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Improved brain MRI indices in the acute brain stem infarct sites treated with hydroxyl radical scavengers, Edaravone and hydrogen, as compared to Edaravone alone. A non-controlled study

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Abstract

Background: In acute stage of cerebral infarction, MRI indices (rDWI & rADC) deteriorate during the first 3-7 days after the ictus and then gradually normalize in approximately 10 days (pseudonormalization time), although the tissue is already infarcted. Since effective treatments improve these indices significantly and in less than the natural pseudonormalization time, a combined analysis of these changes provides an opportunity for objective evaluation on the effectiveness of various treatments for cerebral infarction. Hydroxyl radicals are highly destructive to the tissue and aggravate cerebral infarction. We treated brainstem infarction patients in acute stage with hydroxyl radical scavengers (Edaravone and hydrogen) by intravenous administration and evaluated the effects of the treatment by a serial observation and analysis of these MRI indices. The effects of the treatment were evaluated and compared in two groups, an Edaravone alone group and a combined group with Edaravone and hydrogen, in order to assess beneficial effects of addition of hydrogen.

Methods: The patients were divided in Edaravone only group (E group. 26 patients) and combined treatment group with Edaravone and hydrogen enriched saline (EH group. 8 patients). The extent of the initial hump of rDWI, the initial dip of rADC and pseudo-normalization time were determined in each patient serially and averages of these data were compared in these two groups and also with the natural course in the literatures.

Results: The initial hump of rDWI reached 2.0 in the E group which was better than 2.5 of the natural course but was not as good as 1.5 of the EH group. The initial dip of rADC was 0.6 in the E group which was close to the natural course but worse than 0.8 of the EH group. Pseudonormalization time of rDWI and rADC was 9 days only in EH group but longer in other groups. Addition of hydrogen caused no side effects.

Conclusions: Administration of hydroxyl radical scavengers in acute stage of brainstem infarction improved MRI indices against the natural course. The effects were more obvious and significant in the EH group. These findings may imply the need for more frequent daily administration of hydroxyl scavenger, or possible additional hydrogen effects on scavenger mechanisms.

Figures

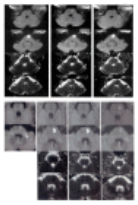

Figure 1 Serial MRI changes in the...

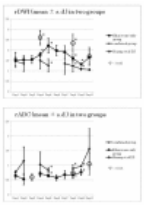

Figure 2 Serial changes in rDWI (upper)...

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