Variable Detection Rate of the Hippocampal Lesion in Transient Global Amnesia According to Different Diffusion-Weighted Imaging Protocol

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Purpose: Transient global amnesia (TGA) is a benign neurological syndrome that is characterized by a sudden-onset of transient anterograde memory disturbance, which resolves usually within 24 hours. Recently diffusion-weighted imaging (DWI) has detected small punctate high signal abnormalities of the hippocampus in TGA patients. However, the frequency of lesion detection on DWI has been reported variably. The purpose of this study was to establish the optimal DWI protocol for TGA by investigating different DWI parameters and different DWI timing after TGA onset.

Methodology: Five patients (all female, mean age 59 years, age range 50-69 years) with clinically diagnosed TGA were consecutively enrolled over recent 6 months. DWI was performed in a transverse plane at 1.5T initially within 24 hours after TGA onset (mean 13 hours, range 4-22 hours), and repeated in 3 days (mean 73 hours, range 71-75 hours) with 4 different sequences: b=1000 s/mm^2/slice thickness 5mm, b=1000/3mm, b=2000/3mm, and b=3000/3mm. These DWI sequences consisted of single-shot spin-echo echo planar imaging with the following parameters: matrix = 128×128 interpolated to 256×256, field-of-view = 220 mm, TR = 5000-12500 ms (5000 ms at b=1000, 9400 ms at b=2000, 12500 ms at b=3000), TE = 60-75 ms, SENSE factor = 2, number of acquisition = 4. The detection rates of the lesion on 8 different DWIs were compared based on the consensus of 3 neuroradiologists.

Results: Four of 5 patients had small (1-2mm) high signal lesions in the hippocampus on one or more DWI sequences. Three patients had a single lesion, 1 patient had 4 lesions, and therefore total 7 lesions were analyzed. The detection rates on initial DWI were 0% (0/7) at b=1000/5mm, 57% (4/7) at b=1000/3mm, and 71% (5/7) at b=2000/3mm and b=3000/3mm. The detection rates on 3-day-DWI were 71% (5/7) at b=1000/5mm, 86% (6/7) at b=1000/3mm, and 100% (7/7) at b=2000/3mm and b=3000/3mm.

Conclusion: The highest detection rate of the lesion was achieved on 3-day-DWI with b=2000/3mm and b=3000/3mm. Considering the small size of the lesion, DWI with thin section thickness and high b-value is preferred for lesion detection. If the lesion is not detected on initial DWI, follow-up DWI is recommended in 3 days.

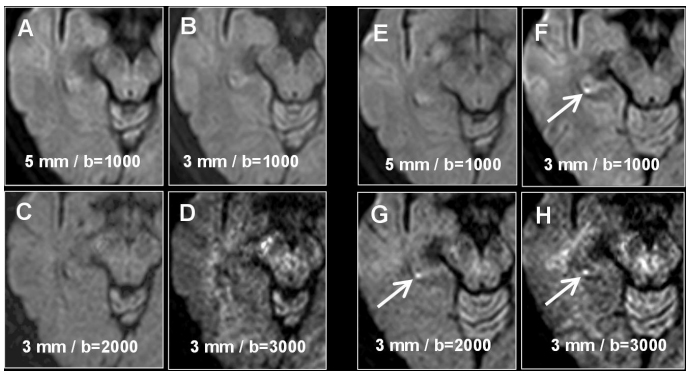

Fig 1. A 50-year-old lady presented transient global amnesia (TGA) for seven hours. The initial axial diffusion weighted imaging (DWI) of four different sequences, which were taken 4 hours after TGA attack, showed no abnormal lesion in the hippocampus (A-D). Follow-up DWI, 72 hours after symptom onset in the same patient, showed a small punctuate (less than 2 mm) lesion of increased signal intensity in the right hippocampus (arrows) on the DWI with slice thickness of 3 mm, b value 1000, 2000, and 3000 s/mm^2 (F-H). The lesion was not seen on the DWI with 5 mm thickness and b value 1000 s/mm^2 (E).