

Schilder's disease in a young child with tumefactive demyelinating brain lesion

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Abstract

Schilder's disease is a rare sporadic demyelinating disease of the brain. We report a girl with Schilder's disease who had undergone Kasai operation for biliary atresia. The patient presented with acute right hemiparesis. Brain magnetic resonance imaging (MRI) showed a single large tumefactive white matter lesion. A diagnosis of Schilder's disease was based on clinical features and MRI findings. The patient showed dramatic clinical improvement and significant regression of the lesion in response to high-dose intravenous methyl prednisone, and remained free of relapse of other neurologic problems during the 3-year follow-up.

INTRODUCTION

Schilder's disease, also known as myelinoclastic diffuse sclerosis, was first described by Schilder in 1912.¹ It is a sporadic subacute demyelinating brain disease that usually affects children. This rare disease results in formation of one or two bilateral large tumefactive plaques.² The clinical presentation is atypical for pediatric multiple sclerosis, and radiologic findings often mimic brain tumor or abscess. Clinical course or treatments for Schilder's disease have not been clearly established. However, some radiological characteristics and clinical features suggest differential diagnosis from other demyelinating diseases, brain tumors, or abscess. Here we contribute to the understanding of Schilder's disease by presenting the case of a child with Schilder's disease who underwent a Kasai operation for biliary atresia.

CASE REPORT

A girl 6 years and 9 months of age who had previously undergone a Kasai operation at one month of age due to biliary atresia presented with acute right side hemiparesis. A year prior to the incident, she presented with tingling sensation both toes and clumsy gait for about 3 days. The symptoms disappeared spontaneously. Brain magnetic resonance imaging (MRI) showed a tumefactive demyelinating lesion with ill-

defined peripheral enhancement in the left frontoparietal white matter (Figure 1). A demyelinating disease such as multiple sclerosis was suspected, but brain MRI was not typical for multiple sclerosis. Therefore, we diagnosed this patient with Schilder's disease while performing further evaluation. Oligoclonal bands in cerebrospinal fluid (CSF) were negative, and a spine MRI showed no abnormalities. The liver disease indicators including aspartate aminotransferase (AST), alanin aminotransferase (ALT), and gamma glutamyl transferase (GGT) were increased to 60 IU/L, 269 IU/L, and 234 IU/L, respectively, and liver cirrhosis was detected. Her vitamin E level, which was obtained during convalescence was 9.4 mg/L (3.8-18.4 mg/L) and her cholesterol level was 187 mg/dL (100-240 mg/dL).

The patient was treated with methyl prednisolone (10 mg/kg/day) intravenously for 10 days. Hemiparesis disappeared about fifth day of treatment, allowing the patient to walk independently, and the size of the brain lesion decreased on MRI (Figure 2). However, she showed intention tremor in her right arm and dystonia in her right foot although hemiparesis has resolved, which were noted during the methyl prednisolone treatment. After methyl prednisolone therapy, oral prednisone (1 mg/kg/day) was given. The oral prednisone was gradually tapered over 6 months. The patient fully recovered from intention tremor and dystonia 2 months after

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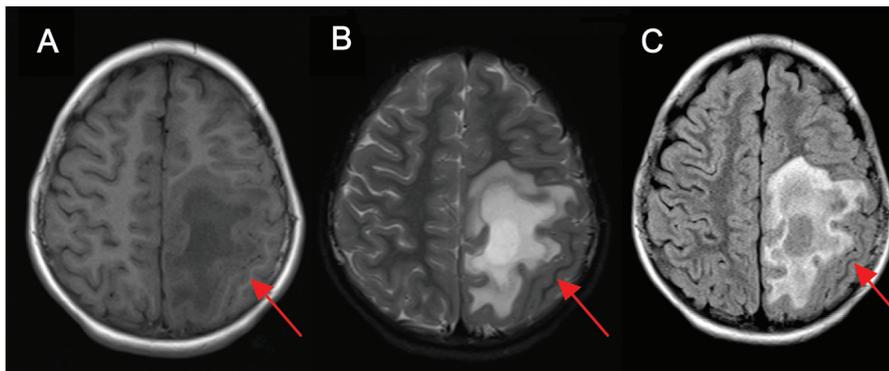


Figure 1. Initial brain MRI shows demyelinating lesion at left fronto-parietal white matter. A) T1-weighted image; B) T2-weighted image; C) T2 FLAIR image.

oral prednisone treatment, with no relapse of neurological symptom during the 3-year follow-up.

DISCUSSION

The diagnostic criteria of Schilder’s disease proposed by Poser are as follows.² It is a subacute myelinoclastic disorder resulting in formation of one, or more commonly, two roughly symmetric bilateral plaques measuring at least 2×3 cm in two of three dimensions, involving the centrum semiovale. These must be the only lesions demonstrable by clinical, paraclinical, or imaging studies. There must be no peripheral nervous system lesion. Adrenal function and very long-chain fatty acids must be normal. The histopathology must be identical to multiple sclerosis. Our patient fulfills the Poser’s criteria, except the absence of histopathology, as brain biopsy was not performed. The tests of adrenal function were not available, but the patient did not show symptoms of adrenal crisis or adrenal

insufficiency. As suggested in recent studies³, improved MRI findings of biopsy-proven cases of Schilder’s disease have enabled noninvasive diagnosis of Schilder’s disease. In our patient, a good response to steroid pulse therapy was also supportive of the diagnosis.

MRI in Schilder’s disease show a hypointense lesion on T1 weighted images and a hyperintense lesion on T2 weighted images.³ Open ring contrast enhancement caused by an acute inflammatory process in the white matter is characteristic.⁴ Other findings are the increased signal on fluid attenuated inversion recovery (FLAIR) and an increase in the apparent diffusion coefficient (ADC). These radiologic features are also supportive of the diagnosis of Schilder’s disease.

In our patient, a possible diagnosis of multiple sclerosis was considered based on the 2010 revisions to the McDonald criteria of MS. She had two episodes of clinical attacks and one brain MRI lesion for dissemination in space.⁵ However, the single large tumefactive lesion was atypical for

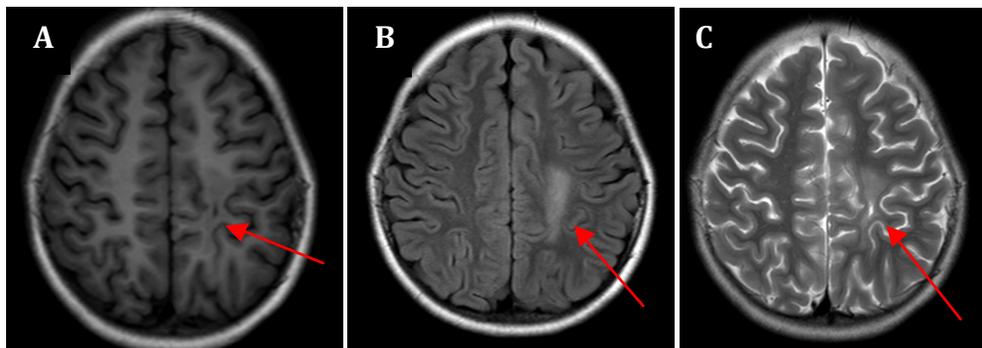


Figure 2. Brain MRI after 3 months shows resolution of lesions seen in Figure 1, with scarring and a small focal area of cavitation. A) T1-weighted image (hypointense); B) T2-weighted image (hyperintense); C) T2 Flair image (hyperintense).

multiple sclerosis, but consistent with Schilder's disease.

In rare cases of acute disseminated encephalomyelitis (ADEM), brain MRI shows a large single lesion, predominantly white matter. However, we believe that the clinical presentation of ADEM must include encephalopathy, which is defined as one or more of the following, behavioral change and alteration in consciousness.^{6,7} Our patient had two historical evidences of ataxia and hemiparesis without any encephalopathy.

As for the relationship between biliary atresia and Schilder's disease, biliary atresia causes cholestasis, or difficulty in secretion of bile acid. Therefore, impaired absorption of fat-soluble vitamins is common in patients with biliary atresia. Vitamin E deficiency is known to be associated with various neurologic abnormalities such as ataxia, weakness, areflexia, impaired vision, loss of proprioception, and vibratory sensation and variable ophthalmoplegia.^{8,9} In our patient, we unfortunately could not determine the vitamin E level at the moment of hemiparesis. The serum vitamin E level determined several months after the event was normal and the serum vitamin E to total cholesterol ratio was also normal.

In conclusion, Schilder's disease should be considered in children with acute or subacute neurological symptom, and large tumefactive lesion in MRI.

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DISCLOSURE

Conflict of interest: None

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