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Spastic colon

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SPASTIC COLON

by

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Senior Thesis

Presented to the College of Medicine

University of Nebraska, Omaha

1937

"In the race of life, the man with educated bowels will eclipse the man with educated brain; and drugs and chemicals that work while you sleep are a little later going to prevent your working when awake."

Elbert Hubbard

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Introduction

There should be a reason for everything. When it was apparent that it was no longer possible to evade the issue as far as a senior thesis was concerned a suitable subject plus reasons for that particular choice were quite conspicuous by their absence. While marking time and hoping for, perhaps, divine guidance three dispensary patients, in startling succession, fell my way plus a lecture on spastic colon. Not a divine sign, but enough pro's and con's resulted to start several arguments and sufficient stimulus to seek the opinion of several internists and surgeons, which revealed an interesting divergence of belief. The die was cast.

The original idea was to ascertain, if possible, as to whether spastic colon in itself was a distinct clinical entity. Review of the first several articles, verified by the remainder, were so emphatic in stating that it was a distinct clinical entity that this motif was discarded in favor of an attempt to appreciate its varied clinical manifestations with a workable explanatory theory. This goal may or may not have been reached as you may decide for yourself after reading the paper. It is regretful that the greatest benefit in writing or presenting a paper is had by the originator; hence if satisfaction is mine nothing more can be asked. Such is the case.

It is needless to say that nothing original is herein

contained. Case reports from the University Dispensary could be used but only with the acknowledgment that they were taken by different observers and insufficient and inadequate from which to draw sound conclusions. Furthermore, when diagnosis hinges upon a differentiation between organic and functional disease it is possible to so distort the true clinical picture in favor of one or the other that a double dose of the proverbial grain of salt must be taken simultaneously.

Numerous synonyms may be found for this particular disturbance, including spastic constipation, chronic colospasm, colon catarrh, colon dyspepsia, irritable colon, and tonic hardening of the colon. Wilson(56) thinks the term enterospasm would be satisfactory if the meaning of the word "spasm" were extended so as to embrace "static" muscular activity. The term "spastic colon" as used here is defined by Jordon(28) as a condition in which the musculoneural apparatus of the colon has lost its co-ordination and correlated function resulting in a greater or lesser contracture of one or more parts of the colon. There is no evidence of an inflammatory process, and the term colitis is, therefore, as poorly chosen as would be the word myocarditis in the condition of "irritable heart".

History

In the history of spastic colon it is interesting to note the lapse of time between the first description, the experimental work which attempted to give a physiological explanation, the re-opening of its clinical nature, the diversified attempts as to etiology, and followed by the vast number of case reports in the past decade.

Hurst(26) gives a useful bibliography of the subject and a concise account of the etiology and important clinical features of the malady. It was first described by John Howship, surgeon to St. George's Infirmary, London, in 1830 in a small and very readable book entitled "Practical Remarks on the Discrimination and Successful Treatment of Spasmodic Stricture in the Colon considered as an occasional cause of Habitual Confinement of the Bowels". He recognized that the complaint was due to a "deficient freedom of relaxation in some part of the intestinal canal", and both as a diagnostic test and therapeutic measure advocated gradual distention of the bowel with a warm gruel enema.

Enterospasm, which may include spastic colon, was recognized by Spigelius and Riolan, quoted by Bedinfield(8), who observed in the cadaver narrowings of the gut in 1645 and 1649, which they termed "angry contractures". Cherchewsky (47a) who was unfamiliar with Howship's account redescribed the condition in 1883. Fleiner(47b) wrote his first article on spastic constipation in 1893, which with the publication of Hawkins(24) first brought into prominence its frequency on the Continent and to a less degree in England.

The basis for the modern study of gastro-intestinal reflexes was laid by Bayliss and Starling(7) in 1899 when they reported that handling the intestine with the fingers "produced reflex inhibition of the whole length of the intestine", and in 1911 Cannon(10) discussed the existence of a psychic tonus of the intestinal tract.

Wilson(54) and Turner(53) note that this type of hardening was discussed at the International Medical Congress held in Paris in 1900 and cases were then described in which portions of the colon were distended as well as being muscularly hardened. Turner(53) states that Mannaburg, of Bienna, spoke of parts of the colon being distended and as hard as a stone and forming a very tender tumor which the patient could feel. At the same meeting Jules Geogroy, in his paper upon "contracture" of the large intestine, spoke of the colon hardening under his hand and forming a tumour which could be grasped like a floating kidney.

Little was added until 1918 when Wilson(47) who had previously discussed the physiology of the pain in this disorder summarised his own views and wide experience in a book entitled "Tonic Hardening of the Colon". From that time on, led possibly by de Bec Turtle(14), Turner(53), and in this country by Alvarez(4) frequent mention of Spastic Colon under that or different terminology is made.

Incidence

Gilbert (20) presents a lead in considering the incidence of spastic colon, stating that while it is true that the same degree of pathology will affect constitutionally different people with varying degrees of severity, the literary dictum that spastic conditions occur only in the "neurasthenic" is not justifiable. We know that the threshold of pain and the susceptibility to visceral sensations are variable factors, but on the other hand we are convinced that disorders of motor function may induce marked nervous and psychic disturbances, as evidenced by asthenia, mental depression, phobias and reflex cardiac and circulatory changes.

Metz (34) believes that one of the most common offunctional nervous disorders is the spastic colon; that disturbances of the colon are becoming so prevalent that they are producing a definite effect upon our economic life. More and more, the colon is recognized as the seat of various ailments of digestion. The more accurate diagnostic facilities have proven that the normally functional colon is exceptional in cases of chronically disordered digestion. Colon spasm is so frequently revealed in routine examinations that one almost hesitates to consider it pathological. Such would be the case if symptomatic discomforts and the associated and accompanying nervous reactions were not relieved by relaxation of the spasticity. The patient is usually in apparent good health and the resulting discomforts are too commonly looked upon as "simple bilious attacks". McMillian (32) from the radiological side believes that derange-

ments of the colon are responsible for many of the chronic abdominal complaints one hears, and most common of these derangements is spasm.

Ryle (47) taking all grades of the condition, allowing for its varied appellations and deceptions, and judging by information received from colleagues in general practice concludes that spastic colon is a common disorder. On the basis of consulting and hospital experience he adds that it ranks high among the causes of chronic distress; numerically that it is more frequent than gastric ulcer, but less frequent than duodenal ulcer -- conditions which are far more likely to be referred for a second opinion.

In a series of 3,000 admissions to the gastro-intestinal service of the Lahey Clinic, Boston, Jordon (38) reports that 30 per cent were found to have no other lesions except this colonic musculoneural disturbance, the correction of which resulted in a majority of cases, in relief of the digestive symptoms. In a study of 500 consecutive gastro-intestinal patients Alvarez (2) was able to demonstrate organic pathology in 27.4 per cent while minor disorders and functional conditions comprised 72.6 per cent. Statistics, according to Morgan (37) show that two-thirds of your young adults suffer from spastic constipation, that the greatest incidence of spastic colon is found in the young and middle aged, with the conclusion that it often occurs in individuals in apparently good health.

Ryle (47) has somewhat of an opposite view, suggesting that it is extremely rare to meet with spastic colon in fair-

haired, blue-eyed, healthy-complexioned types with placid dispositions or in robust individuals. In fifty cases he reported 17 were males, 33 females. The youngest patient was 19, the oldest 78, and the average age 39. 19 cases were specifically described as lean, thin, or spare. Wiry, dark, tall, and pale were other adjectives which occurred frequently. Twenty seven cases were recorded as nervous, neurotic, worrying or anxious. In his own experience he found that spastic colon was more common in private than in hospital practice. As Hawkins (24) remarks, "intestinal neuroses diminish in frequency as we descend the social scale". Gauss (19) found that spastic colon occurs three times as frequently in females as in males. Pinto (40) believes it occurs at any age and in either sex. Men succeed in hiding the cause for their trouble more successfully than women, but the disorder is as common in men as in women.

He further states that in no true sense of the word can this condition be called hereditary, yet it is not uncommon to find it in several generations of one family. Rather it should be said that the tendency to it is hereditary, and under proper stimulation -- stress and strain -- an attack will be precipitated. Along this line, a large series of infant colons were studied by X-ray by Larimore (57), and he shows that a congenital type of left-sided narrowing and right-sided dilatations is associated with constipation. Other groups

studied show that this disease is most common in middle-life, at about the age of 39, being three times more common in women than men.

Etiology

In reviewing the etiology of spastic colon it is easily understood why both the functional and organic aspects have their adherents. There is no direct divergence of thought with drastic, final statements that either factor, soley and independently, is responsible, but a recognition that either one may be the precipitating factor with due consideration taken of the other. As in any phase or entity in medicine the logical course to follow is that of a search for tangible, definite cause, the failure or inability to find such inclines the searcher towards the functional, but in no sense of the word avoiding or ending the organic possibilities. Such is the case with spastic colon.

Spastic change of the colon has been found as a complication of certain organic disease of the bowel wall. Witherspoon (57) mentions cancer of the iliac colon, cancer of the rectum, hemorrhoids and fissura in ano, appendicitis, diverticulitis, and gross ulcers of the bowel have been associated with contracted bowel. Cholecystitis, urinary calculus, disease of female pelvic organs and other adjacent inflammations cause spastic colon. The reason for this is discussed under physiology. Roberts (17) states that spasmodic contracture of the colon and excessive production of mucus are to be regarded as the results of abnormal irritability of the bowel, by either mechanical or chemical stimuli; or of undue irritability of the bowel from inflammation or ulceration of the mucosa; or of undue irritability of the nervous system.

Hurst (26) in considering the clinical aspects of the various spasmodic affections of the colon finds that chronic spasm is commonly associated with more or less severe constipation, and that there is also often spasm of the sphincter ani, so that the stools have the form of thin tape-like masses. He states that constipation associated with spasm of the colon may arise from:

1. Irritants acting from within the intestine, such as hard fecal masses, ascarides, or irritating ingredients of the diet.

2. Toxic causes, such as lead, tobacco, and occasionally caffeine from excessive drinking of tea or coffee.

3. Reflex, secondary to chronic disease of the abdominal viscera such as gall-stones, appendicitis, duodenal ulcer, or salpingitis.

4. Tabetic, intestinal crises being probably due to spasm.

Constipation leads the list of possible causes. It is given high consideration by practically every observer with the usual follow-up that successful treatment must deal with the constipation as well as the spasticity. Retained (Gilliland-22) 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 producing spastic colon. The injurious use of purgatives is frequently contributory as practically all active cathartics have an irritant action on the colon.

Ryle (47) voices the consensus of opinion by saying that

the causal or contributory effect of purgatives must be given due prominence. As an example, 30 out of 50 cases he recorded as constipated, and of these the majority were taking purgatives occasionally or habitually. It cannot be doubted that undue irritation of the neuro-muscular mechanism of the bowel is present in these cases, and that the majority of the popular purgatives, however mildly so, are irritants. Furthermore, not a few of the patients were well aware that their pain might be aggravated by brisk purgation.

Dysentery (Ryle - 47), as might be expected from the habit of irritability which it engenders in the bowel, may be followed by spastic colon, and this even for years after the active infection has subsided. McKechnie (32) has suggested that it comes on as a secondary infection following an infection in the appendix, that this infection locates either in the mucosa (bringing on a muscular reflex) or in the muscularis (producing a low-grade myositis with its consequent muscle "splinting"), as is found in myositis in the skeletal muscles. Quoting Bisset (9), "Jirasek states that degenerative lesions in the cells of Auerbach's plexus may be the cause of enterospasm, whilst Steindl found degenerative changes in the medulla and pons localized near the dorsal nucleus of the vagus in cases of intestinal spasm. Alessandrini attributed the spasms to the lowering of the blood calcium".

Since the rise of the allergist it is quite natural to expect some information from that field, so, Melli (9) states

that asthma may be produced by the inhalation of a substance and the ingestion of the same substance may cause gastric intestinal disturbance without asthma. Rowe (44) has shown that gastro-intestinal symptoms may be due to food allergy. Hollander (25) in the description of 5 cases of mucous colitis which proved to be due to hypersensitiveness to foods, undoubtedly describes symptoms of colonic spasm. Bisset (9), after studying a number of cases of spastic colon, concludes that the presence of a family or personal history of symptoms of an allergic nature, combined with a positive dermal reaction of a particular food, and the increase or decrease of the abdominal symptoms following on the ingestion or elimination of the suspected food or foods, is conclusive that the condition in such cases is one of food allergy.

The explanation of the cause of the manifestations of food allergy is difficult, but it may be primarily due to an inherited constitution which renders the individual hypersensitive to foreign proteins; or it may conceivably be, that under certain disturbed conditions of the intestinal tract, proteins which are incompletely metabolized in the course of digestion may be absorbed in such a form or in such quantities as to sensitize the individual. In addition to the presence of the hypersensitive condition, mechanical factors also must be taken into account, as the mucous membrane of the bowel when in a sensitized state is also irritable, and the bowel contents may mechanically set up a response which is quite apart from the allergic condition.

Hurst (26) lends a consoling hand implying that tobacco is rarely the sole or main factor although it is difficult to assess the part it plays. Other factors which have been mentioned without a definite attempt to give their importance include the enema habit, irregular habits of living, faulty diet, fatigue, insufficient exercise, and faulty environment. Ryle (47) mentions as precipitating factors cold and fatigue, jolting, such as results from games or digging, horse-riding or motoring over rough roads, and even walking; tobacco, and in women the menstrual cycle.

Before delving into the realms of functional disorders Hurst⁴⁷ gives a very realistic, but matter-of-fact, dissertation as to the difficulties of the colon and its functional potentialities. No organ of the body is so misunderstood, so slandered, and so maltreated as the colon. Text-books of anatomy are apt to describe it as it is found in the dissecting-room, not as it occurs in a living man. Text-books of physiology describe its motor functions as seen under experimental conditions in animals, and rarely pay sufficient attention to the results of observations made on healthy human beings, and they ignore more or less completely its secretory functions.

The colon is slandered every day in the advertising columns of the popular press, which accuse it of sins it never commits, and the mass suggestions which results from constantly reading about the disastrous effects of intestinal intoxications results in most of the lay public and many of the medical

profession joining in these slanders. By promoting the sale of purgatives and encouraging the use of various other methods of irritating the colon, these slanders result in maltreatment. No wonder that the colon is unhappy.

Metz (34) continues in this philosophical vein with theory which can be found in any psychiatry text; that, man's brain has progressed more rapidly than his body, and we are becoming a race of people who are unable to cope with the vicissitudes of life whether social, political, economic, financial, marital, religious, domestic, or otherwise. Some are mild and others are severe. Our ideas and groups of ideas from infancy onward are charged with energy which constantly seek outlet and cannot attain it. Thereby the unconscious influences the conscious behavior and there arise complexes. From these arise conflicts between conscious and unconscious thought, or between opposing complexes within consciousness itself, so that the individual wavers between opposing tendencies and is in perpetual struggle with himself.

To turn to a more tangible trend de Bec Turtle (14) states that enterospasm never occurs as an independent neurosis in subjects otherwise normal and healthy. Gauss (19) takes a partial turn in the opposite direction, explaining that while the direct etiologic factor is an open problem, nevertheless it has been observed that usually the patient with spastic colon is a neurotic individual given to introspection, and that the hypertonicity of the colon is a local manifestation of a general spasmophilic tendency. Eggleston (16) thinks the

principal etiological factor is nervous instability, spasm and secretion of mucus being due to disturbance of the sympathetic and parasympathetic, and that the mucous type of colitis is an end form of the spastic type.

Hardy (21) is also of the opinion that emotional instability is frequently prominent, and that patients tend to be depressed, introspective, and even hypochondriacal. Such symptoms may be the result of spasm of the colon, but in most cases unstable nervous system, inherited or acquired, is the most important predisposing factor. He recognizes certain physiological and psychological types, notably the spare, lean type of individual, wiry of build, dark and sallow in complexion, with his anxieties and perplexities engraved on his features. In such a soil a number of different factors will affect the nervous and muscular co-ordination essential to visceral harmony. The most important of these are chronic constipation and the abuse of purgatives, unsuitable food, carbohydrate indigestion, allergic reactions, fatigue, cold winds, and tobacco.

Hartsock (41) classifies neurogenic patients in the following manner:

I. The first group is of those who are constitutionally inferior and who are entirely inadequate to cope with the ordinary problems of life.

II. The mentally active and ambitious, who have a poor physical constitution by hereditary or environmental influences, such as some nutritional problem, childhood tuberculosis, or other chronic illness during the developmental period. They

get along fairly well in life for a while, but do not realize the limitations of physical strength and their ambitions lead them into a breakdown with resulting intestinal symptoms.

III. The patients in the third group have a normal constitution but through sickness, repeated pregnancies, overwork, domestic and financial worries have become completely exhausted. These patients lose their appetites, suffer with indigestion, constipation, abdominal distress and often develop anemia.

IV. The 4th group includes those with sound constitutions, who are inclined to be erratic and are emotionally unstable. They are irritable, emotional, and suffer with cold hands and feet, indigestion, and alternate constipation and diarrhea.

Patients falling into either of these groups may seek medical advice because of intestinal symptoms. It is only by conscientious effort and sympathetic questioning that the real cause may be found in the background of a disturbed nervous constitution.

Ryle (47) believes spastic colon falls into the category of the visceral neuroses. Its association with certain physical and psychological types; its intermittent behaviors; its aggravation by circumstances which depress or harass the higher centers; and the absence of all evidence of an associated organic lesion, give credence to this view. The stimuli which may provoke and perpetuate an attack he lists as follows:

1. Local stimuli (purgatives, constipation)
2. Central nervous stimuli (worry)
3. External peripheral stimuli (cold)

The same irritability of plain muscle is often simultaneously manifest as bladder frequency and even bladder pain, especially in female suffers from spastic colon, in pyloric spasm, spasmodic dysmenorrhea, and in the vascular spasm which gives rise to "dead fingers".

So far, no one has described exactly what mechanism is at fault or how this condition is produced. Some imbalance of the sympathetic nervous system probably produces an instability of the gastro-intestinal tract so that it is more easily affected by irritative agents than the normal gastro-intestinal tract. The exact modus operandi of the nervous imbalance is then unexplained. The terms "vagotonia" and "sympatheticotonia" have been coined in an attempt to classify and describe certain types of physical constitutions in which one or the other of the two divisions of the sympathetic nervous system predominates (Pinto - 40). Spasticity, then, in the words of Morgan(37), may be due in some measure to a disturbance in the antagonistic forces, a preponderance of vagal stimulation causing motor activity, or to lessened irritability of the inhibitory factor, the sympathetics. In order that the contraction waves may be properly correlated and pass in a given direction and perform their proper function, this automaticity of the intestinal tract must be properly regulated.

Physiology

Pathology

Because the etiology is at least partially nervous in origin a working knowledge of the nervous supply of the large intestine should be had. The following is as described by Morris (38). The cecum, vermiform appendix and 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 plexus is derived from the aortic plexus. Therefore, the nerves supplying 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.

Within the gut wall the cells which cause the contraction waves are the nerve cells of the plexus of Auerbach (Gauss -19). The presence of receptor nerves for this myenteric reflex has not been definitely established, but Ranson (41) states that most physiologists assume the existence of sensory fibers in the gastro-intestinal mucosa.

Caehlinger (11) believes that the intestinal nerve plexuses may be injured in constipation by degenerative and inflammatory changes accompanied by a diapedesis of polymorphonuclear cells

and lymphocytes. This brings about an intestinal incoordination probably due to a neuritis. There are, therefore, two intimately interwoven elements : the defense reaction due to inflammation and contracture due to the neuritis. As time goes on, maybe for years, the nerve degeneration extends to the plexuses, and even to the ganglia, until it may become an independent disease. The intestinal lesions may have healed or been relieved but the enteroneuritis persists and does not yield to the usual therapy.

Keith (32) made a study of a number of spastic colons that Lane removed. He found patches of fibrosis in the muscular layer with some decrease of muscle tissue. He also found areas with a slight amount of round-celled infiltration, but none of these coincided with the areas of spasticity. He felt that this infiltration must not be considered as the causative factor of spasticity, but rather a sequence of it.

Sherrington (50) explains the hardening of the colon in the following manner. In their postural or tonic activity the tension of muscles or muscle fibres is largely independent of their length. Therefore a ring-muscle, for example, in the gut, may quite well assume a "cartilaginous" hardness and yet maintain a ring-shape of any desired lumen -- or if requisite might presumably obliterate the lumen. The case of the gut is quite analogous to the bladder or stomach; the musculature of these latter will exert no more pressure upon 200 centimeters than on 50 centimeters. They grasp their

content with the same pressure independently of the length of the muscular fibres, just as the hand can grasp an orange with the same light pressure as a walnut.

He also used the following simile: "Perhaps I can put the notion briefly by comparing the muscle fibre to a Plaster of Paris brick, which would set and unset at the direction of a nerve. If a six-inch brick were desired it flowed into a six-inch length and there set; if a three-inch, then it must unset and set again. If a nine-inch brick, conversely."

Wilson (56) believes that in these observations of Sherrington we have a perfectly satisfactory explanation of the hardening of the colon with which we are clinically familiar. In the normal bowel there must be perfect co-ordination of these two types of muscular activity, otherwise a conflict between them would result.

Seymour Barling (6) while performing a laparotomy, cites an experience showing an extreme case of spasticity. "While under examination (after the abdomen had been opened) a most interesting sequence of events occurred, which in my experience is unique. At one point the bowel suddenly narrowed to half its previous diameter; this narrowing spread up and down for three or four inches, the bowel in this area becoming the size of the index finger and quite as firm. It was so rigid it resisted flexion." We may follow this with a statement from Ryle (47) that in obstructive or irritative lesions of the colon there is increased peristaltic activity

with more or less rhythmical gripping due to the passage of waves of contraction involving successive groups of circular fibres. In spastic colon no such rhythmical movements are provoked, but the tonus or posture of the muscle fibres, including the longitudinal fibres, is modified in such a way as to impart a sustained shortening, with rigidity and narrowing of the lumen, to portions of the bowel wall often many inches.

In the cases of which we are now speaking we recognize the occurrence of lack of co-ordination in consequence of an abnormal amount of postural activity interfering with the normal peristaltic contractions (Turner - 17). In such a case as this the stronger of the two types of muscular activity will overpower the weaker -- an occurrence which, in the case of voluntary muscles, would be certain to give rise to pain, and the degree of pain would be proportional to the force of the opposing types of muscular activity.

The basis for the modern study of gastro-intestinal muscular tonus and reflexes was laid by Bayliss and Starling (7) when they reported that handling the intestine with the fingers "produced reflex inhibition of the whole length of the intestine". This reflex was abolished by section of the extrinsic nerves but was not influenced by section of the gut. It was, therefore, a reflex via the extrinsic nerves alone. No attempt was made to show the application of this reflex to gastro-intestinal physiology.

If mechanical stimuli has the above effect on the musculature of the intestines it seems possible that emotional stimuli should also register. Indeed it is a common observation that emotions have a direct influence on the functions of the gastro-intestinal tract. That there exists a psychic tonus of the alimentary tract is generally accepted by physiologists (Gauss - 19). In 1911 Cannon (10) discussed the existence of this psychic tonus. Alvarez (4) describes an instance where a tracing was being made of the intestinal movements of a man who had a fistula in the first portion of the duodenum. During the course of the record taking there was a sudden increase in the tonus of the patient with a corresponding increase in the amplitude of the rhythmic contractions without any apparent cause for the sudden change from the previous rhythm. Directly the observer heard the steam table come rumbling down the hall bring the patient's luncheon. The patient was hungry and had heard it first. In this instance, impressions coming in through the auditory and possibly the olfactory pathways had caused an accentuation of the tonus of the intestine. This is a concrete instance of the so-called psychic tonus.

Before attempting to explain abdominal pain and distress, which as a rule are present with spastic colon, on a straight reflex or nervous basis it may be well to mention gas which may or may not be present. Intestinal gas, unlike gas in the stomach, is almost entirely produced within the bowels themselves (Hunt - 25a). Large amounts of gas are normally

formed in the intestines -- a point worth telling to some hypochondriacal patients -- and most of it is absorbed. Abnormal fermentative processes in the large bowel may lead to considerable distention, flatulence, and discomfort. When it is realized that 1 oz. of cellulose, if entirely fermented in the gut, will produce approximately 10 litres of gas, the importance of these processes will be raised.

That epigastric distress is definitely related to a disturbed function of the colon is not generally recognized. Nevertheless, such influence on the gastric function is shown clinically in both organic and functional affections of the large bowel (Gilliland - 22). Farrel (18) produced a mild colitis with mustard oil in dogs and then tested their gastric emptying time and found it to be hastened while in severe colitis the emptying time was delayed. Kantor (29) found the gastric secretion reduced in patients with severe colitis without organic change. Smith (51) repeatedly reproduced hyperactivity and epigastric distress in dogs by inflation of the colon. This induced hyperactivity of the stomach, regardless of the intensity, was immediately abolished by atropine. Monroe and Emery (36) arrived at different conclusions, namely that whatever relationship exists between disorders of the lower intestinal tract and the stomach must rest upon some other basis. However, Ivy (27) states that a gastro-colic reflex has frequently been observed in man; and Percy (39) holds that distention of any portion of the gastro-intestinal tract will produce inhibition of every other portion of the tract;

the part stimulated will respond by contraction.

In explaining the pain of spastic colon Bayless and Starling (7) reached the conclusion that it is muscle sense in the hollow viscera and that it is caused by disturbance, mainly distention. Gilbert (20) explains it in the following manner. When gross errors in contraction or motility of the bowel occur there is an overstimulation or hyperalgesia of certain areas in the bowel itself. A tonic contraction ensues producing physiological obstruction and pain is produced by irritation of the plexus of Auerbach. The threshold of pain varies with the individual.

He continues, it will be readily seen that by changed motility most subjective symptoms, such as pain, fullness, pressure distress, sense of gas, disorders of evacuation, nausea and vomiting arise. One important point we wish to make is that when a distended viscus is given its maximum stimulus to contract, the sensation which the patient feels is the same as the sensation felt when the viscus is severely contracted. So fullness and gas are often complained of when contraction has occurred and when no gas can be demonstrated.

Symptomatology

It should be evident by the complicated nerve supply to the large intestine, having a central connection, a sympathetic connection, and a reflex system of its own, that symptoms produced by this disease are the most common, yet the most varied, due to individual characteristics encountered in clinical gastroenterology. Morris (38) divides the symptoms into three groups:

1. Those referable to the nervous system.
2. Those referable to the gastro-intestinal tract.
3. Those with symptoms referable to the cardio-vascular system. The cardiac symptoms vary from mild distress and vague pains in the precordium after eating to severe palpitation, shortness of breath, giddiness, and faintness. As a rule the temperature in these cases is subnormal.

Out of 200 patients of Jordon's (28) the following symptoms were listed and are arranged in a similar classification as above.

1. Gastro-intestinal (listed in order as to frequency)
 - a. Constipation -- dry or infrequent stools with catharsis.
 - b. Distress -- epigastric, entire lower part of the abdomen, right lower quadrant, left lower quadrant, right upper quadrant, left upper quadrant, generalized abdominal, low back.
 - c. Gas -- eructations, distention with distress, borborygmus, distention and eructations.

- d. Miscellaneous, including nausea, vomiting, regurgitations, loss of weight or being underweight, loss of appetite or sitophobia, cankers, fever in attacks.
2. Cardio-vascular. Palpitation, giddiness and faintness, dyspnea, "heart pain".
3. Nervous system. Headache, nervousness, easy fatigability and loss of vigor, urticaria.

From the literature reviewed it is quite apparent that the commonest symptom is that of chronic constipation. McMillian (33) adds that alternating diarrhea and constipation is common. The diarrhea is explained as follows: "Nature attempts to evacuate the stagnant fecal matter by secreting mucus in the bowel. The success of the attempt is very limited. X-ray examination with bismuth shows the latter portions of the large intestine become reduced in caliber by spasm, while the cecum and ascending colon dilate and remain full of stagnant matter. In the hepatic flexure region, fecal material is suspended in mucus; in the rest of the large intestine small portions of material are propelled through the thread-like caliber of the contracted bowel as far as the rectum, to accumulate there until voided. Thus there may be frequent liquid stools -- slimy from the pressure of mucus -- and yet extreme stagnation in the cecum and ascending colon. This paradox often leads to misconception. A patient seeks advice for chronic diarrhea, but is in reality suffering from severe constipation".

One of the leading complaints (Ryle -47) is usually of discomfort or pain in the lower abdomen. The discomforts are variously described as a feeling of stagnation or "stoppage"; as a "ball" or a "lump", or as a sensation "like a bar of lead"; The pain is usually a dull continuous ache, sometimes "gnawing" or "like a toothache", never rhythmical or griping as in the colic of purgation, acute enteritis, or intestinal obstruction, and even in the severe cases unlike the relentless, immobilizing pain of an acute inflammatory lesion. In a case of average severity the pain is at times troublesome enough to interfere seriously with work or pleasure, although it is noteworthy that sleep is seldom lost on account of it.

It is usually referred with accuracy to the part of the colon involved but not with segmental distribution as Wilson (56) believes it is who describes it in the following manner: "As most of the pain impulses enter the cord through the rami communicantes the pain must be of a referred or segmental character and felt in the skin area which is in relationship with the particular segment which receives the pain impulse. When, however, a part of the colon is sufficiently enlarged and tender to be palpable by the patient the pain may be accurately located in the part of the colon in which it arises."

Ryle (47) goes on to say that a common gesture is the application of the palm of the right or left hand to the corresponding iliac fossa, when the proximal or distal portions are affected. In the case of the transverse colon

the course of the pain is traced with a finger or shown with the ulnar border of the hand. Rectal pain is also recorded in a few cases. Some patients can only describe a vague lower abdominal "stomach-ache". With the pain there is often mental depression or irritability and physical inertia. Both onset and relief may be abrupt and occur for no apparent reason. The duration of the pain varies from an hour or less to many hours or even days.

Wilson (56) hints that an important diagnostic point in connection with pain of colon origin is its liability to occur at times when the colon is functionally active. Of these the most characteristic is the period between midnight and 4 a.m., when the colon is presumably preparing for the morning evacuation of the bowels. Colon pain is also liable to occur after meals and, if the transverse colon be involved, the muscular activity in the colon which would be set up by the vibration of a vehicle or by walking may originate colon pain.

Abdominal distress is another common symptom (Gauss - 19). The healthy person gives little thought to his abdomen, except on occasions such as when he is hungry. Abdominal distress and pain are quite likely to occur when there is already a centering of interest in the abdomen. All degrees of pain may then occur. Epigastric distress is sometimes encountered and occurs at variable periods after eating. However, unlike the pain of peptic ulcer it is not referred to a finger point

area and cannot be called definitely periodic. Gilliland (22) finds that gastric symptoms are prominent among the manifestations of irritable colon. Nausea is frequent as is also vomiting. Anorexia is common and in many instances quite marked and is frequently attended by disinclination to eat because of subsequent gastric distress.

Gas is an interesting consideration, as it is oftentimes a major complaint (Gilbert - 20). Gas in the stomach is swallowed, it usually lies under the diaphragm and seldom passes through the pylorus. Gas in the small bowel in the adult is uncommon. Gas in the large bowel is nearly always present. The gas usually arises from chemical changes in the bowel contents. Gas may be present in large quantities in disorders of circulation, apparently arising from the blood, as seen oftentimes in heart failure and pneumonia. The most interesting finding is that, in a majority of patients complaining of gas, the fluoroscope reveals no gas, but on the other hand a spasm where gas is felt. In other words, a hypertonic contracted viscus gives subjectively the same sensations as one distended.

The subjective symptoms vary markedly in different patients (Barker -8). It is often difficult to determine in a given case in how far they are due directly to the spastic constipation and in how far to an underlying psychoneurotic state associated with increased parasympathetic tonus. Hartsock (23) is under the impression that after the

original onset, the symptoms are so distorted and exaggerated by fears, anxieties and the various therapeutic efforts that the final picture does not depict the true situation; that as these patients present themselves to the physician their complaints are referred chiefly to the digestive and nervous systems. However, their complaints are usually legion, and that while real pain is infrequent other commonly associated complaints such as belching, gurgling sensations and noises and distress in one of the lower quadrants, bad breath, and coated tongue hold the limelight.

Barker (8) in considering the cardio-vascular system finds that in persons of markedly hypervagotonic constitution signs of increased parasympathetic tonus in domains other than intestinal may become evident. Thus gastric hyperacidity and pylorospasm are frequently observable; bradycardia and cardiac arrhythmias with precocious systoles are also common. One of his patients suffered from recurrent vagotonic heart block with syncopal attacks coincidental with some of his paroxysms of colopathy. Dizziness, transient diplopias, slight dysarthrias, and paresthesias in the lower extremities occasionally accompany exacerbations of the colonic spasm.

The most common type of mental disturbance (Wilson - 56) is depression, which may vary in degree (according to the severity of the case) from simple unhappiness up to severe suicidal melancholia. Some form of morbid anxiety is also very common, and its degree may vary from simply a tendency to over-anxiety or worry up to very definite phobias or

obsessions. Various types of suspicion are also very common. In children deficient power of application, inattention, and the lack of mental balance which characterizes the "difficult child" may be due to this ailment and be readily curable in a few weeks by simple treatment.

Objective Findings

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Diagnosis

Hartsock (41) introduces us to the physical findings of a patient with spastic colon with the blunt statement that physical examination generally shows little. The patient as a rule is not acutely ill, but gives evidences of emotional tension; he is introspective and self-analytical (Gauss - 19). A slight degree of secondary anemia may be present. The general nutrition is slightly below par, the tongue is coated, and the breath may be offensive; the blood pressure is usually low. The heart and lungs give no information of importance with reference to the disease. There (41) is usually a general abdominal tenderness, which is most constant in the epigastrium and in the right lower quadrant, where distention of the cecum secondary to a spastic colon frequently may be felt. This is the reason that appendectomy so often is performed with poor results. Special examination should include a careful search for foci of infection.

The one physical sign of the disease which is found constantly is an unusual palpability of some part or parts of the colon. Ryle (47) describes it as an unduly hard cord of small calibre, depending upon the tonic rigidity, shortening and straightening of the affected loop. The colon can often be felt in the left iliac fossa in healthy persons or in patients without colonic disease, and simple palpability in this region cannot be regarded as pathological. It is doubtful if the colon is ever palpable in its proximal or transverse

portions in perfect health. In the condition of spastic colon, however, either of these portions may be felt as a firm rod or sausage-like tumor. This is sometimes, but by no means always tender. Gauss (19) finds that the transverse colon is the least tender part of the colon.

Gilbert (20) considers the proctoscopic examination to be highly important as it enables one to judge the condition of the mucous membrane, obtain smears and remove pus and mucus for microscopic examination. Sigmoidoscopy (Ryle - 47) is often both difficult and painful on account of spastic narrowing of the rectal and sigmoid lumen which is further stimulated by passage of the instrument. Fluctuations in the degree of spasm can be witnessed simultaneously with variations in the pain complained of by the patient. The mucosa looks perfectly healthy. One can derive great satisfaction from being able to tell a patient positively that he has or has not something the matter with his rectum or sigmoid. A positive statement after a proctoscopic examination impresses an intelligent patient highly and will add to the confidence of the patient and the standing of the doctor (Erlich - 17).

A good pelvic examination by a skilled gynecologist is helpful (Gilliland - 22). A cystoscopic study of the genito-urinary tract with pyelograms is occasionally needed to exclude this region. In other words, it is essential that the examination be sufficiently comprehensive to exclude every type of functional or organic gastro-intestinal or

genito-urinary disease (Thompson - 52).

McMillian (33) states that X-ray examination is usually of very great service in the diagnosis of this condition. Both the opaque meal and the enema are of use. More information, he believes, is obtained from the former, because the condition is one of deranged function and not an organic lesion. Examination following an opaque meal may show the following:

The stomach may or may not show evidence of pyloric spasm. At the five-hour examination the stomach may be empty and the head of column be in the cecum or ascending colon, a perfectly normal picture, or there may be a gastric residue with the head of the meal well on in the colon. This would indicate an initial hypermotility followed by a hypomotility, due perhaps to a reflex pyloric spasm caused by the passing of the mixture into an irritable colon. When all the meal has reached the large bowel the greater part may be found to be massed in a dilated cecum and ascending colon, while the remaining portion of the bowel may be contracted.

The opaque mixture in the transverse and descending portions of the colon and in the sigmoid will be segmented or broken up into boli, giving rise to the scybalous form of stool. Subsequent examinations will show the spasticity more marked, without any progress or forward movement of the contents of the bowel.

With the opaque enema narrowed areas may be demonstrated,

usually at the juncture of the sigmoid and descending colon, and in the first part of the transverse portion. The opaque mixture generally passes around the colon in a small stream and when it is completely filled the cecum and ascending colon will be found to be dilated, while the rest of the bowel is small, especially narrowed at the site of the spasm, often simulating very closely annular new-growth. The colon is emptied poorly with evacuation and often presents a "stringy" appearance. This is explained by Jordan (28) as a failure of the contracted colon to relax after passage of its contents. Occasionally the whole bowel may be devoid of haustral markings, producing the so-called "lead-pipe" appearance, or it may be present in the descending portion and the sigmoid a "spiked" or saw-toothed appearance, which has been associated with diverticulosis, and have been in the habit of described as a spastic colon with a tendency to diverticulosis.

Jordan (28) outlines the roentgenologic diagnostic criteria as follows:

1. The length of the colon is estimated on the position of its segments and on the presence or absence of redundant loops. A low cecum, an abnormally high hepatic or splenic flexure, and a high straight sigmoid may be congenital variety of normal, but these conditions may also be the result of loss of tone and stretching of the colonic muscle.

2. The rate of filling of the normal colon is between two and three minutes, with a head of pressure of $2\frac{1}{2}$ feet. Spastic

contractions which interfere with the passage of the enema are absent, and the rate of progress of the head of the enema is constant and uniform throughout the entire course of the colon. The normal colon empties only about one half to three fourths of its contents in the evacuation that occurs during the hour after the administration of the enema.

3. The haustral markings appear in the normal colon during the filling with an opaque substance, sparsely, and not entirely regularly, in the sigmoid and descending colon; regularly, and at about the same intervals as in the serial films, in the transverse colon. Their depth is approximately one fourth of the diameter of the colon.

4. The diameter of the filled colon varies, and is estimated as normal by its proportionate relation to other structures.

5. When the normally irritable colon is filled with barium, there is a sensation of urge of defecation by no severe colicky distress. Entire absence of sensation indicates hypoirritability, while severe distress and colicky pains indicate hyperirritability.

Ryke (47) believes that less is to be gleaned by X-ray examination than might be supposed. In the first place, the spastic state is intermittent and may not coincide with the examination. In the second place, a barium enema, which is commonly used by preference to the barium meal in colonic cases, may by its gradual introduction and gentle distention overcome existing spasm. In the third place when views are taken after evacuation of the bulk of the meal or enema it

is necessary to distinguish the appearances of a normal but partly emptied segment from a segment with a spastic narrowing of its lumen.

Examination after a barium meal is more likely to give positive evidence. In extreme cases the affected length of bowel appears as a thin thread or streak of barium, sometimes with a sharp line of demarcation from the better filled portions. Normal haustrations, deepened with lesser degrees of spasm, become obliterated when the spasm is very pronounced.

Metz (34) is under the opinion that diagnosis can be made principally by examination of the stools. These are small, hard, and lumpy and do not resemble the recognized normal stool which is about the size, shape, and consistency of a peeled ripe banana. Stool examination (Morris - 38) presents the constant presence of mucus in great or less amounts. There is a disturbance of the intestinal flora with the general marked diminution of the gram-negative aciduric bacteria. Blood, occult or microscopic, may be present. The stool has a very characteristic sour odor and shows fermentation by presence of gas bubbles on the bottom and sides of the jar. It is well to remember that the patient should be placed upon a standard diet, such as Schmidt's for three or four days before any stool examination.

Complete gastro-intestinal and chemical studies should be routine procedure (Hartsock - 23). They are of distinct psychic benefit and frequently disclose unsuspected lesions.

Achlorhydria is not infrequent and hypoacidity is the rule, but sometimes very high acidities occur and this information is very valuable from the therapeutic standpoint. Gastric analyses in 177 of 200 cases reported by Jordon (28) show the following:

Achlorhydria in 26 cases

Hypochlorhydria in 17 cases

Normal acidity in 112 cases

Hyperacidity in 25 cases

Pinto (40) states that gastric analysis and urinalysis show normal findings in an uncomplicated case. Routine blood studies usually show an anemia of the hypocythemic, normocytic, normochromic type (Hartsock - 23). The basal metabolic rate is usually low in spite of symptoms which suggest hyperfunction of the thyroid gland. In many cases the low metabolism is the result and not the cause of the asthenia.

Differential Diagnosis

If the underlying physiological factors of spastic colon are understood it is comparatively easy to fathom just why the differential diagnosis is so important. According to Sherman (49) it is estimated that 70 per cent of the patients who consult the man doing general medical practice complain of symptoms referable to the gastro-intestinal tract.

The better trained physician has arrived at a point where he recognizes certain definite organic diseases such as cholecystitis and cholelithiasis, peptic ulcer, appendicitis, carcinoma in its various sites, and ulcerative colitis. He feels that, if the patient will co-operate, organic disease should be diagnosed in the great majority of cases, when present. Having done so, there will still be a large number, a very considerable percentage depending upon the point of view and training of the individual physician, who will be classified as functional abdominal distress, nervousness, hysteria, constipation, fatigue, neurosis, colitis, allergy, etc. As time goes on more and more syndromes are gradually being recognized, removed from the neurosis waste basket, and finding relief with proper management. The rationale of some of this treatment is still very obscure, and although empirical to a certain degree while awaiting further research, it would seem to give much relief to the sufferers. Relief of distress, is, after all, part of a physicians function in life.

This approach to differential diagnosis is patterned after that of Ryle (47).

Appendicitis, acute and chronic. Jordon (28) found that in 200 cases 56 or 23 per cent had had previous appendectomy. In simple spastic colon there is no pyrexia, guarding, vomiting, or cutaneous hyperalgesia. The previous history, the patient's psychology, inspection of the stools, routine laboratory procedures, and X-ray if indicated generally establish the diagnosis. In simple spastic colon the interrogation, particularly in regard to the nature, duration, and localization of the pain, and careful palpation along the course of the colon are usually adequate.

Duodenal ulcer may be simulated because of associated pyloric or gastric spasm with food relief, and because the colonic pain itself, although differently situated may develop late after meals and be relieved by food. If there is any suspicion of ulcer as an alternative or additional diagnosis full investigation should be advised. There has been quite frequent reference to this syndrome (spastic colon simulating peptic ulcer) in the medical literature in recent months (Sherman - 49). It is a syndrome which is fairly constant in its main features, namely, abdominal distress, coming on after food, but without the characteristic pain of ulcer. Nausea is frequently an outstanding symptom. The tenderness is most marked over the colon and the colon can usually be palpated. The patient does not respond to medical ulcer management although the roentgen findings often suggest duodenal ulcer (Smith - 51). The patient responds to a low carbohydrate diet plus full doses of belladonna, and elimination of the cathartic

habit. Smith believes the differentiation can be generally made by a careful detailed history. Even though the distress may disappear for a time after meals, relief is seldom obtained by taking sodium bicarbonate except when the eructation of gas is induced. Furthermore, there are present symptoms referable to the bowel which influence the pain in the epigastrium, even though the latter may dominate the clinical picture.

Diverticulitis, in the left-sided cases particularly must be borne in mind, but the type of individual affected is usually different, the victim of diverticulitis being commonly well nourished and less commonly neuropathic. The inflammatory tenderness and thickening of pericolicitis and pyrexia during exacerbation are distinctive. X-ray examination with barium enema should be made in case of doubt.

Attention should be called to a group of cases which are frequently mistaken for malignant growths (Aaron - 1). When there are symptoms present of any intestinal disease it is not difficult to diagnose the character of such a tumor-like resistance (feces). It is entirely different when there is a spastic contraction of the colon simultaneous with other symptoms such as constipation or irregular movements, pain and disturbances of the general condition. Under such circumstances we are likely to suspect a malignant growth when the condition is one of spasticity.

Colonic carcinoma (47) has frequently been feared in cases of spastic colon because the patient himself or his physician has discovered a hard lump in the course of the colon.

The smoothness of the tumor, its sausage or rod-like formation, its mobility in the case of the ascending or transverse colon, its variations in size and hardness, or complete disappearance under observation or in a hot bath are helpful points of differentiation. The absence of obstructive symptoms on the one hand, and of diarrhea or abdominal discomforts are reassuring features. Radiological, sigmoidoscopy, chemical and cytological examinations help.

In differentiating carcinoma from spastic colon Erlich (17) arrives at the following conclusions:

1. Spasm of the rectum and sigmoid must be thought of in connection with every suspected malignancy in this region.
2. X-ray diagnosis of spasmodic contraction is extremely unreliable.
3. X-ray examinations must be repeated in suspected cases of malignancy of the rectum and sigmoid.
4. In the study of constrictions of the large intestine fluoroscopic examination during the flow of the opaque mixture through the colon is more valuable than roentgenograms.
5. A proctoscopic examination should be made by an experienced proctologist.

Intestinal obstruction. It is possible for colospasm (Turner - 53) to give temporary symptoms of intestinal obstruction. This is clearly a much more acute and more localized form of spasm than is generally seen; also it generally is accompanied by definite evidence of colitis. The condition is

comparable to asthma and spasmodic stricture of the urethra. The stools contain much mucus and often blood. There is constipation alternating with periods of diarrhea, and all the other symptoms usually associated with a chronic colitis. In the more severe cases fecal vomiting and visible peristalsis may also be present. This is far more acute than the classical type of spastic colon with which we are concerned and obviously belongs in the realms of the acute abdomen. Objective findings which make the diagnosis of acute abdomen questionable plus history should obviate the condition.

Ovarian or tubal disease. At one time it was not uncommon for operations on one or both ovaries, but especially the left, to be performed for spastic colon. The fallacy probably arose from the aggravation of colonic pain which sometimes accompanies the period and from the association with dysmenorrhea.

Colitis. In the more serious disease an ill and frequently anemic and wasted patient gives a history of watery diarrhea and passing blood and mucus, commonly with a febrile, dysenteric onset. The diagnosis is completed with the sigmoidoscope.

Fecal accumulations can be disposed of with enemata.

Gas (Hunt - 25a). Attacks of colonic spasm due to excessive gas production and irritation may occur most markedly in the sigmoid, in the splenic flexure, in the hepatic flexure, or in the cecum, resembling respectively diverticulitis, angina pectoris or pleurisy, gall-stone colic, and appendicitis. Gas in the splenic flexure is indeed a most important cause, with gastric distention, of pain around the heart, palpitations,

and dyspnea. This causes the well-known gastro-cardiac syndrome or, as it is better put, the gastro-colic-cardiac syndrome.

The attack is very apt to come on when lying down, and may be quite sudden. The diaphragm may be pressed upon and actually develop some degree of spasm, so that the breathing is short, rapid, and even painful. The pressure upon the heart causes extrasystoles and alterations in rate. The distinction from pleurisy, intercostal neuralgia, or true angina pectoris may not be easy, but two points in particular are of assistance:

1. The attack is eased by pressure (as the patient generally discovers) and by the passage of flatus.

2. It is eased by change of position, massage, and movement.

Neurasthenia and hypochondriasis may appear appropriate labels in some cases of spastic colon, but they do not embody an adequate explanation of the pain and physical findings.

Treatment

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Course

The successful treatment of spastic colon depends chiefly upon the full co-operation of the patient (Gilliland - 22). That these cases are difficult to cure is well known because the individual frequently becomes discouraged and returns to his injurious habits, thus aggravating the condition. The prognosis (Morris - 38) is uncertain. Patients can be cured and in all cases relieved of their symptoms, but the treatment is exceedingly painstaking and long-continued. Success requires a great amount of patience on the part of both the patient and the physician.

While many pathological conditions must be corrected by surgery these should be directed definitely toward the removal of infected material and tissue or lesions which induce abnormal motor stimulus (Gilbert - 20), and most patients will do better without surgical procedures which grossly disturb the continuity and the normal physiological mechanical sequence. It may be said that in neurotic individuals persistent irritability of the colon associated with spasm of the anal sphincter and the sigmo-recto junction, distended and mobile cecum, and tenderness over the abdomen, but without a history definitely pointing to an acute infection, the removal of an appendix, for example, is certain to make the condition worse (Russ - 46). In the presence of the terrifying experience associated with illness, nervous individuals revert to the primitive. They become frightened children without power to reason. Spastic colon patients belong to this group, and should not, except

in cases of emergency, be subjected to surgery without the advice of the competent diagnostician and internist.

Hardy (21) divides the principles of treatment into those dealing with the nervous instability, the general health, and the treatment of the colon. Psychotherapeutic measures play a large and important part in the treatment of these disorders. A careful inquiry into the history, followed by a painstaking examination, with the help, if need be, of an X-ray examination, and in some cases a sigmoidoscopy, gains the confidence of the patient and enables the reassurance as to the absence of diseases such as colitis and cancer to carry its full therapeutic effect. The nature of the symptoms and their essential dependence on fatigue should be explained in simple language, and faulty ideas as to bowel habits corrected.

Judicious and sympathetic inquiry should be made into the conditions which fostered the disorder -- the home environment and upbringing, conditions of work, lack of occupation, the solicitude of anxious friends. The word neurotic should always be avoided.

Treatment of the general health consists of a suitable apportioning of rest, occupation, and recreation, planned to suit the degree of fatigue and the mode of life. Mental occupation is most desirable in those who have none and whose minds are overshadowed by the sorrows of the colon. Adequate sleep is essential, and is often wanting in these patients, either from nervous exhaustion or bowel discomforts. Phenobarbitone in small doses is very useful.

In treatment of the colon constipation, the faulty use of purgatives, and the relief of abdominal symptoms are the factors which chiefly need attention. In some cases this is all important and all-sufficient, but in others, and especially in the introspective types of intestinal neurotics, it should be reduced to the least possible interference, and chief reliance be placed on psychotherapy with appropriate mental and physical relaxation.

The diagnosis of constipation must be established, and this is best carried out by the barium meal. It is a good plan to begin treatment by an injection into the rectum at night of warm olive oil, removed by an enema of plain water or normal saline in the morning. Soap should never be used for this purpose in any disorder of the colon, as it is far too irritating. All purgatives must be stopped and their place taken by the regular use of lubricants such as liquid paraffin or simple emulsions of paraffin and agar-agar.

Rowel (45) advocates the following therapy for spastic colon as well as for other conditions of colon involvement: The technic of this colonic therapy is very simple -- to tell. It consists of passing a soft rubber tube, 52 inches in length, into the cecum or ascending colon, where drainage is instituted by means of irrigation, and medication is applied. Ordinary tap water is used. As to the irritating effect of this method he continues that as to spasticity the sigmoid is the hardest point of the bowel to go through. It was not aggravated

or irritated by colonic irrigation, rather the reverse was the case. In practically every instance in which there was difficulty in getting through the sigmoid in the first few treatments it was easily possible later on, which indicates that the irritation is relieved mainly by the hot solutions which are used as a final step in the canal irrigation.

The following are the principles Gauss (19) advocates in treatment:

1. It is desirable to reduce the irritability of the colon.
 2. Reduction of the irritability of the colon must be accompanied by a reduction of the general irritability of the central nervous system.
 3. The colon having acquired faulty habits must be educated, or as the case may be, re-educated to function normally and periodically.
 4. To accomplish these ends, the colon must be put into a state of rest or relaxation as far as it is physiologically possible to do so; and to accomplish this, the individual must be put into a state of rest or relaxation, after which the attempt is made to re-educate the colon to function normally.
- The following therapeutic agents are available : bed rest, a bland, non-irritating diet, intestinal lubrication, drugs (anti-spasmodics and general sedatives), local applications of hydrotherapy or physiotherapy to the abdomen, and psychotherapy.

While it is possible to go into the diet to great lengths Hardy (21) sums up the matter in that the diet must be generous, varied, and well balanced; and free from whole meal and

rye bread, coarse oatmeal, and the root vegetables, unless pulped and passed through a sieve. Many patients will have cut down unduly their food intake on account of dyspepsia, and in these cases the cause of the indigestion must be explained and they must be encouraged to tolerate temporary discomfort in the process of re-education of the colon. Abbott (49) believes that the rationale of the fruits and vegetables consists in a regular dosage of a laxative material, and that subsequent regulation of the dosage will be associated with the proper consistency of the stool.

In some patients the allergic relationship of foods may be a causative factor (Gilbert - 20) in which case the causative factors must be eliminated in addition to a diet of bland, non-irritative foods.

In spasm due to gas production (Hunt - 25a) treatment is chiefly directed towards improvement in the abdominal circulation by exercise and massage, diet, and relief of constipation without irritant purgatives. Gradually increasing walking, golf, swimming, riding, etc., should be ordered if possible, but when this is inadvisable abdominal exercises may be useful, with massage of the colon. Deep-breathing exercises are valuable, since the diaphragm movements not only provide a form of massage to the colon but also tend to improve the portal circulation.

Rowell (45) is under the impression that spasticity of the sigmoid, and other localized inflammatory conditions of the

lower bowel, can also be treated successfully with diathermy and galvanism, by means of electrodes applied through the sigmoidoscope. This method may also be used by reactivating the upper and lower defecation reflexes, whose function is so often impaired or entirely lost. Ultra violet rays are useful (Morris - 28).

In addition to rest and the removal of any cause the most satisfactory method of treatment is by anti-spasmodic drugs, especially by belladonna and hyoscyamus (Turner - 54). The pain gradually disappears and hardening of the colon diminishes both in extent and degree, the iliac colon generally remaining palpable after spasm has disappeared from other parts of the large intestine. The condition, however, has a great tendency to reappear, in some instances seeming to be brought on by worry and overwork.

Wilson (56) finds that the treatment of these patients is a very simple matter if the ailment be recognized in its early stages. All that is necessary is to give a mixture containing tincture of hyoscyamus in 20 mm. doses, with 10 grains of salol made up with mucilage and chloroform water, three times daily, after meals, together with a diet from which salads, green vegetables, all uncooked fruit pulp and "roughage" in general is eliminated.

The role that belladonna plays in the relief of symptoms is apparently very important (Sherman - 49). Undoubtedly it relieves spasm and in that way restores the normal intestinal gradient. At least if one accepts Alvagez's (2) conception

that nausea is usually a symptom of reverse peristalsis, then the disappearance of nausea following belladonna is quite logical. However, Lurje (30) in a series of over 50 experiments on cats found that while atropine injected into the blood or cutaneously caused relaxation of the spastically contracted large intestine it had no effect when directly introduced into the stomach or intestine, concluding that atropine should be administered intravenously or subcutaneously.

Rose (43) reports brilliant results obtained with a new anti-spasmodic, syntropan, used in patients with spastic colon. It was well tolerated, harmless, and patients liked to take it since they did not fear any disagreeable after or by-effect. Benzedrine sulphate is at the present time receiving considerable attention as an anti-spasmodic but until further investigation has been reported nothing definite can be stated.

Conclusion

Brevity, without infringement on its priority right as the source of wit, is also the soul of emphasis. Hence:

1. Spastic colon is a separate, distinct, clinical entity.
2. Definite etiological and physiological explanations are lacking, but enough is known that
3. Diagnosis from subjective and objective findings can be made.
4. Treatment is successful if co-operation and patience of both the patient and physician is had.

"If we have succeeded in conveying to you the suggestion that the study of the general motility of the bowels may be of more importance than the looking for organic defects, possibly surgical, we have accomplished our purpose."

Gilbert (20)

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