

MAPPING STRUCTURAL DISCONNECTION TO BEHAVIORAL DYSEXECUTIVE SYMPTOMS IN SUBCORTICAL STROKE

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Introduction

- Behavioral dysexecutive symptoms are common in subcortical stroke patients¹.
- Prior case reports confirmed that alteration of specific circuits is associated with certain behavioral dysexecutive symptoms^{1,2}.
- The current study aimed to investigate structural disconnections that are critical for dysexecutive behavior.

Methods

- The study sample comprised 123 patients (age 66.1 ± 9.0 years, 69.9% male) with first-ever acute ischemic subcortical stroke.
- The Dysexecutive Questionnaire (DEX) was employed to assess the overall behavioral dysexecutive symptoms and 4 aspects (executive cognition, DEX-EC; metacognition, DEX-MC; behavioral-emotional self-regulation, DEX-BESR; social convention, DEX-SC) at 3 months after stroke.
- A region-wise lesion-symptom mapping (RLSM) approach was applied to determine strategic infarct location underlying behavioral dysexecutive symptoms.
- To further investigate specific white matter tracts responsible for dysexecutive behavior, the disconnected white matter tracts induced by lesions (disconnectome map) were identified and the impact of white matter disconnection on behavioral scores was assessed.

Results

- The lesion overlay map and the RLSM result is shown in **Fig. 1**.
- Only lesions in the left cerebral peduncle were significantly associated with the DEX-EC subscore ($z=3.119$) (**Fig. 1b**).
- The overlay of the disconnectome map and the impact of disconnected white matter tracts on clinical scores are shown in **Fig. 2**.

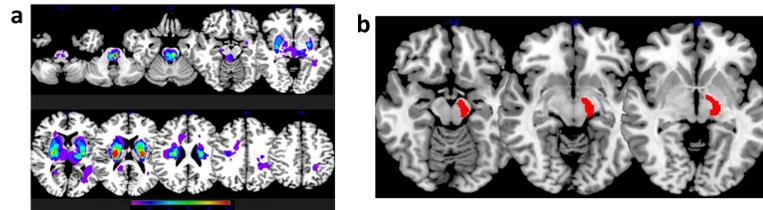


Fig. 1. (a) Lesion overlap map of all participants (radiological convention). The color bar indicates the number of participants having a lesion at a given voxel. (b) The result of RLSM analysis. Only the left cerebral peduncle survived in the RLSM analysis (Bonferroni-corrected $P < 0.05$). RLSM: region-wise lesion-symptom mapping

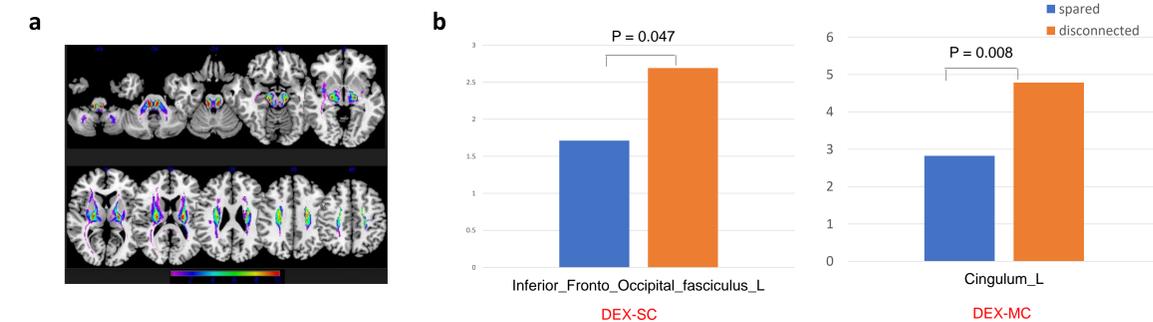


Fig. 2. (a) Overlay of disconnectome map (radiological convention). The color bar indicates the number of participants having disconnectomes at a given voxel. (b) The significant differences in behavioral scores between spared and disconnected white matter tracts.

Conclusion

The current study provides evidence for the role of white matter tracts in dysexecutive behavior pathology, especially in social convention and metacognition aspects.

References

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- Ward P, et al, *Behavioural neurology* 2013;26:219-223.

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