

Title : Clinical Manifestations and Epidemiological Studies of Eosinophilic Meningoencephalitis in Man.

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Objective Our studies during the last two years revealed two definite types of eosinophilic meningoencephalitis. The first one was called typical eosinophilic meningitis and the second type, a newly recognized disease, was designated as eosinophilic myeloencephalitis. The emphasis in the third year program has been on the latter. Refer to the last annual report for detailed information on the differences of these two types of disease. The main effort is to find the etiologic agent of the myeloencephalitis type.

Description A research station has been moved from Nakorn Rajsima (Korat) Province to Ubon province in the Northeast. Ubon is the second biggest province in Thailand with the population of about 1.5 million. The study was confined to Ubon Provincial Hospital. All cases admitted to the hospital with the symptoms and signs of central nervous system involvement were studied. Efforts were made to obtain autopsies in all fatal cases.

Progress

I. Epidemiology

During this year 137 new cases of eosinophilic meningoencephalitis were studied which makes a total of 650 cases since the beginning of this study three years ago. Of these 137 new cases, 75 were the typical form and 62 were classified as myeloencephalitis. To date a total of 122 cases of eosinophilic myeloencephalitis have been studied (Table 1). The proportion of the occurrence of these two types of the disease was variable depending on the location (Table 2). The ratio of the typical to the myeloencephalitis form is 8:1 in Bangkok, 50:1 in Korat and 1.1:1 in Ubon. This disease has been recognized for the first time in four provinces, namely Chiangmai, Nan, Chumporn and Nakhon Pathom, thus making a total of 37 provinces of Thailand as endemic areas for this disease. Two groups of patients were studied in Bangkok during this period, 12 in one group and 7 in another. They were all the typical form and all gave histories of sharing one dish of raw Pila ampullacea collected from the nearby areas. Pila snails from these areas were examined for the presence of any parasitic larvae. The result is shown in Table 3. The infection rates in these two areas are very high, i.e. 53 and 75 percent. The number of infective larvae found in each positive snail varied from 3-85 in one area and 2-60 in another with averages of 35 and 15.

In Ubon, there was no definite difference in the occurrence of the two types of the disease as shown in Figure 1. Both types showed the peak of the disease in July which is in the middle of the rainy season.

II. Clinical Manifestations

The clinical manifestations of the typical form have been well summarized in the last annual report. This year a total of 122 cases of eosinophilic myeloencephalitis have been evaluated as shown in Table 4.

Table 1. Eosinophilic meningoencephalitis studied during April 1966 - March 1968 according to two types of the disease.

Clinical Diagnosis	First Year	Second Year	Third Year	Total
Typical Eosinophilic Meningitis	312	141	75	528
Eosinophilic Myeloencephalitis	35	25	62	122
Total	347	166	137	650

Table 2. The incidence of two types of eosinophilic meningoencephalitis in three provinces.

Clinical Diagnosis	Bangkok	Korat	Ubon	Total
Typical Eosinophilic Meningitis	78	298	110	503
Eosinophilic Myeloencephalitis	9	6	98	96
Total	87	304	208	599

Table 3. Result of examinations of Pila ampullacea from two endemic areas in Bangkok for infective A. cantonensis larvae.

Area	No. Snails Examined	No. Snails Positive	Percent Positive	No. larvae found in each snail		
				Min.	Max.	Average
A	13	7	53.8	3	85	35
B	8	6	75	2	60	15

Male to female ratio was 7:3. Severe headache was the main complaint in 52 percent. Fever was uncommon. Coma was found in 18 percent. Certain cranial nerve involvement was recognized; 14.8 percent of cases had vision impairment, 2.5 percent had lateral cranial nerve VI paralysis and 4.1 percent had paralysis of cranial nerve VII. Unilateral swelling of the eyelids and conjunctivae was an interesting finding which presented in 4 percent of cases. In two cases immature male Gnathostoma spinigerum were recovered surgically from the swollen eyes.

Paralysis of the extremities is the most significant finding, found in 86.9 percent. Of these paraplegia was the most common (56.6%) followed by hemiplegia (25.47%), paralysis of one upper extremity (10.4%), paralysis of two lower extremities and one upper (5.71%) and paralysis of all extremities (1.88%).

Lumbar puncture revealed concomitant hemorrhage in 47.5 percent of all cases of which frankly bloody spinal fluid was observed in 20.5 percent. Fatality was found in 18 cases or 14.8 percent. Autopsy was performed in 9 cases.

III. Pathology

Nine autopsies of eosinophilic myeloencephalitis were studied. In two brain specimens (AU-67-20 and AU-67-28) immature adult male Gnathostoma spinigerum were recovered, from the surface of the brain in first case and attached to the choroid plexus in the second case. The pathological findings in these two cases were similar to the other 7 cases, and can be summarized as follows:

1. Hemorrhage at a nerve root in the thoraco-lumbar region was observed in two cases and the microscopic finding revealed hemorrhage, necrosis and cellular infiltration.

2. A necrotic and hemorrhagic track was noted penetrating into the central part of cord. This track could be traced upward to the brain stem.

3. In the brain, the most striking features were multiple hemorrhages in the brain, subarachnoid space and ventricles. Minute necrotic and hemorrhagic tracks were also noted to be present in many areas. Microscopic examination showed vascular congestion and perivascular infiltration with mononuclear cells and eosinophils. In some areas, clumps of neutrophils were noted.

4. Massive intraventricular hemorrhage was believed to be the cause of death in 2 cases and multiple massive cerebral hemorrhages were the presumed cause of death in 7 cases.

Summary Typical eosinophilic meningitis caused by Angiostrongylus cantonensis and eosinophilic myeloencephalitis caused by Gnathostoma spinigerum are two distinct clinical entities occurring in epidemic form in at least 37 provinces of Thailand. At the end of the third year, 528 cases of the typical form and 122 cases of the myeloencephalitis form were studied. Pila snails were proved to be the most important source of human A. cantonensis infection. However there was no known evidence of the method of infection of G. spinigerum in those patients. Epidemiology of eosinophilic myeloencephalitis is still far from being understood. Death occurred in 14.8 percent of myeloencephalitis cases and the post-mortem examination was performed in 9 cases. Characteristic neuropathological findings were presented including the finding of two immature male G. spinigerum in the brains of two cases.

Table 4. Clinical manifestations of 122 eosinophilic myeloencephalitis cases.

	No. cases	Percent
Male/Female	85/37	70/30
Severe headache	64	52.5
Fever (over 38° C)	9	7.4
Coma	22	18.0
Convulsion	3	2.5
Eye edema	5	4.1
Vision impairment	18	14.8
Paralysis of lateral rectus	3	2.5
Facial paralysis	5	4.1
Limb paralysis	106	86.9
— Monoplegia	11	10.4
— Paraplegia	60	56.6
— Hemiplegia	27	25.47
— Triplegia	6	5.71
— Tetraplegia	2	1.88
Concomitant hemorrhage	58	47.5
— Bloody spinal fluid	25	20.5
— Xanthochromic spinal fluid	33	27.0
Death	18	14.8
Autopsy	9	7.4

Figure 1. TYPICAL EOSINOPHILIC MENINGITIS AND EOSINOPHILIC-MYELOENCEPHALITIS CASES RECOGNIZED IN UBON DURING APRIL 1966 - MARCH 1968 COMPARED TO THE RAINFALL

