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CT of Multiple Intracranial Cryptococcoma

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A case of intracranial cryptococcal masses was encountered with an unusual computed tomographic (CT) demonstration of multiple enhancing deep cortical, basal ganglionic, and posterior fossa lesions which were difficult to differentiate from metastatic disease. Although there have been a few previous reports [1–6] of intracerebral cryptococcal granulomas and abscesses with correlative CT scans, this case may be unique in the number and location of the intracranial cryptococcal mass lesions.

Case Report

A 57-year-old had occipital headaches and difficulty in walking; he fell frequently. His family gave a history of heavy alcohol consumption and confusion and dementia for several months. Physical examination revealed a cachectic and unkempt elderly man who was lethargic but followed commands well. He was afebrile and other vital signs were stable. His neck was supple and his chest was clear. He was oriented to person and place, but not to time. Both recent and remote memory were poor. Cranial nerves were intact, and there was no papilledema. Deep tendon reflexes were 2+ and symmetric with flexor plantar reflexes. He had a wide-based gait.

A lumbar puncture at admission revealed clear cerebrospinal fluid (CSF) with an opening pressure of 42 cm of water, a white blood cell count of 72/mm³ with 80% polymorphonuclear leukocytes and 20% lymphocytes, glucose of 14 mg/dl compared to a serum glucose of 114 mg/dl, and protein of 84 mg/dl. Encapsulated budding yeasts were noted on the India ink preparation, and the CSF culture grew *Cryptococcus neoformans* 3 days later. Posteroanterior and lateral chest radiographs were normal. Admission cerebral CT scans showed, on the unenhanced scan, areas of slightly increased density in the cerebellar hemispheres, the right corpus striatum, and the head of the right caudate nucleus. There was slight anterior displacement and dextrad shift of the fourth ventricle, and mild dilatation of the third and lateral ventricles. After contrast administration, there were multiple homogeneously enhancing lesions scattered throughout the gray and white matter of the cerebral hemispheres, basal ganglia, thalami, and cerebellum (fig. 1). The initial impression of the scan was multiple enhancing lesions due to metastatic disease, but chronic inflammatory masses could not be ruled out. The positive CSF studies for cryptococcus, however, greatly increased the probability that the lesions were multiple cryptococcoma.

Intravenous amphotericin B and 5-fluorocytosine therapy was initiated on the second day after admission. The patient's clinical

condition gradually improved. His serum cryptococcal antigen titer, which was reactive at 1:32 on admission, fell to 1:8 after 10 days, was 1:1 after 30 days, and was negative at the time of discharge. A cisternal puncture 3 months after admission yielded a white blood cell count of 13/mm³, a CSF glucose of 59 mg/dl, and a CSF protein of 31 mg/dl. India ink preparation was negative, and the CSF cryptococcal antigen titer, which was reactive at 1:128 on admission, was negative. Follow-up CT scans 5 days and 30 days after admission were unchanged; however, cerebral CT scans at 2 and 3 months showed considerable decrease in the size and enhancement of most of the lesions, especially those in the cerebellum. The patient was alert, oriented, and headache-free when discharged 3 months after admission.

Discussion

The most common form of cryptococcosis involves the central nervous system (CNS). In a series reported in 1972 by Lewis and Rubinovich [7], 66% (21/32) of patients with cryptococcosis had CNS involvement, and in 71% (15/21) of these cases the CNS was the only organ system involved. These results are similar to those of Mosberg and Arnold [8], who reviewed case reports published before 1949. CNS involvement by *Cryptococcus* most commonly causes inflammation of the meninges; however, abscess and granuloma formation can also occur. In 1971, Vijayan et al. [9] noted that there had been 500 reported cases of CNS cryptococcosis and that intracranial masses were uncommon in this group. A histologic diagnosis either from surgery or necropsy is not available for most patients with CNS cryptococcosis, and since most retrospective studies reviewed cases reported before 1973 and therefore before the advent of CT, the exact incidence of intracranial mass lesions in CNS cryptococcosis is unknown. In three recent CT studies on patients with CNS cryptococcosis [5, 6, 10], the incidence of intracranial mass lesions was 17% (2/12), 25% (3/12), and 18% (2/11), respectively. Fujita et al. [1] reviewed 55 cases of intracranial cryptococcal masses of which 19 (35%) were multiple, and reported four basic morphologic types of lesions: abscess (9%), gelatinous mass (24%), fibrogranulomatous mass (15%), and mixed (43%). In 9% of the cases, the lesions could not be classified owing to inadequate descriptions in the case re-

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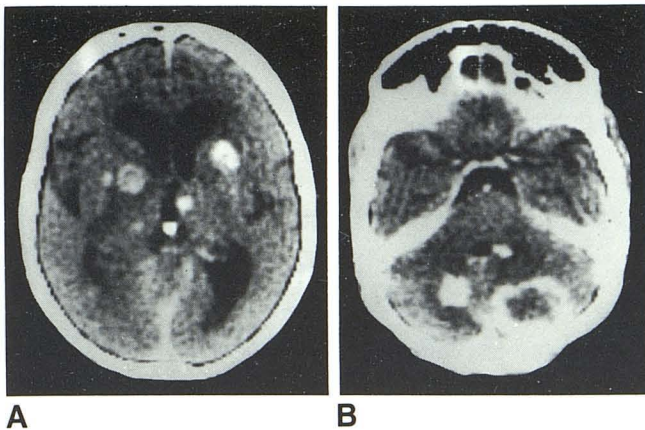


Fig. 1.—Contrast-enhanced CT scans. **A**, Lesions in head of left caudate nucleus, both thalami, and right internal capsule and putamen. Mild hydrocephalus. **B**, Large, ring-enhancing lesion in left cerebellar hemisphere, displacing fourth ventricle anteriorly and dextrad; smaller, homogeneously enhancing lesion in right cerebellar hemisphere; third lesion adjacent to left side of fourth ventricle.

ports. Most patients with intracranial cryptococcal mass lesions present without symptoms of meningeal involvement; Selby and Lopes [11] reviewed 40 case reports of patients with CNS cryptococcomas, in which 58% (23/40) had no clinical signs of meningitis on admission. However, a patient with cryptococcal meningitis has a significant chance of also having a neurologically silent intracranial cryptococcal mass. Fujita et al. [1] reviewed 34 cases of intracranial torulomas with associated meningitis, and found that 18% (6/34) of the patients had no localizing neurologic signs or symptoms of increased intracranial pressure. Routine CT scanning of the brain is, therefore, indicated in all patients with cryptococcal meningitis.

This seems to be the fifth reported case of multiple intracranial cryptococcal mass lesions correlated with CT scans, and the first case in which the cryptococcal masses were seen as both supratentorial and infratentorial lesions on CT. In view of the increasing incidence of fungal infections secondary to increased use of steroids, chemotherapy, and other

immunosuppressants, it is important to be aware of the varied CT appearance of cryptococcosis and other fungal infections [6, 12]. The clinical presentation of cryptococcal masses involving the CNS is usually consistent with metastatic disease, and their appearance on cerebral CT can also be indistinguishable from that of metastases. In lieu of a tissue biopsy, examination of the CSF for *Cryptococcus* is essential for proper diagnosis.

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