EDITORIAL SYNOPSIS This paper presents a careful study of patients with non-specific inflammatory disease involving both small bowel and colon, either in continuity or in the form of skip lesions. Support by medical treatment is a therapy of choice. Steroids are useful but appear only to control symptoms rather than induce a remission. Surgery should be reserved for complications such as obstruction or for prolonged disability.

Patients with inflammatory disease of both ileum and colon constitute a significant clinical entity. In diagnosis, prognosis, and management they pose problems which differ from those of patients with regional enteritis and ulcerative or granulomatous colitis. In the present report we call attention to some features of ileocolitis and our experience in its management.

The distribution of inflammatory disease in both large and small bowel has for years suggested several diagnostic possibilities. The first is the association of regional enteritis in the small bowel with non-specific ulcerative colitis. This was proposed in reports coming from our own hospital (Yarnis, 1955; Crohn and Yarnis, 1958). However, as additional patients have been studied and series described from other institutions (Lockhart-Mummery and Morson, 1960), it has become apparent that our pathologists had been reluctant to make a diagnosis of granulomatous disease involving the colon and had reported these cases as ulcerative colitis. It is now our opinion that regional enteritis and ulcerative colitis are distinct entities which co-exist only rarely and probably by chance. We are thus in agreement with Lockhart-Mummery and Morson (1960), Cornes and Stecher (1961), and Warren and Sommers (1954).

A second diagnostic consideration in inflammatory disease involving ileum and colon is ulcerative colitis with 'backwash ileitis'. The ileal changes in this condition are believed to be caused by regurgitation of irritating or infected colonic contents through an incompetent ileocaecal valve, producing inflammatory changes in the terminal ileum. We do not use the term 'ileocolitis' to describe this situation, since the ileal involvement is usually minimal in degree and extent and does not alter either the course or the medical and surgical treatment of the ulcerative colitis. Indeed, use of the term ileocolitis to describe ulcerative colitis with backwash ileitis has contributed to the delay in the differentiation of granulomatous and ulcerative bowel disease. Only rarely is ulcerative colitis with backwash ileitis a problem in the differential diagnosis.

The third possibility is the presence of granulomatous disease in both ileum and colon. We suggest that almost all cases of ileocolitis belong to this category, and we define ileocolitis as a granulomatous inflammatory disease involving both small bowel and colon, either in continuity or in the form of skip lesions. By 'granulomatous inflammatory disease' we refer to the gross and histological features characteristic of regional enteritis or 'Crohn's disease'. This process is the same, whether it occurs in small bowel or colon. Granulomatous ileocolitis differs from regional ileitis and from granulomatous colitis only in its anatomical distribution. British authors (Lockhart-Mummery and Morson, 1960; Cornes and Stecher, 1961) use the term 'Crohn's disease' to describe this entity wherever it occurs in the gut, but contributors to the American literature tend to avoid eponyms. We have preferred the term 'granulomatous' to avoid confusing this process with the segmental (right-sided) colitis described by Crohn and considered by him to be ulcerative.

CLINICAL MATERIAL AND FEATURES

The present report concerns experience with 40 patients with ileocolitis. The diagnosis was established on the basis of radiological studies demon-
Granulomatous ileocolitis

Figure 1 is a schematic diagram of the distribution of the disease in the colon at the time the patient was first examined and before any surgical procedures were performed. The tendencies toward involvement of the right colon and toward a segmental distribution with sparing of the rectum are apparent.

At the end of the follow-up period 37 of the patients were alive and three were dead. One patient died from toxicity of ileocolitis one month after ileostomy; one died of a cardiac arrhythmia at the time of surgery; one died of a myocardial infarct unrelated to the bowel disease.

Twenty-seven of the patients have been operated upon for ileocolitis. The surgical constructions of these patients at the end of the follow-up period are indicated in Table I. In 23 of the 27 the diagnosis of granulomatous ileocolitis was based on the pathology of resected specimens. In two patients surgery was performed elsewhere and the slides were not available for review; both patients subsequently presented with recurrent disease and the clinical and radiological features were characteristic of granulomatous disease. In two patients exclusion operations only were done and no tissue was obtained for pathological examination.

### Table I

<table>
<thead>
<tr>
<th>Construction</th>
<th>No. of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ileostomy</td>
<td>1</td>
</tr>
<tr>
<td>Ileostomy and total colectomy</td>
<td>5</td>
</tr>
<tr>
<td>Ileostomy and subtotal colectomy</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>(leaving rectum)</td>
</tr>
<tr>
<td>Ileocolostomy with resection</td>
<td>13</td>
</tr>
<tr>
<td>Ileosigmoidostomy with exclusion</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
</tr>
</tbody>
</table>

In 11 of the 27 surgical cases disease recurred in the remaining, previously normal-appearing bowel, beginning at the anastomosis or the ileostomy stoma. A diagnosis of recurrent disease was made from one to 18 years (mean 5-9 years) after initial surgery. In six of these patients the recurrence was in the ileum, and in five disease developed in both ileum and colon. The operative procedure in seven patients had been ileocolostomy with resection of diseased bowel; in two patients ileosigmoidostomy with exclusion of diseased bowel; in one ileostomy alone; and in one ileostomy and total colectomy. In one of the two patients with recurrent disease at the ileostomy stoma, a pathological diagnosis of regional

...strating inflammatory disease involving both the ileum and the colon at the time the patient was first examined with the previously described radiological features of granulomatous disease (Wolf and Marshak, 1962). Surgery involving the intestine had not been performed at the time of the initial studies. Subsequently 27 of the patients were operated upon. Surgical specimens were obtained in 23 of these, and the diagnosis of granulomatous ileocolitis was confirmed. Patients with extension of disease to the colon following operation for ileal disease are not included in this series.

Twenty of the patients were male; 20 were female. The age of onset of symptoms ranged from 12 to 45 years, with a mean of 23.5 years. The duration of illness of the patients, from onset to end of follow-up, ranged from one to 24 years, with a mean of nine years.

The patients presented with diarrhoea, abdominal cramps, and usually fever. Often gross blood was entirely absent from the stools, despite even severe diarrhoea, or bleeding occurred only occasionally and was not a major part of the clinical picture. Gross blood in the stools was a prominent feature in only three of our patients. Twenty-one of the patients had never observed blood in the stool, and in 16 the bleeding was intermittent and slight in amount.

Sigmoidoscopy was performed during hospital admission in 23 patients. In 17 the mucosa was normal, in three it was diseased, and in three the findings were equivocal. The disease tends to spare the rectum and so sigmoidoscopy is often normal. In those cases in which the rectum is diseased we have been unable to distinguish sigmoidoscopic changes different from those of ulcerative colitis. It is especially in those patients who have rectal involvement that blood in the stool can be a prominent part of the history. Lockhart-Mummery and Morson (1965) describe sigmoidoscopic findings of a cobblestone appearance of the mucosa and a patchy distribution of disease with islands of normal intervening mucosa. Their observations suggest that in some cases it may be possible to make a presumptive diagnosis of granulomatous disease from the sigmoidoscopic appearance.

As is characteristic of granulomatous disease of the gut, fistulae were present in a large number of cases, in this series in 20 of the 40 patients. This is in contrast to that in ulcerative colitis where fistulae are relatively uncommon. In six patients the fistulae were intra-abdominal; in eight they were peri-anal; and in six they were both external and internal. Internal fistulae were found more likely to arise from the ileal component of the disease than from the colonic.
enteritis was made on the resected specimen at the time of re-operation. The second ileostomy patient had obstructive signs and symptoms requiring resection of 40 cm. of terminal ileum. Clinically, radiologically, and grossly this was believed to represent recurrent disease in the ileum rather than ileostomy dysfunction, but the pathologist found only non-specific inflammation and thickening, predominantly in the submucosa; no granulomas were seen.

In a disease so marked by exacerbations, partial remissions, and surgery, it is difficult to assess meaningfully the clinical status of the group as a whole at any one time. Nevertheless an attempt was made to evaluate the overall state of well-being of the patients at the end of their follow-up period. Among the 13 patients who have had no surgery, the overall status was considered excellent (asymptomatic) in one, good (mild or intermittent cramps and diarrhoea) in three, fair (severe cramps and diarrhoea) in seven, and poor (constant, incapacitating symptoms) in two. Among the 24 surviving surgical patients, the overall status was considered excellent in four, good in seven, fair in 12, and poor in one.

**RADIOLOGICAL FEATURES**

The radiological findings of regional enteritis and of granulomatous colitis have been described in detail in previous communications (Marshak and Wolf, 1955; Wolf and Marshak, 1962). In most instances the diagnosis is clear-cut, and there are no specific features of granulomatous ileocolitis except for the anatomical distribution. In the small bowel the characteristic findings of regional enteritis are unaffected by concomitant inflammatory disease of the colon and consist of narrowing of the intestinal lumen, rigidity, longitudinal and transverse ulcerations, large inflammatory polyps, skip areas, sinus tracts, fistulae, and separation of the involved intestinal loops due to thickening of the intervening mesentery and to enlarged nodes. In the majority of
Granulomatous ileocolitis

cases the inflammatory process in the small bowel is confined to the distal ileum. In four of our patients a diffuse ileojejunitis was present. Usually the extent of involvement of the ileum can be stated accurately. In several cases numerous fistulae and sinus tracts resulted in matting together of loops of intestine and it was difficult to estimate the extent of involvement. It is not difficult to differentiate regional enteritis from so-called 'backwash ileitis' which may be associated with ulcerative colitis. In backwash ileitis narrowing of the intestinal lumen is usually minimal and the length of ileum involved is small. Sinus tracts, skip areas, and fistulae are not seen and the mucosa is only slightly altered, with minimal thickening of the folds.

FIG. 2. Extensive involvement of the distal ileum with typical changes of regional enteritis. The alterations in the colon from cecum to sigmoid are minimal and consist of flattening of the contour and irregularity of the haustral markings. At operation the entire colon to the sigmoid was involved. The rectum was normal.

Involvement of the colon in patients with ileocolitis is frequently in continuity with the disease in the ileum, and the right side of the colon is most frequently involved. Segmental involvement of the colon is a conspicuous feature of this disease. The

FIG. 3. Similar involvement of terminal ileum and colon to the sigmoid. Longitudinal and transverse ulcers are identified, producing a cobblestone mucosal pattern. A skip area is noted in the splenic flexure.

FIG. 4. Terminal ileum is narrowed with irregular contour and inflammatory polyps, as is the colon to the splenic flexure. The contours of the transverse colon are irregular.
rectum, in our experience, is the segment least often involved, but diffuse involvement of the colon, including the rectum, does occur in ileocolitis. The radiological findings in the colon are similar to those described for the small bowel and consist of thickening and blunting of the folds, inflammatory polyps, linear and transverse ulcerations, pseudo-diverticula and stricture formation due to intramural fibrosis. Sinus tracts and fistulae are less common in the colon than in the small bowel. At times the radiological findings of granulomatous disease in the colon may be subtle and consist only of flattening, isolated nodular filling defects, or localized irregularities in contraction of the colon (Fig. 2). In these cases a motility follow-through film of the colon performed as part of a small bowel examination may clearly reveal minimal changes of granulomatous colitis not well identified on a barium enema examination.

From the radiological point of view three varieties of lesion have been observed in ileocolitis. In the first type the lesions in the small bowel are similar to those in the colon and both present classical features of granulomatous disease (Figs. 3 and 4). In the second type, the lesion in the small bowel is clearly that of regional enteritis but the colon presents features which could be due either to ulcerative or granulomatous colitis (Fig. 5). We have concluded that when the small bowel exhibits the characteristic features of granulomatous disease, the diagnosis of granulomatous ileocolitis may be suggested with some confidence, even though the changes in the colon are not diagnostic. In the third type, which is uncommon in our experience, the ileal lesion is relatively inconspicuous and the colonic features, which predominate, display typical characteristics of granulomatous disease.

In contrast to granulomatous disease, the colon of ulcerative colitis demonstrates marked spasm and irritability, tiny ulcerations, and symmetrical involvement. The mucosal pattern, although diffusely thickened is not nodular or irregular as in granulomatous colitis. While the process may be segmental, especially on the left side, the entire colon is commonly involved. Eccentric localized intramural fibrosis and skip lesions are uncommon in ulcerative colitis. Toxic dilatation, which is a dramatic episode in the course of ulcerative colitis, has not been observed in granulomatous disease. Carcinoma of the colon, a complication of ulcerative colitis, has not yet been observed in granulomatous colitis, although it has been reported with regional enteritis (Berman and Prior, 1964).

The patients with ileocolitis presented with their maximal involvement at the time of initial examination and extensions of disease were uncommon. We have seen only one patient (not included in this series) in whom granulomatous disease was clearly demonstrated to extend, in the absence of surgery, from the ileum into a previously normal colon.

PATHOLOGICAL FEATURES

The pathological features of granulomatous disease are the same whether it occurs in the large or small intestine, or in both (Hadfield, 1939; Lockhart-Mummery and Morson, 1960). The gross findings include thickening of the bowel wall, longitudinal ulcerations and transverse fissures forming an oedematous cobblestone mucosa, narrowing of the lumen, stricture formation, and enlargement of regional lymph nodes. Microscopic examination shows a chronic inflammatory reaction involving all layers of the bowel. Ulcers are deep and extend into the submucosa and muscularis. The principal histological finding is the presence of granulomas composed of Langhans-type giant cells and epitheloid and mononuclear cells. It is not uncommon for a specimen to show some but not all the pathological...
features of the granulomatous process. At times, especially when ulceration is severe, granulomas may be difficult to find, and experienced pathologists may make a diagnosis of granulomatous disease in the absence of granulomas (Cornes and Stecher, 1961), provided other features are present. Biopsy would seem a useful tool in diagnosis, but unfortunately in ileocolitis it is the mid-portion of the gut that usually is diseased, with sparing of both the proximal small bowel and the rectum. The involved area is thus usually inaccessible either to routine peroral small bowel biopsy or to biopsy through the sigmoidoscope. Non-specific atrophic mucosal changes have been reported in the proximal small bowel in patients with regional enteritis (Shiner and Drury, 1962) but a diagnosis of granulomatous disease is difficult to make by this technique since the characteristic changes are submucosal. When the rectum is involved in the disease process, granulomas may be found on deep biopsy through the sigmoidoscope, but in our experience the rectum is commonly free of disease.

DISCUSSION

Granulomatous disease involving the small bowel has been recognized as regional enteritis since the original description (Crohn, Ginzburg, and Oppenheimer 1932). More recently it has become apparent that the same process can involve the colon alone (granulomatous colitis) (Lidner, Marshak, Wolf, and Janowitz, 1963; Lockhart-Mummery and Morson, 1965) or both the small bowel and colon (granulomatous ileocolitis). In most cases of ileocolitis the inflammatory disease is present in both ileum and colon at the time the patient is first seen. Because it is impossible by clinical features alone to determine the extent of granulomatous involvement it is important to perform both a barium enema examination and a small bowel series to determine the precise localization and extent of the disease process. We continue to believe that spread of granulomatous disease in either small bowel or colon is uncommon in the absence of surgery (Lindner et al., 1963). It is not at all uncommon, however, for granulomatous disease to develop in previously uninvolved ileum or colon after an operative procedure.

Such clinical features as chronic diarrhoea free of gross blood, the presence of fistulae, and a normal sigmoidoscopic examination suggest the possibility of granulomatous disease of the intestine. The diagnosis of ileocolitis may then be established by the radiological appearance of the bowel. In our cases the radiological findings in either ileum or colon were sufficiently characteristic so that a diagnosis of granulomatous ileocolitis could be made with confidence and was confirmed in all cases in which tissue was available for study.

Review of our clinical material permits a number of observations concerning the course and prognosis of ileocolitis. Patients with ileocolitis tend to be sicker and to follow a more severely chronic course than those with either regional enteritis or ulcerative colitis. Acute fulminating episodes, toxic dilatation of the colon, and carcinoma of the colon have not been observed. Medical management consisted of bed rest or restricted activity, sedation, non-absorbable sulphonamides or salicylazosalicylapyrine, a low-residue diet, anti-diarhoeal agents, and A.C.T.H. and adrenocortical hormones. Response to a medical regimen is slow and full clinical remissions are uncommon. While A.C.T.H. and adrenal cortical steroid hormones are useful in controlling symptoms, especially in those patients who have evidence of malabsorption, their use is less effective than in ulcerative colitis. Previous observations by our group have shown no striking alteration in the pathology of the disease with steroid hormones.

In terms of prognosis, two groups of patients with ileocolitis can be distinguished, largely on the basis of the nature and extent of the ileal involvement. When the ileal disease is severe, with sinus tracts, fistulae and abscesses, the clinical course is unremitting, early surgery is required, recurrences are frequent and disability is chronic. When the ileal disease is less marked and incomplete obstruction rather than infection is the predominant feature of the illness, the response to a medical regimen is better, disability is less, surgery can be deferred and, when it is required, can be performed with less risk of recurrence.

Unlike ulcerative colitis, which is curable at the cost of an ileostomy and colectomy, ileocolitis does not lend itself so readily to surgical treatment when the medical programme proves unsatisfactory. Extensive areas of ileum and colon may be involved in the disease process so that any surgery at all may demand a formidable resection. Moreover, as is the case with regional enteritis, the tendency to spread of disease following surgery is present. Such recurrences developed in 11 of 27 surgical patients in the present series. (It is of interest in this respect that we have not yet observed recurrence of disease in either ileum or colon following resection of the colon for granulomatous colitis without ileal involvement.) These considerations do not interdict surgery in ileocolitis, but they do suggest that despite the chronic character of the illness, patients with ileocolitis should be managed medically as long as the clinical state does not deteriorate. Surgery, we believe, should be held in reserve for complications,
such as obstruction or abscess formation, or for prolonged disability.

SUMMARY

Ileocolitis is defined as a non-specific inflammatory disease involving both small bowel and colon, either in continuity or in the form of skip lesions. The present report is a study of 40 such patients. Clinical features include diarrhoea without gross blood, abdominal cramps, fever, intra-abdominal or perineal fistulae, and usually normal pictures on sigmoidoscopy. Radiological and pathological features are those of regional enteritis and granulomatous colitis. Provided thorough and careful radiological studies are made of both ileum and colon, the diagnosis of granulomatous ileocolitis may be advanced with confidence in advance of pathological confirmation. The course of the disease tends to be chronic, with little tendency toward remission and a less favourable prognosis for medical or surgical relief of disability than in patients with regional enteritis, granulomatous colitis, or ulcerative colitis. Supportive medical treatment is the therapy of choice. Steroids are useful in management but appear only to control symptoms rather than to induce a remission. The tendency to recurrence and spread of disease after surgery is marked; such extension occurred in 11 of the 27 patients who were operated upon in the present series. It is suggested that despite the chronic nature of the illness, patients with ileocolitis should be managed medically as long as possible and surgery reserved for such complications as obstruction or persistent infection or for prolonged disability.

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Granulomatous ileocolitis

Richard H. Marshak, Arthur E. Lindner and Henry D. Janowitz

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