Psychosomatic consideration of the gastro-intestinal tract with special reference to mucous-colitis"

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PSYCHOSOMATIC CONSIDERATIONS OF THE GASTRO-INTESTINAL TRACT
WITH SPECIAL REFERENCE TO "MUCOUS COLITIS".

--BY--

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SENIOR THESIS
-1940-

PRESENTED TO THE
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COLLEGE OF MEDICINE
INTRODUCTION

It is nearly universally conceded by every medical man who does any amount of clinical work that there are many patients who enter his office that suffer no demonstrable organic lesions upon which to explain the symptoms presented. In no special field of medicine is this more true than in gastroenterological work. That disturbances of the bowel may be caused by the emotions is no new conception, since references of such circumstances can be found back in biblical times.

These early references were, however, mostly observations of easily objective dysfunctions or hyperactivities of the bowels during strong emotional crises. As time went on the growing wealth of experience increased the powers of observation among men, who directed their lives more and more exclusively toward medicine, with the result that subjective dysfunctions were recognized as due to emotional states which were less acute and more chronic in the nature of emotional strains and tensions.

At the present time this conception has come so far that it is now believed that some of the minor dysfunctions of the bowel may be caused by nervous conditions, all of which are found only by close questioning of the patient by all the available resources of the medical and scientific world. This condition has so completely been considered to exist that it
has been given the name "nervous indigestion" by one author (Alvarez\textsuperscript{4}).

As a further degree of specialization a psychosomatic concept has developed which is, in a way, a study of the inter-relations of the psychological and physiological aspects of all normal and abnormal bodily functions, and thus leads to the integration of somatic therapy and psychotherapy. Along these lines considerable work has been done with the result that the more subjective symptoms are more closely correlated to the more obscure mental conditions; and both are more closely related to the somatic characteristics of the patient. In this paper special attempts are made to follow these lines of thought but restricted where possible to the more specific syndrome of Mucous Colitis rather than to too general a consideration of the dysfunctions of the gastro-intestinal tract. I believe that what is said here of mucous colitis could, with modifications and in a general way, be said of many associated functions of the gastro-intestinal tract as a whole.

Speaking in generalities there is much tendency for medical men to dissociate the psychic and the somatic aspects of the patient. Thus, thru a study directed primarily at the correlation of the two, it is hoped that a much broader understanding of the individual as a whole will result. Individual study of individual cases, then, is the goal toward which this paper is intended.
HISTORICAL REVIEW

It is interesting to note some of the references made to the association of bowel dysfunctions and strong emotions. Sullivan\(^1\) reports several of these references and says that so well known was the direct association of strong emotion and defecation that many references to it can be found in folklore and in works of various profane authors, both classic and modern. He further tells that Sydenham in his Epistolary Dissolution, in 1682, wrote, "Hysteria on the stomach will create continued vomiting; on the bowels, diarrhea".

The effect of the psyche on the colon seems to have concerned Van Swieten, for among other cases he cites this one: "I have seen a man who had taken a sufficiently nauseating draught, not only shudder and be nauseated, but also frequently purged, when he merely saw the cup in which he had taken the medicine".\(^2\)

In the 19th century many writers have referred to the effect of mental states on the bowels, particularly the purging effect of placebos and bread pills when they were considered by the patient to be cathartics.\(^2\)

Da Costa\(^7\) recognized still another condition in soldiers of the civil war. He had made quite a study of the irritable heart and in the paper on that subject he listed diarrhea as one of the principal "etiological factors" contributing to the
causation of cardiac irritability.

Da Costa also described the syndrome of mucous colitis for the most part just as it is known today. Further, he related this condition to states of emotional tension.

White22 brings the historical review fairly well through the nineteenth century, with reference mainly to mucous colitis. The subject of mucous colitis was further studied by the dynamically minded clinicians of Europe. White says, "The earlier of these writers, Nothnagel, Marchand, and von Leube emphasized the concept that the disease was really a secretory and motor neurosis of the intestine, while their immediate followers, Einhorn, Boas, Epstein, and Schutz disagreed to a certain extent with this simple concept. All the latter tended rather to emphasize the role of inflammatory processes in the colon."

Soon following this, normal colons from patients who had suffered from severe "colica mucosa" were demonstrated at autopsy. Even the histological picture was normal. From this it became recognized that pain and mucous could occur in the absence of specific lesions, and consequently mucous colitis was considered to be on a nervous basis. The concept of the disease then was that mucus appearing in excess and the inflammatory condition present in the bowel was due to nervous causes. On the other hand, some of these investigators considered the possibility, since many patients suffered with preexisting
constipation, that the mucoid secretion might be induced by the irritation of the hard stool. The pain was thought by some to be due to the 'peeling off' of the mucous from the intestinal walls.

By this time many writers had reported similar cases in which the symptoms of mucous colitis were definitely connected with the neurotic tendencies of the patients. This led to increased interest in the manifestations of lability of the autonomic nervous system encountered in these patients and to the frequency with which severe anxiety was encountered. 22

Thus it can now be seen that the disease "mucous colitis" was becoming a definite entity and that the nervous character, with special reference to the part of the autonomic nervous system in the disease, was being recognized.

Contributions to the diagnosis of this disease were made by many of the later clinicians. Radiological information on the disease increased and it was noted that the sigmoid colon could often be palpated as a firm, hard mass in the left lower quadrant of the abdomen. From this sprung the concept of the "spastic colon" and the "dyschezia" of Hurst. These were attempts to explain the palpable sigmoid, the hard constipated stool, and the pain of these patients. 22

During the "World War, it was again observed that mucous diarrhea and "soldier's heart" often occurred in the same person.
This observation renewed interest in the symptom syndrome and much literature appeared in this country on the disease, but few real contributions were made on the subject.

For a time the question of food allergy in this disease, seemingly, was overemphasized. Then through the work and influence of Cannon, studying the physiological manifestations of fear and rage in the animal, there was developed a broader interest in the etiology of the disease. \(^2\)

Alvaraz, \(^3\) with his conception of the "gradient of irritability of the gastrointestinal tract," did much to explain the symptoms of the gastrointestinal tract and to give a working basis for the effect of the associated psychiatric behavior of the patients. Still more clear and enlightening was his idea of "nervous indigestion." \(^4\) These works were powerful influences on the clinicians in interesting them in the psychosomatic disorders of their patients.

In following White's summary, it was found that later studies of the mucous colitis syndrome, when made, included specific references to the emotional problems which were presented in these patients. Bookus, Bank, and Wilkinson made a study of 50 cases and noted that, though most of the patients were not frankly neurotic, all of them were emotionally unstable. They also concluded that during the exacerbations of the disease the emotions of the patients were "near the surface", and that the
tendencies most commonly seen were depression, hypochondriasis, and asthenia. So it was that the emotional element of the disease was being brought more to the foreground in the study of mucous colitis.

Of the more recent writers there has been a tendency to broaden the field somewhat and connect the emotional etiology to a wider variety of symptom-complaints. Sullivan studied the psychogenic basis of "ulcerative colitis" and considered that there definitely was an emotional element linked with the etiology of that disease. Jordan and Kiefer further broadened the condition, calling it the "irritable colon". This seems to include somewhat more than mucous colitis. In their series of 1000 cases of "irritable colon", however, they report that 62% of the cases showed associated symptoms of neurogenic origin. They also presented a diagnostic criteria which closely parallels the syndrome of mucous colitis.

In contrast to the foregoing authors it might be well here to include the feelings of Bossler on the subject. He considered all these reactions to show definite pathology to which, he believes, too little attention is sometimes paid. He believes that no such thing exists as the "neurologic" or "irritable colon". He further says about the neurologic colon, "This is not a colitis at all but simply a hypersensitivity of the nervous system in which the phenomena in the colon is a
reflex peripheral explosion, and if a real colitis exists, it invariably is due to one of the other types mentioned. "A bowel does not weep mucous for a neurological reason any more than the respiratory tract does."

Some writers even considered this condition to be a more or less physiological problem, for Sullivan20 says that Crookshank wrote: 'I often wonder that some hard-boiled clinician does not describe emotional weeping as a "new disease", calling it paroxysmal lachrymation, and suggesting astringent local applications, avoidance of sexual excess, tea, coffee, tobacco and alcohol, and a salt free diet with restrictions of fluid intake; proceeding, in the event of failure, to early removal of the tear-glands. This sounds of course, ludicrous, but a good deal of contemporary medicine and surgery seems to me to be on much the same level.'

This then brings mucous colitis with its neurogenic basis pretty well up to the present. Many authors have gone far in trying to explain a multitude of symptoms on a purely neurogenic make-up of the individual, while others give the neurogenic side of the patient hardly any consideration at all. In short the extremes are found on both sides of the question. This would suggest therefore that actually much work is yet to be done and especially is this true here, because of the difficulty in presenting objective proof of the relationship of
the psychic and somatic elements in the human being. Somewhere, and probably between these two extremes, there should be found a more nearly true picture of the relationship of these two conditions in the clinical patient.

It is the purpose of the discussion that follows to attempt to present as fairly as possible the psychosomatic concept of the disease process with special reference to the particular disease of mucous colitis as it is now known.

This psychosomatic concept, to quote the editors of *Psychosomatic Medicine*, "studies the effect of the emotions upon the visceral organs and the resulting symptomatology of the dysfunction."

**ETIOLOGY**

In beginning the discussion of the etiology of mucous colitis it is of value first to dissociate the organic and the functional aspects of the individuals make up, and then later to correlate the two in a discussion of the psychosomatic aspect.

What, then, is the organic make-up of these patients? Are there any similarities between the patients which present this syndrome of Mucous Colitis which might be of aid in understanding and recognizing these patients?

White\(^{22}\) was unable to establish any correlation of the anthropological builds of the patients which would be of any definite significance. There were leptosomic, pyknic, and mixed
builds in almost equal numbers in all of his series. He did, however, consider the "physical status" of the patient to be apparently of great importance from the point of view of athletic training. The syndrome was rarely encountered, he concluded, among persons doing hard manual labor, but on the other hand, was frequent among sedentary workers, a point which was also noted by Bargan. Jordan, however, disagreed with this idea of physical "softness", but it must be remembered that her patients were for the most part private, and also that her conception of "irritable colon" was somewhat broader than the syndrome of "mucous colitis" studied by White. Since nowhere could she find any author who had actually tested these patients for physical fitness, no definite conclusions can be drawn other than the fact that this might be an element in etiology.

The role of heredity in these cases does not seem to have been given much consideration by the authors. In reviewing several of the case histories it appears that the family history was essentially not remarkable in the majority of cases. In those cases, however, in which the authors had considered the family history of significance, the principle recordings were those of allergies, i.e., "urticaria in the family", "brother had asthma", etc. Allergies form the biggest group of symptoms mentioned in respect to family history. This may be a worth while observation since there are still those allergists who
consider mucous colitis to belong in their field. The only other significant factor in family history amounted to "having a nervous aunt", or similar references.

The age distribution as reported by White\textsuperscript{22} reaches a peak with the onset of symptoms being between the 20th and 30th year of life, with a quite high incidence between 10 and 20, and a quite sharp decline from 30 to 50 years. Jordan\textsuperscript{14} reported age incidence in 1000 cases in which the peak came at a later period, but it must be remembered that her conception of the disease was somewhat broader in scope. Her figures are quoted below:

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Age in years</th>
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<tbody>
<tr>
<td>under 20</td>
<td>50 - 59</td>
</tr>
<tr>
<td>20 - 29</td>
<td>60 - 69</td>
</tr>
<tr>
<td>30 - 39</td>
<td>70 &amp; over</td>
</tr>
<tr>
<td>40 - 49</td>
<td>-17%</td>
</tr>
<tr>
<td></td>
<td>-7.3%</td>
</tr>
<tr>
<td></td>
<td>-0.7%</td>
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</table>

Since there is a fairly consistent agreement between the age incidence of initial onset it may be of significance, since this is the time when the individual comes to rely upon himself for existence and meet the problems of adjustment which would cause an already unstable nervous mechanism to revolt.

As far as the sex distribution goes it is in universal agreement that it is far more common in the female. White's percentage was about 66 per cent, and Jordan quoted
hers as 77 per cent.

One other type of patient should be mentioned and that is Alvarez's (1) "Constitutional Inadequate". Unfortunately this person has been endowed with a constitution which is inadequate to withstand the stress and strain of life. When the first bumps come along he has too little reserve with which to meet them, with the result that the individual, through no cause of his own, collapses under his load.

Functional Consideration of the Patient. Alvarez says, "The digestive tract is so exceedingly sensitive to nervousness, worry, anger, and fatigue, that of all physicians the gastroenterologist must be the one most concerned to learn something of the patient's temperament, of his sorrows, and his problems of life, in home, and office, and shops."

In the whole series of gastrointestinal symptoms due to what must be considered functional causes, there necessarily must be some underlying psychosomatic basis unique to the patient suffering such distress. For these reasons a psychiatric consideration of the patient is reasonable with the hopes of finding enough correlation of material to allow classification and aid in the diagnosis of the patient.

Considering most of the neurotic types encountered
in mucous colitis, White has summarized them as follows:

Phobic symptoms

In the more neurotic groups:
- crowds: 48%
- high places: 43.5%
- closed rooms: 35%
- others: 30.4%
- none: 35%

Among these there was an average of 1.5 phobic symptoms per patient.

Compulsive symptoms

In the more neurotic groups:
- Upset by crooked pictures: 73%
- Checking doors: 50%
- Fussy about clothes: 59%
- Reading letters twice: 59%
- Checking lights: 36.4%
- None: 13.6%

Among these there was an average of 3 compulsive symptoms per patient. On the controls the average was only 1.5%.

Formal psychiatric diagnosis:

- tensional state: 49%
- anxiety and tensional states: 14%
- psychasthenia: 14%
- manic-depressive psychosis: 8.8%
- neurasthenia: 3.5%
- hysteria: 1.7%

No one formal psychiatric diagnosis was attempted.
Tension is common to all. Hysteria is most uncommon.

Sexual relations:

<table>
<thead>
<tr>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>satisfactory</td>
<td>satisfactory</td>
</tr>
<tr>
<td>82.3%</td>
<td>33.3%</td>
</tr>
<tr>
<td>unsatisfactory</td>
<td>unsatisfactory</td>
</tr>
<tr>
<td>16.7%</td>
<td>66.7%</td>
</tr>
</tbody>
</table>

Sexual dissatisfaction was most frequent among the females. The dissatisfaction varied from mild indifference to strong aversion, however.
Personality characteristics encountered:

- tensions 96%
- resentment 92%
- sensitivity 87%
- anxiety 82%
- depression 74%
- guilt 67%
- dependence 64%
- rigidity 50%

"Note the frequency of tension, which was often accompanied by resentment, anxiety, or guilt."

Depressive symptoms:

About 96% of the patients examined with mucous colitis were reported as having prominent depressive symptoms.

Individual depressive symptoms:
- brief mood swings 80%
- A. M. Depression 68%
- diurnal swing 60%
- suicidal thoughts 56%
- prolonged mood swings 40%

The average patient presented 3.3% depressive symptoms, while the control group suffered only 21%.

Whether or not these figures are accurate is not the important thing. The important thing is that such neurotic tendencies do exist to a greater extent in these patients suffering with mucous colitis.

One finding should be emphasized, and that is that there was a tensional state to be found in every one of the investigated cases. These tensional states varied from acute states due to thwarting, to the chronic states due to
long continued maladjustment to a disagreeable environment. 22
Sullivan 21 found also that all of his series presented tension-
al states, by which he specifically says that he refers to the
"inability to throw off the effects of an emotional episode."

Psychosomatic consideration of predisposition.--It has
been shown that emotional states are found to be present in all
cases of mucous colitis. How it is to find in what way emotion
may influence the functions of the gastrointestinal tract caus-
ing the resultant symptomatology.

Jordan 14 believes that the fundamental factor is an
imbalance between nervous and muscular apparatus of the colon
resulting in disturbances in mechanics, secretion, (to a lesser
degree), which come to the consciousness of the individual by
various symptoms of abdominal discomfort, gaseous distress and
abnormal defecation.

It might be well then to examine how the imbalance
might come about. First an anatomical relationship of the nerves
to the colon should be considered as a basis for this study.

"To a large extent the digestive tract is autonomous
or facultatively autonomous. The mechanisms that produce the
several types of muscular activity, and cause food and its resi-
dues to be moved from the cardia to anus must be sought and
studied primarily in the walls of the stomach and gut." Alvarez 3

"The extrinsic nerves serve useful purposes, and there is no
question about the fact that the bowel functions better when
They are intact. "Alvarez (3).

The gastrointestinal tract has principally three innervations. There is an intrinsic or autonomous nerve supply, and the extrinsic supplies of the sympathetic and parasympathetic of the autonomic nervous system.

White says, "In a general way it might be said that stimulation of the parasympathetic system produces increased tone and peristalsis with relaxation of the sphincters, while stimulation of the sympathetic produces relaxation of muscle tone, diminished peristalsis and spasm of the sphincters."

Through these innervations which are partially autonomous and partially sympathetic and parasympathetic the motions of the large intestine are brought about. Some of these movements are common to the entire gastrointestinal tract while some of them are limited to the large intestine.

"Those which are merely local representations of the several gastrointestinal activities consist of: 1) progressive constricting bands passing along the gut, peristalsis. 2) progressive constricting bands passing cephalad, or antiperistalsis. 3) alternating constricting and relaxing movements remaining essentially in one place or segmentation."

White (22).

White goes on to say that the antiperistalsis is an emergency motion of the small intestine, but in the
proximal half of the large intestine it is the rule, for
the purpose of keeping the fecal contents in the cecum.
One other motor function is limited to the colon as a normal
phenomenon, and that is mass movement. Mass movement con-
sists of associated contractions of the proximal half of
the colon which transfers in the course of a minute or less,
a large part of the fecal contents to the descending colon.
It is a movement which normally occurs only once or twice
daily.

When the musculature of the colon is insufficient
to produce this movement there is constipation and the colon
is considered atonic with the resultant atonic constipation.
If, on the other hand the mass movement is blocked by a
swam in the transverse colon the constipation is called
the spastic type.

The reverse of this condition could also be true.
Here an overanxious and irritable proximal colon could rap-
idly and often expel its contents into the transverse and de-
sceding colon because of the relaxation of the physiolog-
ical sphincter near the hepatic end of the transverse colon,
with resulting diarrhea.

It now becomes necessary to determine how the
autonomic innervation of the bowel can bring about the changes
necessary to produce this kind of disorder. White (22) re-
ports, "The rectosigmoid and descending colons are well supplied with autonomic fibers from the parasympathetic sacral outflow. Stimulation of the nerve endings in this region with cholinergic substances in many instances produces frank spasm. Locally applied, pilocarpine and physostigmine consistently produce it. Administered by mouth acetyl-b-methylcholine yields some reduction in calibre."

Summarizing White's discussion he says that the proximal end of the colon is probably without any parasympathetic innervation.

By the use of cholinergic drugs, White was able to show mucosal changes in the rectosigmoid; the very findings which are characteristic of mucous colitis, consisting of injection, spasm, and mucous secretion. This then lead him to believe that these people had an over-active parasympathetic system. He says, "One clinical finding which conflicts with that expected on the basis of autonomic innervation is spasm of the anal sphincter. A moderate degree of anal spasm occurs in a certain percentage of persons with mucous colitis. This should not be expected inasmuch as sympathetic overstimulation should produce spasm of the sphincter, while parasympathetic dominance should allow the sphincter to relax."
Since it is impossible clinically to differentiate patients into the "sympathicotonic" and "vagotonic" types, the clinical manifestations of sympathetic hyperactivity and those due to parasympathetic overstimulation were listed with the frequency of their occurrence in both the diarrhea group and the constipation group.

The clinical signs of autonomic nervous system disturbances as considered by White were 1) dilatation of the pupil, 2) ptism or apism, 3) sweating, 4) exaggerated pilomotor response, 5) sighing respiration, and 6) sphincter spasm. There was also less easily demonstrable changes presumably due to alterations in function of the autonomic system, such as heartburn (esophagospasm according to Jones), loss of appetite (flattening of the gradient of the upper gastrointestinal tract, Alvarez), and the intestinal cramps, mucous secretion, and bowel disorders of the mucous colitis itself.

Flynn (9) reviewed twenty cases in which he gave special reference to the associated somatic reactions. The record of his findings is seen below:

The most common complaints

<table>
<thead>
<tr>
<th>Complaint</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatigue</td>
<td>90%</td>
</tr>
<tr>
<td>Digestive complaints</td>
<td>90%</td>
</tr>
<tr>
<td>Excessive perspiration</td>
<td>90%</td>
</tr>
<tr>
<td>Coldness of the extremities</td>
<td>90%</td>
</tr>
<tr>
<td>Tachycardia</td>
<td>80%</td>
</tr>
<tr>
<td>Dyspnea</td>
<td>70%</td>
</tr>
<tr>
<td>Headache</td>
<td>70%</td>
</tr>
<tr>
<td>Precordial discomfort</td>
<td>60%</td>
</tr>
<tr>
<td>Insomnia</td>
<td>60%</td>
</tr>
</tbody>
</table>
The physical examination most commonly showed:

- Low blood pressure: 100%
- Sugar tolerance definitely increased (low curve): 90%
- Moist skin: 85%
- Tenderness LLQ: 85%
- Low BMR (below -5): 85%
- Cold extremities: 75%
- Cyanosis or "marbling" of extremities: 70%

Background of the patients:

- All were unhappy.
- All were dissatisfied with life.

Since these complaints were, to some extent at least, dependent upon the imbalance of the autonomic nervous system, Flynn attempted to treat the patients symptomatically with parasympathetic and (or) sympathetic drugs. Some, he says, were definitely cured. Those that were unaided by the drugs were later given psychotherapy with the special attempt to help these patients obtain their objectives. Then all of the symptoms cleared up. As a whole the reactions which he found were the reverse of adrenalin and seemed to act more like those of pilocarpine, muscarine, and choline in the animal.

In summary he concludes that the symptoms, physical signs, and laboratory data are similar to those which one would expect from stimulating the parasympathetic division of the autonomic nervous system. He further concluded, "It is suggested that the menacing influences which may be surmounted
give rise to an emotion in which the predominant physical manifestations are due to stimulation of the sympathetic divisions of the autonomic nervous system; and that those which appear insurmountable give rise to an emotion in which the predominant physical manifestations are due to stimulation of the parasympathetic division of the autonomic nervous system."

White in his studies attempted to prove the relation of the autonomic system to disease processes in the colon by the artificial experimental production of lesions. In this experiment observations were made upon the recto-sigmoid mucosa of a group of normal medical students between the ages of twenty-two and twenty-six. Irritants and drugs affecting the autonomic nervous system were used. Some of the drugs were applied topically to the mucosa while others were given by mouth over a period of days during which time serial observations of the mucosa were made. The mucosa was examined particularly for changes in the following characteristics: 1) Injection; the degrees of injection, its location in relation to the rectal valves and to a certain extent the duration of the change. 2) Mucous: the appearance and character of the secretion. 3) Dilation of the veins: the degree and amount of engorgement of the larger and smaller veins and venules. 4) Granularity and wrinkling of the mucosal surface: the degree of roughness of the mucosal surface as evidenced
by the reflections of light and the multiplicity of fine folds.

The results of the experiment are summarized as follows:

1) Under normal conditions there was little deviation from the normal. It was noted that on the first examination more mucous than was expected was found. With subsequent examination, however, when there was less apprehension most of these minimal findings had disappeared.

2) Following the administration of a soap suds enema the findings were slight. There was a slight increase of mucous and slight increase in the amount of injection but all these findings were far less than those seen in cases of mucous colitis.

3) Following the application of highly irritant salt solution (used for the purpose of testing the effect of a non-specific irritant on the bowel), there consistently was a localized area of brilliant injection which was covered by a definite secretion of clear, moist mucus. No remote effects, however, were observed.

4) Following acetyl-beta-methylcholine chloride applied topically the findings were similar to those of the hypertonic salt solution used, but more transient. When given orally in massive doses, consistent changes in the colon mucosa were found. These consisted of changes in the rectosigmoid which were very similar to those observations in the second
stage of mucous colitis. In general, these changes were
generalized injection of bluish-red color which was most
marked between the middle and upper rectal valves; the sur-
face of the mucosa was wrinkled and velvety rather than
glairy; and real spasm was present in two of the cases. Sub-
jective symptoms were also noted in all of the subjects
who took the drug over a period of days. These symptoms
included a tendency toward diarrhea or constipation, abdom-
inal cramps and uncomfortable low-back pain.

5) Following the local administration of pilocarpine
hydrochloride dramatic changes were found. These consisted
of immediate bluish-red injection with a brilliant, glairy
mucoid surface in the vicinity of the topical application.
This was followed by the rapid formation of moderately coarse
invaginations of the mucosa and, in the course of 3 to 5 min-
utes, of complete occluding spasm of the lumen.

6) Following the local application of physostigmine
sulphate striking changes were again produced, though these
were less rapid than those of pilocarpine. At first there
was a cloudy diffuse swelling of the mucosa, the surface
then became generally glossy and injection was less prominent
than pallor. Later they caused complete spasm.

In discussing the similarity of these lesions to those
seen in mucous colitis it must be said that none of the lesions
produced were the exact replicas of the disease. The characteristic
changes, however, were the most similar following the administration of pilocarpine and acetyl-beta-choline chloride. "There is no characteristic change in mucous colitis which is not represented by the changes observed following the administration of these drugs in normal individuals."

From this point it would be advisable to attempt the experimental production of lesions by artificial stimulation of the autonomic nerves to the colon. Unfortunately, however, this presents many difficulties. In the first place the filamentous nature of the nerves is a mechanical obstruction, and no single nerve trunk is available to stimulate. In the second place, as Alvarez says, there are probably chemical mediators between nerves and smooth muscle so that the responses of smooth muscle to electric stimulation of nerves are too erratic. He says also that even physiologists commonly forget that the effects of the normal stimuli, which probably flow as a gentle stream of impulses from the higher centers, are far different from the traumatizing stimuli which come from the usual faradic coil.

One other type of experimentation, however, is of mention here. This is the experimental production of lesions in the upper gastrointestinal tract by stimulation of centers in the brain. Experimenters have stimulated areas in the hypothalamus and produced a number of body changes, among which are
Masserman\textsuperscript{16} says that since the discovery of the hypothalamus as a visceral center, a multitude of separate functions have been ascribed to it. Excitation of the structure effects a rise in blood pressure, arteriolar contractions, dilation of the pupils, elevation of the hairs, increase in blood sugar and circulating adrenalin, dilatation of bronchioles, increased heart rate, contraction of the bladder, uterus and gastro-intestinal tract, secretion of tears and saliva, regulation of body temperature and sleep regulation.

Most of these reactions it can be seen are those which are usually attributed to the overstimulation of the parasympathetic system. All of them are also considered autonomic nervous system reactions.

How this might be brought about is discussed by Grinker\textsuperscript{13}: "The hypothalamus is connected with the cortex indirectly through the thalamus and also by direct afferent and efferent fibers, with the peripheral autonomic system and its lower center, and with the hypophysis. Thus, it is concerned with several complicated functions all of which are based on its primary capacity of maintaining the stability of the organism's internal milieu as the effector agent of the instincts. Related directly to the hypophysis and indirectly to other glands of internal secretion the hypothalamus \textsuperscript{1}) regulates
endocrine functions and their interrelations: 2) regulate and integrates conservating autonomic functions. 3) is concerned with teleologically defensive and protective reactions which we term emotional expressions and 4) influences the activity of the cerebral cortex in regulation of the degree of wakefulness and excitation. "He further says that not only does the hypothalamus integrate all of visceral and autonomic activity but it functions as a balancing mechanism between parasympathetic and the sympathetic divisions. The parasympathetic system is associated with anabolism, lessening the efficiency of the sensorimotor system and operating in the interest of individual organs. It furnishes the brake upon activities, conserves resources and reserves and builds up tensions. The sympathetic increases functional output and is concerned with catabolic activities in massively discharging internal tensions.

Thus it may be that the imbalance of the individuals autonomic nervous system lies in the region of the hypothalamus. If so, it could be that the instable character of the hypothalamus was inherited and for that matter also the direction toward which the imbalance leaned, i.e., toward the sympathetic or parasympathetic. On the other hand it could be that the instability of the hypothalamus was inherited and the side of the autonomic nervous system toward which it showed preference was due to some external environmental change due to emotional
crisis in the lives of these people. Looking at this from the other direction it could also be that since all these patients with mucous colitis tend to show reactions suggesting overstimulation of the parasympathetic nervous system, that the most vagotonic individuals are less likely to meet their problems directly and so build up a tensional state in that manner.

It is not out of line here to consider the possibility that purely emotional reaction of the individual can produce definite and permanent pathological change. Sullivan\textsuperscript{20} says that the mechanism by which emotional disturbances can produce ulcerative colitis and by which the ulcers can be made to disappear by psychotherapy is, in the light of our present day knowledge a matter of speculation. Our own working hypothesis is that the diencephalon whips the liquid content into the large bowel and perhaps the increased digestibility of the ferments ulcerates the mucosa from prolonged hyperactivity of nervous diarrhea.

Alexander\textsuperscript{5} writes that it is being more and more recognized that nature known no strict distinction between organic and functional diseases. Gradually it is being conceded by most physicians that functional disorders of long standing may lead to serious genuine organic disorders based on visible anatomical changes, just as the heart hypertrophies from long standing hyperactivity of a person under tension.
Further there is much evidence to show that just as the pathological micro-organisms are specific and have a specific affinity to certain organs so also the emotional conflicts are different from each other and are liable, in accordance with these differences, to afflict different internal organs.

Inhibited rage seems to have a specific relationship to the cardiovascular system, and dependent-help-seeking tendencies as recent psycho-analytic studies show, seem to have a specific relationship to the functions of nutrition. Again a different and specific conflict between sexual wishes and dependent tendencies seem to have a specific influence upon respiratory disturbances.

**Precipitating causes in the etiology.** Since it has been seen that the disease of mucous colitis does not come on the individual until in the second or third decade of life it must be that there is some exciting cause which precipitates the disease.

Fantus (8) says that an emotional storm may precipitate such a crisis.

This emotional crisis may be more or less acute and the disease develop more suddenly. Or on the other hand it may be due to a long continued struggle of a patient in a situation of maladjustment and here the disease seems to come on more suddenly and be of a more chronic state. As has already been shown all the patients with mucous colitis had tension states. In many of the cases the patients them-
selves noted the relation of the appearance of the symptoms with some emotional distress suffered.

Summary of the etiology. In summarizing the etiology it is best to say at the first that many of the factors are not definitely provable, and that many of the other factors although they seem to be of significance are difficult to evaluate.

The syndrome may fairly be said to result from hyper-irritability of the sigmoid colon, and all factors which contribute to this hyper-irritability may be said to be etiological.

As far as physical status is concerned no definite conclusions can be drawn though it is probable that these people with mucous colitis are not the rugged athletic type.

Heredity may be of significance since many of the patients had relatives of nervous dispositions, and also since there was considerable family association with allergic reactions. These allergic reactions appear to be of the parasympathetic reaction type and it is evident that mucous colitis patients show parasympathetic prominences.

Age incidence may be of importance since the onset of symptoms is usually in the age when these people are attempting to make new adjustments to the environment; i.e., they are becoming more dependent on themselves.
Sex of the patients is probably important from the standpoint that most of the mucous colitis patients are females and they, because of their dependence are more naturally of the parasympathetic reaction types.

Many of these patients are probably constitutional inadequates and have inherited inferior body structures which do not meet the requirements of their social expectancies.

The more common emotional instabilities encountered in these patients were: tensional states were common to all of the patients. There were 1.5 phobias per patient. There were 3 compulsive symptoms average per patient. As a whole sexual relationships were unsatisfactory with the females. Some personality difficulties were present in all of the patients. About 95 per cent were depressed.

Psychosomatically it was seen that the cause of the increased irritability of the colon was due probably to a vegetative imbalance. The digestive system has long been known to be very sensitive to the effects of emotions. Through the effects of the nervous innervation of the colon the movements of the large intestine are fairly well explained. Then by experimental production of symptoms lesions similar to those found in mucous colitis were produced. These were produced by cholinergic drugs and the conclusion drawn was that overstimulation of the parasympathetic nerve supply to the colon must be responsible for the lesion in the patient.
with mucous colitis. Attempt was then made to find other signs and symptoms of parasympathetic overstimulation in the patient. Many of these were found and correlated well with the picture of general parasympathetic overstimulation in the entire series of cases. On the other hand there were mixed effects which were somewhat confusing, but one is not to expect that parasympathetic overstimulation in one place in the body necessarily means parasympathetic overstimulation over the entire body.

From here theories (with some experimental background) were advanced to show how the individual might through his nervous system, develop gastrointestinal lesions or even a vegetative imbalance. The hypothalamus without doubt plays a very important function in the control and balance of the emotions and autonomic nervous system and consequently on the personality of the patient.

Allowing all this to be present in the patient there must yet be some immediate reason for developing these symptoms. In light of the evidence from case histories and psychoanalysis, etc., it is most probable that a severe emotional crises is the precipitating cause, and this may be more or less acute and is more often a chronic tensional state.

THE LOCAL PATHOLOGY

Since the conception of the disease mucous colitis is different among the different authors, there is some in-
consistency in the literature on the extent of the local pathology. The majority of the authorities, however, agree that the colon is not ulcerated nor inflamed but mucous, moisture and gas are the only definite findings by the sigmoidoscope. (Alvarez\textsuperscript{2})

White\textsuperscript{22} divided the disease into 3 stages. His sigmoidoscopic findings in the 3 stages are listed below:

Stage 1. Dilatation of the smaller veins.
Slight generalized injection.
The appearance of fresh glairy mucous
and a greater or lesser degree of spasm.

Stage 2. (which represents a longer duration of the disease)
The generalized injection is more marked.
The veins lose their identity in the surrounding field.
The mucous is drier and more tenuous.

Stage 3. (A still more severe stage)
Here the tenuous mucous peels off the mucosa with difficulty, leaving small granular indentations in its wake.

There is a certain degree of spasm connected with all three stages.

The microscopic appearance because of the low mortality connected with this disease has not been very extensively studied. A study was made by White, however, of several cases seen at autopsy by Mallory of the Massachusetts General Hospital. From this study he is impressed with the similarity of the picture to that of bronchial asthma. The goblet cells could be seen to be secreting large amounts of leukocytes. There was no evidence of muscular hypertrophy.
It might be well here to quote Bassler mostly because of his skeptical viewpoint toward mucous colitis. He says, "All these reactions show definite pathology to which too little attention is sometimes paid. No such thing exists as the "neurologic" or "irritable colon"." Although he says this he does not say what, if any, pathology he has ever found in this condition.

THE CLINICAL SYNDROME

Symptoms:

Because of the neurotic character of mucous colitis it is not possible to present a clear-cut list of symptoms. For that reason a list of the more common complaints is quoted below from Jordan's series of 1000 cases.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constipation (use of laxatives)</td>
<td>80%</td>
</tr>
<tr>
<td>Cathartics or enema habit</td>
<td>73%</td>
</tr>
<tr>
<td>Diarrhea (constant or alternating)</td>
<td>9%</td>
</tr>
<tr>
<td>Distention</td>
<td>80%</td>
</tr>
<tr>
<td>Eructations</td>
<td>59%</td>
</tr>
<tr>
<td>Nausea</td>
<td>23%</td>
</tr>
<tr>
<td>Vomiting</td>
<td>18%</td>
</tr>
<tr>
<td>Malnutrition</td>
<td>15%</td>
</tr>
<tr>
<td>Loss of appetite</td>
<td>13%</td>
</tr>
<tr>
<td>Shifting abdominal distress</td>
<td>20%</td>
</tr>
<tr>
<td>Epigastric</td>
<td>6%</td>
</tr>
<tr>
<td>Lower abd.</td>
<td>7%</td>
</tr>
<tr>
<td>Upper abd.</td>
<td>5%</td>
</tr>
<tr>
<td>R.L.U.Q.</td>
<td>7%</td>
</tr>
<tr>
<td>L.L.U.Q.</td>
<td>4%</td>
</tr>
<tr>
<td>L.U.R.Q.</td>
<td>4%</td>
</tr>
<tr>
<td>R.U.R.Q.</td>
<td>4%</td>
</tr>
</tbody>
</table>

Associated Neurogenic symptoms:

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>48%</td>
</tr>
<tr>
<td>Nervousness and fatigueability</td>
<td>36%</td>
</tr>
<tr>
<td>Vertigo</td>
<td>31%</td>
</tr>
<tr>
<td>Palpitation</td>
<td>10%</td>
</tr>
<tr>
<td>Depression</td>
<td>3%</td>
</tr>
<tr>
<td>Tinnitus</td>
<td>6%</td>
</tr>
</tbody>
</table>
Laboratory findings:

Chemical

- Achlorhydria: 10%
- Hypochlorhydria: 14%
- Normal HCl: 45%
- Hyperchlorhydria: 14%
- Undetermined: 17%

X-ray

- Distress with filling: 15%
- Rate of fill increased: 20%
- Rate of fill decreased: 5%
- Redundancy: 26%
- Hypertonicity: 27%
- Hypotonicity: 30%
- Combined hypotonicity and hypertonicity: 7%

As an example of the common syndrome of mucous colitis, the summary of a case history is presented below. (From White)

The patient was a 34-year-old, white, single, female.

Chief complaint: Mucous diarrhea of 10 years duration.

Family History: Father had colitis and diverticulitis. One sister had a tendency toward colitis. One brother had many gastrointestinal upsets. There was a strong family history of allergic diseases.

Past History: Diphtheria at 4 years of age, scarlet fever in childhood, mild choreoretinitis at one time, and urticaria on many occasions. Appendectomy, nodule removed from thyroid. Frequent attacks of tensional headache, excessive salivation and cold hands and vomiting all of which symptoms came on at times of emotional tension.

Present Illness: Suffered constipation first at age 19, which was associated with occasional attacks of lower abdominal cramps. At 24 years began to suffer alternating constipation and diarrhea which became worse at time of her father's death when she was 28. Two years later she became better but had remission 6 months before hospital entrance. This time she suffered repeated attacks of severe lower abdominal pain with the passage of large,
mucous casts. In the early stages these had been stained with blood. She noticed aggravation of symptoms with excessive exercise. She also noticed that emotional tension caused things to clamp down and was followed by constipation, which in the course of a few days would run into diarrhea. The fall of her mother's bonds or an address before strangers would serve as an adequate stimulus.

Physical Examination: Red-headed woman of leotomisique lying in bed comfortably and not obviously anxious. Pupils measured 2 mm. in diameter. There was no evidence of tremor, dermatographia, clamminess of the hands or sweating. Reflexes were normal. The descending colon was palpable but neither hard nor tender. (The patient said, however, that it felt like an iron rod on palpation during attacks.)

Special Data: Urine, blood and stool examinations were entirely negative. X-ray of chest, abdomen and entire gastro-intestinal tract were negative. Visual fields showed slightly enlarge blind spots consistent with healed choreoretinitis.

Psychiatric Observations: The patient was a 34 yr. old spinster daughter of the leading practicing physician of an Allegheny mountain town. Her mother died when the pt. was 4, and the father remarried 2 years later. Pt. had always had trouble with her stepmother. In adolescence she attended a fashionable boarding school. At 19, and in the third year of an art course she became involved in a conflict over marriage. At this time her constipation and cramps started. At 28 years the patient’s father died and the patient was left to support her stepmother whom she violently disliked. She felt that her stepmother was selfish, wasteful and had no concept of the difficulties of conserving and administering an estate. The stepmother was in poor health and spent much of her time at a spa. This situation and the fact that the patient felt confined to the Alleghenies caused her to feel that her career as an artist was thwarted. Her symptoms became definitely worse.

In a very rigid way she felt that her future in art lay in a teaching career, but this she felt (equally rigid) required a Ph.D. which would require two more years in a University, and because of her present situation this was out of the question. Balked in this single track objective, she felt that life for her was utterly sterile. She did not appear tense, but on the contrary discussed her emotional problems in an intelligent, cool manner. Her speech was effusive, and she was greatly concerned over the condition of her father’s estate, her career, and her
ambivalence toward her stepmother whose demands stood in her way. She suffered from no delusions, hallucinations, or ideas of reference. Her thinking was logical but very rigid. Her energy output was good. Her instinctual life was probably not strongly heterosexual.

The patient did not discuss any frank phobias or compulsions. However, her thinking was obviously obsessive. She was temperamentally cold. She was very passive in making decisions and extremely dependent upon the opinions which might make or mar her estimate of herself. She was conscientious and felt strongly her obligations to her stepmother and to her brothers and sisters.

DIAGNOSIS

In making a diagnosis of mucous colitis it is usually the rule to examine that patient carefully for any organic lesions which might produce the symptoms. Failing to find any gross lesions the patient is considered to be neurotic and with the symptoms the patient presents, the diagnosis of mucous colitis is made. In many cases, however, it is better to make a more active diagnosis. Alvarez says, "As a rule physicians should not make a diagnosis of functional disorders by eliminating organic causes. It should be an active diagnosis made because the symptoms complained of are typical of neurosis or because an obviously, fussy, worrisome, fidgety, weepy, constitutional inadequate, or a half crazy patient tells his story and behaves during the examination in a typically "neurotic way"."

The diagnosis then is based on the type of neurotic history, the neurotic way in which the patient behaves during the examination, and the character of the patients complaints.
Organic pathology should, of course, be ruled out as a means of verifying the diagnosis.

Jordan lists as diagnostic criteria: A history of one or more of the following symptoms: Dysfunctions resulting in either constipation or diarrhea, abdominal discomfort or pain, which may be shifting or localized, gaseous distention, and eructations, nausea, vomiting and loss of appetite and weight. In addition to these gastro-intestinal symptoms, there are not infrequently found (62% in this series) symptoms of neurogenic origin, such as nervousness, easy fatigueability, palpitation, precordial pain, headaches, depressions, vertigo and tinnitus.

DIFFERENTIAL DIAGNOSIS

The differential diagnosis should not be difficult, but many cases of mucous colitis have been misdiagnosed. The most common missed diagnosis in White's experience are listed below: (These were the initial diagnoses in sixty cases of mucous colitis. In some instances the initial diagnosis were incorrect, in others they became secondary diagnoses.)

<table>
<thead>
<tr>
<th>Initial diagnosis</th>
<th>Cases</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colitis</td>
<td>22</td>
<td>37</td>
</tr>
<tr>
<td>Psychoneurosis</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>Gall bladder disease</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Peptic ulcer</td>
<td>2</td>
<td>3.3</td>
</tr>
<tr>
<td>Appendicitis</td>
<td>2</td>
<td>3.3</td>
</tr>
<tr>
<td>Irritable heart</td>
<td>2</td>
<td>3.3</td>
</tr>
<tr>
<td>Addison's disease</td>
<td>2</td>
<td>3.3</td>
</tr>
<tr>
<td>Carcinoma of stomach</td>
<td>2</td>
<td>3.3</td>
</tr>
<tr>
<td>Initial diagnosis</td>
<td>Cases</td>
<td>Percent</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------</td>
<td>---------</td>
</tr>
<tr>
<td>Pelvic inflammation</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Myxedema</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Diaphragmatic hernia</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Asthma</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Angina pectoris</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Allergy</td>
<td>1</td>
<td>1.7</td>
</tr>
</tbody>
</table>

**COURSE OF THE DISEASE**

The disease begins more or less insidiously. As the pathology increases the symptoms increase or visa verse and go through the three stages described by White. The early symptoms are mild and as the disease advances they become more severe. Since there are no real distressing symptoms until the disease has progressed to a rather late stage the services of a physician are not sought until six months to several years after the onset. Furthermore because of the frequent remissions the patient does not always feel the need of attending to his discomforts. The course of the disease depends greatly upon the type and chronicity of the emotional maladjustments of the patient.

Prognostically the people do not come to a bad end with mucous colitis. No fatalities are considered to result from the disease. The disease will, though, continue with its remissions and the patients continue to suffer and must learn to live with their bowels.

**TREATMENT**

Alvarez says, "If the patient with a sensitive colon
is ever to be really helped, she must be made to realize that she has a peculiar nervous system which will cause her discomfort off and on perhaps for the rest of her days. It will cause the bowel to get sore whenever she gets excited or upset nervously or when she is very tired or when she is coming down with a cold, or perhaps when she is badly constipated or takes too many laxatives or when she eats some particular food to which she is sensitive." The most important thing is that these patients must learn to live with their bowels. They must accept the suffering as much as cannot be relieved by their constant watchfulness of their diet, social life, and bowel habits.

Alvarez goes on to say that with experience the tendency is to mention ever less and less the silent gall stones, ulcers, and ameba in a patient with neurotic tendencies, and the diagnostician should come to insist from the beginning that the difficulty lies in a neurosis which will not decrease by tinkering with any one or two organs inside the body. The removal of a tonsillar tag, hemorrhoid, or even gallstones will never change a frail, complaining, jittery, psychopathic girl into a healthy woman no matter how long these people try.

Having reassured the patient that there have never been any fatalities in cases of these kinds, and after having told the patient the nature of the disease and its probability
of recurrence, about all of the psychotherapy that is necessary has been done, unless it is the physician's desire to help the patient secure their thwarted objectives.

Surgery in these patients is never indicated. It only adds to the patient's discomforts.

Symptomatic treatment does, however, seem to be of definite value. Here the patients may be given the cholinergic or sympatheticomimetic drugs for the purpose of attempting to restore the lost vegetative balance of the patient. Tincture of belladonna is the most convenient antispasmodic, inasmuch, as it can be given in gradually increasing doses to tolerance. Benzedrine as a sympatheticomimetic substance has been used but with little effect.

Sedatives are of great value in that they give the patient relief from the spasm and colic, and also in that they relieve, to some extent, the anxiety of the patient.

Regulation of the bowel, both by bowel habits and by the use of liquid petrolatum, etc., are indicated in these patients, especially where there is a hard constipated stool.

SUMMARY

This discussion, compiled from the works of various authors, attempts to show particularly the psychosomatic aspects of the disease, Mucous Colitis. Through this it has been shown that mucous colitis is thought to be a physiological disorder
of the colon brought about by the parasympathetic nervous system.

Certain etiological conditions seem to give the patient a predisposition to the disease. Most significant of these are physical softness, allergy, fatigue, and emotional instability. A vegetative imbalance appears to be the most immediate underlying factor. This imbalance is always on the side of parasympathetic overstimulation. This theory was supported by experimental evidence as well as clinical evidence.

Emotionally, these patients have a tendency to be the dependent type who have difficulty in meeting their problems actively, as would be expected in the vagotonic type of individual. Persons with these characteristics readily build anxiety states in situations of emotional conflict. Because of the nature of these emotions, these tensional states tend to become chronic. When this happens, the long continued minor dysfunctions of the colon become dysfunctions of a more permanent type and show definite pathological changes.

It would be expected that these patients would show other somatic characteristics of parasympathetic over-stimulation. Although, these somatic reactions of the autonomic nervous system are somewhat mixed, they are, nevertheless, those which would be expected in a vagotonic individual.

It is seen then, that chronic tensional states in a
patient predisposed to a vegetative imbalance can, under emotional strain, develop changes in the autonomic centers which would cause parasympathetic dominance. When this occurs over a considerable period of time, the physiological and psychological dysfunctions produce the symptoms of mucous colitis.
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