

CASE REPORT

AN AUTOPSY CASE OF ACUTE DIFFUSE LYMPHOCYTIC
MENINGOENCEPHALITIS WITH DEGENERATION OF
THE STRIATUM AND CEREBELLUM

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Abstract

An autopsy case of acute diffuse lymphocytic meningoencephalitis has been described.

The patient was a 30-year-old woman who died after 2 months of the illness with characteristic psychotic symptoms and, later, involuntary movements and persistent coma. Neuropathological findings included only minimal perivascular infiltration of lymphocytes, diffuse scattering of rod-shaped microglia, occasional neuronal shrinkage, and distinctive degenerative changes of the corpus striatum and cerebellum. In the corpus striatum there were marked neuronal loss and astrocytic proliferation. The cerebellum showed almost complete loss of Purkinje cells and concomitant proliferation of Bergmann's glia. These degenerative changes of the corpus striatum and cerebellum were thought to be caused at least partly by cerebral hypoxia during the illness.

INTRODUCTION

Acute inflammatory disorders of the central nervous system are quite variable and are usually classified by their pathogenic agents. Of these, there is a rare group of diseases only with mild lymphocytic perivascular infiltration and minimal parenchymatous changes in the central nervous system, in which the etiology is not determined, although some viral infection or non-specific reaction of the nervous system against the disorder of the general organ is suspected^{1,2,3)}. This type of acute meningoencephalitis is called acute diffuse lymphocytic meningoencephalitis⁴⁾ and seems occasionally difficult to be distinguished from fatal catatonia, because of paucity of neurological symptoms and signs contrary to variegated psychotic symptoms^{5,6,7)}.

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It is the purpose of this paper to present an additional case of acute diffuse lymphocytic meningoencephalitis and, furthermore, to describe accompanied degenerative changes of the corpus striatum and cerebellum seen in our case. The latter has not been described up to the present in cases with this disorder.

CASE REPORT

Clinical History (80-1734)

A 30-year-old housewife was admitted to the Kawasaki Medical School Hospital on April 17, 1980, because of persistent convulsive seizure and subsequent coma.

She was well until March 24, 1980, when she experienced headache and nausea. Next morning she was found in unconscious state. Immediately she was transferred to a neighboring hospital by an ambulance. On the way, general convulsive seizure was observed, but after 30 minutes she became alert. On March 29, she had fever and, again, convulsive seizure, and became confused. She took an aggressive attitude with personal misconception, and visual and auditory hallucination. She was admitted to a mental hospital as catatonia or hysteria. On April 8, she became comatose. Clonic convulsive seizures were repeated all over the body. A lumbar puncture yielded a clear, colorless cerebrospinal fluid with an initial pressure of 140 mm H₂O, which contained 38 neutrophils and 9 lymphocytes per cubic millimeter, and 20 mg of protein per 100 ml. A few days later respiratory and heart arrest developed for a moment. Soon she was resuscitated with heart massage and ventilatory assistance. Still convulsive seizure persisted and she remained in comatose state.

She had delivered her first offspring by cesarean section at 25 years of age. There was no history of head injury and no family history of neurologic disease.

On admission, her temperature was 38.0°C, the pulse 120, and the respirations 30. The blood pressure was 140/80 mm Hg.

The patient was comatose. Clonic convulsive seizures were observed in the face and right upper extremity every 15 to 20 minutes. The pupils were isocoric and reactive to light. The optic fundi appeared normal. Nuchal rigidity was not elicited. The extremities were flaccid. No pathological reflexes were obtained.

The white-cell count was 9,800. The serum protein was 6.5 g, glucose 141 mg, and blood urea nitrogen 15 mg per 100 ml. The glutamic pyruvic transaminase (GPT) was 37 unit, and glutamic oxaloacetic transaminase (GOT) 34 unit per liter. Antibody titer for herpes simplex virus was less than 4 times in the serum and less than one time in the cerebrospinal fluid. Antibody titers for other viruses were not examined. An opening pressure of the spinal tap was 300 mm H₂O. The cerebrospinal fluid was clear and colorless, and contained 2 neutrophils and 60 lymphocytes per cubic millimeter; the protein was 44 mg, and glucose 72 mg per 100 ml. An electroencephalographic study demonstrated irregular alpha and beta activity of low voltage with occasional

small spike discharges especially on bilateral temporal leads. A CT brain scan disclosed narrowing of the ventricular system. A tentative diagnosis of herpes simplex encephalitis was made and she was treated with anticonvulsants, antibiotics and adrenocortical hormones.

Since the end of April involuntary movements were observed in the face, trunk and extremities. The patient jerked or pursed the lip, mumbled, blinked, and swung the extremities restlessly. In the middle of May regular clonic movements were seen. She died of concomitant bronchopneumonia on May 27, 1980, 2 months from the onset of her illness.

Neuropathological Findings (80-58)

The brain weighed 1,220 g. The leptomeninges on the convexity of the cerebral hemispheres were slightly turbid along with the sulci, and the external cerebral veins were rather congested. The arteries at the base of the brain were not sclerotic. The cerebral parenchyma was somewhat edematous and pale on external surface and on coronal sections. There were no grossly recognizable focal lesions in the cerebrum, cerebellum and brainstem.

Microscopic examination of the leptomeninges revealed mild infiltration of lymphocytes in various places (Fig. 1). The architecture of the cerebral cortex was well preserved. Only a small number of nerve cells showed shrinkage and pyknosis. Astrocytes with a pale and somewhat swollen nucleus and rod-shaped microglia were scattered, especially in the temporal lobe and

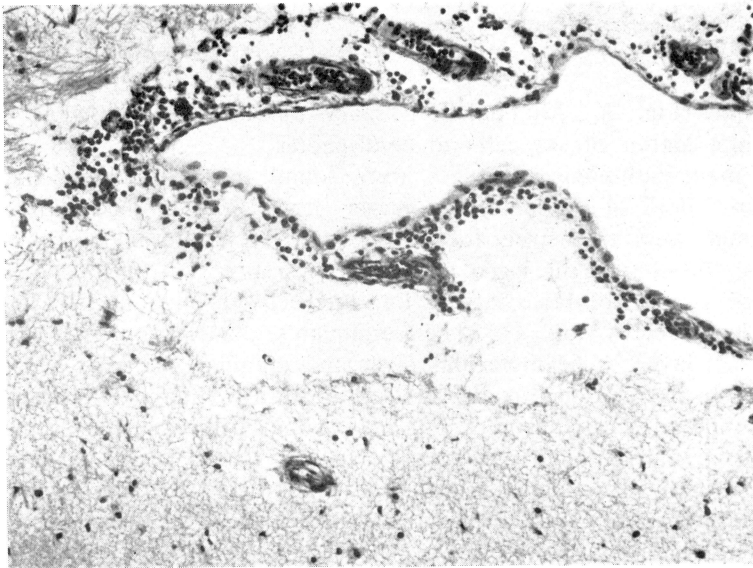


Fig. 1. Photomicrograph of the left temporal lobe showing mild leptomeningeal infiltration of lymphocytes. HE, $\times 158$.

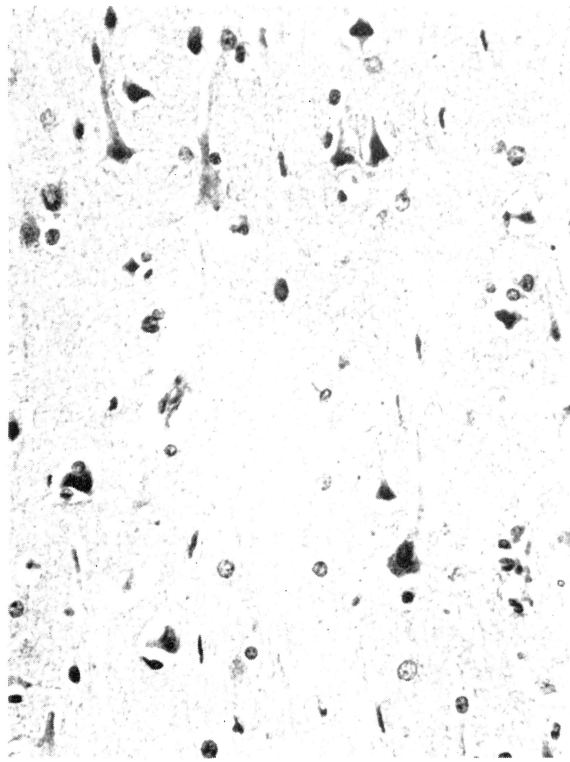


Fig. 2. The cortex of the left temporal lobe showing shrinkage of the nerve cells and scattering of astrocytes and rod-shaped microglia. HE, $\times 315$.

hippocampus (Fig. 2). Minimal perivascular cuffing of lymphocytes was seen in the white matter of the cerebral hemispheres.

The main pathological changes were found in the corpus striatum and cerebellum. Both of the small and larger nerve cells in the caudate nucleus and putamen were extensively lost with diffuse proliferation of protoplasmic astrocytes, rod-shaped microglia and capillaries (Fig. 3). The cerebellum demonstrated almost complete loss of Purkinje cells throughout the vermis and bilateral hemispheres (Fig. 4). The Bergmann's glia were proliferated in the Purkinje cell layer. The molecular layer and granular cell layer appeared to be unremarkable on hematoxylin and eosin stain. Sudan III stain, however, disclosed numerous fatty droplets not only in the Purkinje cell layer, but also in the molecular and granular cell layer. The nerve cells in the dentate nucleus were also slightly to moderately reduced in number. The stroma in this part was rough and spongy with considerable proliferation of astrocytes, microglia and capillaries.

There were no remarkable changes in other parts of the brain including the substantia nigra, pontine nucleus and inferior olivary nucleus.

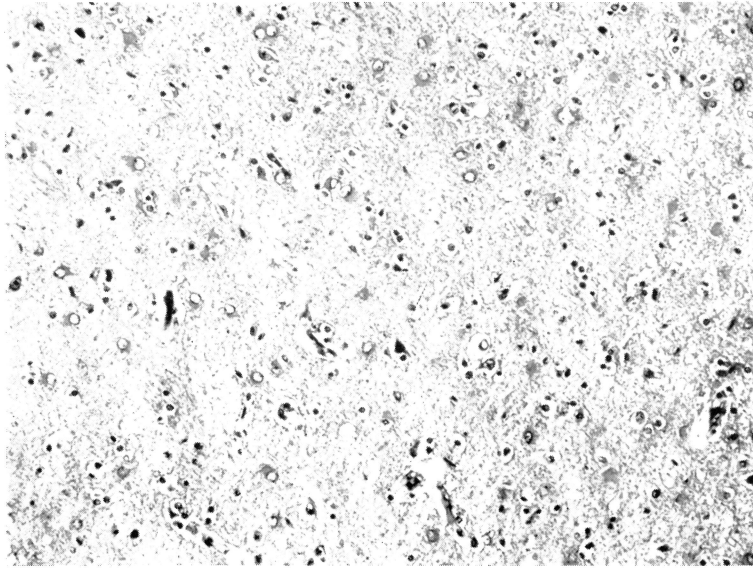


Fig. 3. Section from the left caudate nucleus. Most of the nerve cells are lost with diffuse proliferation of protoplasmic astrocytes and rod-shaped microglia. HE, $\times 158$.

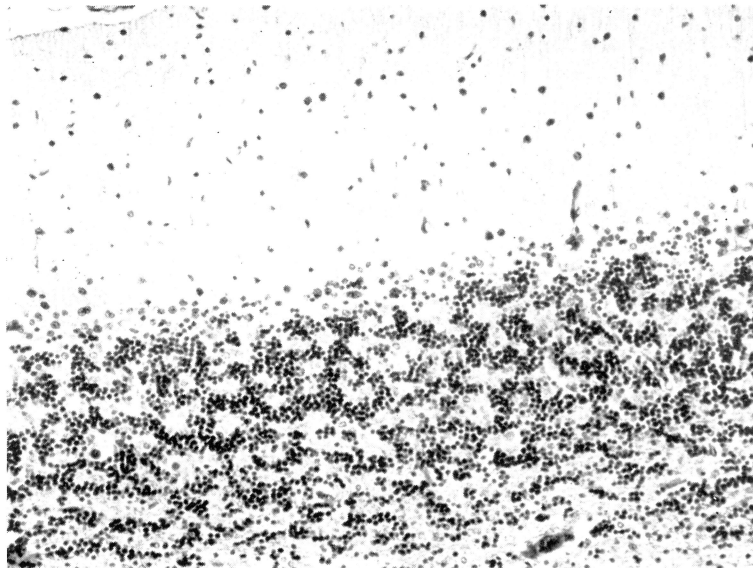


Fig. 4. Photomicrograph of the cerebellar cortex demonstrating complete loss of Purkinje cells and proliferation of Bergmann's glia. HE, $\times 158$.

DISCUSSION

The patient described here developed characteristic psychotic symptoms and, later, involuntary movements and persistent coma. The onset was early in Spring, different from the epidemic season of the Japanese B encephalitis. She died of concomitant bronchopneumonia after 2 months of the illness. Neuropathological examination revealed minimal leptomenigeal and perivascular infiltration of lymphocytes, scattering of rod-shaped microglia and neuronal shrinkage in the cerebral cortex, and distinctive changes of the corpus striatum and cerebellum. There were no extensive necrotic lesions or intranuclear inclusion bodies as seen in cases with herpes simplex encephalitis^{8,9}. These inconspicuous pathological findings seem to be inconsistent with severe clinical symptoms and signs as acute encephalitis such as high fever, disturbance of consciousness and violent involuntary movements.

Such cases, in which clinically severe encephalitic symptoms and signs are seen and pathologically merely edema and minimal lymphocytic infiltrations are found, have been gathered under the name of acute diffuse lymphocytic meningoencephalitis^{1,2,3,4}. In our case edema was clinically evident by CT scan, but at the time of autopsy, edema had almost subsided. Psychotic symptoms reminiscent of schizophrenia may be attributed to an error in judgment due to mild disturbance of consciousness^{5,6,7}. Violent involuntary movements may be one of symptoms of this encephalitis itself¹ or, in our case, partially based on the lesions of the corpus striatum.

The name of acute diffuse lymphocytic meningoencephalitis is originated from "non-suppurative lymphocytic meningoencephalitis" advocated from the pathological standpoint by van Bogaert in 1950¹⁰. Reviewing the autopsy cases of acute diffuse lymphocytic meningoencephalitis^{11,12,13,14,15}, it affects young adults of twenties and thirties. Macroscopically it shows nothing particular other than edema and congestion. Microscopically only mild meningeal and perivascular infiltration of lymphocytes is seen. The change of nerve cells is minimal. There is little glial reaction and almost no glial nodule. On the contrary, the clinical symptoms are severe. It takes an acute and fulminant course with sudden onset of headache, fever, psychotic symptoms, involuntary movements, convulsion and disturbance of consciousness. It is scanty of focal signs. These discrepancy between clinical symptoms and pathological findings makes this encephalitis distinctive.

Its etiology is unknown. Iizuka and his co-workers¹ have classified this encephalitis to primary viral encephalitis, secondary postinfectious encephalitis and symptomatic encephalitis. In some cases, viral infection is suggested. But when viral infection is confirmed, the cases are decisively diagnosed as viral encephalitis. Secondary, some cases may be a type of postinfectious acute disseminated encephalomyelitis. But typical acute disseminated encephalomyelitis takes a form of perivenously demyelinating encephalitis^{10,16}. The third possibility is that it is a kind of encephalitic reaction in which hemodynamic or toxic-

degenerative process based on infection is participated. In our case also, the etiology is quite unknown, even if the possibility of some viral encephalitis remains.

A conspicuous finding in our case was degenerative change of the corpus striatum and cerebellum. In the corpus striatum nerve cells were extensively lost and astrocytic gliosis with proliferation of rod-shaped microglia and capillaries was found. The cerebellum revealed almost complete loss of Purkinje cells. These findings like this have not been observed in cases with acute diffuse lymphocytic meningoencephalitis in literature. It seems unlikely that this degenerative change is due to a systemic degenerative disease, from the course and distribution of the lesions. It may be an effect of noxa of this encephalitis itself, or more possibly a result of hypoxia secondary to edema due to encephalitic process or episode of transient cardiorespiratory arrest occurred during the illness. Tateishi et al.¹⁷⁾ have stressed that, in the cerebral hypoxia, the corpus striatum is always severely involved, while the ischemic changes in the ammon's horn are quite variable. Lance-Adams syndrome¹⁸⁾ is well known as for involuntary movements due to hypoxic encephalopathy, but involuntary movements in our case were apparently different from intention or action myoclonus seen in Lance-Adams syndrome.

Although acute diffuse lymphocytic meningoencephalitis may be attributed to various etiologies, it occupies a unique position clinically and pathologically within a category of acute meningoencephalitides, and more extensive examination about the possibility of viral infection will be recommended.

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