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BRAIN ABSCESS DUE TO THE FUNGUS HORMODENDRUM

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Brain abscess caused by fungal infection is rare, only very few examples having been recorded in the English language literature. Perhaps the most comprehensive review is that of Craig and Gates,[1] who investigated all cases of brain abscess occurring in the Mayo Clinic during the years 1915-1945. During this 30-year period there were 104 examples of metastatic brain abscess, only 5 of which were caused by fungal infection. Two of these were caused by *Actinomyces* species, two by *Coccidioides immitis* and one by *Monilia albicans*. Apart from this series only isolated cases have been reported, mainly due to *Actinomyces*, *Blastomyces* or *Torula* species. Eckhardt and Pilcher[2] described a case caused by *Nocardia asteroides*.

Binford *et al.*[3] reported the case history of a patient with a metastatic brain abscess caused by the fungus *Cladosporium* (*Hormodendrum*) *trichoides*. King and Collette[4] described a second example of brain abscess due to this fungus and the former authors demonstrated the identity of the fungus isolated by King and Collette with that which they had isolated.

The case history reported here is a further example of a brain abscess due to a fungus of the *Hormodendrum* group and is, as far as we are aware, only the third case described.

CASE REPORT

W.P., a Bantu male aged 30 years, was admitted to hospital in a state of mental confusion. This state alternated with lucid intervals of a few hours' duration during which he complained of headache and pains in the chest and in both knees. These symptoms had been present for about 10 days. The headache was occipital and was continuous. It was not possible to obtain any further history apart from these meagre details.

The patient was a well-built man. Normal temperature and pulse rate. There was a small superficial ulcerated area, shallow, and about 1 inch in diameter, on the left side of the scalp over the temporal region. There was marked neck stiffness and both Kernig's and Brudzinski's signs were positive. All the cranial nerves appeared to be intact. The deep reflexes were extremely brisk and both plantar responses were equivocal. Motor power, sensation and proprioception were intact in all limbs.

Examination of other systems was essentially negative. The blood pressure was 128/80 mm. Hg.

Lumbar puncture revealed a slightly hazy fluid under increased pressure. The protein content was 70 mg.%, chlorides 650 mg.% and sugar 60 mg.%. The white-cell count showed 520 polymorphonuclear cells per c.mm. and 200 lymphocytes per c.mm. A Gram-stained film did not reveal any organisms in the spun deposit and culture of the cerebrospinal fluid was sterile.

A provisional diagnosis of tuberculous meningitis was made on admission and treatment was instituted with streptomycin and isoniazid. However, there was no response to this regime. The patient remained in a confused state with occasional bouts of pyrexia to 100·0°F. A fairly rapid deterioration in his condition took place and death occurred 2 weeks after admission.

Autopsy Report

The body was that of a well-built African male. There was no evidence of any skin rash apart from the ulcerated region on the left side of the scalp. Thick pleural adhesions were present on both sides and the lungs showed hypostatic congestion. The liver was enlarged and pale. There was a single horseshoe kidney with a solitary ureter coming off the lower portion of the kidney on the right side.

On the skull being opened the meninges appeared to be normal. When the dura was removed from the right side there was found to be some flattening of the cerebral gyri of the frontal lobe, with obliteration of the sulci. Embedded deep in the right frontal lobe was an abscess cavity containing thick creamy-coloured pus. The cavity was about 2 inches in diameter and was lined with ragged, necrotic fragments of brain tissue. The remainder of the brain appeared to be normal.

Histology. Sections were prepared from the wall of the abscess cavity and stained in the usual way with haematoxylin and eosin. The wall of the cavity contained many multinucleated cells of Langhan's type along with plasma cells, polymorphonuclear cells, lymphocytes and eosinophils. Numerous dark-brown fungal spores were also present in the wall and in the exudate in the cavity. These spores were from 6-15μ in diameter and were thick walled. They tended to be arranged in clusters, in some cases of up to 20 or 30 spores. Others were arranged in short chain formation of 5-6 spores. Many of them showed an appearance of septation.

Mycology. Culture of the pus on Sabouraud's agar resulted in relatively slow-growing colonies. After 14 days these were about 4 cm. in diameter and were of a dark olive-grey colour. In the early stages of growth the surface of the colonies was velvety smooth with a well-marked fringe of mycelial growth. After 3 weeks' incubation the surface of the colonies showed some radial striation. Culture of the pus on the polysaccharide medium of Nickerson and Mankowski gave rise to similar types of colonies, except that growth was a little faster than on the Sabouraud's agar and the colony colour was of a lighter olive shade.

Slide culture preparations on Sabouraud's agar were examined daily. After 4 or 5 days these showed brown-coloured, smooth-walled septate hyphae about 1·5-2·0μ in width. Arising from the hyphae were septate conidiophores bearing spores in long chain formation. The appearances were typical of fungi of the hormodendrum type.

Animal inoculation. A saline suspension from the fungal growth on the Sabouraud's agar was injected subcutaneously into the shaved abdomen of a guinea-pig and also intravenously into a rabbit. After 7 days the animals were sacrificed and examined. No lesions were found in the guinea-pig's organs and the site of injection showed only a restricted oedematous area about 1 cm. in diameter. The rabbit, however, showed multiple small abscesses in the liver, in the cortex of both kidneys and in the spleen. These consisted of collections of polymorphonuclear cells, lymphocytes, plasma cells and multinucleated cells. The typical brown fungal spores were present in large numbers. No lesions were present in the brain.

DISCUSSION

Fungi of the genus *Hormodendrum* are the cause of chromoblastomycosis in man. The term *Cladosporium* is preferred by some, and Binford *et al.*[3] maintain that 'hormodendrum' is an invalid synonym for 'cladosporium'. Chromoblastomycosis is common in tropical and sub-tropical areas and particularly in this part of the world. The condition is characterized by a chronic granulomatous infection of the skin, usually secondary to some form of trauma. The lower limbs are most commonly affected. The lesions progress slowly with the formation of ulcerated papillomatous nodules. Early lesions may simulate dermatophytosis and the later lesions have to be distinguished from tuberculosis verrucosa cutis, late nodular syphilis, yaws, leishmaniasis and maduromycosis.

Apart from the two cases of brain abscess already mentioned as resulting from *Cladosporium trichoides*, metastatic infection with fungi of the chromoblastomycosis group appears to have been recorded on only 2 occasions. Montpellier and Catanei[5] described a patient with metastatic lesions in the quadriceps and Carrion[6] recorded the case history of a patient with primary lesion on one leg and a subcutaneous nodule in the opposite thigh and another in the left forearm.

The strain of *Hormodendrum* described by Binford *et al.*[3] differed in certain respects from the strains usually found in chromoblastomycosis of the skin in man. Thus the spore chains were of greater length, and showed less frequent branching. In addition, the conidia were smaller than in the other pathogenic species. They compared the cultural features of the fungus which they isolated with those of a number of saprophytic strains isolated from fruit and other sources, but without being able to establish its identity with any of these. Intravenous injection of their fungus into rabbits resulted in the production of multiple brain abscesses.

Clinically, the patient described here did not appear to have cutaneous chromoblastomycosis. The small ulcerated area on the scalp was unfortunately not examined for the presence of fungi but its appearance was unlike that of chromoblastomycosis, though it may have been an early lesion.

SUMMARY

An example of brain abscess caused by the fungus *Hormodendrum* is described. Fungi of this type are the cause of chromoblastomycosis in man.

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