

---

**CHANGES OF WHITE MATTER INTEGRITY IN THE CORPUS CALLOSUM BY RTMS FOR TREATMENT-RESISTANT DEPRESSION: A PRELIMINARY DTI TRACTOGRAPHY STUDY**

A. Kita<sup>1</sup>, S. Yamada<sup>1</sup>, S. Ukai<sup>1</sup>, S. Takahashi<sup>1</sup>, T. Tsuji<sup>1</sup>, J. Iwatani<sup>1</sup>, M. Terada<sup>2</sup>, K. Shinosaki<sup>1</sup>

<sup>1</sup>Department of Neuropsychiatry, Wakayama Medical University, Wakayama City, Japan ; <sup>2</sup>Department of Radiology, Wakayama-Minami Radiology Clinic, Wakayama City, Japan

---

**Background:** Reduced white matter integrity in the corpus callosum (CC) has been reported in treatment-resistant depression (TRD). rTMS is assumed to have remote effect on interconnected area with the stimulation site, and this effect is speculated to be one of the therapeutic mechanisms of rTMS treatment. In this preliminary study, we examined changes of callosal fiber integrity in 5 segments of the CC before and after rTMS treatment for TRD.

**Methods:** The subjects were 2 patients with treatment-resistant unipolar depression and 1 patient with treatment-resistant bipolar depression, and 24 healthy controls (HC group). The patients underwent 4-week high frequency rTMS to their left DLPFC. In diffusion tensor imaging (DTI) tractography, the CC was divided into 5 segments (orbital, frontal, parietal, temporal, and occipital) based on their cortical projection zones, and fractional anisotropy (FA) value of each segment was estimated. We compared FA in the CC between the patients and the HC groups, and examined changes of FA in the CC after rTMS treatment in the patients.

**Results:** The patients showed reduced FA in the frontal, parietal, temporal, and occipital-callosal segments compared to the HC group. All patients responded to the rTMS treatment, and FA in the orbital, frontal, parietal, temporal-callosal segments increased after the rTMS treatment.

**Conclusions:** Our results suggest that white matter integrity in the CC is reduced in TRD and that increased white matter integrity in the CC might be related with the therapeutic mechanisms of rTMS treatment.