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AJNR Am J Neuroradiol 1983, 4 (6) 1243-1244

<http://www.ajnr.org/content/4/6/1243.citation>

This information is current as
of August 26, 2025.

Intracerebellar Coccidioidal Granuloma

Glenn Nakazawa,¹ Ross E. Lulu, and Andrew H. Koo

Findings in intracranial coccidioidomycosis by computed tomography (CT) have been well described in the radiologic literature. We describe the CT presentation of a focal intraaxial coccidioidal granuloma and provide pathologic documentation.

Case Report

A 45-year-old diabetic man was admitted for an episode of diabetic ketoacidosis that resolved quickly. During hospitalization, the patient stated that he had had left leg weakness and sensory deficit causing difficulty in walking for 3 years.

Neurologic examination revealed normal motor and cranial nerve functions, as well as normal reflexes and mental status. There was a sensory deficit below the left ankle. Ataxia and poor coordination of the left extremities suggested a cerebellar lesion.

There were no clinical signs of meningitis. Cerebrospinal fluid was negative for smears and cultures.

Head CT showed a low-density abnormality in the left cerebellar hemisphere with ring enhancement after contrast administration (figs. 1A and 1B). Metrizamide cisternography showed most of this mass to be intraaxial, with only a slight extraaxial component (fig. 1C). Cerebral angiography revealed only slight mass effect and stretching of the vein of the lateral recess of the fourth ventricle (fig. 1D).

Admission chest film showed a fluffy left upper lobe infiltrate (fig. 1E). Sputum and needle aspirate showed no malignant cells. Open biopsy of this lesion showed caseating granulomata with fungal elements strongly suggestive of coccidioidomycosis.

Craniotomy confirmed the CT findings of an intracerebellar lesion. Histology of the excised tissue showed a granulomatous process with fungal elements pathognomonic of coccidioidomycosis [1] (fig. 1F). Tissue from the craniotomy was cultured and grew a fungus that was identified later as coccidioidomycosis. The patient was treated with both intravenous and intrathecal amphotericin B. Recovery was gradual but uneventful.

Discussion

Coccidioides immitis is a fungus endemic to the San Joaquin Valley and southwest United States, as well as parts of Mexico and Central and South America [2]. The organism exists as a saprophyte in soil, and becomes infective when the airborne arthrospores are inhaled [2]. About one-third of infected persons develop symptoms, usually of mild upper respiratory illness [2]. In less than 1% of patients, the

primary lung infection may progress to the disseminated form through hematogenous spread of sporangiospores from lungs to other organs [1, 2]. A variety of organs can be affected, including lungs, lymphatics, skin, liver, kidneys, skeletal structures, meninges, and brain [2–4].

The spread of infection from the lungs to the central nervous system (CNS) usually occurs within a period of weeks to months [5]. In fact, development of disease at extrapulmonary sites is uncommon if there have been no manifestations in the year after passage of the initial pulmonary infection [6]. Filipinos, blacks, Mexicans, Chinese, and Japanese have been described as having an increased risk for developing the disseminated form of the disease [1, 6]. However, several authors have postulated that intracranial lesions are more common in young white males [3, 4, 7, 8].

Coccidioidomycosis of the CNS usually presents as meningitis and ependymitis, which on CT will appear as obliteration or distortion of the basal cisterns due to exudative and fibrotic meningeal reaction [3]. After contrast administration, CT scans may show dense enhancement of the basal meninges [3]. The exact pathogenesis of the enhancement remains unknown, but it may be due to neovascularity associated with the exudative reaction [3, 9]. The meningitis can lead to obstruction of the fourth ventricle or basal cisterns causing obstructive hydrocephalus [3].

Ventriculitis has been reported as a manifestation of CNS coccidioidomycosis [3, 4]. Contrast CT scans will demonstrate abnormal enhancement of the ventricular ependymal lining in these patients [4, 10].

"White-matter disease" [3] has also been described. CT scans in these patients can show areas of hypodensity, both focal and diffuse, usually in the periventricular areas [3]. The exact etiology of these low densities is not completely understood [3].

Other reported manifestations, though rare, include vasculitis and vascular infarcts [3, 4]. Granulomas have been postulated [3, 4], but have not been definitely demonstrated by CT scanning or proven histologically.

Our patient represents an unusual presentation of intracranial coccidioidomycosis—that of an isolated intraaxial coccidioidal granuloma, without associated CT or clinical findings of meningitis or hydrocephalus. There were no

Received July 6, 1982; accepted after revision February 3, 1983.

¹All authors: Department of Diagnostic Radiology, Santa Clara Valley Medical Center, 751 S. Bascom Ave., San Jose, CA 95128. Address reprint requests to A. H. Koo.

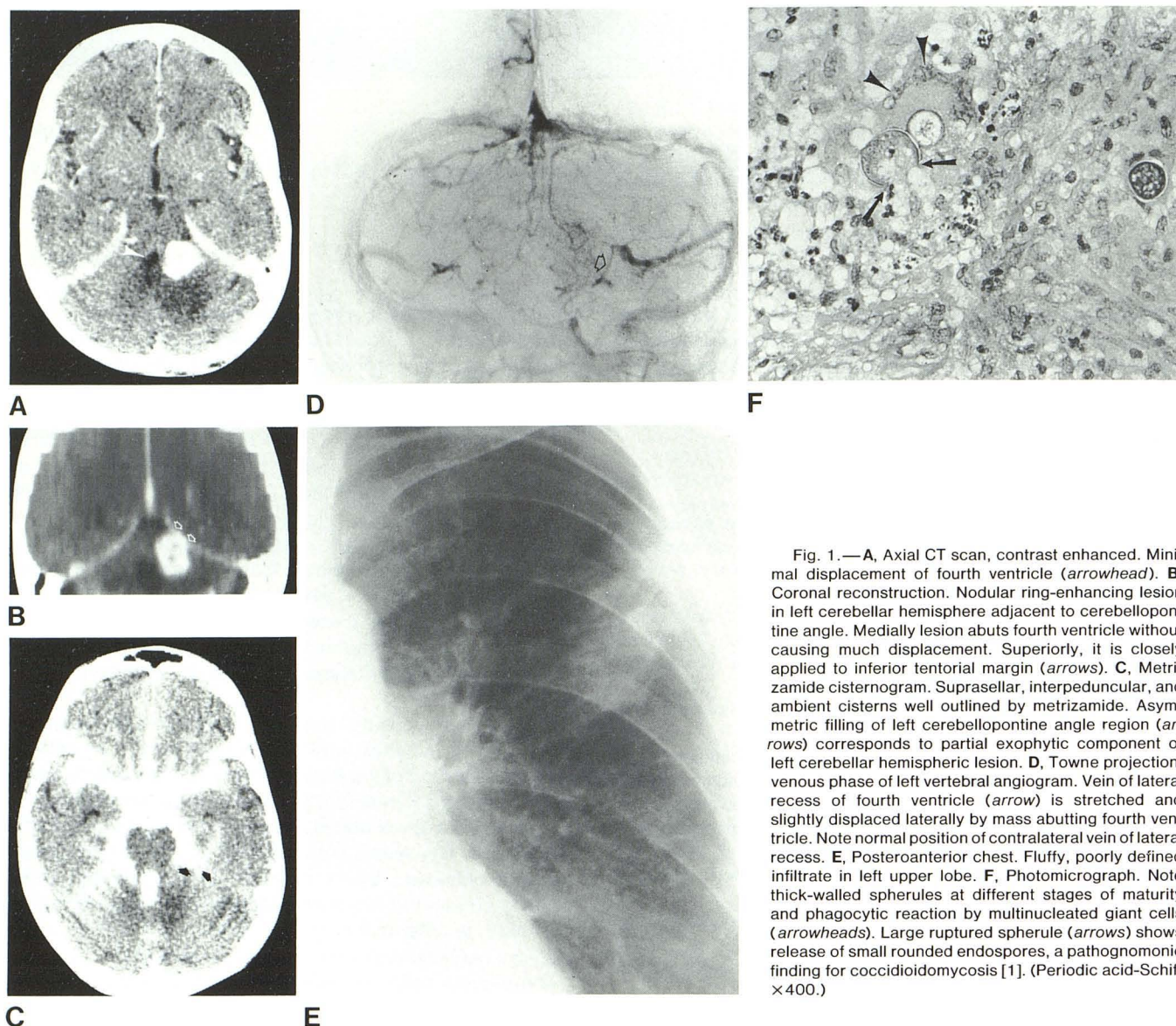


Fig. 1.—A, Axial CT scan, contrast enhanced. Minimal displacement of fourth ventricle (arrowhead). B, Coronal reconstruction. Nodular ring-enhancing lesion in left cerebellar hemisphere adjacent to cerebellopontine angle. Medially lesion abuts fourth ventricle without causing much displacement. Superiorly, it is closely applied to inferior tentorial margin (arrows). C, Metrizamide cisternogram. Suprasellar, interpeduncular, and ambient cisterns well outlined by metrizamide. Asymmetric filling of left cerebellopontine angle region (arrows) corresponds to partial exophytic component of left cerebellar hemispheric lesion. D, Towne projection, venous phase of left vertebral angiogram. Vein of lateral recess of fourth ventricle (arrow) is stretched and slightly displaced laterally by mass abutting fourth ventricle. Note normal position of contralateral vein of lateral recess. E, Posteroanterior chest. Fluffy, poorly defined infiltrate in left upper lobe. F, Photomicrograph. Note thick-walled spherules at different stages of maturity and phagocytic reaction by multinucleated giant cells (arrowheads). Large ruptured spherule (arrows) shows release of small rounded endospores, a pathognomonic finding for coccidioidomycosis [1]. (Periodic acid-Schiff $\times 400$.)

specific CT findings to suggest the correct diagnosis in this patient. The main differential diagnosis included primary or metastatic neoplasm, meningioma, and infectious processes.

ACKNOWLEDGMENTS

We thank Jerrie Ball for manuscript preparation and Maie K. Herrick for the photomicrograph.

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