

· Central Nervous System Infectious Diseases ·

Eosinophilic meningitis caused by infection of *Angiostrongylus cantonensis* in a traveler

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Keywords

Angiostrongylus cantonensis; meningitis; eosinophilia; cerebrospinal fluid; cytology.

【关键词】 广州管圆线虫；脑膜炎；嗜酸性粒细胞增多；脑脊液；细胞学

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Case Report

A previously healthy 55-year-old woman presented with a sudden onset of fever, headache and skin rash. After returning from a trip to South China two weeks ago, she developed low-grade fever (maximum temperature, 37.4–38 °C) and global non-throbbing headache and denied having eaten snails or slugs. Then some rashes appeared on her both arms which were described as erythematous papules by the dermatologist. What was more, the patient stated a burning sensation on her left leg and numbness on her left hand without weakness. The symptoms had no improvement after oral antibiotic treatment. Neurological examination revealed a slight nuchal rigidity and weakly positive Kernig's sign without other neurological focal signs. The findings of brain MR images were unremarkable. Laboratory findings showed a white blood cell count of $13.75 \times 10^9/L$ with 33.80% eosinophils, an erythrocyte sedimentation rate (ESR) level of 23 mm in first hour and normal C-reactive protein (CRP). Panel of antinuclear antibodies was negative. Spinal tap was performed with a cerebrospinal fluid (CSF) opening pressure of 210 mm

Abstract

A 55-year-old female traveler returning from South China with acute onset of meningitis, presenting with eosinophilic pleocytosis in the cerebrospinal fluid was reported. The etiological diagnosis of angiostrongyliasis was confirmed by detection of specific serum antibody against *Angiostrongylus cantonensis*. Angiostrongyliasis should be considered as a major differential diagnosis for eosinophilic meningitis in the travelers to endemic regions.

【摘要】 报告 1 例从中国南方旅游归来后发生急性脑膜炎患者的临床经过。脑脊液细胞学检查发现嗜酸性粒细胞计数显著升高，符合嗜酸性粒细胞性脑膜炎，予以经验性糖皮质激素和抗寄生虫治疗后病情缓解；最终经血清学检查明确诊断为广州管圆线虫感染。对于从流行地区归来的旅游者所患的嗜酸性粒细胞性脑膜炎，应特别注意广州管圆线虫病的可能。

H₂O. CSF cytology study revealed a pleocytosis of $240 \times 10^6/L$ with 70% eosinophils (Fig. 1), an increased protein of 1.50 g/L and a decreased glucose of 1.50 mmol/L, the bacterial and fungal cultures were negative. So the findings of CSF study were compatible with the diagnosis of eosinophilic meningitis. She was considered the possibility of parasite infection and administered empiric therapy with oral prednisolone 30 mg once a day and albendazole 400 mg twice a day for ten days. Her symptoms were improved remarkably, but the repeated spinal tap yielded a pleocytosis of $1400 \times 10^9/L$ with 10% eosinophils. At this moment, her testing result of serum antibody to *Angiostrongylus cantonensis* is positive while that for *Taenia solium* is negative, which confirmed the diagnosis of angiostrongyliasis.

The patient's symptoms were getting worse just after stopping prednisolone, so she was administered again the prednisolone 60 mg/d and her symptoms quickly resolved. The cell counts in CSF decreased to $35 \times 10^9/L$ and CSF protein and glucose levels were normal after two weeks. She was then discharged with a treatment of prednisolone 30 mg/d which was gradually tapered off in two months. She remained continuously well during the follow-up period.

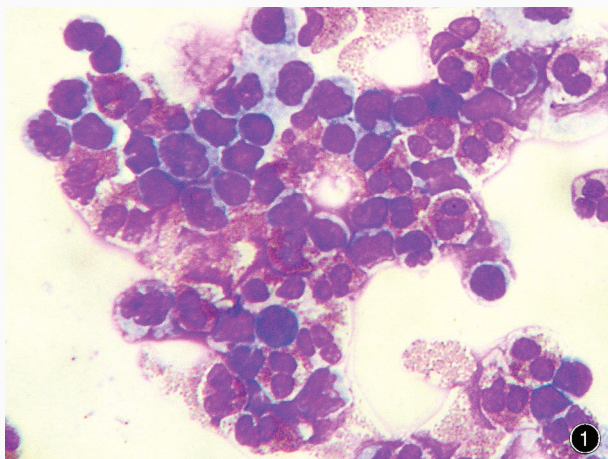


Figure 1 CSF cytology revealed severe inflammation with eosinophilic predominance and activated lymphocyte by MGG staining $\times 200$ **Figure 2** Several *Achatina fulica* Ferussac (giant African snail) were collected in a garden in the downtown of Macau by Guan Hongzhi

Discussion

Eosinophilic meningitis is characterized by meningeal inflammation and an eosinophilic pleocytosis in the CSF. Although neurocysticercosis, which is common in North China can also present with meningitis occasionally, the rat lung worm *Angiostrongylus cantonensis* is the most common worldwide. Individual cases and outbreaks of infection with this parasite have been reported for years in endemic areas of Southeast Asia and the Pacific Rim^[1]. In China, angiostrongyliasis is endemic in its southeast area and local residents and the risk of infections may increase for travelers to those endemic areas. Humans become infected by ingesting third-stage larvae in intermediate hosts, such as snails and slugs. *Achatina fulica* Ferussac is one of the major intermediate hosts of *Angiostrongylus cantonensis*. *Achatina fulica* Ferussac, commonly known as giant African snail, is an invasive alien species in China. The snail, native to East Africa, is artificially introduced because of food purpose and has now become a dominant species in the country's wilderness. Even at the garden in Macau downtown, a dozen of the snails can be easily collected in a few minutes (Fig. 2). It was estimated that nearly 20% of giant African snails contain the larvae in certain regions in the south provinces of China. Potential sources of incidental exposure include food items contaminated with larvae, for example, salad or juice containing undetected small snails and slugs. As for our case, she denied having eaten any snails but she stated that she might have taken raw vegetable or juice during the trip.

In human, the larvae penetrate the gastrointestinal tract mucosa and migrate into the CNS hematogenously. Following an average incubation

period of 1-3 weeks, patients develop severe headache, meningeal signs, fever and sensory abnormalities. Sensory symptoms, including paresthesia, hyperesthesia and numbness, are common and present in the limbs. Some patients reported migratory sensory symptoms. The infection seldom results in motor symptoms or even more severe neurologic impairment, coma and death. Besides acute meningitis, some cases may present with different clinical entities, e.g., meningoencephalitis and myeloencephalitis, which have more CNS parenchymal lesions and result in motor symptoms or even more severe neurologic impairment, coma and death^[2]. The most common finding of neuroimage is the diffuse leptomeningeal enhancement on contrast-enhanced T₁-weighted imaging (T₁WI) which is non-specific and can also be found in the meningitis caused by bacterial or fungal infection (Fig. 3).

The diagnosis of Angiostrongyliasis is usually based on an appropriate epidemiologic history, characteristic clinical presentation, CSF findings and serology^[3]. When epidemiologic evidence and serum antibody tests are not available, CSF cytology may be useful in diagnostic practice^[4]. The discovery of larvae from the CSF is rare. In a study of eighteen cases, only one case was parasitologically confirmed. In most of the cases, eosinophil exceeded 50% in cell count of CSF^[5]. In our previous reports, we set an eosinophil percentage of 50 in CSF as the diagnostic threshold of eosinophilic meningitis caused by *Angiostrongylus cantonensis* infection. This diagnostic criteria had been found with high sensitivity and specificity^[6].

The use of antihelminthic medicine (e.g., albendazole) as specific therapy is controversial for the limited evidence suggested that antihelminthic alone seems to

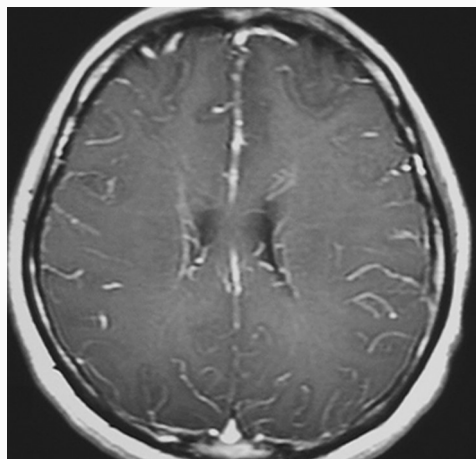


Figure 3 A diffuse leptomeningeal enhancement was revealed on the contrast-enhanced T₁WI in a patient with eosinophilic meningitis due to Angiostrongyliasis

have no effect on the clinical course^[7]. So the treatment is primarily supportive and symptomatic. Systemic corticosteroids may decrease symptom and shorten the duration, while the efficacy of combination treatment with albendazole remains to be increased^[8-9]. According to our cases and clinical experience, it seems that symptomatic improvement tends to depend on prolonged corticosteroid treatment^[10].

Clinicians should consider the diagnosis of angiostrongyliasis in patients with eosinophilic meningitis who have traveled to endemic regions, even though a history of snail ingestion could not be elicited. Travelers and residents of endemic regions should be aware of the potential risks of eating raw vegetable or juice. The empiric therapy with corticosteroids and antihelminthics is reasonable for acute eosinophilic meningitis of unknown origin.

Conflict of Interest

The authors have declared that no conflict of interest

exists.

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