LETTER TO THE EDITOR

Hydrocephalus Secondary to Chronic Meningitis

Feng Zhou, Wei-Wei Hu, Ping Zhu, Wei-Ming Fu, Hong Shen & Jian-Min Zhang

Department of Neurosurgery, Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, China

Correspondence

H. Shen, M.D., Ph.D., Department of Neurosurgery, Second Affiliated Hospital, School of Medicine, Zhejiang University, Jiefang Road 88, Hangzhou, China 310009.

Tel.: +86-571-8778-4714;

Fax: +86-571-8778-4736;

E-mail: sh_2nd@126.com

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A 56-year-old male was referred to us with a 2-month history of low fever and vomiting. Brain MRI showed significant dilation of ventricles, indicating hydrocephalus with basal meningeal enhancement (Figure 1). Lumbar puncture (LP) showed clear cerebrospinal fluid (CSF) with opening pressure of 120 mmH₂O, protein 160 mg/dL, Glu 1.93 mmol/L, CL 115 mmol/L, ADA 11 U/L, WBC 90/μL, lymphocytes 74%, neutrophils 22%, and monocytes 4%. Gram, acid-fast bacilli, and India ink staining of CSF showed negative. Culture of CSF for *M. tuberculosis*, fungi, and pyogenic organisms was negative. Skin testing with purified protein derivative of *M. tuberculosis* (PPD) test showed strongly positive and T-spot test for tuberculosis (TB) also positive which led to a probable diagnosis of tubercular meningitis (TBM). Ventriculoperitoneal shunt and empirical antituberculosis (anti-TB) chemotherapy were administered with rifampicin, pyrazinamide, ethambutol, and isoniazid. The patient improved quickly and returned to normal daily life. Three months later, the patient developed hydrocephalus again with low fever and diplopia. The abdominal end of

shunt tube was entrapped by the omentum, and a revision surgery made the tube patent again. During this hospitalization, the India ink staining of CSF found *Cryptococcus neoformans* although the culture for *Cryptococcus* was negative. The patient's family recalled the patient had harbored a hobby of feeding doves but quit it 5 years ago. The diagnosis of cryptococcal meningitis (CM) was considered, and Lax agglutination test (LAT) for detection of cryptococcal capsular polysaccharide antigen in CSF for *Cryptococcus neoformans* was positive which further confirmed the diagnosis.

Many microorganisms can cause chronic meningitis, among which TBM is the most common form. CM occurs in patients who are immunodeficient due to HIV, diabetes, steroids, cancer, solid organ transplants, chemotherapeutic drugs, and rarely in healthy individuals [1]. Feces of doves are regarded as the common infective sources for immunocompetent hosts. The CSF of this patient was examined for many times, and at the seventh time, *Cryptococcus neoformans* was found for the first time by India ink staining. For CM, LAT was most sensitive (94.9%), while direct microscopic

Figure 1 Brain MR showed significant dilation of ventricles in the horizontal view which indicated obvious hydrocephalus and basal meningeal enhancement in the sagittal view.

examination with India ink staining was mediate (35.9%), and culture was the least (25.6%) [1], although positive fungal culture was the gold standard for diagnosis of cryptococcal infection. For this patient, the culture for *Cryptococcus* is never positive for more than 10 times.

CM and TBM present with a similar clinical picture of chronic meningitis and differentiation between the two on clinical grounds is difficult [2]. For TBM, the gold standard is isolation of the organism through culture or detection of its presence by acid-fast staining. However, the yield from acid-fast staining and culture remains to be very low, and molecular methods, such as polymerase chain reaction (PCR)-based diagnostic techniques, have begun to be applied, but the sensitivity is too low [3]. Ultimately,

clinicians still rely on indirect evidence of TBM, such as the changes in the CSF (lymphocytic pleocytosis + decreased glucose + increased protein) and pulmonary tuberculosis on chest X-ray [4]. As delayed diagnosis may lead to increased mortality, empirical treatment for TB is often prescribed by clinicians when the discrimination from other organisms is difficult [5]. The temporal improvement in this patient after empirical anti-TB treatment could be attributable to the attenuation of hydrocephalus, not anti-TB treatment itself.

After the diagnosis of CM is confirmed, the patient was given fluconazole for 8 months. The patient improved quickly, and 1 month later LP showed WBC 2/ μ L, Glu 4.23 mmol/L, CL 124 mmol/L, and protein 39.2 mg/dL.

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