Irritable bowel syndrome

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Abstract

Irritable bowel syndrome (IBS) is a common gastroenterological disorder characterized by abdominal pain, diarrhoea or constipation, and bloating. The exact pathophysiology remains unknown but possible mechanisms involve altered gut motility, visceral hypersensitivity and exaggerated stress response. Treatment depends on the predominant symptoms. This article discusses the pathophysiology of IBS and the treatments available.

Keywords abdominal pain; constipation; FODMAP; motility; stress; visceral hypersensitivity

What's new?

- Irritable bowel syndrome (IBS) is a chronic gastrointestinal disorder characterized by abdominal pain, bloating and changes in bowel habit
- Recent evidence suggests that a diet low in fermentable oligo-, di- and monosaccharides, and polyols may effectively reduce functional gastrointestinal symptoms
- Antibiotics (rifaximin) have been shown to be effective in the treatment of non-constipated IBS patients
- Guanylate cyclase C agonists (such as linaclotide) have been effective in patients with constipation-predominant IBS

Introduction

Irritable bowel syndrome (IBS) is a chronic gastrointestinal disorder characterized by abdominal pain, bloating and changes in bowel habit. It is the commonest gastrointestinal presentation in primary and secondary care. IBS belongs to a group of chronic gastrointestinal diseases referred to as functional bowel disorders, as classified by the Rome Foundation.

Definition

IBS was initially defined by Manning et al. in the 1970s.[1] In the last two decades, the Rome working parties have refined Manning's criteria as abdominal pain eased by defecation and associated with change of frequency or form of stool. This means that diagnosis relies on symptoms and clinical examination rather than biochemical or histological investigations. The latest Rome III criteria,[2] established in 2006, are shown in Table 1. IBS has recently been subdivided into four categories:

- constipation-predominant (IBS-C) – hard stools more than 25% of the time
- diarrhoea-predominant (IBS-D) – loose stools more than 25% of the time
- mixed bowel pattern (IBS-M) – bowel motions that alternate rapidly between hard/infrequent and loose/frequent more than 25% of the time
- unclassified (IBS-U) – neither loose nor hard stools more than 25% of the time.

Epidemiology

The prevalence of IBS varies among the different studies from 3% to 20% depending on which criteria are used to identify IBS, with most studies reporting 10–15%. The prevalence is similar in many countries despite differences in lifestyle, and there is no clear link with socioeconomic status.[3]

About a third of patients have IBS-C, a third IBS-D and the rest IBS-M or IBS-U. The condition is more common in women (ratio 2:1) and symptoms occur predominantly before the age of 45, although the prevalence rises again in the elderly.[3]

Symptoms

Chronic and recurrent abdominal pain is the main diagnostic feature of the Rome III criteria, based on the major symptoms reported in a community survey of 40,000 patients.[4] Abdominal pain must be associated with change in bowel function, such as relief of pain by defecation or association with change of stool frequency or consistency. Other common symptoms of IBS but not part of the Rome III diagnostic criteria are bloating, tiredness, abnormal stool form, straining at defecation, urgency, sense of incomplete evacuation and passage of mucus per rectum. Symptoms usually occur intermittently and patients often report worsening of symptoms with stress. The stool pattern can be varied and change over time but patients are subclassified according to their predominant stool pattern.

IBS is diagnosed by its characteristic features but some of these symptoms also occur in more serious diseases such as inflammatory bowel disease and colorectal cancer. Alarm features[5,6] that should alert the clinician to the presence of organic pathology are shown in Table 2. Table 3 lists the investigations recommended as part of the diagnostic process to exclude other conditions.[5] The investigations listed in Table 4 are not necessary to confirm diagnosis in people who meet the IBS diagnostic criteria.[5]

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Rome III diagnostic criteria[a] for irritable bowel syndrome

Recurrent abdominal pain or discomfort[b] at least 3 days a month in the past 3 months, associated with two or more of the following:

- Improvement with defecation
- Onset associated with a change in frequency of stool
- Onset associated with a change in form (appearance) of stool

[a] Criteria fulfilled for the past 3 months with symptom onset at least 6 months before diagnosis.
[b] 'Discomfort' means an uncomfortable sensation not described as pain.

Table 1

Suggested investigations[5]

- Full blood count
- C-reactive protein/erythrocyte sedimentation rate
- Urea and electrolytes
- Coeliac antibodies
- Faecal calprotectin

Table 3

Pathophysiology

The exact pathophysiology of IBS is not known. It is thought to comprise elements of gut dysmotility and visceral hypersensitivity, in combination with psycho-social triggers. It is becoming apparent that there are different processes in subgroups of patients and identifying these phenotypes may inform treatment. Some of the key pathophysiological processes are described below.

Motility

As suggested by the symptoms of IBS, gastrointestinal motor disturbances are common. Delayed gastric emptying has been observed in a proportion of IBS patients.[7] Increased small bowel motility[8] with increased frequency of migrating motor complexes and of cluster contractions can be seen in patients with diarrhoea. In the colon, there is increased motility in response to meal ingestion, cholecystokinin, emotional stress, corticotropin-releasing hormone[9] and rectosigmoid balloon distension. Motility patterns can change over time as reflected by the variation in symptoms.

Visceral hypersensitivity

Abdominal pain is a key feature of IBS. A significant proportion of IBS patients exhibit increased sensitivity to experimental gut stimulation. This phenomenon, known as visceral hypersensitivity, plays a significant role in the development of chronic pain and discomfort in IBS patients. Tissue injury and inflammation induces the release of inflammatory mediators, causing sensitivity and excitability of nociceptor terminals, and leads to hyperalgesia at the site of injury.[10] Peripheral sensitization leads to a secondary effect of hypersensitivity of the surrounding non-inflamed tissue, through amplification of sensory inputs from that surrounding tissue.[11] Hypersensitivity is reinforced by processing of sensory inputs at various cortical and subcortical levels.[12] Our understanding of brain processing and mediation of peripheral sensory inputs has improved following the development of functional brain imaging, such as functional magnetic resonance imaging (MRI),[13] cortical-evoked potentials and positron-emission tomography (PET) (Figure 1).

Stress response

The relationship between stress and IBS has become increasingly recognized in recent years. Stress reactivity is a hallmark of IBS and is manifest as increased motility and visceral sensitivity to various stimuli such as meals, visceral distension and psychological stress. Epidemiological observations have suggested that previous life stressors and past exposure to childhood abuse increase the risk of developing IBS later in life.[14] IBS patients report more negative life events than do matched controls. A relationship between physical exercise and improvement in IBS symptoms has been observed. The response to stress is mediated by activation of the hypothalamic-pituitary-adrenal (HPA) axis and the autonomic nervous system. Paraventricular nucleus neurones in the hypothalamus release corticotropin-releasing factor (CRF), stimulating the release of adrenocorticotropic hormone (ACTH) from the anterior pituitary, which acts on the adrenal medulla and stimulates cortisol release. CRF has been shown in a number of studies to be a key mediator of the stress response in the brain–gut axis and CRF-1 antagonists have been investigated as treatments for IBS.[15]

Post-infectious IBS

Post-infectious IBS (PI-IBS) is a well-recognized complication of acute gastroenteritis. The incidence of PI-IBS varies from 6% to

Alarm features in irritable bowel syndrome[5]

- Unintentional and unexplained weight loss
- Rectal bleeding
- A family history of bowel or ovarian cancer
- A change in bowel habit to looser and/or more frequent stools persisting for more than 6 weeks in a person aged over 60 years
- Anaemia
- Abdominal mass
- Rectal mass
- Inflammatory markers for inflammatory bowel disease

Table 2

Investigations that are not necessary to confirm diagnosis in patients who meet the irritable bowel syndrome diagnostic criteria[5]

- Ultrasound
- Rigid/flexible sigmoidoscopy
- Colonoscopy/barium enema
- Thyroid function test
- Faecal ova and parasite test
- Faecal occult blood
- Hydrogen breath test

Table 4