## Disturbance of Defecation

### Table 1. Micturitional Symptoms

<table>
<thead>
<tr>
<th>Symptom Type</th>
<th>Symptoms</th>
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<tr>
<td>Irritative symptoms</td>
<td>diurnal urinary frequency, nocturnal urinary frequency, urinary urgency, urinary incontinence (stress, urge, overflow, reflex)</td>
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<tr>
<td>Obstructive symptoms</td>
<td>difficulty of initiation, prolonged micturition time, intermittency, decreased urinary stream, terminal dribbling, urinary retention</td>
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such as cough, laugh or sneeze. Urge incontinence is an incontinence associated with urgency. Overflow incontinence is an incontinence occurs in the bladder with large amount of residual urine, and urine dribs even during lying position. Reflex incontinence is a sudden loss of urine by sensory stimuli to the lower abdomen without micturitional sensation, and usually occurs in patients with severe spinal cord disease. All the obstructive symptoms are caused by the failure of expulsion of urine, and irritative symptoms are usually due to failure of storage of urine, but can occur in the bladder with decreased functional capacity (caused by residual urine) due to failure of expulsion of urine.

Pathophysiology of micturitional disturbance is investigated clinically by urodynamic studies (3, 4). Urodynamic studies include uroflowmetry, residual urine measurement, urethral pressure profilometry, cystometry, external urethral sphincter electromyography and voiding cystourethography. During the normal storage phase, intrabladder pressure remains low and almost stable, and external urethral sphincter electromyographic activity continues. On the other hand, during the normal expulsion phase complete silence of electromyographic activity and increase of intrabladder pressure are seen. A sudden involuntary increase of intrabladder pressure during storage phase is called detrusor hyperreflexia or uninhibited contraction, and a common cause of irritative symptoms in patients with central nervous system disease. Persistence of external urethral sphincter activity during expulsion phase is called detrusor-sphincter dyssynergia, and is a common cause of failure of expulsion often seen in spinal cord disease. Sudden loss of external sphincter activity during the storage phase is termed uninhibited sphincter relaxation, and often causes the urge incontinence seen in cerebral hemisphere lesions.

The most common diseases having micturitional disturbances in routine clinical situations are cerebrovascular disease and diabetic peripheral neuropathy. Irritative symptoms are dominant in cerebrovascular disease and obstructive symptoms are dominant in diabetic peripheral neuropathy. It is noteworthy that the micturitional symptoms are often the presenting and sole symptoms in status lacunaris, the most common form of cerebrovascular disease. Other less common diseases which have micturitional disturbances are Parkinson’s disease, Alzheimer’s disease and cervical spondylisis.

Among the conservative treatments, bladder training, drug treatment and transurethral catheterization are used singly or combined (4). Various drugs such as to suppress or increase the detrusor contraction, and decrease or increase the urethral sphincter tone are used. Anti-cholinergic drugs to suppress detrusor hyperreflexia and alpha-blocker to decrease urethral sphincter tone are the most effective drug treatments. Transurethral catheterization is the method of evacuating residual urine preventing detrusor overdistension. Among the transurethral catheterization, indwelling catheterization is known to cause various complications, therefore it is wise to use intermittent catheterization if possible. From our experience the overall success rate of treatment is quite satisfactory.

### References


### 6. The Disturbance of Defecation

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**Key words:** irritable bowel syndrome (IBS), autonomic nervous system, neuropeptides

The function of gastrointestinal (GI) tract including transport of diet, digestion and absorption as well as excretion is known to be regulated by the autonomic nervous system and GI hormones. Irritable bowel syndrome (IBS) is one of the major

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Internal Medicine Vol. 35, No. 1 (January 1996)
functional disorders, which could result in the disturbance of defecation. There are several criteria in the diagnosis of IBS. But in the present study, the diagnosis of IBS was based on Manning's criteria, because it includes symptoms of IBS and is also simple to indicate.

This study was undertaken to clarify the relationship between intestinal motility and autonomic nervous system, by measuring Holter electrocardiogram (ECG), gastroelectrogram and intraluminal pressure of large intestine simultaneously, in healthy controls and in the patients with IBS. Neuropeptide distribution was also investigated in enteric and the central nervous system of rat.

Healthy controls (939 persons) were assessed for functional bowel disease, using the bowel disease questionnaire devised in Mayo Clinic (1). About 38% of 939 healthy controls complained of dysfunction of bowel movement, in which 16 subjects (1.6%) complained of all of items described in Manning's criteria.

R-R intervals in Holter ECG were evaluated by Marquette series 8800 Holter analysis system (2). Power spectrum of pulse/every 2 min was lower and more irregular in IBS patients than in controls, and high frequency components were more frequent. Low frequency (L)/high frequency (H) ratio is often used as a sympathetic index. L/H ratio in IBS patients was lower and more unstable than those in healthy controls (Fig. 1). These results indicated that the patients with IBS tended to be rather parasympathetic than healthy controls.

The intraluminal pressure of the large intestine was significantly increased in the patients with IBS and the activity index, obtained from intraluminal pressure, also tended to be higher especially in the sigmoid colon, compared with the healthy controls. This change was recognized even during resting as well as in cold stress (Fig. 2).

Electrogastrogram during cold stress showed a decrease in 3 cpm wave in the patients with IBS, which was consistent with tachygastria (3). The results obtained by gastroelectrogram also showed the tendency toward parasympathetic in the patients with IBS (Fig. 3).

In addition to the clinical data, we studied the distribution of acetylcholine esterase (AchE), 5-hydroxytryptamine (5HT), somatostatin (SOM), \( \gamma \)-aminobutyric acid (GABA), enkephalin (EK) and macrophage inflammatory protein (MIP) in enteric nerve plexus of rat intestine by an immunohistochemical method (4). AchE and 5HT were stained in the same nerve, which built a network pattern. \( \gamma \)-GAMA and SOM were also in the same nerve as ENK and AchE were observed. MIP was stained in reticular thalamus nucleus and internal capsule in the central nervous system, and also found in neuron and nerve fiber of Auerbach's plexus in the small and large intestines. Therefore, these neuropeptides might regulate the intestinal function, considering that neuropeptides were present in the enteric and central nervous system.

In summary, the accelerated movement of the large intestine and dysmotility of the stomach were observed in the patients with IBS, and they tended to be parasympathetic. The close relationship between enteric and the central nervous system was suggested from the neuropeptide distribution in the rat experiment. The bowel movement seemed to be regulated by various neuropeptides, which are present in the enteric and central nervous system. Thus, the response of the intestine to stress might be explained by the brain-gut axis.

**Figure 1. Effect of cold stress on heart rate variability.**
Disturbance of Defecation

Motility

Control (n=6)

Activity index

IBS (n=8)

Figure 2. Effect of cold stress on intraluminal pressure of colon.

Figure 3. Effect of cold stress on gastroelectrogram.

References


