PRIMARY CHRONIC COCCIDIOIDAL MENINGITIS
A DIAGNOSTIC NEUROSURGICAL PROBLEM

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SINCE Wernicke\textsuperscript{29} and Posadas\textsuperscript{16} case of coccidioidal granuloma affecting a Brazilian soldier was reported from Argentina in 1892, much more has been learned concerning this interesting fungus infection, most of it from studies of infections occurring in the San Joaquin Valley of California.

The first case in California was described by Rixford\textsuperscript{19} in 1894, and this together with a second case observed that same year by Thorne\textsuperscript{28} and Rixford\textsuperscript{20} were subsequently reported in greater detail by Rixford and Gilchrist\textsuperscript{21} in 1896. It was their impression that the organism was a protozoan belonging to the group of coccidia and they gave it the name Coccidioides immittis.

During their observation of another case, Ophüls and Moffitt\textsuperscript{14} found the parasite grew readily on artificial media and developed a mold, belonging to the group Oidia. Subsequently, Ophüls\textsuperscript{13} gave the name of Oidium coccidiiodes to the organism and coccidioidal granuloma to the lesion produced by it.

Thereafter many fatal cases of the disseminated granulomatous type were reported and it was believed generally that this was the only form in which it appeared, and that it was a chronic, progressive and highly fatal entity. In 1930 Rand\textsuperscript{17} reported two cases of coccidioidal granuloma simulating spinal cord tumor, and emphasized the similarity of the disease to tuberculosis and its frequent confusion with it.

The more common benign pulmonary disease caused by this fungus was not appreciated until its description by Gifford\textsuperscript{8} and Dickson\textsuperscript{5} in 1936 and 1937. Since that time other comprehensive reports on this relatively mild manifestation of the infection have been written by Faber, Smith and Dickson,\textsuperscript{6} Smith,\textsuperscript{23} Smith and Baker,\textsuperscript{24} Peers, Holman, and Smith,\textsuperscript{15} and Goldstein and Louie.\textsuperscript{9}

It has been estimated\textsuperscript{1} that about twenty-five per cent of those dying of the disseminated granulomatous infection have lesions of the nervous system. The cases of so-called primary chronic coccidioidal infection, in which the first or primary clinical indication of the infection is in the meninges, occur infrequently, seldom are diagnosed prior to autopsy, and often the patients are operated upon neurosurgically for suspected intracranial tumors or abscesses.

Interestingly, of the seven cases of so-called primary coccidioidal meningitis reported by Abbott and Cutler\textsuperscript{1} five were diagnosed at autopsy; in
one an antemortem culture taken from the nose revealed the fungus and in the other a biopsy of the arachnoid obtained in a suboccipital exploration established the diagnosis. Moreover, in three cases craniotomies were performed for suspected intracranial neoplasms and in another ventriculography for the same purpose.

In 1939 Storts also reported a case of coccidioidal granuloma simulating a brain tumor in a child of four years.

The same diagnostic problem has been encountered with torula or Cryptococcus hominis meningitis. The first two cases of torula reported by Stoddard and Cutler were from Dr. Harvey Cushing's service at the Peter Bent Brigham Hospital.

As mentioned by Cushing, in a discussion of a paper by Shapiro and Neal, in both there were symptoms of intracranial pressure without localizing features, operation was without avail and the diagnosis was made only at autopsy. In one of the cases reported by Reeves, Butt, and Hammack an operation had been performed elsewhere for a suspected right frontal lobe abscess, and recently Swanson and Smith described two patients with granuloma simulating cranial tumor, one of whom was operated upon.

Because of the clinical similarity of torula and primary chronic coccidioidal meningitis, their rarity, and the differential diagnostic problems involved, it was believed sufficiently important to emphasize the diagnostic, clinical and pathologic features of the two, and to report an additional informative case of primary chronic coccidioidal meningitis.

REPORT OF CASE

History. A 37-year-old soldier was well until 26 July 1943, when he contracted a respiratory infection with fever persisting for three days. He then improved until the evening of 1 August, when he fainted. Following this, his wife observed that he talked incoherently and was confused. That evening he was admitted to the West Los Angeles Area Station Hospital, where he was described as being drowsy, incoherent, and confused.

The following morning his symptoms subsided and during the ensuing week he was so much improved he was about to be discharged, when he developed a slight fever and again became confused and lethargic. A spinal puncture at this time revealed 690 cells with 13 per cent polymorphonuclear cells and 87 per cent lymphocytes, a sugar of 25 mg. per cent, and a four plus Pandy. A stiff neck and a positive Kernig were found on examination and a repeated spinal puncture disclosed opalescent spinal fluid under slightly increased pressure with 890 cells, of which 80 per cent were lymphocytes. The sugar was 94 mg. per cent and the Pandy four plus. No growth was obtained on the blood or spinal fluid cultures. He was given sulfadiazine for eleven days. Unfortunately no chest roentgenogram was taken during this hospitalization. In about three days the meningeal signs disappeared, but a left positive Babinski sign was noted. A spinal puncture performed 23 August 1943 showed 420 cells which included 2 per cent polymorphonuclears, 68 per cent lymphocytes and 30 per cent large monocytes, with a sugar of 46 mg. per cent and a four plus Pandy. The culture revealed no growth. In view of the fact that he continued to complain of headache, and because of his history and clinical findings, he was transferred to the Hoff General Hospital 25 August 1943 with the impression that he had a right frontal lobe abscess.

Clinical Findings and Course at Hoff General Hospital. On admission the patient was alert, responsive and cooperative. His temperature was 99.6 degrees by mouth, urinalysis was normal, and the blood count disclosed 4,670,000 erythrocytes, 9,900 leukocytes, and a hemo-