Irritable colon: its etiology, symptomatology and treatment

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SENIOR THESIS

1933

MILAN D. BAKER
IRRITABLE COLON:
ITS ETIOLOGY, SYMPTOMATOLOGY AND TREATMENT
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IRRITABLE COLON:
ITS ETIOLOGY, SYMPTOMATOLOGY AND TREATMENT

This paper will deal with that condition which, due to long usage and brevity is commonly called spastic colitis, but which will here be called irritable colon. This condition has been variously referred to in the literature as spastic colon, spastic colitis, spastic constipation, unstable colon, mechanical colitis, neurogenic colitis, tonic hardening of the colon, disordered colon, and irritable colon. The last term has been most generally favored by writers of recent years. Barker (3) has suggested that it might be called hyperkinetic-dyskinetic constipation.

For some years the word colitis has been used by physicians, and also patients, to indicate any disturbance in the colon, whether organic or functional, which was not a malignant lesion and which produced abdominal distress or disturbance in colonic function.

The suffix -itis, originally Greek, has always signified in medical usage "an inflammatory disease of", and it is only when used in relation to the colon that it has been misapplied.

The outstanding abuse of the word colitis has been in connection with the functional disorders of the colon --- one, irritable colon, and the other, that disturbance in secretion which allows abnormally large amounts of
mucus to appear in the fecal material or to be excreted independent of the feces.

These two functional conditions, mucous colitis and the condition carelessly termed "spastic colitis", have obviously been grossly misunderstood, for they have been confused with each other and with the organic inflammatory diseases of the colon. It is now fairly well established that the abnormal secretion and dejection of mucus should be considered a symptom and not a disease, since it may accompany all infections of the colon, may exist independently of all other symptoms or it may be one of the symptoms of the functional condition, irritable colon.

The term irritable colon has been used to define a condition in which the musculoneural apparatus of the colon has lost its coordination and correlated function. There is no evidence of an inflammatory process, and the term colitis is, therefore, very poorly chosen and misleading.

The term spastic has also been objected to. One of the objectors, Wilson (34), remarks that although spasm of the colon probably does occur, he feels sure that it will ultimately be agreed upon that the commonest cause of "colon hardening" is not muscular contraction but a tonic static fixation of some of the muscle fibers, a form of primitive muscular activity. In the absence of more precise terminology the condition may be described
as irritable colon and defined as a disturbance in the normal function, which consists of the propulsion of colonic contents from cecum to rectum, the reabsorption of fluid, and the digestion of cellulose— the coordinated motion of the parts of the colon, through rhythmic and synchronized contraction and dilatation, being lost because of a disturbance in the tonus and irritability of the musculoneural tissue evidenced by colonic spasticity. These functional disturbances are attended by a change from the normal complete unconsciousness of the patient of intra-abdominal activity, to an abnormal consciousness of digestive disorders.

Because colonic motility and tonus are dependent on a complex adjustment of complicated neuromuscular mechanism and because of its relationship to this condition perhaps it would be well to outline the nervous supply and, in part, the physiology of the large intestine; thus promoting a greater ease of interpretation of abnormality.

The cecum, vermiform appendix, ascending colon and transverse colon are supplied by nerves which arise directly from the superior mesenteric plexus. These nerves include both vagus and sympathetic fibers. The descending colon and upper part of the rectum are supplied by nerves which arise from the inferior mesenteric plexus— this being derived from the aortic plexus through which it receives vagus fibers from the celiac plexus. Therefore,
the nerves supplying the descending colon include both vagus and sympathetic fibers. The lower part of the rectum is supplied by sympathetic fibers derived from the upper and lower part of the hypogastric plexus accompanying the superior and middle hemorrhoidal arteries. The rectum is also supplied through white rami of the second, third and fourth sacral nerves and pelvic plexus. The inferior hemorrhoidal branches of the pudendal nerve also supply the lower part of the anal canal and the external sphincter.

The intrinsic nerve supply of the digestive tube consists mainly of the myenteric (Auerbach's) plexus, situated between the longitudinal and circular muscle layers, and the submucous (Meissner's) plexus situated in the submucosa. Both these plexuses include numerous ganglia which are intimately connected with each other by strands of nerve fibers. The strands are made up almost entirely from fibers of the ganglia but they contain fibers which enter the wall of the digestive tube through its extrinsic nerves. These two plexuses are connected with each other by numerous strands of nerve fibers, which include both fibers which arise in the myenteric and submucous ganglia and the fibers which enter through its extrinsic nerves. The afferent components of the vagus and sacral nerves enter the digestive tube and preganglionic neurons, which effect the synaptic relations of neurons in the enteric ganglia.
These nerves with the enteric plexuses constitute the parasympathetic innervation of the digestive tube. The sympathetic components of the nerves which enter the tube are postganglionic fibers. They do not effect synaptic connections with the enteric neurons, but terminate directly in relation to the tissues which they innervate.

Vagus stimulation results in contraction of the intestinal musculature as far as the distribution of the vagus fibers extends. Stimulation of the sacral parasympathetic nerves brings contraction of the smooth muscle in the descending colon, rectum and anal canal. The stimulation of the splanchnic or the hypogastric nerves acts as an inhibitor to the intestinal musculature. (Morris, (26))

In the intestine, contractions of the longitudinal strands of muscle shorten and widen the tube, whereas contractions of the circular muscle narrow the tube. The so-called pendulum movements have the function of mixing the food derivatives intimately with the juices secreted by the digestive glands and also of placing all portions of the contents of the bowel in contact with the surface of the mucous membrane in order that absorption may take place. The peristaltic movements have the function of propelling the intestinal contents toward the anus; among these are included the so-called "great colon movements" that come three times in twenty-four hours and cause the translocation of the contents
of the colon over considerable distances. In addition to these movements, there occur, as we know, antiperistaltic movements that provide for retrograde transport of the colonic contents. It is particularly in the cecum and ascending colon that these antiperistaltic contractions are prominent. As soon as the contents of the ileum are discharged into the cecum, these antiperistaltic contractions begin; they result in retention of the contents in the cecum and ascending colon where they not only favor the thorough mixing of the contents, but through the stagnation produced in this part of the colon, provide both for the important process of bacterial digestion and for the absorption of fluids and dissolved substances, with consequent concentration of the feces. It is only after completion of these processes that the antiperistaltic movements normally cease. Then through peristaltic movements the contents are shoved on into the transverse colon and later, into the descending colon. The feces remain normally in the sigmoid, until, through the movements of defecation, they are discharged. In addition to the contractions of the colonic musculature just described, the smooth muscle in its walls, between such contractions is constantly held in a certain degree of tonus (peristaltic contraction). Obviously then, the motility of the colon is a very complex affair, dependent upon an intricate set of neuromuscular mechanisms, which must work together
in a coordinated or synergistic manner for normal functioning. It is but little wonder that this motility should be easily disturbed, owing either to alteration of its neuromuscular apparatus or to stimuli impinging upon that apparatus.

ETIOLOGY:
The etiological factors concerned with irritable colon are many, varied and, to some extent, debatable. Most authorities endorse a picture composed of a large number of factors all playing a part. Others are more inclined to favor some particular factor which in their experience seems to be most important.
The incidence of the condition is striking. In a review of 2,500 cases, Kantor (22) shows that colonic irritability occurred in two hundred cases per thousand. Kantor and Sagal (23) state that fifty percent or more of all patients complaining of digestive disorders show evidence of colonic disease. Condry (10) makes the same statement of irritable colon. According to Hunter (18), the condition is on the increase. However, it must be kept in mind that the increase may only be apparent and due to more perfect diagnostic procedures and thus fewer failures in recognizing the disease.
The relationship of this condition to age and
sex is important, for it occurs in all ages and both sexes. It is quite generally conceded that it occurs more often in women and particularly in early life.

This is well shown in Table 1, compiled by Jordan and Keifer (21):

Table No. 1

<table>
<thead>
<tr>
<th>Male, 53; Female, 147</th>
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<tbody>
<tr>
<td>Below 10 years........1</td>
</tr>
<tr>
<td>From 10-20 years.......11</td>
</tr>
<tr>
<td>From 20-30 years.......41</td>
</tr>
<tr>
<td>From 30-40 years.......62</td>
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<tr>
<td>From 40-50 years.......34</td>
</tr>
<tr>
<td>From 50-60 years.......29</td>
</tr>
<tr>
<td>From 60-70 years.......11</td>
</tr>
<tr>
<td>From 70-80 years.......4</td>
</tr>
</tbody>
</table>

It is more common in private than in hospital practice.

Little has been said of the physical type in which the condition is most often found. Graves and Graves (17) find it more commonly among the long, slender, ptotic type of individuals with intense emotional reactions. Rhinehart (29) says body habitus and the height of the hollow viscera have no relation to the irritability of these organs. "In fact there seem to be more sufferers with high viscera than with low."

Ryle (30) finds it extremely rare, to meet with irritable colon in fair haired, blue eyed, healthy complexioned individuals with placid dispositions or in robust people.

Most writers agree that the patients presenting nervous symptoms are usually those of a hypersensitive impressionalistic nature -- being emotionally unstable,
introspective and easily depressed and exhausted.

In his paper "The Irritable Colon" Brougher (7) makes the statement that the mode of living and eating of the present generation, with the rush and hurry of daily routine, lack of regular meals, proper foods and daily bowel evacuation, contribute greatly to this condition.

S. J. Morriss (26) gives a simple enumeration of etiological factors as factors as follows:

1. A condition in which the musculoneural of the colon has lost its coordinating and correlating function.

2. Constipation, with the abuse of cathartics, enemata, and irritating irrigations.


4. Improper diet.

5. Pericolitis due to pressure of adhesions.

6. Lesions outside the intestinal tract, such as focal infections in the teeth, tonsils, and prostate.

He makes no discussion of the mechanism of production.

Gilliland and Sigoloff (16) repeat the above mentioned theories of etiology. They are not exponents of any single theory.

According to Condry (10), organic lesions of colon, gallbladder disease, achlorhydria, appendicitis, improper diet, pericolitis due to extraintestinal
irritation and remote lesions outside the digestive tract by reflex action on the autonomic nervous system all play a role in production of the symptom complex.

Although up to the present time no work has been done on this particular phase of the problem, Brougher (7) believes the role of the endocrine system played in irritability of the colon, although uncertain, to be undoubtedly important. Some of the symptoms often associated with hyperthyroidism are frequently seen in irritable colon. He also believes irritable colon to sometimes occur on an allergic basis analogous to asthma, urticaria, and angio-neurotic edema.

Of all the factors concerned with the production of the condition irritable colon, that factor most generally agreed upon as being of undoubted importance is the unstable nervous system. This element is discussed to some extent by practically all writers. Bougher (7) says, "The routine of the individual superimposed upon a none too stable nervous system predisposes to the condition termed irritable colon. This unstable nervous system may be inherited or acquired." Gilliland and Sigoloff (16) add that acute exacerbation of symptoms often accompanies nervous shock or emotional disturbance. Condry (10) states that it is due to an imbalance of the autonomic nervous system.

Backus, Bank and Williamson (5), in a study of
fifty cases concluded that it is due to an underlying basic instability of the vegetative nervous system, involving in most instances overactivity of both sympathetics and parasympathetics. In corroboration, Bailey (1) says that an unstable nervous system seems to be the most important etiological factor in "spastic colitis". Many of the individuals suffering with this complaint are born weaklings, and during the third and fourth decades, when the strain of life is the greatest, they break down. Careful history reveals that most of them suffer with some form of neurosis. Many are introspective. In others all life and happiness is bound up in the activity of their bowels and the condition of their stools. The severity of their symptoms varies directly with the nervous or emotional strain under which they are laboring.

Another thing that points strongly to the nervous system as the causative factor is the close relationship between "spastic colitis" and mucous colitis. Mucous is found in the stools in "spastic colitis", and during the acute attacks, it may be difficult to differentiate the two disorders. Both of these conditions seem definitely due to a disturbance in the equilibrium of the sympathetic and parasympathetic effort upon the colon.

Black (4) says that in the term "spastic colitis"
we deal not with an inflammatory condition of the colon, but with a motor and sensory neurosis which is dependent upon an abnormal innervation within the lumen of the digestive tract. This abnormal innervation occurs very frequently in persons of neurotic constituents, and are brought on by attacks of over-exertion, emotional disturbances, excess smoking, family quarrels, illness of beloved relations, love affairs that go wrong, business worries, etc. It may be thought of as a primary neurosis, or occurring in patients who have a hypersensitive nervous system or suffer from chronic nervous exhaustion.

Emery (13) likes to think of "disordered function of the colon" on the basis of threshold values. He thinks of the colonic mechanism as having a threshold value at which it will respond to a given stimulus -- if the threshold is lowered a smaller stimulus being required to touch it off, and if it is raised, a larger stimulus is required. With this in mind, he reasons as follows:

Under normal conditions the stimulus to activity is such that the mechanism works as it should. The system can be thrown out of order in two ways -- (1) The threshold value can be left unchanged and the stimulus increased sufficiently to break through. This may be done by the excessive use of cathartics, excessive use of alcohol, or the continued use of unduly
irritating foods. If continued over a long period of time, this sets up a chronic condition. (2) The stimulus may be kept constant and the threshold lowered. This being brought about by anxiety, mental excitement, etc. This seems to be the situation in the cases with an unstable nervous system and is what we have in the so-called neurasthenic or neurotic individual. These cases have a low threshold value normally and a stimulus which can be tolerated in the average case, will be too much for the nervous individual. Emery does not attempt to explain the factors raising or lowering the threshold.

Eppinger and Hess (14), in their writings state the belief that the condition occurs especially in those individuals designated by them as being "vagotonics" -- those individuals manifesting a functionally increased vagus tonus and increased irritability in this anatomical system together with an increased sensitiveness to pilocarpine, which, according to them, is comparable in action to a theoretical hormone "Autonomin", which acts upon the autonomic nervous system. They are inclined to attribute the disease wholly to autonomic irritation.

Rhinehart (29) advanced the theory that irritability of the alimentary canal is a deficiency disease, caused by insufficient vitamin D or its physiological equivalent with a consequent disturbance in calcium utilization. He observes that this condition
is most prevalent in winter and early spring, and in those persons who spend most of their time indoors — initiation of the condition or exacerbation of that already present most often taking place at that time. The important factor being a deficiency in these patients of the effect of the vitamin D component of the direct rays of the sun. He also has observed that most persons suffering from this condition are addicts of a bulky diet and one with a high carbohydrate content. All of them seem to receive little vitamin D in their food since they eat a deficient amount of such animal products as meat, milk, eggs or butter, all rich in sources of vitamin D.

To strengthen his theory of vitamin D deficiency and improper calcium utilization, Rhinehart (29) likens irritable intestine to tetany defined as a clinical syndrome occurring after parathyroidectomy or spontaneously, and characterized by gradually increasing hypersensitiveness of the nervous system and by a painful tonic spasm of certain groups of muscles or even of the entire musculature. He shows how Trouseau's phenomenon, given as an increased spasticity and pain following mechanical stimulation of muscles which are in state of tetany, takes place in the colon of one suffering from irritable colon with such mechanical stimulation as a bulky diet as shown by symptoms and roentgenological findings. Also removal of the me-
chanical stimulant relieves symptoms. Thus he says that using a bulky diet in treatment causes increased tetany and associated increased intestinal irritability and nervous instability rather than being if assistance. Successful treatment of irritable colon on the basis of deficiency by Rhinehart, as taken up in later pages, strengthens his viewpoint.

Dr. Frank Smithies suggests that in many instances these people present something more fundamental than what is understood by the nervous or neurotic type. He has been impressed with the fact that in many cases he has to deal with a peculiar diathesis -- a spasmophilic diathesis. These individuals may from birth exhibit definite manifestations of this diathesis with faulty calcium metabolism manifested clinically by an intermittent, recurrent, intestinal disturbance. The local bowel response seems to represent allergic responses which are excited by a number of agents such as dietary unbalance with regard to vitamins, varied forms of infection, nervous strain, accumulations in the bowels, and enemas.

The effect in these spasmophilic individuals of an explosion is an attack of colitis instead of the usual asthma.

Many authors emphasize the fact that colonic abuse is the most important secondary causative factor.

1 Discussion following Eggleston (12).
By this is meant principally improper use of purgatives, enemas, and diets. Many of the patients suffering from irritable colon have taken pills or salines daily until these measures have become ineffectual. Bailey (1) says it is because the bowel becomes so irritated that the drug no longer has the desired effect. It is thought that the same is true of the enema habit which several years ago was a popular "fad".

This viewpoint is shared by many writers including such men as Condry (10), Gilliland and Sigoloff (16), Will S. Horn 2, Graves and Graves (17), Hunter (18), etc. Hunter says that usually a history of constipation and long continued use of aperients is in evidence. These aperients "interfere with the rhythm of the bowel, setting up inhibitions and spasms, causing first a too rapid passage and later local stasis; they render the feces more fluid than they should be and thus favour abnormal bacterial and putrificitive growth". 3

Bailey (1) also says that errors in diet may also start this condition and that the habit of urging all constipated individuals to go on a diet high in roughage is unpardonable. "Constipation associated with a disordered digestion is usually made worse by this means. Rough vegetables and raw fruits -- cabbage, greens, bran, apples, etc. -- will certainly precipitate spas--

2 Discussion of Graves and Graves (17).
3 Quoted from Sprigg (33).
tic colitis in susceptible individuals. Certain protoplasmic poisons -- coffee, tea, alcoholic beverages and tobacco -- may be among those guilty."

McBride (24) enlarges upon Bailey's viewpoint on "colonic abuse" and emphasizes it in his article "Cathartic Colitis", stating, "There may be many causes of 'hypertonic state' of the large intestine, but I wish to emphasize only one, the cathartic, paying particular attention to the role cathartics play in the etiology and to emphasize the fact that such a condition can be eliminated or certainly allayed by the proper bowel management". He believes that intemperate indulgence in the use of cathartics and evacuant enemas is the greatest causative agent in the condition. One reason for his belief was that Jordan and Kiefer (21) found that in 200 cases of irritable colon all but 9 of the patients were habitual users of cathartics and irrigations; in the majority of the cases the habit being of very long standing. Some of the patients definitely stated that cathartics irritated the condition.

In other causative factors such as gallbladder disease, rectal conditions, particularly fistulae and, in the female, pelvic conditions, he states that the use of such laxatives as salts, sodium phosphate and bile salts aggravate the spastic state and produce an irritability of the colon. He reasons that drugs cause exacerbations by their disturbing effects
locally; that under normal conditions material collects in the large intestine in a liquid state and is gradually propelled along the colon by the normal peristaltic action, the liquid being absorbed. The consistency of the stool depends, therefore, on the rate of motility and absorption in the bowel. Likewise any type of food that excites peristaltic action will produce the same irritating effect.

There has been some little discussion as to the cause and effect relationship of constipation and irritable colon. For example, Bailey (1) says: "Constipation is an effect rather than a cause of spastic colitis. The spasm of the colon delays the fecal column; the condenser action of the mucosa removes the water from the feces; leaving hard, dry masses which irritate the bowel and increase the severity of the condition. Improper management of constipation is of great importance." Gilliland and Sigoloff (16) maintain that retained fecal material accompanying constipation may be attended by absorption of toxins which act by stimulating contraction in the distal half of the colon and thus produce spastic colon.

The opinion is also expressed by Bailey (1) that spasticity of the colon may definitely be due to organic conditions reflexly affecting the colon.
Among these being focal infections about the digestive tube, as gallbladder disease or appendicitis, or irritating lesions about the rectum, as hemorrhoids, fistulae, etc. Disease of the pelvic organs must also be considered.

Will S. Horn suggests that spasm of the sphincter ani might be given an etiological role and that its cause must be removed before any improvement and be expected higher up.

SYMPTOMATOLOGY:

The symptoms associated with irritable colon are innumerable. They vary greatly with the individual. They may simulate no particular picture or may closely resemble those of such organic conditions as chronic appendicitis, cholecystitis, or peptic ulcer. A single individual may complain of symptoms too many to mention. It is said by Bailey (1) that when the history of a gastro-intestinal case gets too long or too involved one must always suspect a functional disorder.

The following list of symptoms of which the patient suffering with irritable colon may have in many possible combinations may lend an idea of the variability of the picture. Most of them are included in the various degrees of vertigo, headache, malaise, asthenia, nervous instability, numbness and tingling of the hands and feet,

4 Discussion of Graves and Graves (17).
twitching of the eyelids, palpitations, precordial pain, shifting pains throughout the abdomen, back and chest; faintness, insomnia, creeping sensation over body, hot and cold flashes, anorexia, nausea, vomiting, pain in the abdomen or back, constipation, gaseous eructations, distention and fullness after eating, etc.

Jordan and Kiefer (21) have classified symptoms and their incidence as shown in table number two. The figures were taken from a series of 200 cases chosen at random and divided into three groups of symptoms representing what, in their experience, were the most common combination of symptoms, namely, epigastric distress with nausea and vomiting; generalized abdominal distress with gaseous eructations, distention and loss of appetite; or pain in the left upper quadrant with palpitation and "heart pain". The most common symptom was gaseous eructation. Second in frequency was epigastric distress, occurring in eighty cases, and the chief complaint in fifty-eight cases. In a few cases the latter was said to occur at a definite time after meals and might well have been confused with typical ulcer distress.
Table No. 2
Jordan and Kiefer (21)

Classification of Symptoms and Their Incidence

<table>
<thead>
<tr>
<th>SYMPTOMS</th>
<th>NO. CASES OCCURRED</th>
<th>NO. CASES CHIEF COMPLAINT</th>
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<tbody>
<tr>
<td>Distress:</td>
<td></td>
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<tr>
<td>Epigastric</td>
<td>80</td>
<td>58</td>
</tr>
<tr>
<td>Entire lower pt. of abdomen</td>
<td>16</td>
<td>6</td>
</tr>
<tr>
<td>Rt. lower quadrant</td>
<td>23</td>
<td>12</td>
</tr>
<tr>
<td>Lft. lower quadrant</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Rt. upper quadrant</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Lft. upper quadrant</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Generalized abdominal</td>
<td>33</td>
<td>16</td>
</tr>
<tr>
<td>Low back</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Constipation</td>
<td>33</td>
<td>10</td>
</tr>
<tr>
<td>Gas:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eructations</td>
<td>107</td>
<td>9</td>
</tr>
<tr>
<td>Distention with distress and distention and eructations</td>
<td>65</td>
<td>9</td>
</tr>
<tr>
<td>Nausea</td>
<td>33</td>
<td>3</td>
</tr>
<tr>
<td>Vomiting</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>Regurgitations</td>
<td>17</td>
<td>0</td>
</tr>
<tr>
<td>Loss of wt. on being under wt.</td>
<td>35</td>
<td>1</td>
</tr>
<tr>
<td>Loss of appetite or sitophobia</td>
<td>23</td>
<td>0</td>
</tr>
<tr>
<td>Cankers</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Fever in attacks</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Group 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Palpitations</td>
<td>18</td>
<td>8</td>
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<tr>
<td>Giddiness</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>Dyspnoea</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>&quot;Heart pain&quot;</td>
<td>5</td>
<td>3</td>
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<tr>
<td>Group 3</td>
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</tr>
<tr>
<td>Headache</td>
<td>14</td>
<td>13</td>
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<tr>
<td>Nervousness</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>Easy fatigability and loss of vigor</td>
<td>23</td>
<td>5</td>
</tr>
<tr>
<td>Urticaria</td>
<td>6</td>
<td>0</td>
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The pain of irritable colon may vary from an indefinite abdominal discomfort to severe griping pains. The characteristic thing about the discomfort is its haphazardness in appearance in relation to time, meals, and location. The discomfort is usually in the form of a mild griping or dull aching sensation. It may be "gnawing" or cramping in nature. It most often begins in the region of the umbilicus and radiates over the entire abdomen, especially the lower part. Although it may remain localized, occasionally it goes through the lumbar or sacral region. It may rather definitely simulate appendicitis, cholecystitis, or ulcer in type and location of pain, or it may be pericardial. Often associated with it is tenderness, especially noticeable over the sigmoid and cecum but not uncommonly over the transverse colon.

There may be a diffuse aching sensation ranging from a dull headache to a low grade, unpleasant sensation in the trunk, back and legs. It may be so acute and severe as to simulate gall-stone colic, or renal colic, or acute appendicitis, or peptic ulcer, or even angina pectoris. Morphine has been given to relieve the pain in many cases.

Whereas distention, gaseous eructations, constipation, epigastric distress and constant pains in the right upper quadrant were formerly nearly always thought to be linked with chronic cholecystitis, it is now
known that all or any part of this syndrome frequently occurs in patients who have normal gallbladder and suffer from irritable colon.

The same symptoms, with the addition of pain in the right lower quadrant and tenderness at McBurney's Point from spasm of the cecum, are also known to occur in patients with a normal appendix or from whom it has been removed and who have no adhesions.

Many, many patients who later were found to have irritable colon have undergone such as appendectomy, cholecystectomy, gastroenterostomy, and in women, even pelvic operations, -- without relief.

Of the symptoms referable to the nervous system Morriss (26) says that the patients suffering from them are usually those of a hypersensitive or impressionistic nature manifesting evidence of emotional instability, depression, exhaustion, and introspection.

Those symptoms referable to the cardiovascular system vary from a mild distress and vague precordial pain after eating to severe palpitation, shortness of breath, giddiness and faintness. As a rule, the temperature in these cases is subnormal.

A case which is interesting from a standpoint of symptoms, especially those referable to the nervous system, is outlined by Immerman (19).

Case No. I

Patient M. M., male, age 30, fireman, single, admitted
April 16, 1929. His chief complaint was belching food up and palpitation around the heart. The belching occurred chiefly in spells. The attack started with a peculiar sensation arising from the feet and moving upward. There was no loss of consciousness. With some spells there was a blackness before the eyes and some palpitation of the heart. There was also a sensation of choking in the throat and some shortness of breath. The belching was loud and might continue all night. He had been constipated for four years but had passed no mucus. His first attack started in July, 1928. There was occasional regurgitation. The physical examination was generally negative. B. P. 115/60. The sigmoid appeared to be spastic, glairy, and contained some mucus. Fractional gastric analysis showed normal acidity. Barium study, including enema was negative except for phrenospasm and gastrospasm.

Diagnosis of a neurosis of the vagotonic type was obvious enough. Except for the phrenospasm observed the attacks seemed exactly like a gastric crisis occurring in patients with neurogenic colitis. Since our observations show that abdominal and gastric crises may be separated by a period of years, it seems likely that in this case there was a neurogenic colitis which had not yet reached the stage of abdominal attacks.
An excellent example of a case simulating peptic ulcer is given by Sherman (31), in case II. The syndrome has been mentioned by many others including Jordan and Kiefer (21), Eggleston (12), Gauss (15), and Smith and Miller (32).

Case No. II:
A man, aged 50, druggist, was first seen in November, 1929. He stated that for 15 years he had had stomach trouble of a very constant type. During that time he never had a good appetite, although he maintained his weight at a normal level. He stated that he had a dual distressing sensation in the upper half of the abdomen, no definite pain but rather a sense of fullness. The distress usually came on about two hours after eating. Being a druggist he had tried various sorts of remedies and found that he was relieved to a large extent after food by sodium bicarbonate, bismuth, and belladonna. Nausea was an outstanding symptom and frequently between five and six o'clock in the afternoon before dinner he would vomit several times. Following dinner he was relieved to a large extent but would again become very nauseated and would vomit later in the evening. He never noted blood in the vomitus. The bowel movements were regular and stools appeared quite normal. He had not taken cathartics for several years.

Of interest and importance is the history of other
opinions. Nine years ago he consulted a large clinic in the middle west, was told that he had duodenal ulcer and operation was advised. He refused operation on the advice of his own physician. The following year a complete G. I. series was carried out by a leading roentgenologist who advised that there was no evidence of ulcer but that the appendix should be removed. This was carried out; but without any change in symptoms. Next followed extraction of several abscessed teeth, hemorrhoidectomy, and repair of inguinal hernia. No relief. Eight years ago he was seen by a consulting gastroenterologist and was advised that he did not have an ulcer but that symptoms were due to constipation. Previously he had been a taker of cathartics. A diet abundant in fruits and vegetables was given. The constipation was cured and from that time onward he has never resorted to cathartics. The symptoms, however, were not relieved.

Examination: The physical examination revealed nothing of any significance other than in the abdomen. He was tender about the umbilicus but without spasm. The descending colon in the left iliac fossa could be felt quite readily, and it was tender.

Roentgen examination: (by Dr. P. M. Hickey) "The gall-bladder is moderately well visualized, rather atypical in shape. Gallbladder is possibly adherent to the lower border of the liver. Shadow persists at six hours."
Esophagus appears normal. Steerhorn type of stomach. Normal peristalsis, normal motility. Fluoroscopically the bulb filled out rather well. Films made with the compressor over the duodenal bulb showed definite deformity of the bulb suggestive of duodenal ulcer. No retention. At 24 hours the cecum was movable and not tender. Probably duodenal ulcer."

Gastric Analysis: Fasting free hydrochloric acid 32, combined; 13. At the end of one hour free hydrochloric acid 35, combined, 50. No blood was found.

Treatment: A provisional diagnosis of duodenal ulcer was made and inasmuch as the patient had never tried peptic ulcer management, he was placed on Sippy treatment. This he followed conscientiously after a preliminary rest in bed but received very little benefit. He was still nauseated a large part of the time but did not vomit. At the end of three months he was advised that persistence in the ulcer treatment was useless.

It was felt that treatment for so-called irritable bowel should be given a trial. Accordingly on April 1, 1930, he was placed on the following program: Frequent feedings were discontinued and three regular meals planned, alkaline powders were discontinued. Using a list of 5 and 10% vegetables, he was encouraged to eat at least three cooked vegetables and two cooked fruits daily. Foods of high carbohydrate content were
discouraged for the time being -- namely, potatoes, corn, lima beans, peas, white bread and candy. Meats were allowed as desired. Salads composed of fruits of the five and ten percent. class were encouraged. Water was advised in amounts of 8 - 10 glasses between meals.

Drugs: The tincture of belladonna was prescribed, twenty-five drops after each meal for one week. At the end of that time the dose was reduced to five drops three times a day.

Subsequent course: Almost at once after the onset of the above program all symptoms disappeared and he has remained well up to the present time. He has recently spent two months in Europe and while abroad was unable to obtain food as desired at certain towns. He suffered a slight relapse at that time but as soon as he secured his usual food he was as well as before and so remains at the present time.

Cases III, IV and V have also been chosen because of their value in illustrating symptomatology. They are taken from the writings of Graves and Graves (17).

Case III: H. G., married, white, an American stock farmer, 46 years of age, was first seen Nov. 3, 1924, complaining of stomach trouble. His family history and past history were essentially negative. He rarely indulged in alcoholic liquors and smoked about 20 cigarettes a day. For 15 years he had heartburn, belching, and colicky pains in the epigastrium coming on two or three hours after eating,
and was relieved by taking soda or additional food. He thought that starchy foods intensified his symptoms. The pains had grown worse and often awakened the patient at night, though at no constant time. He had occasional spells of vomiting at variable times after meals but at no time had the vomitus contained blood. Physical examination revealed nothing positive, except that he was slightly underweight, a contracted colon was felt under the examining finger, and a liver edge was felt just below the costal border in the mid-mammary line. The clinical pathology showed a free hydrochloric acid value of 55 and a total acid value of 68 following the Ewold meal, but was otherwise negative.

X-ray examination showed no evidence of gastric or duodenal ulcer, but evidence of spastic colon was reported.

Case IV: R. J. S., a single, white, American salesman of 26, was first seen in June, 1924, complaining of gas and pains across the lower abdomen. Family history, past history and habits were negative.

For three years the patient had been troubled by "gas on his stomach" and sour belching. His weight had fluctuated showing a loss of 25 pounds in the first six months. Beginning six months before entry he first noted a binding, gnawing, pain in the mid-line between the umbilicus and the xiphoid, which woke him early in the morning and was relieved at
first by eating. His bowels were periodically costive. Physical examination was essentially negative except that he was underweight and had a large, coated tongue and slight subjective tenderness over the epigastrium.

His clinical pathology examination was essentially negative except that test meals showed a free hydrochloric acid of 67 and 65 with total acidities of 87 and 78 respectively.

X-ray examination revealed a hypertonic stomach with a ptosis and a spastic colitis.

Case V: T. C. H., a single, white, American, a life insurance agent of 30 years of age, was first seen Nov. 15, 1924 complaining of aching pains across the lower abdomen.

The family history and past history were negative except for typhoid fever at the age of ten.

He smoked cigarettes to excess. For two years he had experienced a dull aching pain in the middle of the lower abdomen, worse after he had been on his feet all day and relieved by lying down. He also complained of a sour stomach with belching and eating a large meal made all of his symptoms worse. His appendix had been removed without amelioration of symptoms. He was very nervous. Excitement seemed to make his pain worse.

Physical examination was negative except for pyorrhea alveolaris and hypertrophied tonsils.
Clinical pathology examinations were essentially negative.

X-ray report was of spasm in the pyloric portion of the stomach and spastic colon.

TREATMENT:

The treatment of irritable colon presents a problem which in many cases is difficult of solution. The case is usually chronic, the constipation usually of long duration and it and the discomfort not relieved by simple measures such as laxatives, enemas, and high residue diets. The mental state is very often depressed and the patient, in some degree, possessed of a faulty nervous system. The ultimate aim of all treatment is to give the sufferer's colon an opportunity to resume its normal function.

Methods of treatment vary quite widely, depending in most instances upon the therapistist's concept of the etiology of the condition.

The first and a very important step is to exclude the presence of organic disease of any kind. When a patient comes in complaining of vague abdominal symptoms with a previous diagnosis of irritable colon, one should never conclude too quickly that he or she has a functional disorder and make the fatal mistake of overlooking the presence of possibly an organic lesion. Should this be present, it should be
corrected if possible before turning attention to the colon. A complete anamneseis and a thorough physical examination including those of the laboratory, stool, proctoscopic, sigmoidoscopic and X-ray study should be done. On the other hand the mistake of subjecting these patients to superfluous operations should be avoided.

Treatment shall first be discussed as found in the routine of various authors who stress a particular concept of etiology.

Eggleston (12) stresses Neuropsychiatric treatment, feeling that without it, little can be accomplished by other methods. He says that because of the neurotic condition existing, it is advantageous to have the patients removed from home surroundings to an institution where a satisfactory program can be followed and every effort made to relieve their anxiety, psychotherapy being an essential part of the treatment. He is in accord with Dawson (11) in saying that he is of the opinion that the profession needs to take up in a large-minded spirit the question of psychic treatment; that the patient with colitis who is in danger of being crushed by his illness is not helped by being dubbed "neurotic"; that the patient's mind can be trained and helped to detach itself, to control what it contemplates, to temper rather than reinforce in consciousness the aches and ills of the body, and thus establish the
benign rather than the vicious circle. He feels that it is not necessary that the patient be referred to a neurologist, provided the internist has the confidence of the patient and has at least a working knowledge of psychotherapy. Eggleston feels that until the emotional life of the patient and his ability to live above his fears is corrected, little hope of complete relief can be seen; that more can be accomplished for their relief through a careful study of their nervous condition and a rational adjustment of their emotions than by the use of any other therapeutic effort.

In local treatment, especially in the most severe cases, he finds heat to be of most value in relieving spasm of the colon. Enemas of from 110 degrees to 120 degrees F. given slowly, (sometimes necessitating knee-chest position and use of colon tube) proving efficient in relieving the spasm temporarily and heat locally over the abdomen enhancing results. Relaxation of the colon and satisfactory movements have also been obtained by using 6 - 8 ounces of cottonseed oil at a temperature of 100° introduced into the rectum in knee-chest position and retained over night, or for several hours. He sometimes finds it necessary to supplement this with agar-agar or psyllium seed by mouth.

With regard to diet, he recommends a liberal one which in the more acute stages of the disease should be
bland and devoid of bulk or roughage, which may be added as the patient improves.

Of the drugs he uses, where needed, belladonna as an antispasmodic and the barbituric group as sedatives.

McBride (24), who believes colonic abuse in the form of cathartics and enemas to be the principal factor concerned in etiology, considers the situation to be difficult but not so complicated -- the important consideration being the complete abstinence from cathartics and enemas and restoration of a proper diet. This he believes to be any which makes the least demand upon the intestinal tract, tending to render the feces pasty and soft and the intestinal mucous membrane pliant and slippery and which includes all classes of foods with sufficient fats, vegetables and fruits for the normal excitation of peristalsis.

According to his routine the blandest of foods is taken for the first few days, consisting mainly of starches, such as cream of wheat, rice, oatmeal, crackers, milk, potatoes, soft eggs, jellies, macaroni and bread. After three or four days, proteins are added in the form of meat -- never fried or with gravy. Beef, chicken, and broiled or baked fish being the most useful. In four or five days, vegetables are added. Only those vegetables which have a tender fiber are used -- such as asparagus, beets, peas, string beans, spinach,
cauliflower and squash. Then after three or four more days fruits and desserts are added in the form of any cooked fruit, with soft puddings, sponge and angel cake, American and cottage cheese. The patient is restricted to this class of food indefinitely until normal bowel function is obtained. In addition to the above, he states that it is necessary to convince the patient that he can have a bowel movement without a purgative.

He enhances the above with a glass of hot water in the morning to aid peristalsis, atropine for spasticity, (1/150 gr. twice a day) and mild sedation to produce nervous and mental relaxation.

Rhinehart (29), in treating irritability, or as he calls it, "tetany", of the intestinal canal, works on the basis of deficiency and faulty calcium metabolism.

In the medical treatment, since cod liver oil and viosterol are slower than parathyroid substance or extract, he gives tenth-grain doses of fresh dried parathyroid gland -- this after meals with 5 or 10 grains of calcium carbonate and a glass of milk. This is stopped as soon as complete relief is obtained.

He states that ten days has been sufficient time to obtain relief in the most advanced cases.

Rhinehart's suggested diet is a concentrated one with due regard to vitamins A, B, C, and E. For these he suggests oranges, raw tomatoes and lettuce. All
bulky food and cellulose is prohibited. Meat and milk are emphasized, the milk for its vitamins, and for gall-bladder evacuation. The object of his diet is to relieve distention and to conform to what appears to be natural for human beings. His patients are not allowed any artificial means of emptying the colon.

Of surgery he merely says that where indicated, it must be included in treatment, for organic lesions in the abdomen. However, since he says, "Perhaps the enforced rest of the colon and the usual hospital post-operative diet of milk and eggs have been the key to the cure in some of these patients", diet is probably the most important treatment. He also advocates treatment of the irritability before and after the surgical procedure.

For prophylaxis, Rhinehart (29) would suggest a restoration of natural conditions of living; that is, a return of conditions prevailing during the stone age but modified by our present knowledge and economic factors. Patients in whom there has been and annual return of the irritability diseases should be told to take cod liver oil in the late fall, winter and spring months. Everyone should drink at least a pint of milk a day in order to furnish daily need of calcium. They should eat meat and little or no roughage.

Brougher (7) on the basis of the Rhinehart theory, received good results from the following treatment de-
signed to raise serum calcium and relieve tetany.
Treatment varying as to the severity of the picture.
Patients were put on a low residue, nonirritating diet, essentially high in mineral and vitamin-rich foods. Because of vitamin content, meat and milk were given liberally. All vegetables were put through a sieve or ricer to remove the fibrous part until the clinical condition improved. Viosterol, drops 10, two times a day. Also powders consisting of three parts calcium gluconate and one part bismuth subnitrate were given in a dosage of one dram in a glass of water thirty minutes after each meal. If numbness, tingling and muscle cramps were predominating symptoms or if blood were present in the stool, parathormone, one cc., was given twice a week until symptoms of calcium deficiency disappeared. Plain oil and agar emulsion was administered in dram dosage twice a day in water.
Daily exercise, especially walking, was advised. Relief from pain and constipation was usually experienced in a few days.

Backus, Bank and Williamson (5) in cases in which they feel there is a disturbed calcium metabolism give calcium lactate, gm. 2, three times a day with parathormone, 15 units, 3-6 times weekly.

Following are several cases as reported by Brougher (7). They are especially interesting in that his results
are quite spectacular.

Case No. VI: Mrs. D., age 32, married.

Family history, negative.

Chief complaint; gas, sense of fullness after eating, nervousness, pain in lower part of back, nausea, constipation, bitter taste in mouth, ribbon-shaped stools. History of present complaint -- Patient in good health until 12 years ago, when she had ruptured appendix. Two years later was again operated for gallbladder adhesions. Three years later had third operation for removal of ovarian cyst and adhesions. Following the first operation, she became very nervous. Since her first operation enemata distress her and has always had the uncomfortable sensation of flatulence after eating, but gallbladder operation did not relieve it. There has been some mucus in her stool since her second operation.

Past history: General good health up to 1919. Has spells of vertigo and feels as though floating about in space. She is constipated and has some mucus in stool. Complains of palpitation at times. Occasionally has slight edema of ankles and puffiness under eyes. Annoyed with numbness and tingling in hands and feet. The extremities are usually cold.

Examination: Patient is very tender over cecum, ascending colon, transverse colon, and especially the descending colon.

Laboratory: Stool mucus, vegetable fibers, few yeast
cells. Gastric analysis: Free acid 42, total 66, mucus and urine negative.

Blood: Hb. 83%, R. B. C., 3,960,000, W. B. C., 5800, small lymphocytes 43%, polys 52%.

Progress: Patient placed on bland diet, calcium gluconate and bismuth subnitrate powders, viosterol and plain oil and agar. Stools now daily and regular, normal in size and shape. She has no nausea or burning sensation and very little gas. She is still nervous but much less so, and is gaining in strength and weight.

Case No. VII: Master B. Age 13, white.

Chief complaint: Nausea, gas, headache, weakness, cough, cold hands and feet, vertigo, pain in abdomen, vomiting, constipation, night sweats, numbness and tingling of hands and feet.

History and Present Complaint: Present attack began three days ago with pain in abdomen, gas and vomiting. His mother brought him to the office because of those repeated so-called bilious attacks. She stated that his first attack came when he was five years of age. Since then he has had such attacks every three or four months.

The patient has been examined repeatedly with the usual diagnosis of biliousness or indigestion and often no treatment but castor oil. He has never had a roentgen
examination. His mother also stated that the boy was very apathetic, did not want to play as other boys do and seemed to tire so easily. His father would poke fun at him and call him a sissy and would often whip him for laziness. At times he would have spells of vertigo with his so-called bilious attacks and would become very pale, complaining of feeling as though sinking off into space.

Physical examination: Patient was very tall, thin, undernourished and presented an apathetic tired appearance. Chief physical finding was tenderness over transverse and descending colon.

Roentgenography: Showed redundant sigmoid colon and spastic descending colon.

Laboratory: Urine negative, blood normal, stool bloody mucus, occult blood positive, pus, and much mucus.

Treatment: Bland diet, calcium and viosterol, petrol agar plain.

Progress: In ten days patient seemed almost a different individual. He had a ravenous appetite and his mother made statement he was acting like a normal boy. He gained in weight consistently, became less irritable, and has had no more bilious attacks or fainting spells. It is unnecessary to give him laxatives to produce bowel movements.

Case No. VIII: Mrs.F. Age 41, married.

Chief complaint: Gas, constipation, ribbon shaped stools,
mucus in stools, nervousness, vertigo, periodic spells of enterospasm and numbness and tingling of hands and feet.

History of Present Complaint: Patient has had gas since just a little girl. At times has taken soda and if she could belch would get some relief. When twenty-two years of age she had very acute indigestion, following severe constipation. Since then she has had periodic acute attacks of gas. Apparently she is worse and belches more at night. If able to vomit relief is obtained from the gas and distress. At times she seems to have hunger sensations. Occasionally has slight pain after eating. This pain and nausea after eating have only been present for about one year. For about six months she took acidine and seemed to get a little relief. Has never had tarry stools. She has been told by different physicians that she needed to have her gallbladder removed and has also been given magnesium sulphate for months at a time and has taken caroid and bile tablets in large quantities.

Family history: Essentially negative. Personal history negative except that she has trouble in sleeping if the gas is very bad.

Examination: Essentially negative except that she is tender over the colon, especially the transverse and descending portions.

Laboratory: Wasserman negative, urine negative, blood
count normal. Gastric analysis, free acid 27, total 70.

Roentgenraphy: Barium enema revealed a typical picture of irritable colon.

Treatment: Patient was placed on a bland diet and given oilonagar, viosterol and parathormone. After the first injection of parathormone her numbness and tingling disappeared. Later it returned, but viosterol relieved it and she often commented on how gratifying it was to have viosterol available.

Progress: In a week's time the patient felt greatly relieved, had much less gas, and said she was not nearly so nervous. In the meantime numbness and tingling had returned but was completely relieved by viosterol.

Methods of treatment as outlined by those writers who are not exponents of any etiological concept, for the most part, conform pretty well with one another, most of them including neuropsychiatric treatment, diet, drugs, local treatment, etc., varying somewhat, but working on the same principle.

Most of the treatment suggested for the nervous and mental disorder is similar to that proposed by Eggleston (12).

Barker (3) believes much help can be given by rational and systematic psychotherapy -- suggesting
removal of apprehension of the existence of severe organic disease by means of a general diagnostic survey that will convince the patient of its accuracy and thoroughness, removal of his fears and anxieties, supervision of mode of life, and in outspoken psychoneurotics and mild psychotics a thorough rest and up-building cure with isolation, away from home, and with the aid of a special nurse, psychotherapy, occupational therapy, etc.

Hunter (18) impresses upon his patients that irritable colon is not so much a disease of the colon as a local response to an excitable nervous system.

It is expressed by Black (4) that such a condition cannot be cured and be expected to remain cured by operating, nor can the patient suffering from such a condition be relieved by local treatments unless the basic background is treated -- this being a hypersensitive nervous system or nervous exhaustion.

Bailey (1) states that in the purely functional case in the under par individual, rest in bed away from family and friend is the treatment of choice. Since this condition is fundamentally of nervous origin, psychotherapy must not be neglected; the patient must be removed from fears and worries as far as possible. Above all the patient should not be told that the trouble is only with his nerves and that he is a neurotic.
It is quite generally agreed that diet is a very important factor in the cause and relief of irritable colon. Most writers recommend a liberal diet, but one which is low in residue and bland and devoid of bulk or roughage. That recommended by McBrine (24) as given on previous pages being a good example.

In this aspect, Bailey (1) states that all rough foods or foods with a large amount of residue aggravate the condition and may precipitate an acute exacerbation. At first when there is much pain and tenderness a very low roughage diet is advised. Start out with a diet of milk, eggs, cereals -- cooked or prepared, oatmeal should be strained and bran cereals avoided -- bread from white flour; soft vegetables that have been forced through a collander, strained orange or grapefruit juice, chicken, fish and ground beef. These foods contain little roughage and do not tend to irritate the colon. Care must be taken to avoid stimulants such as pepper, spice, coffee, and alcoholic beverages. Gradually other foods of a more bulky nature may be added to the above list. In arranging a diet, be sure that the total quantity is sufficient, as many of these people are already undernourished. The excess gas which the patient has attributed to certain foods is usually relieved when the stasis has been corrected.

Morriss (26) also uses the bland non-residue diet but suggests that milk should be avoided or greatly
reduced as it tends to increase gas formation. This is not true of fermented milks. He believes meat to be well tolerated and suitable to be given in large amounts -- fat content can be high. As the patient improves, he says other articles of diet can be added, such as chicken, rice, and fish. The last items to be added to his diet consist of raw vegetables and fruits and those foods containing mechanical or chemical irritants. This same type of diet is recommended by such men as Gilliland and Sigóhoff (16), Barker (3), Condry (10), Hunter (18), etc. The latter forbids "such indigestible foods and condiments, highly seasoned articles, lobster, salmon, pork, bran, tough skins and seeds, coarse vegetables, iced drinks and coffee". He suggests a tumbler of acidophilus milk 2-3 times daily.

Drugs properly used may be a definite aid in treatment of irritable colon and have been used to some extent by practically all of those who have written on the subject. In the main those used are the antispasmodics and sedatives. However, mild laxatives, bulky inert chemicals, calcium compounds, endocrine extracts, intestinal antiseptics, hydrochloric acid, antacids, etc. are thought to have definite indications by some therapeutists. The antispasmodics used are principally belladonna and atropine.

Hunter (18) recommends atropine gr. 1/200 twice
a day with gr. 1/100 at night -- the dosage increased to the physiological effect of dryness of the mouth and commencing difficulty in reading, then continuation for about two months just under this dose and gradually decreasing.

In acute attacks, Bailey (1) gives tincture of belladonna in doses of fifteen drops every four hours. Morriss (26) uses tincture of atropine and belladonna starting with ten drops three times a day until symptoms disappear or ocular accommodation is paralyzed. Barker (3) uses atropine one mgm. or novotropin 2½ mgm. orally -- or if quick effect is desired, one mgm. of atropine sulphate subcutaneously.

Wilson (34) claims speedy results if the patient be given full doses of an atropine-containing compound, preferably tincture of hyocyamus in 20-30 minum doses, in combination with an intestinal antiseptic such as salol gr. 10 three times a day or where not contraindicated, "the mercury and iron antiseptic".

Belladonna and atropine are also used by most other writers -- Condry (10), Gilliland and Sigoloff (16), Graves and Graves (17), Barker (3), etc.

The sedative drugs are used when indicated by such conditions as acute attacks of pain, sleeplessness, depression, nervousness, etc. Bailey (1) favors the use of the barbitol group for producing mental and physical rest -- or in acute attacks, luminal gr. 1½.
Codeine or morphine is the choice of Gilliland and Sigoloff (16) in acute attacks. In cases suffering from anxiety, insomnia or introspection, they prefer bromides or luminal. For use in acute attacks, Barker (3) uses codeine or pantopon.

At the outset, where necessary, Hunter (18) suggests the passing use of bromides, gr. 30 or adalin, gr. 10 at bedtime.

Of those who feel that a mild laxative is occasionally necessary to resort to when treatment is first instituted, Bailey (1) feels that mineral oil or agar-agar are best suited for this purpose. In the chronic case with constipation, gassy indigestion and abdominal discomfort, he uses one of these and a small enema in the morning at first.

Morriss (26) occasionally gives castor oil, one or two ounces once a week to clean out old residue, mucus, and bacteria. He sometimes uses sodium phosphate or similar salts or a quart of normal saline after breakfast.

Gilliland and Sigoloff (16) are in favor of the passing use of mineral oil or agar-agar and water used freely. At the outset Hunter (18) sometimes clears the intestine with a single large dose of castor oil tempered with 7-8 drops of laudanum.

Bulky, inert substances are sometimes used to supply volume to the intestinal contents. Morriss (26)
suggests barium in doses of a tablespoonful twice a day. Hunter (18) uses two tablespoons of flaxseed after meals with a teaspoonful of paraffin at night.

In cases recognized as being due to deficiency or faulty metabolism, calcium compounds, vitamin-containing oils, etc., and parathormone are used as described in treatment by Rhinehart (29), Brougher (7), and Gilliland and Sigoloff (16).

For intestinal distention with gas, Gilliland and Sigoloff find magnesium perhydrol gm. 1 three times a day or powdered bismuth or kaolin to be useful. This same can be accomplished in many cases by cutting down carbohydrate in the diet.

In many cases of irritable colon the patient may be aided by correction of gastric hypo- or hyperacidity by the use of dilute hydrochloric acid or alkalies, as the case may be. (Condry (10))

It is quite generally accepted by all writers that all forms of colonic abuse such as the promiscuous use of cathartics and enemas should be eliminated at the outset of treatment. However, the judicious use of enemas, as well as cathartics, has a definite place in the therapy of irritable colon. Bailey (1) often finds an occasional enema of one pint of tap water to be very useful in the beginning of treatment. In cases of obstinate constipation, he finds oil enemas to be a great aid. He warms six to eight ounces of cotton seed oil.
to a little above body temperature, injects it slowly into the rectum with the patient in the knee-chest position, and allows it to remain overnight.

He feels that the use of hot colonic irrigations is definitely injurious. In acute attacks, Barker (3) finds that one or two colonic irrigations with warm salt solution to which a little sodium bicarbonate has been added is often of value. After symptoms subside, he uses small intrarectal injections of olive oil at nine o'clock for a few nights. At the onset, Hunter (18) finds that a large enema of normal salt solution given very slowly may relieve the discomfort quite markedly. In severe cases, Hunter uses 4-5 ounces of warm olive oil introduced into the rectum every night for a few nights then 2-3 times a week.

Heat is often employed in treatment. Bailey (1), Condry (10), Hunter (18), etc., use heat applied to the abdomen, especially over the descending colon to relieve pain. Gilliland and Sigoloff (16) use hot fomentations such as the Priessnitz pack on the abdomen. In addition to this, Barker (3) advocates warm baths. He suggests that diathermy, massage, other than on the abdomen, and dilatation of the sigmoid may be of value.

Horn 5 suggests cure of spastic sphincter ani by treatment of such as hemorrhoids, fissure or fistulae or by graduated rectal dilators. "Once this

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5 Discussion from Graves and Graves (17)
source of spasticity is relieved, the bowel and the patient's general nervous irritability manifests favorable improvement."
CONCLUSION:

The foregoing pages are an attempt at placing before the reader's eye, without evaluation, an accumulation of popular and unpopular views concerning etiology, symptomatology, and treatment of irritable colon.

It is quite evident that as yet it is not certain just why and how this condition happens to occur. For example, it is said that promiscuous cathartics is a strong etiological factor. Who has proven that the practice preceded the constipation coincident to the disease? Or did the disease make necessary the promiscuous use of cathartics? If Rhinehart, Brougher, etc., are correct in their concept of etiology as would be judged by their rather spectacular therapeutic results, why have they not been accepted more widely and enthusiastically?

Many more questions could be asked, but probably will not be answered until more work is done on the subject. The condition has an interesting future.
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