

Effect of psycho-emotional stress on gastrointestinal motility

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Psycho-emotional stress often induces various kinds of gastrointestinal symptoms, suggesting alteration in gastrointestinal motility, particularly in patients with functional bowel disorders such as non-ulcer dyspepsia (NUD) and irritable bowel syndrome (IBS). However, the precise mechanism involved in the alteration in the motility. We have evaluated gastrointestinal motility under psycho-emotional stress and simulated stressed condition with corticotropin releasing hormone (CRH).

EFFECT OF MENTAL ARITHMETIC STRESS ON GASTROINTESTINAL MOTILITY

Mental arithmetic (MA) stress is one of the simple and effective stress test. Gastrointestinal motility in normal control subjects and patients with functional bowel disorders were monitored to see the effect of MA stress, using microtransducer manometric system (Synectics, Sweden). Esophagus: With MA stress, esophageal peristaltic contraction amplitude decreases insignificantly. In patients with diffuse esophageal spasm or nut cracker esophagus, contraction amplitude increases after mental arithmetic stress^[1]. Stomach: Antral contractility decreases during MA stress both in normal control subjects and in patients with NUD or IBS^[2,3]. Duodenum: MA prolonged the duration of phase II with MA stress, both in normal control subjects and in IBS patients. This effect is more prominent in IBS patients. Also, MA stress induces discrete clustered contractions in the duodenum. MA decreases amplitude of duodenal contraction during MA stress, which is more prominent in patients with NUD or

IBS^[2,3]. Colon: MA stress slightly increases colonic motility indices (CMI) in normal control subjects, while it increases significantly in IBS patients^[2].

COMPARISON BETWEEN NORMAL CONTROL SUBJECTS AND PATIENTS WITH FUNCTIONAL BOWEL DISORDERS

Esophagus: Esophageal motility in patients with nut-cracker esophagus and in patients with diffuse esophageal spasm is obviously different from normal control subjects because of the definition of the disorders^[3,4].

Stomach: Antral contractility is weaker in NUD patients. Similar findings were suggested from the EGG study and gastric emptying study^[5].

Duodenum: Prolonged duration of phase II and the appearance of discrete clustered contractions were observed in some patients with NUD or IBS^[3,4].

Colon: Colonic motility index in patients with IBS is higher than normal control subjects, and more exaggerated response to MA stress are observed.

EFFECT OF CORTICOTROPIN RELEASING HORMONE (CRH) INJECTION

As the hypothalamo-Pituitary-Adrenal (HPA) axis is highly suspected to be responsible for the physical response to stress, CRH which plays an critical role in HPA axis response to stress was administered to normal volunteers and IBS patients exogenously to simulate stress response.

Duodenum: Duodenal motility was suppressed with CRH after transient minor increase of motility index. IBS patients showed transient, but significant increase of motility index of the duodenum^[6].

Colon: Colonic motility increased after CRH injection in normal volunteers, and more prominent response was observed in IBS patients^[6].

SUMMARY

MA stress induces alterations in gastrointestinal motility, which is partly reproduced by CRH injection. Similar changes in gastrointestinal motility was also found in patients with functional disorders of the GI tract such as NUD or IBS. Patients with functional disorders of the GI tract have exaggerated response to MA stress or CRH injection. These data suggest that mental stress, which can be simulated by CRH injection, alters gastrointestinal motility. Such alterations of GI motility is frequently observed in patients with NUD or IBS, and exaggerated responses to MA stress or CRH injection.

CONCLUSION

From the data above listed, we conclude that the mental stress induces GI dysmotility which can be seen in patients with NUD or IBS, probably via CRH secretion.

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