



Fig 4 Photomicrograph of a coronal section of an anal canal of a child showing muscle fibres (arrowed) from the conjoint longitudinal muscle (on the right) traversing the internal sphincter (on the left). Masson.  $\times 30$

The mucocutaneous junction at the pectinate line in man is often represented by a zone of gradual transition (Walls 1958, Parks 1958) which may extend for over a centimetre of epithelium. In most of the mammals studied, however, there was an abrupt change at the mucocutaneous junction from stratified squamous epithelium to rectal mucosa. In the baboon, however, the change was more like that of man.

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## The Early Course and Prognosis of Ulcerative Colitis [Abridged]

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The course of ulcerative colitis and its apparently unpredictable nature have provoked many previous studies. Unfortunately, with the notable exception of those by Rice-Oxley & Truelove (1950) and Edwards & Truelove (1963), most of these previous studies have failed to distinguish between patients who presented in their *first attack* of the disease, and who were followed up through its course, and those who were in a relapse of *chronic established* disease; in the latter the early course of their illness is uncertain.

We have surveyed all patients with colitis who came to us between 1952 and 1963 and have analysed 204 patients who presented in the first attack of their disease within twelve months of the onset. During this time a further 261 patients presented in a relapse of chronic established disease but these have been excluded from the present study.

The information was obtained by examination of personally compiled case histories; during the latter half of 1963 all the 204 patients were traced and all but 2 of the survivors were interviewed and examined by one of us. Both the remaining patients, one of whom was living in Southern Rhodesia, answered a postal questionnaire.

#### The First Attack of Colitis

The outcome of the initial attack of colitis in 204 patients was as follows: in the majority (70%) medical treatment led to remission of symptoms; bowel symptoms persisted in 17% of patients although these were usually minor and were improved, but in 11% radical surgery became necessary in the first attack because medical treatment had failed. The overall mortality in the first attack of colitis was 3.9%; 8 patients died, 5 after surgery and 3 whilst under medical care.

The factors which affect the mortality during the first attack are the severity of the attack, the extent of colitis and the age of the patient. The severity of colitis was assessed as mild, moderate or severe, according to the criteria of Truelove & Witts (1955); in severe attacks, characterized by severe diarrhoea with bleeding, tachycardia, fever, high ESR and anaemia, the mortality was 9.6%.

The extent of colitis in the initial attack also affected the mortality. Three categories of extent

were recognized: (1) Limited to the rectum. (2) Involving part or all of the colon distal to the hepatic flexure (substantial involvement). (3) Involving the whole colon and rectum (total involvement). In patients with total involvement, 12.2% died in the first attack. However, the most important factor affecting mortality in the first attack of colitis is age: in patients over 60 years old at the first attack the mortality in that attack was 17.3%.

#### *Subsequent Course and Prognosis*

One hundred and seventy-eight patients survived the first attack on medical treatment alone. At the review, with an average follow up of 3.7 years, only 51 had escaped a further attack of colitis; the other 127 had had at least one further episode and 33 of these subsequently needed operation. Eleven patients died, 8 because of colitis and 3 from incidental causes.

Concerning prognosis, it has been claimed by Edwards & Truelove (1963) that the influence of the first attack may extend throughout the course of the disease. This at first appears to be true in our patients, but this appearance is misleading and is due to bias introduced by including deaths in the initial attack itself. Once this first attack is over, its severity has no influence on the mortality in the subsequent course. Similarly, once the initial attack has subsided, the initial extent of colitis, whether confined to the rectum or involving part or all of the colon, has little effect on the subsequent mortality.

Thus, in our patients the first attack is a *poor* guide to the subsequent course. There are, however, three factors which appear to influence the prognosis in our patients after the first attack is over.

The item which determines the immediate outcome of any attack is its severity. Between them our patients suffered 260 mild relapses (Table 1) and the outlook for them in a mild relapse was good, with only a small risk of surgery or death. They also suffered a total of 51 severe relapses and in these there was a 46% risk of medical treatment failing (these patients either died or came to radical surgery); the overall death rate was 13.7%. This outcome was, moreover, independent of the first attack, for many patients with mild relapses had a severe first attack, and *vice versa*.

**Table 1**

The effect of the severity of relapses of colitis upon the immediate outcome

Severity	No. of relapses	Medical failure	Death
Mild	260	1.5%	0%
Severe	51	46.0%	13.7%

**Table 2**

The effect of the maximum extent of disease upon the outcome

Maximum extent	No. of patients	Medical failure	Death
Rectum alone	32	0	0
Whole colon + rectum	57	42%	17%

The next fact influencing prognosis at any particular moment in the history of a case of colitis is the extent of the disease at that time. Table 2 shows that, if the disease was limited to the rectum during the whole course, the outlook was good. In 57 patients who developed total involvement of the colon and rectum during their disease (either at the first attack or later, by proximal extension) the outlook was poor; in 42% of them medical treatment failed and 17% died.

The third element is the age of the patient. Among those over 60, during a relatively short follow-up period, 29% have already died from colitis, these being about equally divided between medical and surgical treatment.

If more than one of these poor prognostic factors occur in the same patient, the outlook is appalling. Severe attacks in patients over 60 carried a 50% mortality, total involvement in patients over 60 carried a mortality of 83% and of the small group over 60 who had a severe attack and total involvement none survived more than six months.

#### *Practical Implications*

(1) The death rate is very high in severe attacks, especially in patients over 60, and there may be an analogy in this respect between colitis and hæmatemesis. In hæmatemesis it has been clearly shown by Avery Jones (1947) and Tanner (1950) that the death rate is highest in patients with a severe attack, especially in elderly patients; furthermore early surgery in these patients can reduce this high mortality. We are in an intermediate stage; we realize that the bulk of our mortality occurs in severe attacks, especially in old patients, and we shall therefore try in future to reduce this mortality by the earlier use of surgery in severe attacks, especially in patients over 60, while the patient is still relatively fit. (2) Although severe attacks cannot be anticipated, total involvement can be detected while the patient is still in remission, and in this group of patients, as we have shown, the outlook on medical treatment is poor; in fact, nearly half came to surgery and 17% died. Therefore, bearing in mind the enormous difference in mortality between urgent and elective surgery, it may well be better in this small group of patients to operate upon all of them while they are in remission,

rather than upon half of them while they are desperately ill.

### Summary

(1) The outcome of any attack of colitis depends on the severity of the attack, the extent of disease and the age of the patient at the time. (2) If surgery is to be used in a severe attack, it should be in the early stages. (3) Total involvement of the colon implies such a poor prognosis that prophylactic proctocolectomy may be justified in these patients. It may also be justified in patients over 60 even if the large bowel is not totally involved.

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## Intraperitoneal Perforation of the Colon in Ulcerative Colitis [Abridged]

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Wilks & Moxon (1875), in their description of ulcerative colitis, realized the danger of perforation, mentioning the caecum and rectum as possible sites where this was likely to occur.

Reports of more than 300 cases of perforation of the colon in ulcerative colitis have appeared, although most of these have been presented in papers of wider scope and many were merely listed or dealt with cursorily. In recent years smaller series of perforations have been published in which cases have been described in greater detail (Brown *et al.* 1951, Ripstein 1954, Lumb *et al.* 1955, Brooke 1956, Bruce & Cole 1962, Hickey *et al.* 1963, Edwards & Truelove 1964). It is now widely accepted that intraperitoneal perforation of the colon is the most lethal local complication of acute ulcerative colitis.

### Clinical Material

The intraperitoneal perforations reported here were recorded during a survey of 465 patients with ulcerative colitis who attended the Colitis Clinic at Leeds during the period 1952–63. This is a retrospective study based on case histories,

operation notes and pathological data recorded at the time, and on interview during the latter half of 1963 with all but 8 of the 424 surviving patients, including everyone who survived a perforation.

The severity of each attack of colitis was classified as mild, moderately severe or severe, according to the criteria of Truelove & Witts (1955). The extent of colitis, assessed on the basis of repeated examination by sigmoidoscopy and barium enema, was described as being confined to the rectum, involving a substantial area of the colon distal to the hepatic flexure, or total involvement of the colon and rectum.

We have excluded from this analysis a patient who suffered a perforation of the terminal ileum four years after an ileorectal anastomosis.

### Findings

Among the 465 patients surveyed, intraperitoneal perforation of the colon was recorded in 13 (2.8%); of these 9 had single perforations and 4 had double or multiple perforations. Altogether 20 colonic perforations were recorded, 7 of which were free, giving rise to a generalized faecal peritonitis, whilst the remaining 13 perforations were sealed off by adherent viscera or parietal peritoneum.

*Anatomical site of perforation:* The site of each of the 20 perforations is shown in Table 1. The majority were in the sigmoid colon, which was the site of perforation in 11 patients (one also had a perforation of the caecum). Of the remaining 2 patients, one perforated at the splenic flexure and the other had multiple perforations of the caecum and ascending colon.

*Time of perforation:* The clinical impression that perforation occurs commonly in initial attacks of colitis was borne out by this study; perforation occurred in 8 out of the 13 patients in their first episode. Our 465 patients suffered a total of 328 severe attacks of colitis and the incidence of colonic perforation is significantly higher in severe initial attacks (9.7%) than in severe subsequent attacks (1.8%).

*Severity of colitis:* No perforation was recorded whilst the patient was in remission. Perforation of the colon occurred in 10 of our patients during a severe attack. It also occurred during a

Table 1

The site of 20 perforations of the colon in 13 patients

Site	No. of perforations
Sigmoid	15
Caecum	3
Splenic flexure	1
Ascending colon	1
Total	20