DISEASE-RELATED MICROSTRUCTURAL DIFFERENCES IN THE BRAIN IN FEMALES WITH LOCALIZED PROVOKED VULVODYNIA

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Background: Localized provoked vulvodynia (LPVD) affects almost 15% of females and is characterized by localized sensitivity of the vulvar vestibule. Very little research has been performed characterizing central abnormalities in LPVD using neuroimaging. The few studies that are available indicate that neural alterations may play a causal role in symptom generation or are secondary responses to the chronic pain condition. Main Objective: The aim was to utilize diffusion tensor imaging (DTI) to identify unique microstructural differences in the brain. We compare LPVD to HCs to assess whether alterations in fractional anisotropy (FA) and mean diffusivity (MD), which are measures of cohesive axonal orientation and tissue compactness, are specific to pain, and with IBS to determine distinct or shared mechanisms with another chronic pelvic-pain disorder. Methods: Structural and DTI MRIs were conducted in a sample of 58 age-matched premenopausal females. FA and MD were processed using FMBRIB Diffusion Toolbox. Voxelwise and ICBM atlas based region of interest analyses were performed using pairwise t-tests with age as a covariate. Results: LPVD vs. HC: Patients with LPVD demonstrated significantly higher FA in brainstem regions including the left superior cerebellar peduncle as well as the medial lemniscus. There were higher FA values in frontal lobe connections, right internal capsule, right corona radii, bilateral superior longitudinal fasciculi, and primary sensory and motor regions. Higher MD was observed within the cingulum bundle and left anterior limb of internal capsule. LPVD vs. IBS: FA and MD differences between LPVD and IBS patients were less extensive and only localized to regions near the right posterior corona radiata and left posterior thalamic radiation. Conclusions: The significant group-related microstructural differences in deep gray matter structures included regions that are associated with sensorimotor tasks and cognitive-emotional tasks, suggesting increased processing and modulation of sensory and endogenous pain modulatory systems in LPVD.

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