Images in Neurosciences

T2/Fluid Attenuation Inversion Recovery Hypointensity of Corticospinal Tracts due to Subacute Stage of Wallerian Degeneration

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A 67-year-old male, with a history of sudden onset of left-sided weakness 4 weeks back, came to our hospital for neurorehabilitation. His magnetic resonance imaging (MRI) revealed chronic infarct in the right insula, inferior frontal gyrus, lateral thalamus, and gangliocapsular region. T2/fluid attenuation inversion recovery (FLAIR) hypointensity was noted along the right corticospinal tract in brainstem, with mild brainstem atrophy [Figure 1, arrows].

Wallerian degeneration of corticospinal tracts after acute infarct progresses through three stages, which can be detected earlier and better appreciated by diffusion tractography imaging (DTI),^[1,2] though advanced stages can be detected by conventional imaging as well. The first stage consists of no signal change in conventional MRI lasting for 4 weeks, the second stage consists of T2/FLAIR hypointensity lasting for 4–10 weeks, and the third stage consists of T2/FLAIR hyperintensity of tracts 10–12 weeks onward. While conventional imaging detects advanced stage of T2/FLAIR hyperintensity with volume loss, detection of early and subacute stages is frequently not reported. The subacute stage of T2/FLAIR hypointensity is attributed to alteration in protein–lipid–water content of myelin as a

result of degradation and disintegration of myelin sheath. The T2/FLAIR hypointensity of corticospinal tracts during Wallerian degeneration was initially demonstrated by Kuhn *et al.*,^[3] though the subsequent study did not demonstrate such phenomenon out of 150 patients.^[4] Identification of corticospinal tract signal intensity changes and DTI abnormalities during Wallerian degeneration is strongly and significantly predictive of motor outcome of patients.^[5]

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Conflicts of interest

There are no conflicts of interest.

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Figure 1: (a and b) Axial fluid attenuation inversion recovery and T2-weighted magnetic resonance images showing subacute infarct in the right gangliocapsular region, chronic infarct in the right frontal lobe and insula. (c-j) Serial axial sections of brain showing T2 and fluid attenuation inversion recovery hypointensity of corticospinal tracts in brainstem (arrows)

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