CASE REPORT

MRI and MR spectroscopy findings of a case of subacute sclerosing panencephalitis affecting the corpus callosum

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SUMMARY

Subacute sclerosing panencephalitis (SSPE) is a rare, slowly progressive, fatal, inflammatory and neurodegenerative disease that is seen mostly in children and young adolescents, and primarily affects the parieto-occipital lobes. The corpus callosum, cerebellum and basal ganglia are less frequently involved. MR spectroscopy (MRS) may illustrate the pathophysiological features of SSPE. To the best of our knowledge, this is the second report of MRS findings of corpus callosum involvement in a stage 3 SSPE case.

BACKGROUND

We evaluated the MRI and MR spectroscopy (MRS) findings of a case of subacute sclerosing panencephalitis (SSPE) affecting the corpus callosum.¹⁻⁵

CASE PRESENTATION

A 14-year-old boy presented with atonic-type seizures after taking sodium valproate for 3 years. The patient had not received a measles vaccine, but had a history of measles. The patient was conscious and aware, but unable to cooperate; other neurological examinations were normal. On EEG, generalised epileptic abnormality was observed. Lamotrigine was added to the treatment. On the second day of hospitalisation, the patient lost consciousness and became unresponsive to sound and pain stimuli. There were bilateral light reflex, hypoactive deep tendon reflexes and indifferent Babinski. Since of myoclonic seizures, we started him on levetiracetam,

followed by midazolam infusion. After his seizures were controlled, an EEG showed diffuse voltage suppression in cerebral bioelectric activity. The measles index of the cerebral spinal fluid was 2.5 and in the serum >1:180; therefore, isoprinosine was started. He was diagnosed as clinical stage 3a, according to the Jabbour classification. After the patient's seizure activity ceased, he was discharged with planned outpatient follow-up.

The cranial MRI showed atrophy in the cerebral parenchyma. On the T2-weighted (T2W) sequences, increased intensity was observed in the left thalamus, grey, periventricular, deep, and subcortical white matter of the frontal and parieto-occipital regions. Sagittal T2W images demonstrated hyperintensity in the rostrum, genu and body of the corpus callosum, but not the posterior part of the body and splenium (figure 1).

MRS was performed (repetition time TR: 1500, time to echo TE: 135 ms). Voxels were placed in the anterior and posterior parts of the corpus callosum and in the periventricular white matter. MRS obtained from the aforementioned areas showed a significant decrease in the *N*-acetyl-aspartate/creatine (NAA/Cr) and an increase in the choline/creatine (Cho/Cr) ratios, together with inverted prominent lactate peaks (figure 2).

OUTCOME AND FOLLOW-UP

After the patient's seizure activity ceased, he was discharged with planned outpatient follow-up.

Figure 1 Axial T2-weighted images showing widespread hyperintensities in the cortical, subcortical and deep periventricular white matter of the bilateral frontal region (blue arrows). Sagittal T2-weighted images demonstrating hyperintensity in the rostrum and genu (pink arrows) and normal intensity in the splenium (posterior part of the corpus callosum) (yellow arrows).

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Figure 2 Multivoxel MR spectroscopy (time to echo, TE: 135 ms) obtained from the splenium reveals a prominent decrease in *N*-acetyl-aspartate/creatine (NAA/Cr) and an increase in choline/creatine (Cho/Cr) with prominent inverted lactate peaks.

DISCUSSION

SSPE is chronic encephalitis of the measles infection that leads to demyelination of the central nervous system.⁶ In histopathological examination, neuronal loss, astrogliosis, demyelination and inflammation have been determined.^{1–7} The cause of demyelination in SSPE is oligodendrocyte inflammation. In advanced stages, atrophy in the cerebral cortex becomes more evident.⁸ Early diagnosis and staging is difficult due to various clinical presentations.

The correlation between MRI findings and clinical stages of SSPE are weak. During higher clinical stages of SSPE, improvement of MRI findings is possible.⁴ In our case, T2W images showed signal changes in the anterior part of the corpus callosum. However, MRS showed decreased NAA/Cr, increased Cho/Cr ratios, and the presence of lactate in the normal appearing splenium of the corpus callosum besides also being in the anterior part of the corpus callosum and white matter of the brain. Active inflammation, neuronal loss, demyelination and anaerobic metabolism are possible reasons for the MRS findings. These findings were also consistent with stage 3 SSPE.

In one case of SSPE with corpus callosum involvement, MRS showed a decreased NAA/Cr ratio in the corpus callosum, and parieto-occipital subcortical and deep white matter, as well as an increased Cho/Cr ratio and lactate.⁹ Similar MRS values were found for the case presented here. The difference mainly

appeared in the anterior involvement of the corpus callosum in our case and beside the splenium in the other case. Although the splenium appeared normal on MRI, the MRS revealed decreased NAA/Cr and increased Cho/Cr. That indicated neuronal loss, demyelination, active inflammation and/or anaerobic metabolism in the normal-appearing brain tissues in SSPE.

As a result, MRS is not specific or diagnostic; it can show metabolic changes in the early–late stage of SSPE and may be useful in revealing the changes in normal-appearing brain tissue and the extent and progression of SSPE.

Learning points

- ▶ Subacute sclerosing panencephalitis (SSPE) affects the corpus callosum.
- ▶ MR spectroscopy is not specific or diagnostic; it can show metabolic changes in the early–late stage of SSPE and may be useful in revealing the changes in normal-appearing brain tissue and the extent and progression of SSPE.

Contributors MÖ was involved in research. AS was responsible for writing of the manuscript. CY was involved in regulation.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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