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Assessment for brain damage of carbon monoxide poisoning at different clinical stages with diffusion kurtosis imaging

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Aim is to investigate the value of DKI on the damage of brain at different clinical stages after CO poisoning. 79 MRI scans were performed in 58 patients with CO intoxication and 21 controls. The patients were further classified into three groups: Acute group, Delayed Neuropsychiatric Sequelae(DNS) group and chronic group. The DKI parameter values of the four regions of interest were compared among the four groups. In the globus pallidus, MK was 1.51 ± 0.15 , 1.07 ± 0.11 and 0.59 ± 0.11 in the acute phase, DNS phase and chronic phase, respectively, and it was significantly higher in the acute phase than in the control group (1.06 ± 0.06 , $P<0.05$), significantly lower in chronic phase than DNS phase and control group ($P<0.05$). For the semi-oval center and the corpus callosum, the MK were increased progressively in acute and DNS phase, especially in DNS phase ($P<0.05$). It was not significantly reduced until chronic phase. DKI can quantitatively evaluate the changes of brain gray matter microarchitecture after CO poisoning, which is helpful to understand the characteristics of brain injury of CO poisoning in different clinical stages from the microscopic level.

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