurs after herpes zoster corneae are described. A unique cystic space, defects in Bowman's membrane, and thin underlying epithelium were the chief features.

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