ENDOGENOUS FUNGUS ENDOPHTHALMITIS DUE TO *Candida Albicans**†

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ENDOGENOUS fungus infections of the inner eye are rare, actinomycete, blastomycete, and aspergillus being the most frequent causative organisms. After the introduction of corticosteroids there was a 15-fold increase in ocular mycosis and fungi of low pathogenicity have produced ocular lesions. *Monilia Candida albicans* has been reported to produce metastatic retinal or chorio-retinal lesions (van Buren, 1958; Vialatte, Satge, Roidot, and Meschaka, 1961; Pearl and Sidransky, 1960; McLean, 1963) and panophthalmitis (Miale, 1943; Wolter, 1962; Rimbaud, Rioux, and Boulad, 1963). These cases were healed by the use of mycostatic agents (Calmettes, Deodati, and Bazex, 1960; Bonatti, Jaeger, and Frayer, 1963). The purpose of this communication is to describe two such cases, one exhibiting retinal lesions with keratitis and the other one showing endogenous endophthalmitis due to *Candida albicans*.

Case Reports

Case 1, a boy born in 1948, had received several courses of penicillin for various infections before his first birthday and had since been admitted to hospital several times for generalized moniliasis. Fungus lesions had been diagnosed in the skin, nails, throat, and lungs, and *Candida albicans* had been cultured from the throat, sputum, stomach fluid, and cerebrospinal fluid.

Right Eye.—In January, 1957, the visual acuity was 1·0 with correction. The conjunctiva showed slight congestion and there were small pin-point infiltrates in the cornea. The tension and ocular media were normal. The optic disc was slightly congested and following the lower temporal branch of the retinal veins a chorio-retinal lesion compatible with chorio-retinitis was noted (Fig. 1, opposite).

Left Eye.—The findings were similar, except that the chorio-retinitis followed the course of the upper temporal branch of the vein and small chorio-retinal scars were present (Fig. 2, opposite).

In July, 1958, very little change had taken place, but the retinal arteries appeared narrowed and sheathing was observed in the veins.

The patient continued to suffer from generalized moniliasis and died of moniliasis-septicaemia in 1960. Autopsy was refused.

Case 2, a 70-year-old man, observed a skin ulcer in the right retro-auricular region in December, 1964. A similar ulcer soon developed in the right temporal region and a plum-sized lump in the neck. He had enjoyed good health except glandular tuberculosis at the age of 12 years. He was treated at the department of dermatology, University of Helsinki for 9 days in January. A reddish skin ulcer measuring 6 × 3 cm. was observed in the right zygomatic region as well as a

* Received for publication September 14, 1965.

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FIG. 1.—Case 1, showing retino-choroiditis from *Candida albicans* of the right eye following the course of the lower temporal vein.

FIG. 2.—Case 1, showing retino-choroiditis from *Candida albicans* of the left eye following the course of the superior temporal vein.

purulent ulcer measuring 4.5×2.5 cm. behind the right ear, and a plum-sized lump was felt in the submandibular region (Figs 3 and 4).

FIGS 3 and 4.—Case 2, showing ulcers due to *Candida* species.

Candida albicans was cultured from the retro-auricular ulcer as well as from the throat and the nose, and *Staphylococcus aureus* was also recovered from the skin ulcer. Tuberculosis tests were negative. The erythrocyte sedimentation rate was 57 mm./1 hr; Hb 13.8 g.; white blood cells 11700, anti-streptolysin titre 70, anti-staphylolysin titre 16. Blood sugar 228 mg. per cent.; glucose positive in the urine 5.3 per cent. Gerhard and Lange tests negative.

Chest x ray changes were compatible with senile emphysema and x rays of the skull revealed patchy atrophy and osteoporosis.

The ears showed no symptoms.

The patient was treated with oral tetracycline 250 mg. four times a day, carbutamide BP (Alentin^R) 500 mg. twice daily, and local Terramycin-polymyxin powder. The right eye now became reddish and painful with decrease of vision, and the patient was referred to the Helsinki University Eye Hospital.

Right Eye.—On January 24, 1965, the visual acuity was projection of light. The conjunctiva was heavily congested. There were + + + flare and cells in the aqueous including a 2 mm. hypopyon. The iris was congested and an area of posterior synechiae was noted. Some nuclear sclerosis was present in the lens and the vitreous was cloudy, obstructing the view of the fundus. The ocular tension was 15 mm. Hg (Schiötz).

Left Eye.—The visual acuity was 0.3. The eye appeared white, but a slight flare with cells was present in the aqueous. The vitreous was clear and the fundus normal. The ocular tension was 15 mm. Hg (Schiötz).

Treatment was started with oral tetracycline 250 mg. four times a day and local steroids and mydriatics. Because of the probable fungus aetiology, nystatin (Mycostatin Sguibb) 500 000 units three times a day was used instead of tetracycline and was also included in the topical treatment. This resulted in the disappearance of the hypopyon in the right eye in 4 days and of the flare and cells in the left eye in one week. The right eye remained reddish and painful and the vitreous remained cloudy; secondary glaucoma developed and the right eye had to be enucleated on February 12, 1965.

Macroscopical Examination.—The globe was of normal size. It was opened in the horizontal plane. The choroid appeared thickened and the vitreous was filled by a greyish soft mass. Sections were stained with haematoxylin and eosin, van Gieson, periodic acid-Schiff, Löffler, and Gridley stains.

Microscopical Examination.—The cornea appears normal, the anterior chamber is of normal depth, and the filtration angle is open. The iris and ciliary body exhibit diffuse infiltration with lymphocytes and plasma cells. Close to the ciliary body there is an abscess in the vitreous and the retina and pigment epithelium have been replaced by intensive infiltration of various inflammatory cells (Fig. 5, opposite), which consist mostly of polymorphonuclears and eosinophils, with areas of epithelioid cells (Fig. 6, opposite). Periodic acid-Schiff and Gridley stains reveal the budding yeast phase of the fungus at the site of the abscess (Fig. 7, opposite).

Follow-up.—The nystatin treatment was continued for 3 months and led to healing of the skin ulcers and improvement of the visual acuity of the left eye. When the patient was last seen on June 30, 1965, the visual acuity was 0.8, there were no cells or flare in the aqueous, the vitreous was clear, and the fundus normal.

Medical examination revealed only mild diabetes, with no evidence of systemic fungus infection. The diabetes was well controlled with Alentin^R.

Discussion

The incidence of *Candida* infections usually increases with age, patients with some other debilitating illness, such as diabetes, being liable to moniliasis (as in our second patient). In children prolonged antibiotic therapy (as in our first case) is often followed by clinical infection with *Candida albicans* (Zimmerman, 1950).

FIG. 5.—Case 2, section of the right eye, showing vitreous abscess. Haematoxylin and eosin. $\times 4$.

FIG. 6.—Case 2, accumulation of polymorphonuclear leucocytes with pale epithelioid cells in the wall of the abscess. Haematoxylin and eosin. $\times 400$.

FIG. 7.—Case 2, high-power view of yeast-like cells (*Candida*) from the vitreous abscess. Gridley fungus stain. $\times 1,100$.

The retina appears to be the ocular structure chiefly affected in metastatic *Candida* infection; although the corneae were slightly affected in Case 1, there was no evidence of anterior uveitis, and although the uvea was affected in Case 2 the most marked changes were seen in the retina and pigment epithelium. These findings agree with those of van Buren (1958) and McLean (1963).

For the treatment of candida lesions, nystatin and amphotericin B have been advised by Hoffmann (1965), and the clinician must be alert to the possibility of a fungal lesion.

Summary

Two patients had metastatic ocular infection by *Candida* species; the first showed bilateral retino-choroiditis and superficial keratitis but no evidence of anterior uveitis, and the second presented with bilateral uveitis and a vitreous abscess in one eye which had to be enucleated. The histopathological changes agreed with the clinical picture.

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