Göteborg, 2019

Brain-Gut Interactions in Irritable Bowel Syndrome (IBS)

Akademisk avhandling

Som för avläggande av medicine doktorsexamen vid Sahlgrenska akademin, Göteborgs universitet kommer att offentligen försvaras i Hjärtats aula, Sahlgrenska Universitetssjukhuset/Sahlgrenska, Vita stråket 12, 413 45 Göteborg.
Fredagen den 18 januari, klockan 09:00.

av **Cecilia Grinsvall**

Fakultetsopponent:

Professor Sigrid Elsenbruch

Universitet Duisburg-Essen, Tyskland

Avhandlingen baseras på följande delarbeten

I. C. Grinsvall, H. Törnblom, J. Tack, L. Van Oudenhove#, M. Simrén#; *Psychological factors selectively upregulate rectal pain perception in hypersensitive patients with irritable bowel syndrome*; Neurogastroenterol Motil; 2015 Dec;27(12):1772-82. doi:10.1111/nmo.12689.

II. C. Grinsvall, H. Törnblom, J. Tack, L. Van Oudenhove#, M. Simrén#; *Relationships between psychological state, abuse, somatization and visceral pain sensitivity in irritable bowel syndrome*; United European Gastroenterol J; 2018 Mar;6(2):300-309. doi:10.1177/2050640617715851.

III. C. Grinsvall*, H. J. Ryu*, L. Van Oudenhove, P. Dupont, J.S. Labus, A. Gupta, M. Ljungberg, H. Törnblom, E. A. Mayer#, M. Simren#; *Sensorimotor network gray matter morphometry in irritable bowel syndrome versus healthy controls: sex differences and associations with pain responses*; In manuscript.

IV. C. Grinsvall, L. Van Oudenhove, P. Dupont, M. Ljungberg, H.J. Ryu, J.S. Labus, H. Törnblom, E.A. Mayer#, M. Simrén#; *A somatization brain network in Irritable Bowel Syndrome (IBS) involves altered connectivity in brain regions with cognitive functions*; In manuscript.

SAHLGRENSKA AKADEMIN
INSTITUTIONEN FÖR MEDICIN

GÖTEBORGS UNIVERSITET

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Cecilia Grinsvall

Avdelningen för invärtesmedicin och klinisk nutrition, Institutionen för medicin, Sahlgrenska akademin, Göteborgs universitet, Sverige, 2019.

Abstract

Irritable bowel syndrome (IBS) is a common disorder of gut-brain interaction defined by recurrent and longstanding abdominal pain and disturbed bowel habits. This thesis aims to deepen the knowledge about aberrant visceral sensory processing seen in a large group of patients with IBS, with particular focus on central mechanisms. The methods used were rectal balloon distensions using a barostat to evaluate rectal sensitivity, structural magnetic resonance imaging of the brain to investigate regional gray matter properties, and questionnaires to assess psychosocial factors, gastrointestinal and multiple somatic symptoms (somatization).

Anxiety, depression and somatization were all associated with increased pain intensity ratings in hypersensitive IBS patients. Non-painful intensity ratings were influenced only by anxiety and to the same extent in normo- and hypersensitive IBS patients. Somatization was further associated with several measurements of rectal pain sensitivity, and mediated the effects of depression and GI-specific anxiety on rectal pain perception. Sex, age and sexual abuse in adulthood were also associated with rectal pain sensitivity.

The level of somatization in IBS was related to differences in local gray matter network connectivity, mainly in regions of the prefrontal cortex, insula and cerebellum. The increased importance of prefrontal cortex and decreased importance of insula implies that cognitive aspects are more important than primary viscerosensory aspects in the neurobiological sensitization process in IBS patients with high levels of somatization. Gray matter morphometry differences between IBS and healthy controls in sensorimotor network seem to be related to psychological distress in women, but not in men.

In conclusion, somatization, measured as multiple somatic symptoms, is important for visceral (hyper-) sensitivity in IBS, and associated with altered structural connectivity within the brain.

Keywords: visceral sensitivity, anxiety, depression, somatization, central sensitization, gray matter morphometry

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