QUANTITATIVE EVALUATION OF THE ENTERIC NERVOUS SYSTEM IN HEALTH AND DISEASE VIA X-RAY PHASE-CONTRAST TOMOGRAPHY

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X-ray phase-contrast micro-computed tomography enables 3D volumetric assessment of the enteric nervous system in human ileum biopsies, showing reduced neural tissue volume in patients with enteric neuropathy compared to controls.

KEY POINTS

- The neural tissue volume to total tissue volume ratio was significantly higher in controls (4.57) compared with patients with enteric neuropathy (3.07) (p=0.013).
- The study used X-ray phase-contrast micro-CT to assess full-thickness ileum biopsies from five controls and six patients clinically diagnosed with gastrointestinal dysmotility and neuropathy.
- The method allowed 3D determination of ENS volume and thickness over larger areas than conventional light microscopy, without requiring prior staining or preparation.
- The architecture of ganglia and fascicles was well visible, and connections between different parts of the ENS could be followed in the 3D reconstructions.
- Further evaluation is needed to examine the role of this method in the diagnosis of enteric neuropathy.

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