BRAIN ACTIVITY IN RESPONSE TO FOOD VISUAL STIMULI DETECTED BY INFRARED SPECTROSCOPY AND AN ARTIFICIAL INTELLIGENCE-BASED DIAGNOSIS SUPPORT SYSTEM IN PATIENTS WITH IRRITABLE BOWEL SYNDROME AND FUNCTIONAL DYSPEPSIA

Maki Ayaki

UEG Week Copenhagen 2023 | Poster

Oesophagus

October 15, 2023

A clinical study using functional near-infrared spectroscopy and an artificial neural network demonstrated that patients with functional dyspepsia show distinct brain activity patterns and food preferences compared to patients with irritable bowel syndrome and healthy controls.

KEY POINTS

- Among 41 participants (12 with functional dyspepsia, 13 with irritable bowel syndrome, 16 controls), patients with functional dyspepsia had the lowest preference scores for all foods, particularly fatty foods (VAS score 43.4 versus 78.1 in controls, $p<0.001$).
- Brain activity in the left dorsolateral prefrontal cortex measured by functional near-infrared spectroscopy was significantly higher in patients with functional dyspepsia (Z-score 0.125) compared to patients with irritable bowel syndrome (-0.001) and healthy controls (-0.077), $p<0.001$.
- An artificial neural network model using brain activity and food preference data achieved diagnostic accuracies of 89.3% for distinguishing functional dyspepsia from controls, 81.5% for irritable bowel syndrome versus controls, and 68.5% for differentiating functional dyspepsia from irritable bowel syndrome.
- This study may be of interest to researchers exploring objective biomarkers for disorders of gut-brain interaction and the potential role of neuroimaging in diagnosis.

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