Factors Affecting Recurrence
Following Resection for Crohn’s Disease

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The records of 187 patients with Crohn’s disease who underwent resectional surgery were analyzed to evaluate the effect of several clinical and histologic features on the recurrence rate. Recurrence was defined as the need for re-resection. The data were analyzed by the life-table method. Age, sex, age at onset of disease and at time of resection, family history, presence of granuloma, and microscopic involvement at the line of resection did not affect the recurrence rate. The distribution of the disease and duration of symptoms before primary resection did influence the rate of re-resection. Patients with predominantly large bowel disease (N = 56) were found to have a higher rate of re-resection (45 percent) when compared with 32 percent in patients with small bowel involvement (N = 94) and with 35 percent in patients with both small and large bowel involvement (N = 57) (P = 0.04). A detailed review, an analysis of the literature, and a comparison with our results are made. [Key words: Crohn’s disease; Recurrence; Re-resection]

The influence of various factors on the rate of recurrence following resectional surgery for Crohn’s disease is much debated. To resolve some of this controversy, we have reviewed our data on 210 patients who underwent surgery for Crohn’s disease. An analysis was carried out of the relationship between nine different variables and the rate of recurrence. To eliminate the potential confusion created by clinical or radiologic criteria for recurrence, we chose re-resection for histologically proven Crohn’s disease as our criterion for recurrence.

Methods

The records of 210 patients who underwent surgical intervention for Crohn’s disease at Long Island Jewish-Hillside Medical Center between January 1952 and December 1981 were examined. Eleven patients had had their first operation performed at another institution. The data on these patients were obtained and entered into the analysis. Seventeen patients had undergone primary surgery other than resection for Crohn’s disease (e.g., bypass, diverting ileostomy, or colostomy); therefore, they were excluded from the analysis. The remaining 193 patients who had undergone resectional surgery for Crohn’s disease were included. Six patients had died within 30 days of surgery, constituting a mortality rate of 2.8 percent. The diagnosis of Crohn’s disease was confirmed histologically in all patients according to the criteria established by Lockhart-Mummery and Morson.

Ninety nine men and 88 women were in the group. Ages at the time of intestinal resection ranged from 8 to 78 years (average 32.0 years) (SD = 15.9). Follow-up ranged from two to 48 years (average 10.5 years) (SD = 9.8).

The up-to-date follow-up on 187 patients was completed. Of these 187 patients at risk, 100 patients (53.4 percent) subsequently underwent a second, 43 a third, 11 a fourth, five a fifth, and one patient a sixth resection.

The incidence of re-resection was examined by a life-
Operations Performed for Large Bowel Disease

<table>
<thead>
<tr>
<th>Procedure</th>
<th>First Resection</th>
<th>Number of Patients with Re-resection</th>
<th>Re-resection Rate (Percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right colon</td>
<td>5</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>Left colon</td>
<td>10</td>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>Subtotal colectomy (with or without primary anastomosis)</td>
<td>25</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>Abdominoperineal resection</td>
<td>3</td>
<td>1</td>
<td>33</td>
</tr>
<tr>
<td>Total proctocolectomy</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>56</strong></td>
<td><strong>17</strong></td>
<td><strong>30</strong></td>
</tr>
</tbody>
</table>

table analysis with regard to the possible influence of the following eight factors. The numbers involved in the ninth factor (i.e., type of surgery performed) were too small for analysis by the life-table method.

1. Sex.
2. Age at onset of disease.
3. Age at first resection.
4. Family history.
5. Duration of disease from onset to first resection.
6. Presence or absence of granuloma in the specimen.
7. Microscopic involvement at the line of resection.
8. Distribution of disease.
9. Type of surgery performed.

The sex of the patient had no significant effect \( (P = 0.08) \) on the rate of recurrence (Fig. 2). Similarly, age at onset of the disease \( (P = 0.6) \) and age at the first resection \( (P = 0.7) \) had no effect on the recurrence rate. Nineteen patients \( (10.2\%) \) had a family history of Crohn's disease, which did not influence the recurrence rate \( (P = 0.08) \).

Twelve patients \( (6.4\%) \) had evidence of microscopic involvement at the line of resection. This did not influence the recurrence rate in these patients \( (P = 0.3) \). Granulomas were present in the resected specimens of 71 patients \( (45.2\%) \). No significant correlation was found between the presence of granulomas and the rate of recurrence \( (P = 0.7) \).

Duration of Disease Before Surgery: Patients who had had the disease for three to ten years before they underwent their first resection were more likely to have a re-resection than patients who had had the disease for either longer than ten years or less than three years. This significant finding \( (P < 0.05) \) affected the rate of recurrence (Fig. 3).

Distribution of Disease: The rate of re-resection according to the location of the disease is shown in Figure 4. Patients with predominantly large bowel disease were found to have a higher rate of recurrence, as compared with the other two groups. For example, of 56 patients

**Results**

The overall cumulative recurrence rate according to the life-table analysis was 36 percent at ten years and 57 percent at 20 years. The recurrence rate increased with the length of follow-up. We found a trimodal curve in the cumulative recurrence rate. During the first five years, the recurrence rate was 5 percent per year. There was a decline to 1.5 percent per year for the next 10 years and then an incline to 4 percent per year for the 16th to 20th years (Fig. 1).

The overall cumulative recurrence rate was divided into three categories:

1. Predominantly small bowel disease with no or minimal cecal involvement \( (94\% > 50.2\%) \).
2. Predominantly colonic disease with no minimal terminal ileal involvement \( (56\% > 29.9\%) \).
3. Gross involvement of small and large bowel \( (37\% > 19.8\%) \)

**Type of Surgery Performed:** When the site of disease was in the ileocecal area, ileocecal resection was performed with or without primary anastomosis. Similarly, when the small bowel was involved, resection of the diseased segment with or without primary anastomosis was performed. When predominantly the large bowel was involved, several different operations were performed, depending on the location and extent of disease and the condition of the rectum (Table 1).

**Fig. 1.** Cumulative recurrence rate calculated by life table analysis (95 percent confidence intervals).