Are superficial lesions of the distal part of the ileum early indicators of Crohn's disease in adult patients with abdominal pain? A clinical and radiologic long term investigation

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SUMMARY The possibility of early superficial Crohn's disease should be considered when mucosal irregularities without transmural abnormalities are seen in the distal 15 cm of the ileum in young patients with protracted symptoms of abdominal pain and diarrhoea. Radiologic assessment of the small bowel is improved using the barium/air double contrast technique and in this study mucosal abnormalities were categorised as a 'mucosal nodularity pattern', an 'abnormal mucosal fold pattern', and a 'specks of barium pattern'. None of the 21 patients followed prospectively for four to seven years developed established criteria for Crohn's disease, or any other chronic progressive disease of the small bowel. Colon examinations were normal. In comparison 26 patients with histologically proven Crohn's disease of the ileum were studied retrospectively and no similar clinical or radiologic characteristics were present. It is concluded, therefore, that such isolated superficial lesions are not pathognomonic and are not early indicators of Crohn's disease or any other chronic progressive disease of the small bowel.

In a young patient protracted symptoms of crampy abdominal pain, diarrhoea and right lower quadrant tenderness may indicate the presence of Crohn's disease. In order to disclose or exclude this diagnosis radiologic examination of the small bowel and colon is usually performed. When the small bowel and colon are examined carefully the diagnosis of Crohn's disease is unequivocal if extensive transmural lesions are present. Diagnostic problems may arise in patients with superficial lesions confined to a short segment of the bowel. This is especially the case when small bowel examination indicates the presence of superficial lesions localised to the distal part of the ileum in a patient with a normal colon examination.

The aim of the present investigation was to study whether superficial lesions in the distal part of the ileum are potential indicators of Crohn's disease or any other progressive condition.

Methods

PATIENTS

The study was divided into two parts in order to define the clinical importance of superficial lesions in the distal part of the ileum (group 1) and the radiographic appearance of early Crohn's disease in the distal part of the ileum as revealed on radiographic examination of the small bowel using a barium/air intubation technique (group 2).

GROUP 1

Twenty one patients were selected for this study, range 21-75 years (mean 33.5, median 31 years). There were 10 men and 11 women and all had been referred for radiologic examination of the small bowel and colon because of abdominal pain localised in the mid-abdomen or in the right lower quadrant. On physical examination they were tender in the right lower quadrant. The small bowel was radiologically examined *via* duodenal intubation using a double contrast technique (barium/air) according to a previously described technique.¹

The appearance of the small bowel was regarded as normal when the lumen of the bowel was

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distended to at least 3 cm in the jejunum and 2 cm in the ileum. The mucosal folds of Kerkring's should have a circular or parallel course and should be thin and slender with a thickness not exceeding 2 mm. The mucosa between the folds should be smooth without irregularities and protrusions, except for the distal few centimetres of the jejunum and ileum. Here the mucosal folds could be somewhat irregular and there could be millimetre sized nodules and protrusions not exceeding 2 per square centimetre. This was regarded as definitely normal (Fig. 1).

Included in group 1 were patients with superficial abnormalities of the distal part of the ileum including the distal segment of 5–15 cm. All patients with signs of definite transmural Crohn's disease were excluded – that is, fibrosis, transmural ulcerations, and fistula. All the patients had a normal radiologic examination of the colon and/or a normal rectoscopy, sigmoidoscopy, or colonoscopy with a negative biopsy.

The abnormalities of the distal part of the ileum were often intermingled in one and the same patient. The following three types of abnormalities were registered in the distal part of the ileum:

Mucosal nodularity pattern

This was seen as smooth multiple protrusions from the mucosa. The nodules varied in size between 3 and 10 mm. They could be isolated but were often coalescent. This pattern was present in eight patients and was the main feature of the distal ileum lesions in four of these patients (Fig. 2).

Fig 1 Normal radiologic appearance of the distal part of ileum. Mucosal surface is smooth and mucosal folds are slender. Barium/air examination.

Fig 2 'Mucosal nodularity pattern' in distal part of ileum. There are numerous millimetre-sized protrusions from mucosal surface which appears irregular. Barium/air examination.

Abnormal mucosal fold pattern

This was seen as blunting, effacement, coarsening, and irregularities of the mucosal folds. The folds could also have a pronounced axial and/or tortuous orientation instead of being parallel or circular at right angles to the axial extension of the bowel. This pattern was present in 14 patients and was the main feature in 11 of these (Figs. 3,4).

Specks of barium pattern

This was seen as accumulation of tiny specks of barium on the mucosa between or on folds, sometimes surrounded by a halo. This pattern was present in nine patients and was the main feature in six of these (Fig. 5).

The patients had at least one small bowel examination and one colon examination and/or rectoscopy, sigmoidoscopy, and colonoscopy with biopsy. The course of the radiological abnormalities in the distal part of the ileum was registered on reevaluation of the films. The patients' clinical courses were carefully followed up by one of the

Fig 3 'Abnormal mucosal fold pattern' in distal part of ileum. Mucosa is smooth. Normal mucosal folds are totally absent owing to effacement. Barium/air examination.

Fig 4 'Abnormal mucosal fold pattern' in distal part of ileum. Mucosal folds are thickened and somewhat irregular (arrows). Barium/air examination.

authors (BS) with special reference to the development of Crohn's disease or any other subacute or chronic disease of the distal part of the ileum. Other intra-abdominal or pelvic explanations of the patients protracted complaints were sought and duration of clinical symptoms and fluctuation of the symptoms were registered.

GROUP 2

Included in this group were 149 patients with Crohn's disease of the ileum histologically proven after resection of the small bowel. The patients had all been examined with the same radiographic technique as the patients in group 1 of this study. The radiographic examinations of these patients were reevaluated. Assessment of severity of lesions and extent of disease were recorded. Twenty six patients had Crohn's disease only in the ileum and confined to a segment shorter than 200 cm. The remainder of the patients had Crohn's disease in a

longer segment of the small bowel or also in the colon. Radiographs of the small bowel in patients with Crohn's disease localised to the small bowel were particularly scrutinised for the presence of lesions in the distal part of the ileum and especially of lesions similar to those present among patients in group 1 of this study. The age of these patients varied between 20 and 67 years (mean 35, median 34 years). A total of 60 small bowel examinations were reexamined (2.3 per patient). The time lapse between onset of symptoms and the time when a definite diagnosis could be established either radiographically or histologically was registered.

Results

Patients in group 1 of this study were followed for four to seven years. None of these patients developed any radiographic or clinical signs of Crohn's disease. Their symptoms were fairly stable

Fig 5 'Specks of barium pattern' in distal part of ileum with numerous millimetre-sized accumulations of barium on mucosa. This is most prominent in antemesenterial border of bowel (arrows). Folds are slender (thick arrows). Barium/air examination.

with periods of abdominal pain of the kind that had led them to the initial small bowel examination. Some of the patients had less severe but more constant abdominal pain, and others had symptoms that varied according to the patients psychosocial situation. In none of the patients were there any definite blood chemical indicators of inflammatory activity. All patients had negative bacteriologic and serologic examinations for intestinal infections. There were no signs of dysgammaglobulinaemia or of lymphoma during the period of observation. On repeat radiologic examination of the small bowel the ileal lesions/abnormalities showed only minor alterations.

The patients in group 2 of this study with Crohn's disease only of the distal part of the ileum ($n=26$) had had their abdominal symptoms for a period of 0–48 months before the diagnosis was established radiographically or histologically (median 4, mean 8.6 months). The first radiographic examination of

all patients revealed one or more types of transmural lesions of the ileum. The lesions varied in extension between 10 and 200 cm. Intermingled between areas of these transmural lesions were superficial lesions. These superficial lesions, however, were always located either between or proximal to transmural lesions. In none of the patients did the reevaluation of the radiographs reveal any superficial lesions solely of the distal part of the ileum of the kind described in part one of this study.

Discussion

With the enteroclysis method it is possible to increase the diagnostic information from radiologic small bowel studies, compared with the peroral route of examination.^{2,3} The additional use of barium and air double contrast technique improves delineation of the small bowel mucosa.^{1,4–6} When the bowel, especially the distal part of the ileum, is well distended by air the wall is stretched making the folds easy to assess. When the bowel is poorly distended it is difficult to comprehend the importance of tortuous and other mucosal fold abnormalities, as the folds regularly change in height and shape when the bowel is contracted. In the jejunum and proximal ileum the appearance of the bowel – that is, the width of the lumen and its pliability as well as the mucosal surface including the folds of Kerkring's is uniform. Different loops of the bowel can easily be compared and thereby localised alterations from the normal appearance, such as changes in the height and orientation of the folds and contrast accumulation in mucosal lesions, can be detected. This is in contrast with the most distal part of the ileum where lymphoid tissue is abundant. The interpersonal variance of the normal radiologic appearance of the distal part of the ileum also differs. Therefore we have found it a common problem to distinguish between normal and abnormal mucosal pattern in the distal part of the ileum, especially when the question of superficial Crohn's disease has arisen as the 'mucosal nodularity pattern' could indicate the presence of enlarged lymphoid tissue – that is, lymph follicles, Peyer's patches, and lymphnodes. The 'abnormal mucosal fold pattern' could indicate the presence of mucosal and submucosal oedema. The 'tiny specks of barium pattern' could be caused by the presence of superficial mucosal ulcerations of the aphthoid type. Therefore, the present study was undertaken in order to define the clinical significance of the described radiologic mucosal abnormalities and to compare it with that of Crohn's disease.

The distinction between normal and abnormal is

based on the authors' experience from the appearance of the distal part of the ileum when the patients are examined with the used barium/air technique. This technique is well known and at the beginning of this study had been used in about 1000 patients and at the end of the study among 4000 patients. We therefore claim that the described abnormalities in the distal part of the ileum are not caused by technical difficulties. Disintegration of barium contrast medium hinders the contrast medium coating the mucosa in an optimal way as the contrast bolus is transported more or less in the middle of the lumen of the bowel. If the disintegration is of minor degree it may mimic superficial ulcerations. The disintegration phenomenon is regularly seen at the apex of the barium column in the gullet as this barium is most prone to mix with mucus and foregoing content in the bowel which are the cause of disintegration. Therefore, films should be assessed only if they are obtained during a phase when the bowel is filled with fluid barium and preferably also plenty of air. There are three potential and common explanations to the radiographic abnormalities in the distal part of the ileum: (1) Crohn's disease, (2) backwash ileitis in ulcerative colitis, and (3) Yersinia ileitis.

The presence of Crohn's disease has been of focus because we originally suspected that these patients had early and superficial lesions due to Crohn's disease and that these lesions would progress into others consistent with established criteria for Crohn's disease during the time of observation. This suspicion was based on the symptoms of the patients as well as their age, both of which correlated with those found in Crohn's disease. There was also a similarity between the abnormalities in the distal part of the ileum among patients in part one of this study and that described in early and superficial Crohn's disease as an irregular reticulated pattern in a non-stenotic distal part of the ileum.³⁻⁹ The results of the part two study indicate, however, that when Crohn's disease is localised exclusively to the small bowel it may be either superficial or transmural. Superficial lesions were always confined to a long segment (50–200 cm) of the ileum. From another study we know that superficial lesions may be localised in the distal part of the ileum, but always in a patient with disease of the colon as well.⁵ The transmural lesions may, however, be confined to either a short or a long segment of the bowel. Therefore in our experience Crohn's disease when localised only in the small bowel seems to be either of a superficial type and confined to a long segment of the bowel, or transmural and confined to a varying length of the bowel. The differences in the extension of the small bowel lesions between group

1 and group 2 patients indicate that the patients in group 1 did not have Crohn's disease.

Another observation which indicates that the patients in group 1 did not have Crohn's disease is the fact that the abnormalities in the ileum did not progress during the time of observations. Crohn's disease is often characterised by its local and sometimes axial progression. We cannot, however, exclude the fact that our patients had a mild and abortive form of Crohn's disease. To our knowledge such a type of Crohn's disease has not been mentioned in the literature.

An important dissimilarity between the patients in group 1 and group 2 of this study was the duration of symptoms before a definite diagnosis could be established. This period was short in group 2 – that is, patients with Crohn's disease had their symptoms for a median time of four months which is in line with earlier observations.¹⁰ This is in contrast with patients in group 1 who still after four to seven years had not developed any clinical or radiologic established criteria for Crohn's disease or any other conclusive diagnosis. This seems in favour of the conclusion that the patients in the group 1 study did not suffer from Crohn's disease. We therefore claim that the presence of Crohn's disease can be excluded from the patients in the group 1 of this study due to (1) appearance of the radiologic abnormalities (submucosal), (2) the radiologic extension of the lesions (short) and (3) the course of the radiologic abnormalities as well as the clinical symptoms (stationary).

Another explanation of the radiographic abnormalities in the distal part of the ileum could be the presence of backwash ileitis in ulcerative colitis. All patients, however, had a normal colon examination. The radiographic appearance of the distal ileum could indicate the presence of Yersinia ileitis. The clinical course of these patients, however, was protracted, and this is in contrast with patients with Yersiniosis who seem to run a short illness not exceeding three months.¹¹⁻¹² The clinical course therefore differs substantially between patients with Yersiniosis and the patients in the group 1 of this study.

The results of the present study indicate that patients with the described abnormalities in the distal part of the ileum will not progress into definite Crohn's disease or any other disease with local or axial progression.

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