Acute toxic dilatation of the colon in Crohn's colitis

A. J. BUZZARD, W. N. W. BAKER, P. R. G. NEEDHAM, AND R. E. WARREN

From the Gordon Hospital, London

SUMMARY Twelve new cases of acute toxic dilatation of the colon in Crohn's colitis treated by total colectomy and ileorectal anastomosis are reported, and criteria for making the diagnosis are given.

The complication has occurred in 6% of patients diagnosed as having Crohn's disease of the colon treated at the Gordon Hospital since 1948. The patients have been predominantly young adult females, with a short preoperative history of disease. The sigmoidoscopic appearance of the rectum preoperatively has been no indication of the likelihood of recurrent disease at the anastomosis. Only four patients still have successfully functioning ileorectal anastomoses and four patients have died from the effects of the disease.

Acute toxic dilatation of the colon has been recognized as a complication of ulcerative colitis for many years (Lumb, Protheroe, and Ramsay, 1955; Roth, Valdes-Dapena, Stein, and Bockus, 1959; Morson and Dawson, 1972) but its occurrence in Crohn's colitis has not been described until recently. We know of only 11 cases of acute toxic dilatation of the colon in Crohn's colitis with reasonably full clinical and pathological details (Schachter, Goldstein, and Kirsner, 1967; McGovern and Goulston, 1968; Javett and Brooke, 1970; Leoutsakos and Pedridis, 1970; Papp and Pollard, 1970; Clark, 1972), and of 18 others without full descriptions (Farmer, Hawk, and Turnbull, 1968; Fielding and Truelove, 1972; Brooke, 1972).

The objects of this paper are: (1) to define the condition on clinical and pathological criteria; (2) to report 12 further cases treated surgically by total colectomy and ileorectal anastomosis; and (3) to assess the results of treatment.

Materials and Methods

The case records of all patients with ulcerative colitis and Crohn's disease of the colon seen in the Gordon Hospital between 1948 and 1972 were reviewed by two of us (A.J.B. and W.N.W.B.), and those patients who presented with acute toxic dilatation of the colon were selected for further study. All these patients had undergone emergency total

colectomy, and photographs of the gross colectomy specimens, together with histological sections taken at standard sites from each specimen (Dawson and Pryse-Davies, 1959), were reviewed by two of us (P.R.G.N. and R.E.W.). Each case was classified as either ulcerative colitis or Crohn's disease on the basis of antecedent history, clinical presentation, and the gross and histopathological appearances of the colectomy specimens using current criteria (Morson and Dawson, 1972). In addition, the maximum width of the transverse colon in the opened-out, formalin-fixed state was measured from each photograph using the scale adjacent to the specimen in the photograph (see fig).

DEFINITIONS

The following criteria were applied to each case accepted as acute toxic dilatation of the colon.

Acute

All patients should be ill and showing a rapid deterioration in their general health.

Toxic

At least two of the following measurements should apply in the 48 hours immediately preceding operation (adapted from Truelove and Witts, 1955; Roth *et al*, 1959): (1) an oral temperature of over 100°F, (2) a pulse rate greater than 120 per minute, (3) a white cell count of 10 000 or more per mm of peripheral blood, (4) an erythrocyte sedimentation

Fig Duration of pre-operative symptoms

rate (ESR) of 30 mm or more in the first hour (Wintrobe).

Dilatation

A maximum diameter of the transverse colon in the formalin-fixed specimen of 10 cm or greater.

Results

Clinical

Of the patient records reviewed, 190 had been diagnosed as having Crohn's disease of the colon, and 12 of these satisfied the above criteria for a diagnosis of acute toxic dilatation of the colon occurring in Crohn's colitis.

There were nine females and three males with an age range of 14 to 45 years, and a mean age of 29 years at the time of operation.

All patients had been treated with systemic steroids before operation.

The duration of symptoms up to the acute episode of dilatation was less than two years in 10 of the patients (see fig).

The criteria for toxicity showed oral temperatures in excess of 100°F in 11 cases, a WBC over 10 000 in eight, a pulse rate over 120 in 10, and an ESR over 30 mm/hr in ten.

Dilatation of the colon was present in all 12 patients. Straight radiographs of the abdomen taken preoperatively were available for review in only three cases, but showed good correlation with the measurement of the fixed specimen.

Preoperative sigmoidoscopic examination showed active rectal disease in eight patients, and a virtually

normal mucosa in the other four. The preoperative state of the rectal mucosa appeared to have no effect on the subsequent recurrence rate (table I.) Minor anal lesions—tags and fissures—were present in four patients preoperatively.

Rectum		Recurrence	No Recurrence
Inflamed	8	4	4
Normal	4	3	1

Table I Preoperative sigmoidoscopic appearance of rectum related to subsequent recurrence in region of anastomosis

All patients in this series were treated with a total colectomy and ileo-ectal anastomosis as a staged procedure. Of these only four still have successfully functioning ileorectal anastomoses at eight months, 16 months, seven years, and eight years respectively. Four patients have subsequently had to have the rectum excised and a permanent ileostomy established, and four have died (table II). The overall

Alive and well with functioning ileorectal anastomosis	..	..	4
Alive, rectum excised and permanent ileostomy	..	..	4
Dead	..	..	4

Table II Clinical results of operation at follow up

mortality is 1 in 3; three patients died in the post-operative period without leaving hospital from the effects of extensive sepsis, and the other one died five years later from chronic sepsis and malnutrition (table III).

Postoperative from overwhelming infection	..	..	..	3
Late, five years postoperatively from chronic sepsis and malnutrition	..	..	..	1

Table III Deaths

PATHOLOGICAL

The 'normal' width of the transverse colon in a non-dilated colitic was assessed by measuring the maximum width of the transverse colon in 50 consecutive formalin-fixed operation specimens where the colectomy had been performed for ulcerative colitis or Crohn's disease. In no case did the width exceed 5 cm. This compared with a minimum width of 10 cm in all our 12 cases. This difference is highly significant ($P < 0.001$).

MACROSCOPIC APPEARANCES

All the colectomy specimens showed linear ulceration of the mucosa, and in three typical 'cobble-

stone' appearances were present. Discontinuous disease with skip areas was present in 10 cases; in the other two a continuous pattern was present. The terminal ileum was inflamed in only one case at the time of operation.

MICROSCOPIC APPEARANCES

In all cases the mucosa and submucosa showed patchy inflammation with fewer crypt abscesses than are usually seen in ulcerative colitis. The inflammatory infiltrate was transmural and tended to follow the course of blood vessels in the muscle coat. In some areas in the transverse colon only there was also patchy muscle coat disintegration such as is seen in toxic dilatation due to ulcerative colitis. Fibrosis was present in the submucosa and subserosa but was markedly less in the transverse colon than in other parts. Fissures into and through the muscle coats were present in all cases, but epithelioid granulomata were present in the bowel wall in only four cases. Only one case showed any significant loss of mucus cells in the glands; mucus cell secretion appeared unimpaired in the remaining eleven.

Discussion

It is unwise to draw conclusions from a small retrospective series but it is hoped that by attempting to define the condition and report the results of a particular form of treatment that recorded experience will be built up as the condition becomes more widely recognized.

There have been 190 patients treated for Crohn's disease of the large intestine at the Gordon Hospital since 1948, and acute toxic dilatation of the colon has occurred in 12 of them, a rate of 6%. This compares with a rate of 16% quoted by Farmer *et al* (1968) for Crohn's disease, and a rate of 1.6% for the complication in ulcerative colitis reported by Edwards and Truelove (1964).

The clinical profile which emerges is of an uncommon complication of Crohn's disease of the colon affecting predominantly young adult females, with a relatively short preoperative history of the disease.

The best criteria for toxicity appear to be the raised pulse rate, temperature, and ESR; a raised leucocyte count is a less reliable guide, probably because of the suppression of the leucocyte response by steroid therapy.

Abdominal distension before operation and dilatation of the colon at operation were observed in all cases, and a close correlation between these observations and the maximum width of the transverse colon, measured in the fixed state, was found. Unfortunately these findings could not be correlated

with preoperative radiological appearances for all the patients, but in the three where radiographs were available there was a good correlation.

All patients in this study underwent total colectomy and ileorectal anastomosis covered by a relieving ileostomy (Aylett, 1970). All were known to have had colitis for at least one month, and in one case 19 years, before operation, but in only one case was a diagnosis of Crohn's disease made preoperatively. This failure to distinguish between Crohn's colitis and ulcerative colitis did not affect the decision to operate on any patient, but the subsequent course taken by many of the patients has been different from patients with acute toxic dilatation complicating ulcerative colitis treated in the same manner (Baker, 1970). The preoperative sigmoidoscopic appearances of the rectum appears to have been of no value in predicting the likelihood of recurrent disease in the region of the anastomosis.

The overall clinical results compare unfavourably with those for total colectomy and ileorectal anastomosis for ulcerative colitis (Aylett, 1970). It is therefore important to recognize that acute toxic dilatation can occur in Crohn's disease as well as in ulcerative colitis from the point of view of prognosis.

PATHOLOGY

Some of the criteria (Morson and Dawson, 1972) used to distinguish between ulcerative colitis and Crohn's colitis, such as transmural inflammation, vascularity of the mucosa and wall, and serositis, were found to be common to both conditions in the acute toxic, dilated state; however, satisfactory differentiation between the diseases was achieved using the remaining criteria.

Farmer *et al* (1968) stated that acute dilatation could not occur in Crohn's colitis because of the fibrosis associated with the disease. All our cases showed patchy fibrosis of the submucosa and subserosa, which increased the thickness of the colon wall in all parts except the transverse colon. The reason for this finding is obscure but it may be that the administration of steroids preoperatively delayed the laying down of fibrous tissue in the most severely inflamed area.

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