Cryptococcal skull granuloma

Case report

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A patient with a cryptococcal skull granuloma is presented, and the radiological differential diagnosis is discussed.

KEY WORDS • osteomyelitis • cryptococcosis • skull lesion

Cryptococcosis is a disease caused by a parasitic fungus, Cryptococcus neoformans, and has a special predilection for the lungs and central nervous system (CNS). Meningitis, ventriculitis, and cerebral, intraventricular, and spinal cord granulomas are all known CNS complications of disseminated cryptococcosis. Cryptococcal granulomas of the skull are quite rare but have been noted. We have recently examined a patient with a cryptococcal granuloma of the calvaria and add this unusual case to the literature.

Case Report

This 71-year-old black man presented for evaluation of a lump on his scalp. He had a long history of chronic lymphocytic leukemia that had been treated with various drug regimens and irradiation.

Physical examination revealed a 4 × 3 × 4 cm soft fluctuant mass in the right frontal region. It was not tender or erythematous, and there was no palpable underlying bone defect. Neurological examination was normal. Laboratory studies revealed 29,600 white blood cells/cu mm, a hemoglobin of 10.8 gm%, a hematocrit of 33%, and 25,000 platelets/cu mm.

Skull films demonstrated a 3 × 3 cm lytic lesion with an irregular margin, but with no surrounding sclerosis in the parasagittal region of the right frontal bone. Both the inner and outer tables of the calvaria appeared to be destroyed (Fig. 1). Computerized tomography showed a nonenhancing lytic lesion of the skull associated with an overlying soft-tissue mass.

At surgery, a large cavity filled with necrotic debris was found in the scalp, extending through the outer and inner tables of the calvaria to involve the outer surface of the dura. Histological sections revealed necrotic tissue debris heavily infiltrated by yeast fungi. The organisms occasionally showed budding and were heavily invested by thick mucoid capsules. These were preferentially stained by periodic acid-Schiff and mucicarmine techniques. Rare pseudohyphal forms were also present (Fig. 2). Occasional blood vessels were surrounded by uniform, apparently neoplastic lymphocytes. However, there was minimal inflammatory reaction. Cultures of the lesion and cerebrospinal fluid grew Cryptococcus neoformans. The patient was treated with amphotericin and did well.

Discussion

Cryptococcosis is a common fungal infection. The organisms are thought to enter the respiratory tract and generally establish a primary infection in the lungs. The pulmonary lesions may go undetected since they are often small and infrequently undergo mineralization. Widespread hematogenous dissemination may occur with relatively frequent involvement of the CNS. Perhaps 50% of such individuals have underlying debilitating diseases or immunosuppression.

Osteolytic lesions of the skull are not uncommon.
Cryptococcal skull granuloma

The differential diagnostic list is long and includes parietal foramina, meningoceles, meningoencephaloceles, dermoid cysts, epidermoid cysts, hemangiomas, fibrous dysplasia, eosinophilic granulomas, hyperparathyroidism, neurofibromatosis, leptomeningeal cysts, metastasis, myeloma, and osteomyelitis, among others. Many osteolytic lesions have a characteristic radiographic appearance and offer little diagnostic problem, while others are more difficult to identify.

The identification of osteomyelitis on roentgenograms is not always easy or certain. The acute osteomyelitic process is characterized by progressive spotty rarefactions interspersed by islands of intact bone. Small rarefied areas eventually coalesce into larger ones. Acute advancing osteomyelitis is a lytic process and is usually associated with cellulitis or other soft-tissue involvement. Scalp abscesses may be seen. Granulomatous cranial osteomyelitis may be represented on x-ray films as discrete lytic areas that may or may not have a circumferential zone of sclerosis. Localized soft-tissue swelling may be present, associated with draining sinus tracts. In other instances of granulomatous osteomyelitis, the bone changes may be purely sclerotic, without involvement of soft tissue.

Involvement of both tables of the skull in association with a soft-tissue mass is common in osteomyelitis, and these findings should alert the radiologist to this possibility. Thus, although bone involvement is relatively uncommon, a cryptococcal granuloma probably should be considered in the differential diagnosis of lytic lesions of the skull in the immunosuppressed individual, even in the absence of overt CNS cryptococcosis.

Fig. 1. Lateral (left) and Towne's (right) views of the skull demonstrating a large lytic lesion in the right frontal bone.

Fig. 2. Photomicrograph demonstrating organisms with thick mucoid capsules, characteristic of Cryptococcus neoformans (arrow). PAS, $\times$ 500.
References


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