MYCOTIC KERATITIS*

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SINCE the use of corticosteroids and the broad-spectrum antibiotics became widespread, fungus infections are becoming increasingly common. The rising incidence of keratomycosis has been well brought out by Haggerty and Zimmerman (1958) in their review of the records of the Registry of Ophthalmic Pathology; there were three cases (1 in 11,329) from 1933 to 1951, and thirteen (1 in 777) between 1952 and 1956. According to Ley and Sanders (1956), Mitsui and Hanabusa (1955), and Thygeson, Hogan, and Kimura (1953), fungus keratitis should be suspected in chronic hypopyon ulcers that have received prolonged local instillations of antibiotics and/or corticosteroids. In most of the cases so far reported, the diagnosis of fungus keratitis was established by histological examination; Ley and Sanders (1956), Veirs and Davis (1958), and Zimmerman and Gibson (1958). Mitsui and Hanabusa (1955) were able to identify fungus from the corneal lesion in their four cases.

The two cases reported here are of interest in that fungus infection was suspected from the biomicroscopic appearance of the corneal ulcers and that the fungus was subsequently isolated.

Case Reports

Case 1, a 50-year-old male farmer, complained of redness and severe pain in the right eye for 5 days. There was no history of trauma or of any medication.

Examination.—There was a superficial corneal ulcer in the central third of the cornea and the ocular tension appeared to be raised. Culture could not be done as the patient was in agony.

Treatment.—Terramycin ointment was applied and the eye bandaged, and Diamox 250 mg. 8-hrly was given. The next morning the patient felt comfortable, and cultures were taken from the conjunctival sac, and the base and the edges of the ulcer. The lacrimal passages were patent. The culture showed only *Staphylococcus albus* (coagulase-negative).

Progress.—Diamox and terramycin ointment were continued and the staining of the ulcer was negative on the 6th day, but 4 days later the patient had a relapse of severe pain. There was again staining of cornea and raised intra-ocular pressure. The same

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treatment was given and the patient felt comfortable after 2 days. At this stage slit-lamp examination revealed a superficial corneal ulcer occupying the central third of the cornea with irregular margins delineated by sub-epithelial yellow granular deposits. The base of the ulcer had a dry and crumbly appearance, and there was trachomatous pannus.

Fungus infection of the cornea was suspected, and material for culture was taken by platinum loop and inoculated on Sabouraud and Maconkey's agar media. The patient was given Nystatin (Mycostatin: Squibb) and terramycin eye ointment thrice daily. The staining of the cornea was negative in 10 days but the sub-epithelial yellow deposits persisted, and no fungus was isolated.

The epithelium again broke down 2 days later and the symptoms recurred. This time the yellow material was scraped out with a spud and a wet smear and culture on Sabouraud's medium, blood agar, and Maconkey agar were taken. The smear did not show fungus. The culture examination revealed opaque greyish heaped-up colonies which were radially furrowed, and were identified as *Trichophyton sabouraudi*.

Extensive iodine cautery of the ulcer was repeated every 5th day.

Result.—The ulcer healed in 5 weeks leaving behind a dense leucoma.

Case 2, a 30-year-old male farmer, had his left eye injured by his child's finger. On the 3rd day after the injury he felt some irritation and pain and applied some indigenous medicine but the trouble increased. On the 5th day he consulted a doctor who diagnosed a corneal ulcer. Terramycin and atropine ointments were applied but without much improvement; subconjunctival injections of penicillin and streptomycin were also given every alternate day for 20 days, but the ulcer increased. Vitamins C, B₁, and A were given orally without effect. The case was referred to us after being treated in this way for about 5 weeks.

Examination.—A corneal ulcer occupied the central 3/4 of the cornea. The margins of the ulcer were irregular and the base appeared as a sloughing raised mass. The peripheral rim of the cornea was vascularized. Hypopyon filled the lower third of anterior chamber and the ocular tension was fairly high. Cultures, taken from the lower fornix, and the base and the edges of the ulcer, showed only *Staphylococcus albus* (coagulase-negative).

Treatment.—Diamox 250 mg. was given 12-hrly and 1 per cent. atropine ointment and penicillin-streptomycin-gelatine discs (Grover, 1961) were applied locally thrice daily. Paracentesis was done on alternate days.

Progress.—There was no appreciable improvement in the local condition after one week of treatment. On slit-lamp examination a dry, grey, granular, raised mass was seen to occupy the base of the ulcer, being separated from the periphery by a shallow irregular gutter.

Fungus keratitis was suspected and the material for bacteriological examination was scraped with a spud and cultured on Sabouraud's medium, blood agar, and Maconkey agar.

The smear from the scraping showed *Pseudomycelia*, and the culture examination revealed *Candida albicans* (*Monilia*). Nystatin (Mycostatin: Squibb) ointment was applied but a local allergic reaction developed. Scarification and iodine cautery of the ulcer was done every fifth day.

Result.—After two cauteries the ulcer started to improve and it healed in 10 weeks' time leaving behind a total leucoma.

Comment

These two cases of fungus infection of the cornea were detected while carrying out a clinico-bacteriological study of 964 cases of corneal ulcer

attending the Gandhi Eye Hospital during the period May, 1959, to April, 1960. The following atypical points found in these cases led us to suspect fungus infection:

- (i) Lack of response to the routine treatment given to other cases.
- (ii) Repeated negative cultures from the material removed by the platinum loop.
- (iii) Biomicroscopic picture different from the usual appearance of bacterial corneal ulcers.

The slit-lamp examination in the first case revealed an almost classical picture of the keratomycosis caused by *Aspergillus fumigatus* (Duke-Elder, 1938): "Grey, ulcerative necrosis with a dull dry surface, surrounded by a yellow line of demarcation." In the second case of chronic hypopyon ulcer, there was a dry, grey, granular, raised mass at the base separated from the margins by a shallow groove. Both patients had raised ocular tension. Fungus was identified in each case from the material scraped from the base and margins of the ulcer.

The first case had no history of trauma or of any local medication. The fungus cultured from it was identified as belonging to the Genus *Trichopyton*, which produces ringworm of the skin, a common infection in this part of India. When the skin around the eye is already affected, ringworm may occasionally invade the conjunctiva and produce conjunctivitis. This fungus has, however, been reported as occurring exclusively in the conjunctival sac without skin involvement (Deuchler, 1930). Conjunctivitis may also occur in association with trichophytic infection of the scalp and may spread to the cornea (Milian and Lelong, 1923). Mitsui and Hanabusa (1955) cultured this fungus from a normal conjunctival sac in a series of 65 normal control eyes. In our case there was no ringworm of the face or scalp, but the rest of the body was not thoroughly examined for it. It is probable that the patient had ringworm somewhere on his body and had infected the eye by soiled fingers. The keratitis produced by *Trichophyton* resembled that of *Aspergillus* in its clinical appearance, except for the absence of hypopyon which might have developed if the case had been left untreated.

In the second case there was a history of trauma and 5 weeks' treatment with oxytetracycline and subconjunctival penicillin-streptomycin injections. The fungus identified was *Candida albicans*; it may be saprophyte in the eye, but its virulence is enhanced (Seligmann, 1953) and the chance of corneal infection is increased by the use of oxytetracycline (Ley and Sanders, 1956). In this case *Candida albicans* might have been the primary causative organism introduced by trauma or the prolonged use of antibiotics may have encouraged a fungus which may have already been present in the conjunctival sac.

The value of Nystatin in the first case was very doubtful, and in the second it gave rise to an allergic reaction. Montana and Sery (1958) have

demonstrated that Nystatin has little or no therapeutic value in established infections of the rabbit cornea produced by *Candida albicans*.

Repeated scarification of the base and margins of the ulcer followed by iodine cautery controlled the infection in each case.

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