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Irritable bowel syndrome -a disorder of gut-brain interaction

Akademisk avhandling

Som för avläggande av medicine doktorsexamen vid Sahlgrenska akademin, Göteborgs universitet kommer att offentligen försvaras i Arvid Carlsson, Medicinaregatan 3, 413 90 Göteborg, fredagen den 12e februari 2021, klockan 09.00.

av **Irina Midenfjord**

Fakultetsopponent:

Professor Peter Bytzer

Københavns Universitet, Danmark.

Avhandlingen baseras på följande delarbeten

I. Midenfjord, I, Polster, A, Sjövall, H, Törnblom, H, Simrén, M. *Anxiety and depression in irritable bowel syndrome: Exploring the interaction with other symptoms and pathophysiology using multivariate analyses.* Neurogastroenterology and motility 2019; 31: e13619.

II. Midenfjord, I, Polster, A, Sjövall, H, Friberg, P, Törnblom, H, Simrén, M. *Associations among neurophysiology measures in irritable bowel syndrome (IBS) and their relevance for IBS symptoms.* Scientific Reports, 2020;10:9794.

III. Midenfjord, I, Borg, A, Törnblom, T, Simrén, M. *Cumulative effects of psychological alterations on gastrointestinal symptoms in irritable bowel syndrome.* American Journal of Gastroenterology, 2020 Nov 4, Online ahead of print.

IV. Midenfjord, I, Grinsvall, C, Koj, P, Carnerup, I, Törnblom, H, Simrén, M. *Central sensitization and severity of gastrointestinal symptoms in irritable bowel syndrome, chronic pain syndromes and inflammatory bowel disease.* In manuscript.

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Irritable bowel syndrome -a disorder of gut-brain interaction

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Abstract

Irritable bowel syndrome (IBS) is a common and multifactorial functional gastrointestinal (GI) disorder characterized by altered gut-brain communication. Due to the complexity of gut-brain interactions, the aim of this thesis was to enhance the understanding of associations between GI symptom severity and measures from multiple levels along the gut-brain axis in IBS patients.

In this thesis, various indications of altered gut-brain interactions were demonstrated: I. IBS patients with anxiety or depression reported more severe GI and non-GI symptoms than patients without psychological distress. Visceral hypersensitivity, aberrant function of the autonomic nervous system, GI-specific anxiety, and non-GI somatic symptoms differentiated between patients with and without psychological distress. II. Overall, modest associations were discovered among neurophysiological factors, and between neurophysiological factors and the severity of IBS symptoms. The most important combination of neurophysiology measures for GI symptom severity in IBS patients were extracted through a computerized method and were found to be visceral hypersensitivity and psychological distress. III. Alterations in a wide range of psychological measures were common in IBS. A strong cumulative effect of psychological alterations on the severity of GI symptoms was found. IV. Central sensitization was frequent in IBS patients, but the severity of central sensitization and GI symptoms were only modestly associated in IBS, suggesting that the presence, rather than the level, of central sensitization is of importance for GI symptoms in IBS.

In conclusion, the results from this thesis support the current view of IBS being a disorder of gut-brain interaction, where both peripheral and central factors contribute to this multifactorial disease. Complex associations between psychological and neurophysiology measures, and the severity of GI symptoms were demonstrated in the studies included in this thesis.

Keywords: Irritable Bowel Syndrome, gastrointestinal symptom severity, anxiety, depression, neurophysiological aberrations, psychological alterations, central sensitization.

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