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Case Report

EOSINOPHILIC MENINGITIS DUE TO *ANGIOSTRONGYLUS CANTONENSIS*

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Abstract

Angiostrongylus cantonensis is a nematode parasite that inhabits the pulmonary arteries and heart of rodents. It is one of the causative agents of fatal eosinophilic meningoencephalitis in man. We present five cases of eosinophilic meningitis presumably due to infection with *Angiostrongylus cantonensis*. All the five patients gave history of ingestion of monitor lizard within ten days of onset of symptoms.

Key words: *Angiostrongylus cantonensis, eosinophilic meningitis, monitor lizard*

Eosinophilic meningitis is a rare disorder. It is associated with tuberculosis, syphilis, parasitic infections, drugs and malignancies. *Angiostrongylus cantonensis* is an important cause of eosinophilic meningitis in endemic areas. *Angiostrongylus cantonensis* is a nematode parasite that inhabits the pulmonary arteries and heart of rodents. Infective larval stages are also found in certain snails and monitor lizard (*Varanus bengalensis*). Humans get infected when they ingest raw or partially cooked snails or monitor lizard. We describe five cases of eosinophilic meningitis presumably due to *Angiostrongylus cantonensis* following ingestion of monitor lizard.

Case Report

We had five cases of eosinophilic meningitis between January 2000 and August 2004. All the five cases were males between 28 and 35 years of age. They presented with history of fever, hyperaesthesia, headache and neck stiffness. They gave a history of ingestion of monitor lizard within last ten days of onset of symptoms. None of the patients had any focal neurologic deficits. The blood examination revealed eosinophilia. Serum creatine kinase was raised in all patients. Serum electrolytes, renal and liver function tests were normal in all patients. Electrocardiogram, chest X-ray and ultrasound abdomen were normal in all. Serology for syphilis, dengue virus, leptospira and HIV were negative in all. Computed tomography scan of brain was normal. Cerebrospinal fluid study (CSF) showed raised opening pressures and increased cell count with eosinophilia. Gram stain, Ziehl Neelsen stain, India ink stain and culture of CSF were negative (Table 1).

From the history of ingestion of monitor lizard and peripheral blood and cerebrospinal fluid study findings of eosinophilia we came to the diagnosis of eosinophilic meningitis presumably due to *Angiostrongylus cantonensis*. Wet smear examination of the CSF study did not reveal the organism. An immunologic study could not be done because of non-availability. All the patients were treated with steroids. At the end of three weeks all of them improved symptomatically and repeat CSF study examination was normal.

Discussion

Eosinophilic meningitis is a well-known disease where the rat lungworm, *Angiostrongylus cantonensis* is endemic (South East Asia and in the Caribbean). Its life cycle involves snails, slugs or fish as intermediate hosts and rodents as definitive hosts.[1] Humans are accidental hosts where the worm migrates but does not reach maturity. Infection occurs by eating poorly cooked or raw fish, slugs, snails or vegetables contaminated by infected rat. The central nervous system damage is caused by direct mechanical and toxic injury caused by the worm. The immunologic reactions of the host also play a role.[1]

There are reports of infection following ingestion of monitor lizard as in our case. In 1990, five patients with eosinophilic meningitis were admitted to a teaching hospital in Bangkok. All the patients had eaten raw or partially cooked monitor lizard (*Varanus bengalensis*) before experiencing symptoms. Autopsy in one of the fatal cases revealed many fifth stage larvae of *Angiostrongylus cantonensis* in the brain.[2] Similarly, at Khon Kaen University, autopsies carried out in fatal cases of eosinophilic meningoencephalitis occurring after eating monitor lizard revealed areas of disrupted brain tissue, a massive response by eosinophils to the dead *Angiostrongylus cantonensis*.[3]

Angiostrongyliasis is diagnosed by a history of exposure, cerebrospinal fluid finding and serology. The incubation period varies from 2-30 days of ingestion of infected animal. Patients usually present with headache, neck stiffness, vomiting, fever and hyperaesthesia. Blood shows pleocytosis with eosinophilia. CSF protein is marginally elevated with normal sugar level.[4] CT scan is usually normal. MRI may show

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Table 1: Blood and cerebrospinal fluid findings in five patients with eosinophilic meningitis

Case No.	Blood		Cerebrospinal fluid			
	White blood cell count (per μL)	Eosinophils (%)	Protein (mg%)	Sugar (mg%)	White blood cell count (per μL)	Eosinophils (%)
1	12550	24	75	40	550	40
2	14960	20	90	45	500	30
3	15600	32	110	50	625	45
4	12000	28	95	46	590	32
5	11000	26	88	55	700	38

prominance of virchow robin spaces, periventricular hyperintense T2 signals and enhancing subcortical lesions. Proton beam MR spectroscopy may show decreased choline in the lesions. Diagnosis is confirmed by demonstrating the larva from central nervous system and by Western blot analysis.[5]

The most important differential diagnosis is gnathostomiasis. Other conditions associated with eosinophilic meningitis are mentioned in table 2. It often presents with more severe symptoms such as paralysis of extremities, severe radicular pain, impairment of sensorium and CSF xanthochromia with eosinophilic pleocytosis.[6]

Treatment is mainly supportive analgesics to relieve pain and repeat CSF tap to relieve symptoms of headache. Steroid therapy without specific antihelminthic therapy is effective in control of symptoms.[7] A recent study showed that a combination of albendazole and prednisolone for two weeks was safe and effective in the treatment of eosinophilic meningitis.[8] The prognosis is generally good. Most symptoms resolve within weeks and long term sequel is rare.

Table 2: Differential diagnosis of eosinophilic meningitis

Infections	
	Syphilis
	Tuberculosis
	Angiostrongylus cantonensis
	Gnathostoma spinigerum
	Paragonimus spp.
	Strongyloides stercoralis
	Toxocara canis
	Loa Loa
	Toxoplasma gondii
	Taenia solium
	Coccidioides immitis
	Schistosoma japonicum
	Fasciola hepatica
	Trichinella spiralis
Malignant tumors	
	Glioblastoma,
	Hodgkin's disease
	Non-Hodgkin's lymphoma
	Acute leukemia
	Meningeal carcinomatosis
Drugs	
	Radiographic contrast
	Ibuprofen
	Ciprofloxacin
	Foreign bodies
	Ventriculoperitoneal shunts

Eosinophilic meningitis due to *Angiostrongylus cantonensis* should be suspected in patients who present with eosinophilia and signs of meningitis after eating monitor lizard. It should be suspected in any traveler who presents with eosinphilic meningitis and has visited an endemic area. The treatment is mainly supportive and long term prognosis is good.

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