REGIONAL ENTERITIS

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THE LITERATURE relating to regional enteritis has become rather voluminous during the past 13 years. Scarcely an article has been written in which the author has not in the first column (frequently in the first paragraph), referred to the original article by Crohn, Ginzburg and Oppenheimer,[1] which appeared in the Journal of the American Medical Association, October 15, 1932. That paper first describing this clinical entity as a disease *sui generis* was read before the Section on Gastro-enterology and Proctology at the 83rd session of the American Medical Association, New Orleans, Louisiana, May 13, 1932. It was a remarkable treatise not merely because it raised the curtain on an hitherto unheralded disease but chiefly because of the accuracy and fullness of the observations on the part of the authors and the intelligent and intelligible recording of those observations by them.

In fact, so accurate was the original Crohn, Ginzberg, Oppenheimer story of regional enteritis that in all the literature contributed to the subject during the years that have followed, nothing has been subtracted from it. And so today, one may say to a medical student or intern: "If you would acquire sufficient knowledge of this condition to recognize and know how to treat it, all you need do is read the original article."

The original title of terminal ileitis was changed following the suggestion of Dr. Bargen that the word "terminal" suggested agonal, and regional was substituted therefor. Enteritis has been substituted for "ileitis" since it has subsequently been demonstrated, time and again, that any part of either the large or small bowel and not infrequently a part of both in the same patient may be involved, although the ileum and indeed the terminal ileum is the overwhelmingly favorite site. In 87 per cent of the cases reported by Dixon[2] the disease was confined to the terminal ileum. A great variety of names have been offered as a designation for this condition by the numerous contributors to the subject, among which have been, in addition to the original of terminal ileitis, regional ileitis, regional ileocolitis, regional enterocolitis, segmental enteritis, nonspecific granuloma, infective granuloma, chronic cicatrizing enteritis, pseudocancer, Crohn's disease, and, finally, regional enteritis. The latter term is the most popular and comes nearest to being true and the most appropriate.

Whenever a new idea is evolved or discovery made, the literature is sure to be flooded with a great many offerings related to the original. In some, one thing is emphasized; in some, another. Preliminary to the preparation of this paper, 39 articles by different authors which have appeared in a wide

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assortment of medical and surgical journals of this country, Canada, and the British Isles were reviewed by the author. Our series of 17 cases illustrates a variety of the special features which have been pointed out and have been made the central theme for various of these individual articles. It is for the purpose not only of adding our series of cases to the literature but, moreover, for the purpose of adding confirmation to the several special observations which have been made by a variety of contributors and which are borne out by our experience that this report is being made.

Historical: While all credit is due the original authors, above referred to, for their astuteness and perspicacity leading them to make their epochal report, it is not believed that this was really a new disease. There are numerous reports in the literature indicating that it has existed for centuries. In 1913, Combe, of England (Phillips[3]) described a case of thickening and stricture of the ileum at postmortem. This in all probability was a case of regional enteritis. Moschcowitz (Phillips[3]) reported a small series in 1923, which may well have been cases of regional enteritis; and, in 1893, W. J. Mayo[4] described what he termed granuloma of the small intestine. The writer recalls very clearly having witnessed an operation when he was a medical student in the early '20's in which an involvement of the ileum, typical of segmental enteritis, was demonstrated and was thought to be of tuberculous origin. Subsequent to that time, and prior to 1932, he saw several similar cases.

That the incidence is increasing is indicated by a report from the Mayo Clinic, by Donald and Brown,[5] in 1941. They reported 178 cases at the clinic between the years 1922 and 1940, and 114 cases between 1937 and 1941. More convincing evidence of the increase in the incidence of the disease is offered by Fallis,[6] who reports only one case of granuloma of the small bowel and seven cases of tuberculosis of the small intestine in 195,000 patients admitted to the Henry Ford Hospital, Detroit, during a 15-year period prior to January 1, 1933. During the ensuing ten-year period, that is, from 1933 to 1943, out of 180,000 new patients, there were 27 positively proven cases of regional enteritis, and five additional cases diagnosed on the interpretation of the history and roentgenographic findings—making a total of 32 cases. While sharper recognition is admitted as a possible factor, it is not regarded as the sole explanation for this apparent increase in incidence.

Etiology: As has been said of Banti's disease, and as is true of chronic ulcerative colitis and a number of constitutional disorders, a lack of knowledge as to the etiology seems essential to a diagnosis of regional enteritis. A number of theories have been advanced—some have been disproven, some remain purely nebulous. Of the disproven theories, that purporting to assign to Koch's bacillus of either the human, bovine, or avian variety the rôle of causative agent heads the list.

That allergy may in some manner tie in with this disease entity remains in the category of fancy. That there is a correlation between mesenteric lymphadenitis and regional enteritis seems not improbable, but which is the cause and which the effect remains a moot question. Several writers,

notably Donald and Brown,[5] have suggested that the malady has a predilection for Jews, particularly at an early age. It has been claimed that the disease is more common in the Eastern cities. This appears to be borne out by case reports in the literature, however, the validity of this claim may be more apparent than real when we consider that there are more people in the Eastern states, and particular interest in this condition has been manifested by Eastern writers. In our series of 17 cases only one, the first, was a Jew. The group comprised personnel of the U. S. Navy admitted over a two-year period to the U. S. Naval Hospital, San Diego, California. There were 15 enlisted men and two officers. The fact that they were near southern California at the time of their transfer to the hospital by no means indicates that they were anywhere near that part of the world at the time of the original onset of their disease. Actually, from their histories, it would appear that not more than one of the entire group developed his disease in California. That there is a seasonal variation in the incidence of this disease or at least in the tendency towards an acute exacerbation of the pathologic process appears quite probable and is to some extent borne out by our experience. That a familial tendency may play a rôle in the occurrence of regional enteritis has been suggested by Crohn.[7] That the disease is distinctly more prone to appear between the ages of 15 and 40 seems to be generally recognized. The youngest in our series was 17, the oldest 33. The majority of the statistical reports indicate that the disease has a preference for males in a ratio of 3 to 2 (Crohn[7]), Fallis[6] found this ratio to be 4 to 3. However, Marshall,[8] at the Lahey Clinic, reported 13 men and 16 women in a series of 29 cases. All 17 of our cases were males.

Pathogenesis: The earliest or incipient stage of regional enteritis remains more or less conjectural, since it is seldom, if ever, recognized at operation or roentgenographically until at least a fairly advanced or well-defined stage has been reached. It seems reasonable, however, to surmise that it begins as a proliferative process in the interstitial structure of the bowel wall and gradually assumes the characteristics of a cicatrizing granulomatous lesion. Hence the term "pseudocancer." As the wall of the bowel becomes thickened, the mucosa becomes ulcerated, possibly due to interference with the blood supply and possibly due to an infective process, either virus or bacterial in character. Whether the fibrosis is secondary to the ulcerative process or the ulcerative process is secondary to the fibrosis is not known. In any event, as the disease progresses, the bowel wall becomes progressively thicker and as a result of this change, plus the contraction of cicatrizing ulcerated areas, the lumen is encroached upon and thus narrowed, until obstruction eventuates in some cases.

While the bowel is undergoing these changes, the adjacent mesentery becomes thickened and the mesenteric lymph nodes become enlarged but usually remain discrete. An edematous condition is superimposed in the bowel structure and mesentery alike. As this pathologic action advances, the ulcerated areas tend to perforate, leading to abscess and fistula formation. These

fistulae may communicate internally with adherent loops of small bowel, large bowel, or bladder, or externally with the surface through the abdominal wall or any combination of these possibilities may obtain. The premises upon which some writers upon this subject have based their reasoning that this disease may progress through four more or less well-defined stages, namely: First, acute; second, irritative; third, obstructive; and fourth, fistulae, are, therefore, readily understood.

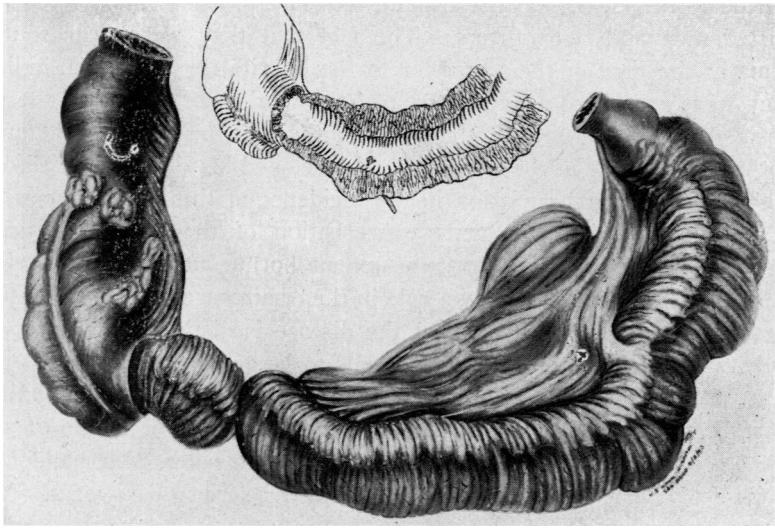

FIG. 1.—Drawing of segment of involved ileum showing the classical corrugated or cobblestone appearance of the bowel and its adjacent mesentery. Note sharp line of demarkation at ileocecal junction. Thickening of bowel wall, narrowing of lumen, and presence of fistula are shown in the insert. The findings upon roentgenologic examination in this case are shown in Figures 3 and 4.

There is also a wide range of possibilities as to the extent and part of the intestinal tract that may be involved. While, as has been pointed out, the terminal ileum *per se* is overwhelmingly the favorite site for involvement, nevertheless, the disease extends past the ileocecal junction and invades the cecum in an appreciable number of cases (Figs. 7 and 9). Likewise, may any part of the bowel, from the jejunum to the sigmoid, be affected. Moreover, several portions of the bowel may be involved in the same patient, with healthy segments intervening, hence, what is referred to by various writers as "skipped areas" are demonstrable.

The disease is chronic in its course, and is characterized by periods of exacerbation and remission. The duration of these phases appears to vary with different individuals and, undoubtedly, is in some measure influenced by the physical stamina and general health of the individual. In any event, the weight of evidence and opinion indicates that spontaneous cure, if it ever occurs, is rare. This view is probably somewhat radical. Appreciable contradictory evidence is not lacking. (Our Cases 10, 12, and 16.)

There is a marked contrast between the appearance of the bowel during an acute and a quiescent or remission stage. In the acute phase, the involved surface is swollen, inflamed and hyperemic. Its surface may be coated with a plastic exudate. The mesentery is likewise swollen, edematous and inflamed, and its contained lymph nodes may constitute tumor masses varying in size from that of a pea to that of an English walnut (Fig. 9). Gross corrugations

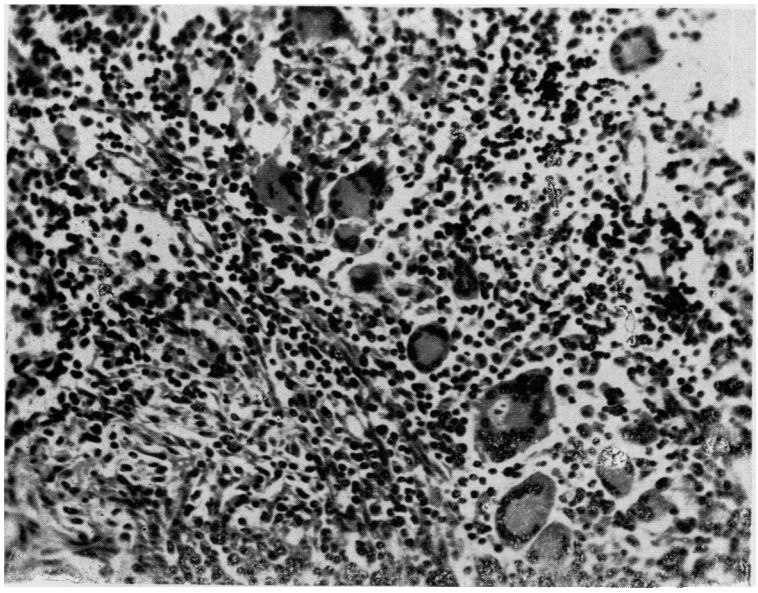

FIG. 2.—Microscopic appearace of tissue removed from the gross specimen shown in Figure 7. It was upon the presence of giant cells, such as are shown in this section, that the theory of tuberculosis as an etiologic factor was predicated.

which extend from the mesenteric border and tend to encircle the bowel become more prominent as the disease persists, and during an acute episode these markings are greatly accentuated. This has been described by Sneierson and Ryan[9] as a "cobblestone" appearance (Figs. 1 and 9).

A considerable accumulation of serosanguineous fluid within the peritoneal cavity is not uncommon during the acute phase. During quiescence or remission from acute activity, the bowel remains thickened, heavy and leathery in consistency, and is devoid of its normal flexibility and distendability. As the hyperemia subsides, organization of the plastic exudate laid down during an acute attack leads to the development of dense fibrous bands and adhesions during the remission phase.

In a typical case, histopathologic examination of a segment of bowel affected with regional enteritis reveals a marked fibrosis and thickening of the submucosal and mucosal layers. The entire structure of the bowel wall is apt to show a mononuclear infiltration, with a preponderance of these cells in the mucosal layer. Giant cells (Fig. 2) are also commonly seen and have

been largely responsible for the erroneous assumption that the tubercle bacillus was the mischief maker.

Symptoms: The symptoms will, to a very appreciable degree, depend upon the stage, location, and severity of the disease. The three cardinal symptoms of regional enteritis are abdominal pain, intermittent diarrhea, and loss of weight. The latter is not as consistent a finding as the first two. The pain is usually cramp-like, intermittent, and recurrent in character. Nausea is not uncommon and when present vomiting as a concomitant symptom is the rule.

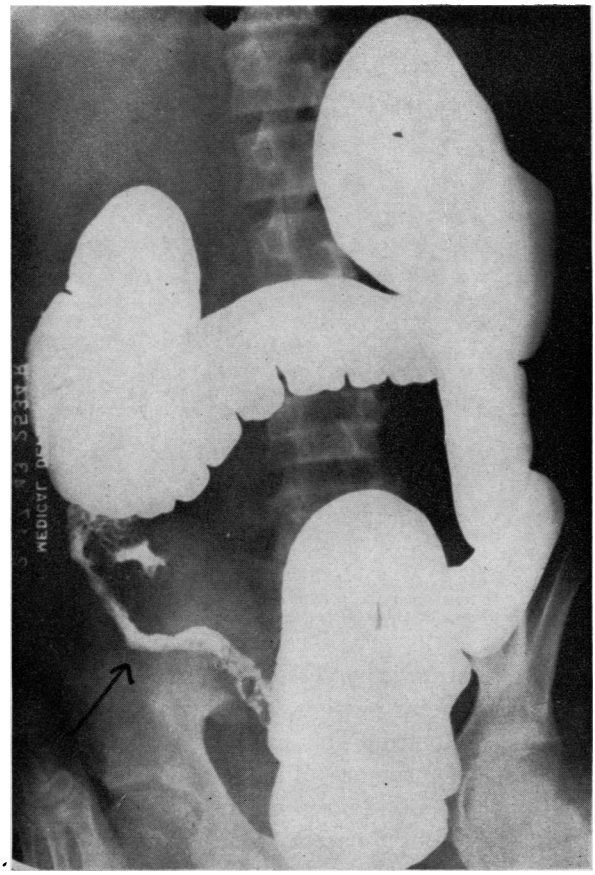

FIG. 3.—Roentgenogram showing narrowing of lumen of ileum. Note amount of barium in large bowel before opaque media could be forced into the ileum.

In some cases the pain, nausea, and vomiting assume such proportions as to lead to a suspicion of intestinal obstruction, although complete obstruction seldom occurs. Anorexia is also experienced in a goodly percentage of cases. The onset may be sudden and the patient may fail to give a history of antecedent prodromal symptoms. The pain is apt to be most severe in the right lower quadrant and, therefore, the fact that over 50 per cent of the patients in our series, as is true of most of the series reported, have been erroneously

diagnosed as acute appendicitis, and have been operated upon for that condition, is quite naturally accounted for. Hemorrhage from the bowel, while not usually regarded as an evidence of regional enteritis, does occasionally occur in this condition and in the absence of a more readily demonstrable explanation should be considered as a diagnostic indication of appreciable import.

Signs: When coupled with the symptoms as above indicated, anemia is a common sign of regional enteritis. Some elevation of the patient's tempera-

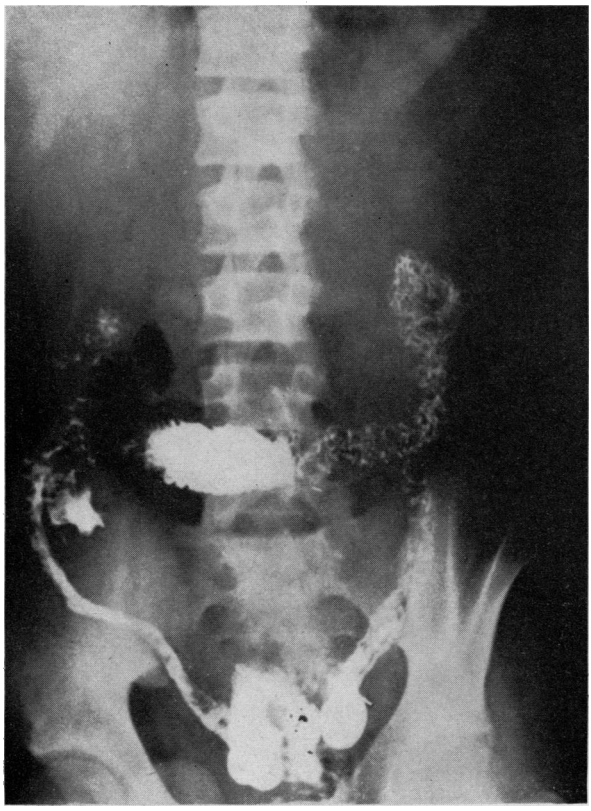

FIG. 4.—Same case as illustrated in Figure 3, after evacuation of barium enema. The segment of bowel removed at operation in this case is illustrated in Figure 1. While the pathologic process did not extend to the cecum originally, it is a notable fact that a recurrence became manifest within a few weeks in this case, and upon recurrence the transverse colon was grossly involved along with a second segment of ileum. This was the only patient in the series of 17 who developed a recurrence within a year postoperatively. Following the second resection, this patient has remained symptom-free for over two years.

ture is also common. During an acute exacerbation the temperature will usually show an elevation of from 102° to 103° F., with some fluctuation. During a remission the temperature may be normal, however, a slight P.M. rise is not unusual. The blood picture will characteristically reveal evidence of a moderate secondary anemia and the white count may fluctuate between

normal and that commonly associated with acute appendicitis, depending upon the phase, whether acute or quiescent. Actually, during an acute stage, the white count may be elevated to 18,000 to 20,000 and, therefore, raise a doubt as to the diagnosis of acute appendicitis. The blood sedimentation rate is, as a rule, sharply accentuated during an acute attack.

Abdominal examination will not infrequently reveal the presence of a boggy mass in the right lower quadrant, particularly in thin individuals or when complete relaxation of the abdominal wall is obtained. A mass, along

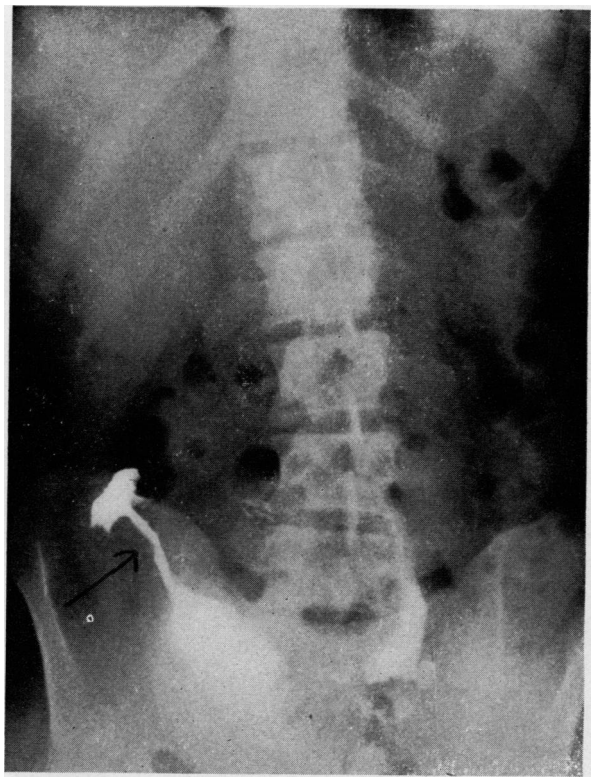

FIG. 5.—Kantor's string sign.

with tenderness in the right fossa, may also be palpated upon rectal examination. Evidence of ascites is not rare.

Roentgenologic examination is repeatedly referred to as the most important diagnostic aid. Roentgenograms following the ingestion of barium by mouth or when introduced as an enema may reveal the presence of intestinal fistulae at any part of the intestinal tract. However, the classical roentgenographic sign is that produced by a narrowing of the luminal shadow in the terminal ileum (Figs. 3, 4, 5, and 6). This is known as Kantor's[10] string sign, and is excellently described by him in the J.A.M.A., 1934. When present, this sign is considered practically pathognomonic of regional enteritis of the terminal ileum.

Differential Diagnosis: The condition with which regional enteritis is most commonly confused is acute appendicitis. A careful history, with emphasis upon prodromal symptoms, is of prime importance. The onset of acute appendicitis is ordinarily more sudden, the point of maximum abdominal tenderness in appendicitis is likely to be more sharply defined, and rebound tenderness is apt to be less striking in regional enteritis. The abdominal mass, which is not uncommonly demonstrable in regional enteritis, is rare in acute appendicitis unless abscess formation has supervened. The white

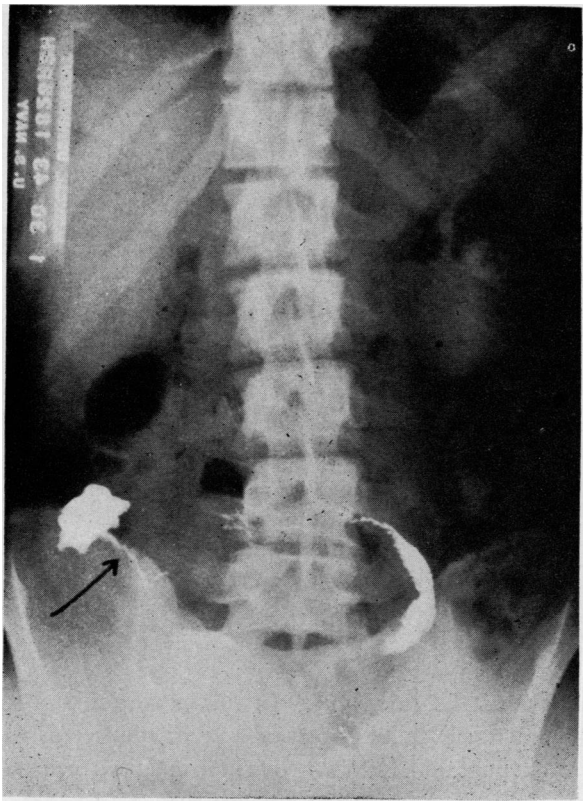

FIG. 6.—Kantor's string sign.

blood count tends toward greater elevation in an acute stage of regional enteritis, and a sharp and decided drop in the blood sedimentation rate is more indicative of enteritis. Diarrhea is the rule with regional enteritis, while constipation is the rule with acute appendicitis. Intestinal tuberculosis may simulate regional enteritis. Roentgenologic examination is the most important differential diagnostic aid. Moreover, pulmonary tuberculosis is expected to constitute a concomitant disability when intestinal tuberculosis is present. Again, a decided elevation of the white blood count is against tuberculosis. As has been pointed out by Crile:[11] "It is occasionally impossible, even at the time of operation, for the surgeon to distinguish nonspecific regional from

tuberculous enteritis. But since the treatment of these conditions is essentially the same, the matter of differentiating between the two is not of practical importance." Diverticulitis, due either to inflammatory involvement of Meckel's diverticulum or multiple diverticula of the large bowel may produce symptoms similar to regional enteritis. Here again, roentgenologic examination is a valuable diagnostic aid. Amebiasis may produce a picture which could quite likely be confused with regional enteritis. In amebiasis, however, if diarrhea is present, blood and mucus should be looked for in the stool, and sigmoidoscopic examination will reveal characteristic ulcerations in the lower bowel. If there is no amebic involvement of the lower bowel, the patient will probably not have diarrhea with his amebiasis. Finally, the finding of *Endamoeba histolytica* in the stool is proof positive of amebiasis. Chronic

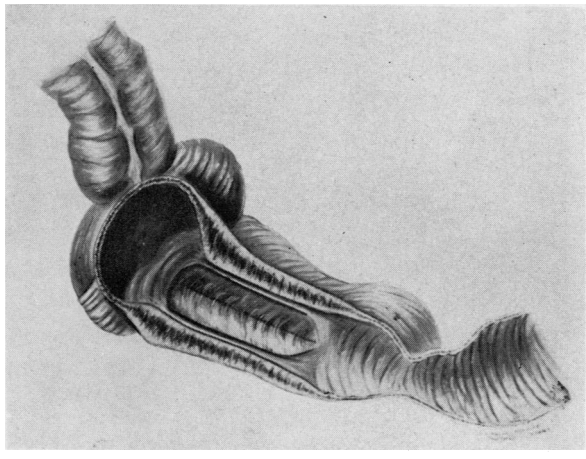

FIG. 7.—Drawing of extension of process beyond ileocecal junction on to cecum. Microscopic appearance of tissue removed from site indicated in this drawing is shown in Figure 2.

ulcerative colitis must be ruled out. In this condition the stools commonly contain blood and much cellular detritus. Sigmoidoscopic examination and roentgenologic examination following barium enema are usually sufficient to rule out or establish the existence of this disease.

Complications or Sequelae: Practically every complication, sequela, or peculiarity of this disease which has been described in the literature, and certain of which have been emphasized in particular articles, have been illustrated in one or more of our cases. In order of their frequency in our series of 17 cases, these complications or special features may be listed as follows:

(1) An involvement of segments of large bowel, apparently as a result of direct extension from involved small bowel segment (Fig. 7).
(2) Positive Kantor's sign.
(3) Fistulous communication within the abdomen—internal fistulae.
(4) Fistulous communication with the abdominal wall—external fistulae.

(5) Obstruction.
(6) Skipped areas in the small bowel.
(7) Apparent subsidence of symptoms and absence of roentgenologic signs without operative interference.
(8) Hemorrhage.
(9) Recurrence after operation.
(10) Fistula or fissure in ano.

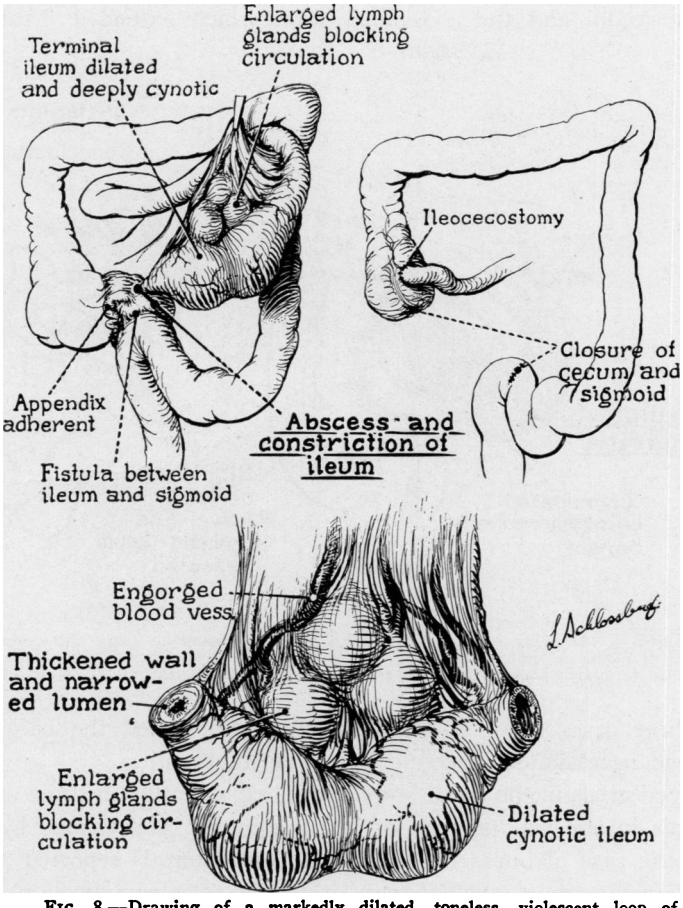

FIG. 8.—Drawing of a markedly dilated, toneless, violescent loop of ileum, with involvement of sigmoid and fistula formations between the ileum and sigmoid. The disturbance of circulation in this segment of bowel was apparently due to interference with the blood supply by tremendous lymph node enlargement, edema, and fibrotic changes in the mesentery. Resection and closure of sigmoid fistula and end-to-side ileocolostomy was successfully accomplished in a one-stage operation.

In nine cases, over one-half of our series, there was evidence of extension of the pathologic process from the ileum to the large bowel. In six cases the cecum was involved, in two the sigmoid colon, and in one the transverse colon.

Fistulous communication within the abdomen existed in six of our cases. In two there was a fistulous communication between the ileum and

sigmoid colon (Fig. 8). In one there was a fistulous communication between a dependent loop of jejunum and the cecum and a dependent loop of the mid-ileum and the cecum (Fig. 9). In one there was a fistulous communication between the ileum, sigmoid, and urinary bladder (Fig. 10). This complication has been referred to by Bargen.[12] In one there was a fistulous communication between a kink of terminal ileum and the cecum; in another there was a fistulous communication between the ileum and the transverse colon.

Four of our cases developed fistulous communications between the ileum or cecum and the abdominal wall, which extended through to the exterior.

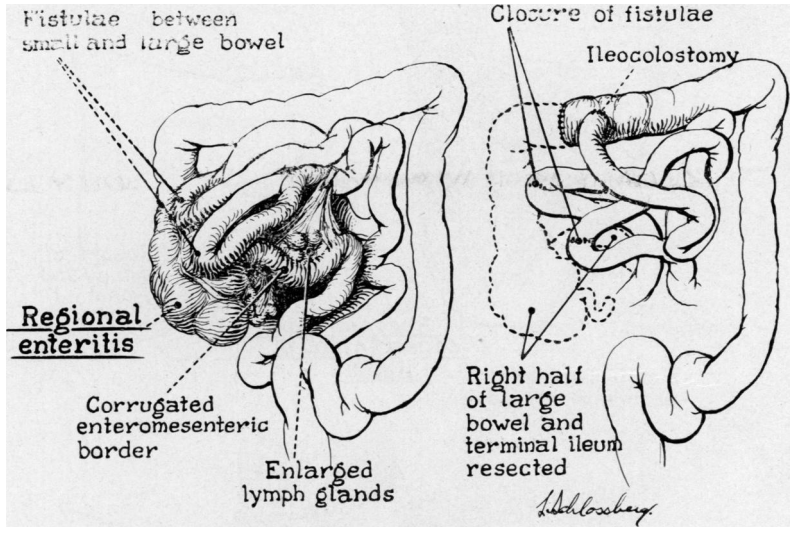

FIG. 9.—Drawing of regional enteritis involving terminal ileum and cecum, with loops of ileum and jejunum adherent to the inflammatory mass, and with communicating fistulae formation between both loops of small bowel and cecum.

In three cases small bowel obstruction constituted the paramount disability and necessitated emergent operative intervention.

Skipped areas in the small bowel were demonstrable in three of our cases.

Fistula in ano was present, or had previously been treated by operation in only one case of our series. Jackman and Smith[13] reported 36, or a 32 per cent incidence, of anal abscess or fistula as a complication of regional enteritis in a series of 114 cases.

In one of our cases, hemorrhage from the bowel had been a notable but not a prominent symptom.

Recurrence necessitating a second operation occurred in one of our cases. At the first operation, two feet of the terminal ileum and the right half of the large bowel were resected (Fig. 1), and an end-to-side ileotransverse colostomy was established. After a month of indifferent improvement or progress following this operation, the patient began to decline markedly. At the second operation the ileum, for a distance of 18 inches, and the transverse colon, for a

distance of ten inches, showed every evidence of a recurrent involvement with regional enteritis. It seems noteworthy that the large bowel was not involved in the original process but became involved when the condition recurred. The diseased bowel was again resected and an end-to-side anastomosis was established between healthy ileum and the colon near the splenic flexure. The patient went on to complete recovery and gained 40 pounds in weight.

TABLE I

REVEALING THE INCIDENCE OF THE MORE COMMON SIGNS AND SYMPTOMS, ALONG WITH OTHER DATA PECULIAR TO REGIONAL ENTERITIS IN A SERIES OF 17 CASES. THIS SERIES IS COMPRISED OF NAVY AND MARINE CORPS PERSONNEL FOUND TO BE AFFECTED WITH REGIONAL ENTERITIS DURING A 27-MONTH PERIOD IN A NAVAL HOSPITAL, WHOSE AVERAGE DAILY PATIENT CENSUS FOR THAT PERIOD WAS 6,268. IT MAY, THEREFORE, BE REGARDED AS A FAIR INDEX OF THE RATE OF OCCURRENCE OF THIS DISEASE IN SERVICE PERSONNEL.

Case No.	Month Admitted	Age	Pain	Diarrhea	Hemorrhage	Loss of Weight	Anemia	Elevated W.B.C.	Diagnosis of Appendicitis	Obstruction	Fissure or Fistula in Ano	Kantor's Sign	Extension to Colon	Internal Fistula	External Fistula	Skipped Areas	Resection	Recurrence	Surgical Cure	Spontaneous Cure?
1	5	24	✓			✓	✓	✓				✓	✓				✓		✓	
2	1	20	✓					✓	✓				✓		✓		✓		✓	
3	1	17	✓	✓	✓	✓		✓	✓	✓		✓			✓		✓	✓	✓	
4	2	18	✓				✓	✓	✓				✓		✓		✓		✓	
5	3	21	✓	✓		✓	✓	✓		✓		✓	✓	✓		✓	✓		✓	
6	8	24	✓					✓				✓		✓	✓		✓		✓	
7	6	23	✓	✓		✓	✓	✓			✓		✓	✓		✓	✓		✓	
8	11	23	✓					✓	✓				✓				✓		Died	
9	2	21	✓				✓	✓				✓					✓		✓	
10	2	19	✓					✓	✓							✓				✓
11	3	20		✓				✓	✓			✓		✓			✓		✓	
12	4	28	✓					✓	✓											✓
13	4	33	✓					✓				✓	✓				✓		✓	
14	6	26	✓	✓		✓		✓		✓		✓	✓	✓			✓		✓	
15	6	18	✓	✓		✓	✓	✓	✓			✓	✓	✓			✓		✓	
16	7	17	✓					✓	✓											✓
17	6	27	✓	✓		✓	✓	✓				✓					✓		✓	
Totals			16	7	1	7	7	17	9	3	1	10	9	6	4	3	14	1	13	3

Three cases in our series cleared up without definitive surgery. The first of these cases was diagnosed as regional enteritis upon his symptoms alone. At operation his jejunum and ileum to within three feet of the ileocecal junction contained at least six areas presenting the classical appearance of regional enteritis with normal bowel of from one to three feet in length in between the diseased segments. Because of the extent and distribution of the involvement, the patient's abdomen was closed without resecting any of the bowel. Penicillin therapy was instituted and the patient rapidly became entirely symptom-free. His bowel was roentgenologically negative. He was sent to duty with the recommendation that he return to the hospital after six months for re-examination. Whether he will remain well and whether or not the penicillin influenced his course is entirely conjectural. One patient had been operated

upon for acute appendicitis aboard ship and what had been described by a seasoned surgeon as a typical regional enteritis involving his terminal ileum was found. He was sent to the hospital for further treatment. Upon second celiotomy five or six months later, scarcely any evidence of a former acute process involving any segment of the intestine could be found. The third case was that of a 19-year-old patient operated upon for acute appendicitis. He was found not to have any appendiceal involvement but his terminal ileum

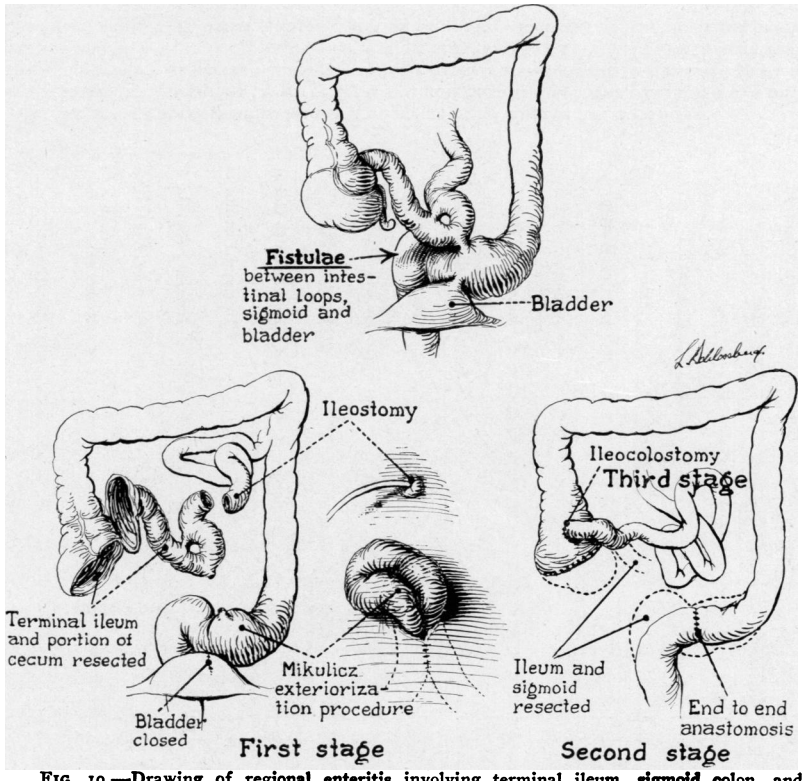

FIG. 10.—Drawing of regional enteritis involving terminal ileum, sigmoid colon, and urinary bladder, with fistulae existing between sigmoid and bladder and sigmoid and ileum. The passage of gas through the urethra was a prominent symptom in this case. The operative procedure involved three steps. First stage: A resection of the involved segments of ileum, closure of fistula in urinary bladder, and the establishment of a temporary single-barrel ileostomy and a double-barrel colostomy. Second stage: While the ileostomy was functioning and the large bowel was functionless, an end-to-end anastomosis was done between the proximal and distal sigmoid segments. Third stage: The ileostomy was taken down and an ileo-ascending colostomy was done, thus restoring complete continuity of the intestinal tract.

was described as typical of regional enteritis. The patient rapidly improved subjectively, however, and roentgenograms revealed no evidence of any departure from normal. Further operation was considered not warranted and the patient was discharged to duty.

Treatment: The preponderance of opinion, as expressed in the literature on the subject of regional enteritis, proclaims surgery not only as the treatment of choice but as the treatment of necessity, if a cure is to be hoped

for. There is, however, one notable exception to the disciples of this doctrine. That is Dr. Elliott Cutler,[14] of Harvard University, whose ideas relative to the treatment of regional enteritis appear to be similar to those commonly held with regard to diverticulitis; namely, that the disease is a medical entity unless certain complications such as obstruction, fistulae, or abscess formation arise. Certain of our observations, as borne out by three of our case reports, tend to lend substantiation to Dr. Cutler's contention. Nevertheless, our treatment has been predominantly surgical and it is felt there are ample grounds for the stand that when applied to men in the naval and military service, this form of treatment is by all odds preferable.

Granted that surgery is agreed upon as the accepted means of dealing with regional enteritis, there remains a considerable divergence of opinion as to what constitutes the best surgical procedure. It is unanimously agreed, I believe, that in the presence of an acute process or exacerbation of the disease, it is unwise to institute any form of surgery unless some complication such as obstruction makes emergent intervention imperative. It is, moreover, generally agreed that it is inadvisable to remove a nonentity appendix in the presence of an enteritis of the ileum or cecum, lest a fistula eventuate and that such a fistula will eventuate is well recognized by those who have had appreciable experience with this condition. When then should surgery be performed? It is a dictum of seasoned surgeons that operative measures may be undertaken when the plastic exudate incident to an acute episode has become organized and fibrous adhesions have taken its place.

As to what comprises the most judicious surgical management, it is again agreed that in the presence of obstruction, a short-circulating operation, such as an ileotransverse colostomy, is all that should be undertaken. When the operation may be classed as elective, however, the surgical proponents seem to occupy two fundamental groups: First, those who advocate a two-stage procedure; and second, those who advocate a single-stage operation. Dr. Frank Lahey has formerly stood, and probably still stands, at the head of the two-stage school of thought. A great many at random surgeons advocate a one-stage operation when circumstances will permit. In our series a resection of the involved bowel with an ileocolostomy was done in one stage in all save two of the entire series treated surgically. A preliminary ileotransverse colostomy was done in one case which presented a classical picture of obstruction, and in the case where there was involvement of the sigmoid and fistulous communication with the urinary bladder a three-stage operation was successfully performed. The three stages consisted of, first, a resection of the involved ileum and sigmoid, with establishment of a single-barrel ileostomy; second, an end-to-end anastomosis of the sigmoid, and third, an end-to-side ileo-ascending colostomy.

Mortality.—There was one death in our series. A resection of the right half of the large bowel was done in this case, with the establishment of an end-to-side ileotransverse colostomy in one stage. Four days postoperatively this man died of uremia incident to urinary suppression. The cause for the

urinary suppression was never definitely determined, but was attributed to sensitivity to sulfa drugs. There was no demonstrable evidence of blockage of the uriniferous tubules at autopsy and there was no peritonitis.

Of the three cases in our series who were discharged to duty without surgical intervention, two received penicillin therapy. While it is in a considerable measure speculative, it is, nevertheless, believed that this drug was a very definite factor in the amelioration of symptoms in these cases. Penicillin was used in the acute phase of three other cases who ultimately came to surgery. There was promptly a notable drop in the temperature of these patients following the administration of this medicament. It is by no means fanciful to consider that Doctor Cutler may have in penicillin another very potent agent to add to his medical armamentarium.

SUMMARY

1. A general review of the salient features of regional enteritis has been presented.

2. Surgical features related to the disease have been emphasized. A one-stage surgical procedure was employed in 12 out of 14 operative cases.

3. There was one death which was definitely not due to a surgical complication, but for want of a more plausible explanation was attributed to sulfa drug sensitivity, with a consequent urinary suppression.

4. Penicillin was used in five cases, all of which showed prompt clinical improvement.

5. Three cases appeared to show complete resolution of their disease and were not operated upon.

6. A report of 17 cases of regional enteritis with a tabulation of the common manifestations peculiar to the disease, along with other related data, is added to the literature.

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