

# Central Pontine Myelinolysis After Liver Transplantation: MR Diffusion, Spectroscopy, and Perfusion Findings

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## Introduction

Central pontine myelinolysis (CPM) is a rare neurologic complication after orthotopic liver transplantation (OLT). There were some papers on MR diffusion (DWI) and spectroscopy (MRS) of CPM<sup>1-5</sup>. However, MR perfusion of CPM was not reported. In this report, we present a case of CPM after OLT followed by serial functional magnetic resonance imaging scans.

## Case Report

A 41-year-old male patient with a history of hepatocirrhosis for more than 10 years was admitted for OLT. Three days after OLT, the patient was found to be severely hypernatremic with serum sodium levels of 157-170 mmol/L. Two days later, he developed pseudobulbar, dysarthria, tetraplegia, and coma. Mental status and extremity motion gradually improved over the next 25 days.

Sequent MR examination including T1WI, T2WI, FLAIR, DWI, MRS, MR perfusion, CEMRI were performed by a 1.5 T magnetic resonance system on the 8<sup>th</sup> day and the 48<sup>th</sup> day after the developing of tetraplegia.

MRI obtained on the 8<sup>th</sup> day showed symmetric long T1 and long T2 signals within the pons and the thalami bilaterally. CEMRI demonstrated peripheral enhancement. DWI showed obviously high signal intensity in central pontine region and bilateral thalami with a decreased apparent diffusion coefficient (ADC) value of  $(0.593 \pm 0.2533) \times 10^{-3} \text{mm}^2/\text{s}$ . MRS showed decreased NAA/Cr ratio (1.58) and increased Cho/Cr ratio (1.52). Pontine lesion demonstrated increased perfusion on cerebral blood volume (CBV) map. On the 48<sup>th</sup> day, lesion in central pontine showed obviously decrease in size, no enhancement, iso-signal intensity on DWI, further decreased NAA / Cr ratio (1.34) and increased Cho/Cr ratio (1.79), decreased CBV.

## Discussion

Conventional MRI features of CPM after liver transplantation have been well documented in the literature<sup>7-9</sup>. Because conventional MR imaging findings lag the clinical manifestations of CPM, DWI was thought useful in the early diagnosis of CPM<sup>1-3</sup>. The high signal intensity on DWI and decreased ADC value in our patient were consistent with previous reports and suggests cytotoxic edema in acute CPM and EPM. The recovered DWI signals and ADC values suggest disappearing of cytotoxic edema in later CPM and EPM. A limited number of cases are reported focusing on the MRS findings of CPM<sup>4-5</sup>. MRS of CPM in the present case showed decreased NAA / Cr ratio and increased Cho/Cr ratio in acute phase. The decrease in NAA levels may be related with neuronal loss. The increase in Cho levels may support the gliosis in this region. Both NAA and Cho levels showed an obvious decrease in later stage. These may suggest further neuronal loss and spared gliosis. So far as we know, there was no report on MR perfusion of CPM. MR perfusion in multiple sclerosis<sup>11, 12</sup>

demonstrates increased CBF and CBV in enhancing lesions, indicating inflammation-mediated vasodilatation. Increased CBV in CPM may reflect higher metabolic activity due to an increase in cell number and activity and indicate that the acute CPM is accompanied by vasodilation. In later stages of gliosis, the perfusion decreases with increasing axonal injury. In general, MR diffusion, spectroscopy, and perfusion measurement in CPM may cast light on the disease pathogenesis and lesion development.

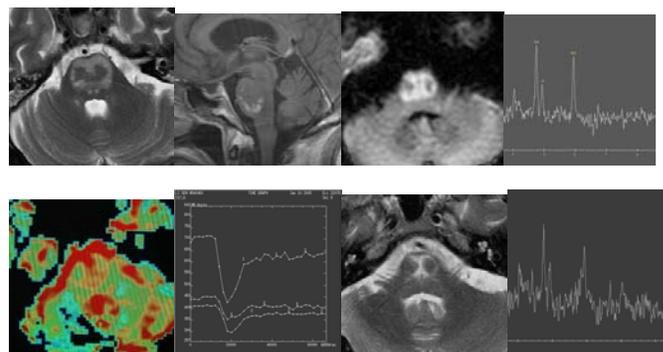


Fig.1 T2WI. Fig.2 CEMRI showed Peripheral enhancement. Fig.3 DWI showed increased signal intensity. Fig.4 1H-MRS showed a slight reduction of NAA and marked increase of Cho. Fig.5 Perfusion color CBV map showed yellow color in pontine lesion representing increased perfusion. Fig.6 Graph shows signal intensity-versus-time curves measured in pontine lesion, normal appearing region of pons, and cerebellar hemisphere. Fig.7 Follow-up study of T2WI showed obvious resolution of the pontine lesion. Fig.8 Follow-up study of MRS showed marked reduction of NAA and Cho.

## References

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