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Differential prefrontal activation pattern between Bipolar and Unipolar Depression: A Fnirs Reserch

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Background: Bipolar depression (BD) is a unique, severe and prevalent mental illness that shares many similarities in symptoms with unipolar depression (UD). Improving precision of their diagnoses would enhance treatment outcome and prognosis for both conditions. This study aims to provide evidence for functional Near-Infrared Spectroscopy (fNIRS) as a potential tool to differentiate UD and BD based on their differences in hemodynamic change in the prefrontal cortex during verbal fluency tasks (VFT).

Methods: We enrolled 179 participants with clinically confirmed diagnoses, including 69 UD patients, 68 BD patients and 42 healthy controls (HCs). Every participant was assessed using a 45-channel fNIRS and various clinical scales.

Findings: Compared with HCs, region-specific fNIR leads show UD patients had significant lower hemodynamic activation in 4 particular pre-frontal regions: 1) the left dorsolateral prefrontal cortex (DLPFC), 2) orbitofrontal cortex (OFC), 3) bilateral ventrolateral prefrontal cortex (VLPFC) and 4) left inferior frontal gyrus (IFG). In contrast, BD vs. HC comparisons showed only significant lower hemodynamic activation in the LIFG area. Furthermore, compared to BD patients, UD patients showed decreased hemodynamic activation changes in the VLPFC region.

Conclusion: Our results show significant frontal lobe activation pattern differences between UD and BD groups. fNIR can be a potential tool to increase diagnostic precision for these conditions. In particular, the VLPFC area holds promise to be a useful site for such differentiation for further investigations.

Biography

This is one of my preject in china, and I am the PI of that project. Nature sicience foundation required the PI as the corresponding author.