Rectal biopsy as an aid to cancer control in ulcerative colitis

B. C. MORSON AND LILLIAN S. C. PANG
From the Research Department, St. Mark's Hospital, London

EDITORIAL COMMENT  This is a very important paper as it provides the clinician with a new method of identifying patients with total colitis who may be particularly exposed to the risk of carcinoma. Rectal biopsies of flat mucosa may demonstrate a certain cellular pattern which has been shown to be particularly associated with carcinoma.

There is general agreement that malignant change in ulcerative colitis mostly occurs in those patients whose large intestine is totally involved and have a history of symptoms for more than 10 years. Having thus defined the population of colitics most at risk the problem remains of identifying the individual patient destined to get carcinoma. There is yet no evidence that all the population at risk will eventually develop malignant change. It has been previously pointed out that some test is required which will decide that a patient with ulcerative colitis has entered a precancerous phase (Morson, 1966).

The detection of epithelial changes suggestive of precancer or carcinoma in situ in rectal biopsies from patients with ulcerative colitis prompted an investigation into the incidence and extent of such changes in colectomy specimens removed for colitis with and without malignant change. The results of this enquiry are reported here as well as an analysis of the first nine patients in whom the diagnosis of precancer was made in a rectal biopsy and played an important part, together with clinical and radiological observations, in the subsequent decision to perform total proctocolectomy.

MORPHOLOGY OF PRECANCER IN COLITIS

There are two main types of precancer in ulcerative colitis: the polypoid variety and precancerous change in a flat mucosa.

Precancerous polypoid changes in ulcerative colitis have been described and illustrated by Dawson and Pryse-Davies (1959). The appearances are similar to those found in solitary adenomas and villous papillomas of the colon and rectum without any colitis although there are some significant differences. The polyps are nearly always multiple although few in number compared with inflammatory polyps. They are sessile, cover a relatively large field of mucosa and commonly have a villous or papillary surface configuration (Figs. 1 and 2) rather than the typical adenomatus appearance. In our experience the circumscribed, adenomatus polyp on a stalk so common as a solitary lesion and in familial polyposis is seldom seen as part of the precancerous phase of ulcerative colitis. The fact that the villous growth pattern is the commoner type of neoplastic change may be important, for there is evidence that this is more prone to produce invasive carcinoma than the adenomatus variety (Grinnell and Lane, 1958). However, many of the precancerous polyps of ulcerative colitis have a mixed villous and adenomatus structure and may be referred to as papillary adenomas. Another distinctive feature of precancerous polyp formation in ulcerative colitis is the presence of an obvious inflammatory component. This is in continuity with the inflammation in surrounding flat mucosa. The cytological changes found in these neoplastic or precancerous polyps of ulcerative colitis are described below. They are essentially similar to those seen in solitary adenomas and villous papillomas.

It would appear from our studies that neoplastic or precancerous change in ulcerative colitis more commonly occurs in a flat rather than a polypoid mucosa. This cannot be detected by macroscopic examination alone. However, those areas showing precancerous change at a microscopic level of observation vary in their macroscopic appearance from mucosa which looks almost normal to obviously inflamed mucous membrane. Perhaps the commonest change is a rather thick mucosa with a finely nodular or velvety surface configuration.
FIG. 1. Case 3 (Table III). Sigmoid colon and rectum. In the upper part of the specimen there is extensive papillary tumour which is partly benign but contains a malignant stricture about 5 cm. long. In the rectum there are smaller areas of villous overgrowth of the mucosa.

FIG. 2. Case 7 (Table III). Mucosal surface of colon showing polypoid change which has nodular and papillary surface configuration.

MICROSCOPIC FEATURES The histological and cytological criteria for the diagnosis of precancer in colectomy specimens and rectal biopsies for ulcerative colitis are fundamentally the same as those used for other precancerous conditions of the intestine such as adenomas and villous papillomas. Moreover, they are no different from those used for precancerous lesions or carcinoma in situ in other organs such as cervix, bladder, and skin.

Precancerous polyps There is adenomatous or villous overgrowth (Fig. 3) of the intestinal epithelium in a polypoid form. The epithelial cells show loss of goblet cell secretion and the nuclei are stratified, hyperchromatic, irregular in shape and size, and show many mitotic figures. Sometimes there is an excess of mucin production associated with the villous type of proliferation, as seen in some solitary villous tumours of the colon and rectum. These histological and cytological changes are associated with a variable amount of inflammation of the lamina propria, but usually more than that seen in ordinary adenomas and villous papillomas.

Precancer in flat mucosa (Figs. 4-10) The microscopic features of precancer or carcinoma in situ in a
Rectal biopsy as an aid to cancer control in ulcerative colitis

flat mucosa are of particular importance because the changes can only be identified at the microscopic level of observation. The mucous membrane is intact and either of normal thickness or rather thicker than normal. The epithelial tubules tend to lose their normal parallelism and become irregular in shape and size. They show lateral budding and frequently adopt a vertical or villous growth pattern (Fig. 4). An important characteristic is the tendency to misplacement of the proliferating epithelial tubules through the muscularis mucosa into the superficial submucosa (Fig. 5). Dukes (1954) drew attention to this feature as important in the pathogenesis of invasive carcinoma in ulcerative colitis. However, it is sometimes impossible to decide whether the epithelium is just misplaced as a result of chronic inflammation or that the appearance is, in fact, an early stage of invasive carcinoma.

The amount of inflammation in the flat precancerous mucosa of ulcerative colitis is variable but seldom severe. Indeed it may be completely absent. It usually takes the form of an increase in the inflammatory cell content of the lamina propria with some hyperplasia of lymphoid follicles and occasional crypt abscesses. There may be some inflammatory infiltration of the superficial submucosa but the deep layers of the bowel wall are not usually affected. The absence of signs of active or acute inflammation, such as vascular congestion and oedema with mucosal destruction, is significant because of the clinical observation that malignant change in ulcerative colitis is most commonly found in patients with a long history of mild or quiescent disease.

The cytological changes of precancer in ulcerative colitis are identical with those seen in other organs. There is loss of function in the form of a diminution of the amount of mucus secretion with irregularity in size and shape of the cells which are often larger than normal. The nuclei are stratified, enlarged, hyperchromatic and vary in shape with prominent nucleoli and a coarse chromatin pattern (Figs. 6 and 7). Moreover, the size of the nuclei is considerably

FIG. 3. Case 3 (Table III). Precancerous change in rectal biopsy; there is villous overgrowth of the mucosa and the epithelium shows loss of goblet cell secretion and stratification of nuclei which are also hyperchromatic. H. & E. × 100.
FIG. 4. Case 3 (Table III). Precancerous change in flat mucosa. The epithelial tubules have lost their normal parallelism, are irregular in shape and size, and have adopted a villous growth pattern. There is inflammation of the lamina propria. H. & E. × 80.

FIG. 5. Precancerous change in flat mucosa with villous growth pattern and misplacement of proliferating epithelial tubules through the muscularis mucosa into the superficial submucosa. There is inflammation of the lamina propria. H. & E. × 100.
FIG. 6. Precancerous change in flat mucosa. The epithelial tubules are irregular in shape and the lining epithelium shows stratification of nuclei which are very hyperchromatic. There is almost complete loss of goblet cell secretion; also inflammation of the lamina propria. H. & E. × 300.

FIG. 7. Precancerous change in flat mucosa. There is adenomatous overgrowth of the tubules and the lining epithelium shows stratification of nuclei which are very hyperchromatic. The lamina propria contains chronic inflammation. H. & E. × 180.
FIG. 8. Precancerous change in flat mucosa. There is a transition from hyperplastic epithelium to severe precancerous change with adenomatous overgrowth of the tubules. H. & E. × 25.

FIG. 9. Case 5 (Table III). Precancerous change in flat mucous membrane with underlying invasion by adenocarcinoma. There is much inflammation of the lamina propria. H. & E. × 140.
Rectal biopsy as an aid to cancer control in ulcerative colitis

The lateral budding and villous growth pattern of the epithelial tubules mentioned above is also absent.

A considerable increase in the number of Paneth and argentaffin cells has been noted in areas of precancerous mucosa. In the absence of any knowledge of the function of these cells it can only be presumed that this is a feature of the longstanding chronic colitis rather than the neoplastic change (Watson and Roy, 1960). However, it has been shown that Paneth cells are common in those polyps of the large intestine which are generally regarded as precancerous (Gibbs, 1967), and it is therefore possible that in colitis they are sometimes part of the neoplastic process.

PRECANCER IN COLECTOMY SPECIMENS OF COLITIS AND CANCER

A retrospective study was made of 27 surgical specimens of ulcerative colitis with cancer of the colon or rectum. Four of these were rejected because
of inadequate information about the pathology or clinical features. The incidence of precancer in the mucosa of the remaining 23 specimens was estimated together with the relationship to length of history and extent of colitis.

The pathological features of precancer were present in the mucus membrane of all 23 colectomy specimens removed for colitis in which one or more invasive carcinomas were found. The precancerous changes were very extensive involving large areas of mucosa away from sites of invasive carcinoma as well as in their immediate vicinity. It has not been possible to measure the extent of precancer in these colectomy specimens with any precision but it was a very diffuse process in many cases, as judged by the examination of many sections from different parts of the colon and rectum. In some specimens the entire mucosa of the large bowel appeared to be affected although the severity of the changes varied. In general the precancerous changes were more frequent and extensive in the left colon and rectum.

All 23 specimens of ulcerative colitis with invasive cancer had total colitis as judged by clinical, radiological, or pathological evidence. Nineteen patients gave a history of more than 10 years and nine of these for more than 20 years; four had a history of less than 10 years.

**PRECANCER IN COLECTOMY SPECIMENS FOR COLITIS**

A consecutive series of 172 colectomy specimens for ulcerative colitis were examined retrospectively for the incidence of precancer together with the relationship to extent of colitis and length of history (Table I). In 12 precancer was found but only in patients with total colitis. The incidence of precancer in the 134 patients with total colitis was therefore 9·0%. Of the 12 patients with precancerous change nine had a history of colitis exceeding 10 years and three under 10 years. The extent of precancer was extremely variable ranging from small patches to large areas of involved mucosa.

**PRECANCER IN RECTAL BIOPSIES**

A retrospective study was made of 148 consecutive rectal biopsies of patients with ulcerative colitis. Ninety-four have had medical treatment only but none showed any evidence of precancer in the rectal biopsy. The remaining 54 biopsies were carried out on patients who had a subsequent colectomy (Table II). Sixteen (29%) of these showed the appearances of precancer and similar precancerous changes were found in the colectomy specimen. All had total colitis, but there was no invasive carcinoma present. Twelve of these are also included in Table I. All but one of the rectal biopsies regarded as precancerous were from patients with a history of colitis for more than 10 years. Thirty-eight rectal biopsies negative for precancer showed no precancerous change in the subsequent colectomy specimen.

During recent years the diagnosis of precancer has been made by rectal biopsy in nine patients who were under clinical and radiological investigation for the state of their colitis. In these cases the discovery of precancer in a rectal biopsy influenced the decision to carry out surgical treatment. A summary of the clinical history, surgical treatment, and pathology is given in Table III.

There were seven women and two men. Eight had a long history of symptoms exceeding 10 years and one for eight years. All nine patients had total colitis confirmed radiologically or by examination of the colectomy specimen.

Biopsy of polypoid lesions in the rectum of two patients showed precancer. The other seven had precancer in flat mucosa.

One patient (case I) had an inoperable growth of the sigmoid at laparotomy. The other eight were all treated by total proctocolectomy. Invasive carcinoma as well as extensive precancer were found in

---

**Table I**

<table>
<thead>
<tr>
<th>Length of History (yr.)</th>
<th>Total Colitis</th>
<th>Subtotal Colitis</th>
<th>All Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Cases</td>
<td>Incidence of Precancer</td>
<td>No. of Cases</td>
</tr>
<tr>
<td>Under 10</td>
<td>88</td>
<td>3 (3·4%)</td>
<td>22</td>
</tr>
<tr>
<td>10-20</td>
<td>31</td>
<td>7 (23·8%)</td>
<td>7</td>
</tr>
<tr>
<td>Over 20</td>
<td>15</td>
<td>2 (13·3%)</td>
<td>9</td>
</tr>
<tr>
<td>All cases</td>
<td>134</td>
<td>12 (9·0%)</td>
<td>38</td>
</tr>
</tbody>
</table>

---

**Table II**

<table>
<thead>
<tr>
<th>Length of History (yr.)</th>
<th>No. of Cases</th>
<th>Incidence of Precancer (% of Biopsies)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 10</td>
<td>26</td>
<td>0·0</td>
</tr>
<tr>
<td>10-20</td>
<td>15</td>
<td>6·0</td>
</tr>
<tr>
<td>Over 20</td>
<td>13</td>
<td>6·0</td>
</tr>
<tr>
<td>All cases</td>
<td>54</td>
<td>6·0</td>
</tr>
</tbody>
</table>
four of these specimens. In four others only precancerous mucosa was found. The invasive carcinomas were in the descending colon (cases 2 and 5) and the sigmoid and rectum (cases 3 and 4). In case 5 the invasive carcinoma was of microscopic size, although it had penetrated the full thickness of the bowel wall.

The extent and severity of the precancerous changes in the eight proctocolectomy specimens varied. In one patient (case 5) there was precancer in flat mucosa throughout the colon and rectum. In two others (cases 7 and 8) there were large patches throughout the large bowel. One of these (case 8) showed widespread precancer of the polypoid type as well as similar changes in flat mucosa. In cases 4 and 6 there was patchy but quite extensive precancer in flat mucosa confined to the left colon and rectum. Case 3 showed patchy polypoid precancer in the sigmoid and rectum, the intervening flat mucosa showing a mild colitis with patchy precancerous change. In case 9 there was patchy polypoid precancer in the lower rectum only. Case 2 could not be assessed for extent of precancer as the histological sections of the bowel were not labelled for site.

Table III also gives an assessment of the severity of the colitis. In only one (case 8) was this at all severe, showing diffuse chronic inflammation with much crypt abscess formation and areas of full-thickness mucosal ulceration. In cases 2, 5, and 7 the severity of the colitis was graded as moderate and in three cases (3, 4, and 6) as slight. The inflammation in the latter appeared to be of a residual character. In case 9 the mucosa of the entire large intestine showed atrophy only with a little increase in the inflammatory cell content of the lamina propria in some areas. Moreover, there was evidence of healed colitis in the macroscopic examination of the specimens in the form of extensive submucosal scarring.

The following three case reports are representative of the value of rectal biopsy. The first (case 3) is a patient with a long history of colitis in whom sigmoidoscopic and radiographic opinion was suggestive of malignant change. This was reinforced by the presence of polypoid precancer in the rectal biopsy. The second (case 5) is a patient with a long history of colitis in whom there was no clinical or radiographic evidence of carcinoma, but the biopsy showed precancer in a flat mucosa. The colectomy specimen showed only a single small focus of adenocarcinoma in the descending colon about 1 cm in diameter. The third (case 7) is a patient with a long history of total colitis but no clinical or radiographic evidence of malignancy. Rectal biopsy showed precancer in a flat mucosa. Only extensive precancer was found in the operation specimen.

**COLITIS AND CANCER (CASE 3, TABLE III)** Twenty-four years intermittent diarrhoea, sometimes with rectal bleeding. Recent loss of weight and pain in left iliac fossa. Sigmoidoscopy showed proctitis with an area of polypoid mucosa at 8 cm. Barium enema radiographs revealed total colitis and narrowing of the sigmoid very suggestive of carcinoma.

Rectal biopsy (Fig. 3) of the polypoid mucosa showed 'villous and adenomatous hyperplasia of the rectal mucosa but no sign of invasion by carcinoma. The appearances are certainly precancerous'.

**Operation** Total proctocolectomy in two stages.

**Pathology of surgical specimen** The colon from the caecum to the descending part is shortened with contraction of the lumen and a granular atrophic appearance of the mucous membrane. The sigmoid colon (Fig. 1) shows extensive papilliferous or villous overgrowth of the mucosa over a length of 15 cm, in the middle of which there is a malignant stricture about 5 cm long. There is extensive invasion of the pericolic fat by carcinoma. In the rectum there is one area of sessile villous overgrowth of the rectal mucosa about 4 cm in diameter and a second smaller area 1 cm diameter. The remainder of the rectal mucosa is intact but has an atrophic appearance.

### TABLE III

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Sex</th>
<th>Age at Onset of Colitis</th>
<th>Length of History (yr.)</th>
<th>Extent of Colitis</th>
<th>Rectal Biopsy Type of Mucosa Showing Precancer</th>
<th>Surgical Treatment</th>
<th>Pathology of Colectomy Specimen</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>F</td>
<td>20</td>
<td>46</td>
<td>Total</td>
<td>Flat</td>
<td>Inoperable</td>
<td>Not available</td>
</tr>
<tr>
<td>2</td>
<td>F</td>
<td>23</td>
<td>24</td>
<td>Total</td>
<td>Flat</td>
<td>Proctocolectomy</td>
<td>Sigmoid</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>27</td>
<td>24</td>
<td>Total</td>
<td>Polypoid</td>
<td>Proctocolectomy</td>
<td>Descending colon</td>
</tr>
<tr>
<td>4</td>
<td>M</td>
<td>27</td>
<td>18</td>
<td>Total</td>
<td>Flat</td>
<td>Proctocolectomy</td>
<td>Sigmoid</td>
</tr>
<tr>
<td>5</td>
<td>F</td>
<td>46</td>
<td>13</td>
<td>Total</td>
<td>Flat</td>
<td>Proctocolectomy</td>
<td>Descending colon</td>
</tr>
<tr>
<td>6</td>
<td>M</td>
<td>41</td>
<td>8</td>
<td>Total</td>
<td>Flat</td>
<td>Proctocolectomy</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>F</td>
<td>46</td>
<td>12</td>
<td>Total</td>
<td>Flat</td>
<td>Proctocolectomy</td>
<td>Sigmoid</td>
</tr>
<tr>
<td>8</td>
<td>F</td>
<td>18</td>
<td>17</td>
<td>Total</td>
<td>Flat</td>
<td>Proctocolectomy</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>F</td>
<td>24</td>
<td>27</td>
<td>Total</td>
<td>Polypoid</td>
<td>Proctocolectomy</td>
<td>None</td>
</tr>
</tbody>
</table>
Microscopy shows mild chronic inflammation throughout the mucosa of the large intestine. There is atrophy of the mucous membrane in the proximal colon but no definite evidence of precancerous change. In the sigmoid there is extensive villous and adenomatous overgrowth of the rectal mucosa with focal invasion by mucus-secreting adenocarcinoma. The rectum shows extensive precancerous change in flat mucosa (Fig. 4) as well as the two areas of villous overgrowth, but no sign of invasion by carcinoma. The regional lymphatic glands are not involved.

**Follow-up** Well two years after operation.

**COLITIS AND EARLY CANCER (CASE 5)** Intermittent diarrhoea and bleeding per rectum for 13 years. Sigmoidoscopy showed appearances typical of ulcerative colitis. Barium enema radiographs confirmed colitis but there was no evidence of malignancy.

**Rectal biopsy** 'Mild chronic inflammation of the mucosa with some superficial erosion. The epithelial tubules are strikingly irregular with villous change and the lining epithelium shows bizarre nuclear changes. The appearances are those of pre-invasive carcinoma'.

**Operation** Total proctocolectomy.

**Pathology of surgical specimen** There is shortening of the large intestine, particularly on the left side, and the muscle layers are thicker than normal. The mucous membrane throughout the colon and rectum shows patchy polyoid change which has a nodular and papillary surface configuration (Fig. 2). Mucosa between the polyoid areas is thick and has a mucoid appearance. Microscopy shows intact, but hypertrophic, mucosa with a moderate inflammatory cell infiltration and some crypt abscess formation. The inflammation does not penetrate into the submucosa. The epithelial tubules are very irregular and show horizontal budding in some areas. In others there is a villous or papillary type of proliferation. These adenomatous and villous changes are most marked in those areas of polyoid change observed macroscopically. At a cytological level the entire mucosa shows changes of precancer or carcinoma in situ. In addition there are many areas where the epithelial tubules are breaking through the muscularis mucosa, but this infiltration does not amount to definite invasion by carcinoma.

**Follow-up** Well three months after operation.

**DISCUSSION**

The diagnosis of carcinoma in ulcerative colitis is often made at an advanced and incurable stage. It is not surprising that the prognosis of cancer in colitis is rather poor (Slaney and Brooke, 1959), although perhaps not as bad as previously estimated (Hinton, 1966). The only way to control the death rate at the present time is by earlier diagnosis.

It is well recognized that the detection and treatment of precancerous lesions is an effective method of cancer control. The progress made in recent years in the screening of patients by biopsy and exfoliative cytology for precancer of the cervix is perhaps the best example. In the large intestine a notable advance has been made in the prevention of cancer in polyposis families (Dukes, 1958). In this disease the polyposis is a precancerous phase which is often symptomless and precedes the development of invasive carcinoma by many years. Total colectomy and ileo-rectal anastomosis in this phase has considerably reduced the incidence of malignant change (Bussey and Morson, 1967).
A description of the morphology of precancerous change in ulcerative colitis is given here making a
distinction between the appearances seen in polyloid
lesions and in flat mucosa. The recognition of
carcinoma in situ in flat mucosa is particularly im-
portant because there may be no macroscopic
evidence of this in colectomy specimens or by sig-
moidoscopy and radiographic investigation. Our
studies indicate that precancer in a flat mucosa is
more common than the polyoid form. The fact that
it can be detected in rectal biopsies from patients
with a long history of total colitis emphasizes the
importance of careful follow-up of such colitics with
regular rectal biopsy whatever the state of the
mucosa as judged by sigmoidoscopy.

It would appear from this study that precancer is
present in all colectomy specimens removed for
colitis and cancer and can also be found in some
patients who have no invasive carcinoma but have a
long history of total colitis. Its precise incidence and
extent in different parts of the large bowel remains
to be worked out but this study suggests that it is
mostly found in the distal large intestine. Although
invasive carcinomas in colitis are more evenly dis-
tributed in the large bowel than in cancer without
colitis the incidence is still greater in the sigmoid and
rectum than in the proximal colon (Langman, 1966).

It is obviously desirable that surgical treatment
should be carried out before the development of
invasive carcinoma. The problem so far has been to
identify the precancerous phase in the individual
patient before the examination of a colectomy spec-
imen. It is likely, from experience with precancer in
other organs, that the length of the precancerous
phase of ulcerative colitis is very variable and it may
be a great many years before invasive carcinoma
develops. Indeed, it is not certain that precancer will
invariably proceed to invasion although the risk must
be very high.

It would appear that precancerous change in
ulcerative colitis is usually very diffuse and may even
involve the entire mucosa of the large intestine. The
retrospective examination of rectal biopsies reported
here shows that there is good correlation between the
biopsy diagnosis of precancer and the appearances
in the subsequent colectomy specimen. Moreover,
the patients with no precancer in the rectal biopsy
showed no precancer or cancer in the subsequent
colectomy specimen. These operations were mainly
performed for colitis although the long history of
disease and the risk of malignancy influenced the
decision to carry out surgical treatment.

Because of the patchy distribution of precancer in
the rectum it is likely that rectal biopsy will some-
times fail to be helpful. Negative reports should not
be regarded as excluding the chance that precan-
cerous or cancerous changes may be present in the
proximal bowel beyond the reach of the sigmoido-
scope. Clinical and radiographic observations by
themselves remain the most valuable means of
assessing the need for surgical treatment. For
example, one patient with a long history of colitis,
not included in this study, was regarded as particu-
larly at risk from malignant change. The rectal biopsy
report was equivocal but the subsequent colectomy
revealed a cancer of the ascending colon.

In nine patients the rectal biopsy diagnosis of
precancer accurately predicted the presence of similar
changes in the subsequent colectomy specimens. As
yet there has been no false diagnosis of precancer in
a biopsy. It would appear that rectal biopsy has a
valuable part to play in the recognition of the pre-
cancerous phase of ulcerative colitis in conjunction
with clinical and radiographic opinion. However, the
detection of precancer in a rectal biopsy has so far
been associated with a high incidence of suspected
and unsuspected invasive carcinoma in the more
proximal bowel. Thus, five of the nine patients had
invasive cancers. In one of these (case 5) the recogni-
tion of the patient as a 'high risk colitic' on clinical
evidence together with a rectal biopsy report of pre-
cancer led to proctocolectomy at an early and almost
certainly curable stage of the malignant process. The
remaining four patients showed only extensive pre-
cancer in the operation specimen. They are examples
of how the development of cancer in colitis may be
anticipated and surgical treatment carried out in the
precancerous phase. In all these patients the inten-
tion to perform colectomy was much influenced by
the biopsy report although this was, by no means, the
only basis for the decision.

If rectal biopsy can help to detect the patient who
has entered a precancerous phase then it follows that
all patients with a long history of total ulcerative
colitis should have a regular biopsy examination.
Once a year should be sufficient. The adoption of
such a policy could not only help to prevent or
control the death rate from cancer in the population
of colitics at risk, but it would certainly teach us
more about the evolution and fate of the precan-
cerous phase.

**SUMMARY**

Histological changes characteristic of precancer were
recognized by rectal biopsy in nine patients with
chronic ulcerative colitis. One or more foci of inva-
sive carcinoma, together with widespread pre-
cancerous change, were subsequently found in the
colon or rectum of five of these patients. One, how-
ever, was at a very early stage of development. In the
other four patients the colectomy specimens showed precancerous changes only.

Rectal biopsy, in conjunction with clinical and radiological studies, may be helpful in the recognition of the patient with ulcerative colitis who has entered a precancerous phase. However, experience to date has shown that the recognition of precancer in a rectal biopsy is associated with a high incidence of suspected or unsuspected invasive carcinoma in the more proximal bowel.

It is suggested that regular rectal biopsy for all patients with ulcerative colitis is desirable in order that more may be learnt about the evolution of the precancerous phase. In particular those patients with a long history of total colitis should have a rectal biopsy at least once a year. Those in a precancerous phase would require total proctocolectomy. Such a policy should help to control the death rate from cancer in the population of colitics at risk.

We would like to thank the consultant staff of St. Mark's Hospital for permission to study their cases. The photographs were taken by Mr. Norman Mackie and Mr. Lloyd Soodeen gave valuable technical assistance. The expenses of this research were defrayed out of grants from the British Empire Cancer Campaign for Research (B.C.M.) and the Medical Research Council (L.S.C.P.).

REFERENCES


