

Clinical-Pathological Investigation of Regional Enteritis as a Guide to Prognosis

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NUMEROUS STUDIES have shown that recurrence is the rule rather than the exception following operation for regional enteritis. In fact, the recent emphasis on postoperative recurrence has almost obscured the fact that some patients show no evidence of recurrent regional enteritis even though follow-up periods now extend to more than 30 years. Such patients differ greatly from those who display relentless progression of their disease but the explanation for such divergent clinical patterns remains obscure.

Long-term observations of patients with regional enteritis treated at the Presbyterian Hospital provide a unique opportunity to examine this question. The present study focuses on patients who have been followed for at least 10 years postoperatively and an effort has been made to identify specific clinical and pathological features that might be associated with a favorable response to surgical therapy. Eight clinical and 10 pathological features were examined and a stepwise discriminant analysis was carried out in order to evaluate characteristics useful in prognosis as well as to gain a better understanding of the disease in patients with long term remissions following surgical excision of the involved intestine.

Methods

Clinical Material

The 64 patients comprising the study group were drawn from 117 patients operated on for regional enteritis at the Presbyterian Hospital during the 25-year period between 1932 and 1957. No patients operated on after 1957 were accepted since the postoperative follow-up

would have been too short for purposes of this analysis. Twenty-six patients with ileocolitis were considered separately and are not included in this report. Patients whose initial definitive operation was performed at another hospital were excluded as were patients who had a bypass procedure rather than a resection. Specifically, the study group consisted of patients in whom disease was treated by ileocelectomy (23 enterectomy patients were excluded) and in each instance the resection represented the patient's first definitive surgical procedure. Actually 70 patients meeting these criteria were treated by ileocelectomy during the time period mentioned, but five were lost to follow-up and one died in the immediate postoperative period, reducing the study group to 64 patients. Obviously any study of pathologic features must be limited to patients treated by resection; the other strictures such as a specific operation (ileocelectomy) and the use of only the first surgical procedure were added in an effort to make a more homogeneous group. Some patients had previous operations such as appendectomy or laparotomy but since these were not considered curative such patients were included in the study group. However, patients who had had unsuccessful bypass procedures prior to resection were excluded since they represented recurrent disease and would have biased the study. The study group, as eventually constituted, represents a more uniform selection of surgically treated patients than has been analyzed in previous reports.

All patients were followed for a minimum of 10 years after operation except for eight patients who died dur-

ing this 10-year postoperative period. Five deaths were related to progression of regional enteritis and these patients were obviously included in the recurrent group. The three patients who died of unrelated causes within the first 10 years represent a more difficult problem, since they might have recurred had they survived the full 10 years. However, it was thought best to place these three patients who died 5, 6 and 8 years postoperatively in the non-recurrent group. Most of the 64 patients were followed for considerably more than 10 years and the mean duration of follow-up for the entire group was 17.4 years.

The value of a long follow-up period would be lost without accurate reporting of postoperative recurrences. This continues to be a difficult problem and it is evident that the evaluation of surgical results in regional enteritis depends to some degree upon the definition of recurrence. We have continued to use the definition set forth in our original study; the return of symptoms in association with x-ray and laboratory evidence of activity of the disease.¹³ Since the great majority of patients have some diarrhea postoperatively, it is difficult to evaluate this symptom in establishing the diagnosis of recurrent disease. Usually, this diarrhea is of no great clinical significance; if no weight loss or malabsorption was associated, it was not considered to be evidence of recurrent regional enteritis. Another problem is posed by the asymptomatic patient with persistent radiologic evidence of mucosal abnormalities in the region of the anastomosis. This was an unusual event and in the present series only three patients developed such changes. However, this number may be artificially low because small intestinal x-rays were not uniformly requested in asymptomatic patients. The three patients referred to above were not considered to have recurrent disease.

The actual follow-up was conducted at the Presbyterian Hospital in 43 patients while 16 patients were contacted by mail or telephone and five through their doctor. As noted above, five patients who were lost to follow-up were previously excluded from the study group.

The 64 patients included 38 men and 26 women and the average age at the onset of symptoms was 35.2 years. The patients fell into two roughly equal groups: Twenty-nine who developed recurrent regional enteritis and 35 who showed no evidence of recurrence during their more than 10-year period of follow-up. Several variables were tested in order to examine their value in prognosis following operation. Both clinical as well as gross pathologic and histologic features were employed. The clinical features included (1) sex, (2) age at onset of symptoms, (3) the presence of an abdominal mass (4) external fistulas and (5) anal suppuration such as fistulas, fissures, ulcers or perirectal infection. Features recorded at the time of laparotomy included (6) the length

of involved bowel in inches (7) how far above the gross disease the bowel was transected and (8) the presence or absence of skip areas.

Pathology

The diagnosis of regional enteritis was documented in all 64 patients by clinical, x-ray and laboratory findings as well as careful examination of the resected specimen. The incidence of 10 histologic lesions was recorded and when these features were added to the eight clinical characteristics mentioned above it provided 18 variables that could be tested against the two subdivisions of the study group; those who recurred and those who did not.

The histologic features selected for examination represent an extension of a previous study reported from this department (1). The four microscopic lesions evaluated at that time consisted of (1) aberrant pyloric glands or pyloric metaplasia; (2) epithelioid and giant cell granulomas; (3) so-called neuromatous lesions and (4) inflammatory and obliterative vascular lesions. In the present study, the presence of granulomas was further broken down according to their location in the bowel wall or in regional lymph nodes. Five additional histologic criteria were recorded: the presence or absence of (a) intramural abscesses, (b) microscopic sinus tracts or fistulae (c) dilated mural lymphatics (d) nodular aggregates of lymphoid tissue or actual lymph follicles other than Peyer's patches, and (e) hyperplasia of the muscularis mucosae. When one of the 10 histologic features was present, a semi-quantitative value was ascribed by grading from + to +++++.

Pyloric metaplasia may be evident only in a portion of the mucosa, usually the deep aspect (Fig. 1) or the glands may occupy the greater part of the thickness of the entire mucosa. The histochemistry of aberrant pyloric glands is distinctively different from that of normal small intestinal glands. The pathogenesis of pyloric metaplasia has been traced in detail by Ming and associates¹⁸ who supported the concept that it is an acquired condition, representing an abnormal regenerative process following destruction of the pre-existing mucosa. Similar changes are found in the vicinity of marginal ulcers, and this has led to the theory that pyloric metaplasia represents adaptation to alterations of pH. However, aberrant pyloric glands have also been described in various other conditions all of which are characterized by breakdown and subsequent healing of the bowel mucosa.²⁵

Epithelioid and giant cell granulomas are discrete, non-caseating lesions, reminiscent of those seen in Boeck's sarcoid (Fig. 2). These are not infrequently situated in the vicinity of submucosal lymphatics, but may be seen in any layer of the intestine. They frequently occur within a nodule of lymphoid tissue. The finding of granuloma-like foci in the vicinity of fistulous tracts was

FIG. 1. Regional enteritis: a focus of pyloric metaplasia is seen towards the left side. The muscularis mucosae is considerably thickened and appears to fuse with the muscularis propria in the center of the field. A small artery to the right of center shows marked intimal proliferation. This vessel is surrounded by two nodules of neuroamatous hyperplasia. Verhoeff $\times 28$.



discounted in this study, as they may represent a foreign body reaction rather than a characteristic feature of regional enteritis. Within lymph nodes, aggregates of large acidophilic epithelioid cells, with or without multinu-

cleated giant cells, and generally situated in the cortical portion of draining mesenteric nodes, were accepted as epithelioid and giant cell granulomas (Fig. 3). These aggregates must be distinguished from large reticulum cells

FIG. 2. Nodules of lymphoid tissue, usually associated with dilated lymphatics, are noted in the subserosa. In addition, a group of epithelioid granulomata, containing epithelioid cells, multinucleated giant cells and surrounded by a rim of lymphocytes is noted towards the right of the picture. Hematoxylin and eosin $\times 38$.



in germinal centers of lymphoid follicles, which may mimic granulomatous lesions. Schaumann bodies, as described by Williams,²⁴ were not encountered in this study.

Neuromatous lesions were characterized by wide, curved bundles of Schwann cells, often in association with submucosal or myenteric ganglion cells. In former years these lesions were, indeed, mistaken for plexiform neuromata. Similar proliferations of Schwann cells are commonly found underlying chronic peptic ulcers, and it might be presumed that in regional enteritis these lesions are related to concurrent or pre-existing ulceration of the mucosa in the corresponding area.

Inflammatory and obliterative vascular lesions of a non-specific type (Fig. 1) were usually most prominent in the deeper layers of the wall in areas of most intense inflammation. Such vascular lesions are also reminiscent of those seen in the base of chronic peptic ulcers, as well as a host of other lesions, including the vicinity of invasive malignant epithelial tumors.

Intramural abscesses were characterized by fairly well circumscribed collections of inflammatory cells totally replacing a portion of the bowel wall (Fig. 4).

Microscopic fistulae or sinus tracts, were sometimes extensions of abscesses, or they were narrow elongated defects lined by granulation tissue. Some extended from the mucosa (Fig. 4) while in other instances a connection with the mucosa was not evident.

Dilatated lymphatics were most often noted in the

submucosa (Fig. 5). These endothelial lined channels were unusually prominent, and contained proteinaceous material.

Lymphoid nodules were present mainly in the submucosa (Fig. 5) and subserosa, (Fig. 2) although they occasionally occurred in the muscularis propria as well. They consisted of aggregates of small mature lymphocytes or follicles with germinal centers. Those in the submucosa were often contiguous with a lymphatic channel. Only those lesions lacking epithelioid and giant cells were included in this category.

The muscularis mucosae showed hypertrophy of the smooth muscle (Fig. 1) either in a segmental or a more diffuse distribution. In a number of instances the muscularis mucosae was widened by the presence of fibrous tissue separating muscle fibers but without actual hyperplasia of the muscle tissue itself. The latter finding was not tabulated. In addition to hypertrophy of the muscularis mucosae several of the specimens revealed distortion of this layer, so that the fibers splayed out and appeared to be perpendicular to the long axis of the submucosal layer. Fusion between the thickened muscularis mucosae and muscularis propria was noted at some points.

Statistical Analysis

The data were analyzed utilizing a stepwise discriminant analysis²⁰ and a computer program for this analysis as implemented in the BMD statistical program pack-

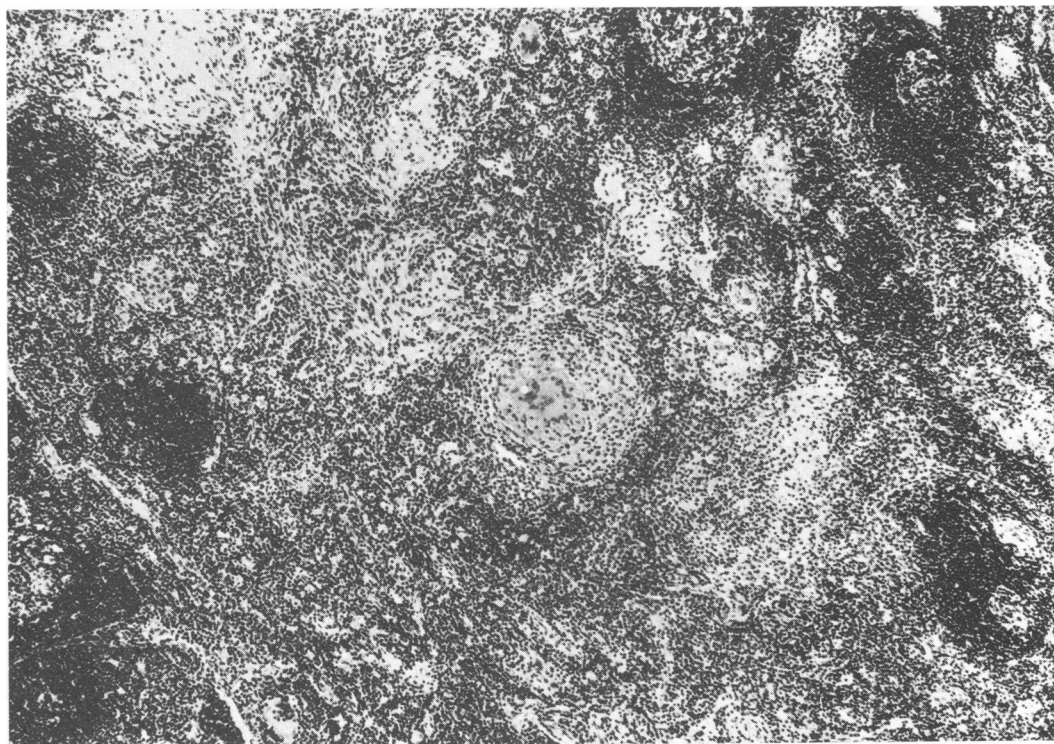
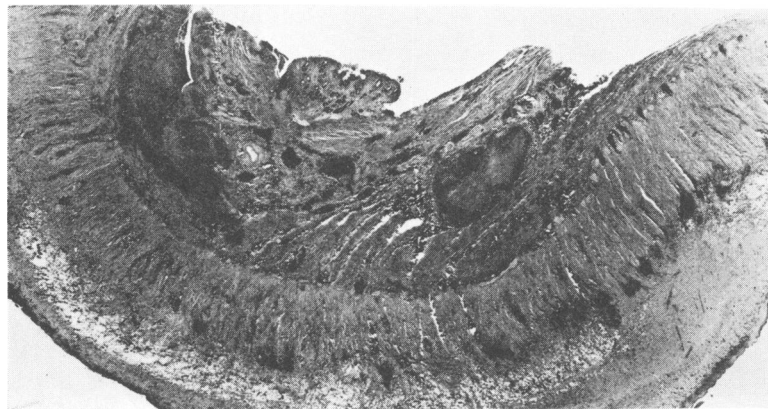


FIG. 3. Epithelioid granuloma within a mesenteric lymph node. A well formed granuloma is noted in the center of the field; a multinucleated giant cell is seen alone at the top of the field while aggregates of plump epithelioid cells are present to the right and above the central granuloma. Hematoxylin and eosin $\times 63$.

FIG. 4. Low power view of involved segment of small intestine, showing transmural inflammation which includes an intramural abscess to the right of the center and a beginning sinus tract on the left. Hematoxylin and eosin $\times 4$.



age.⁵ The stepwise discriminant analysis is used to determine the effects of parameters in differentiating one population from another. The analysis determines a linear discriminant function (a linear combination of the

variables) which minimizes the probability of misclassification (or maximizes the ability to discriminate between groups). This is accomplished in a stepwise manner with one variable added or removed from the

FIG. 5. Prominently dilated submucosal lymphatics and a lymphoid nodule are shown in this hematoxylin and eosin stained section of small intestine from a resection for regional enteritis. $\times 80$.

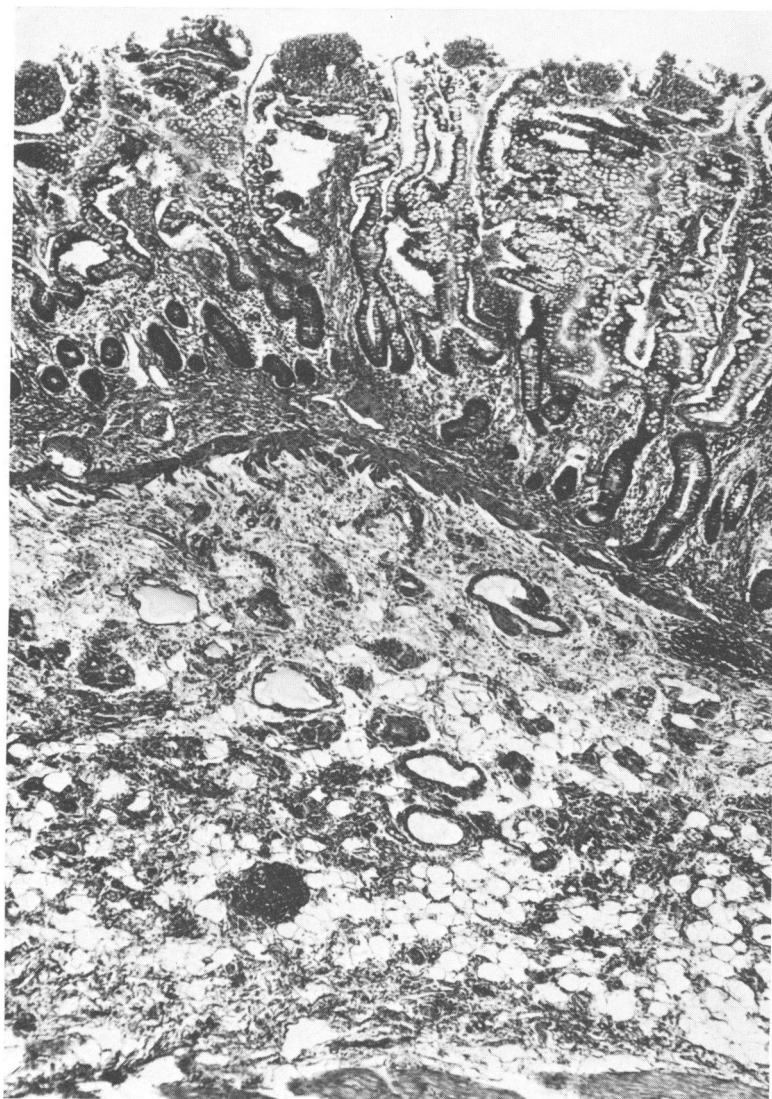


TABLE 1

Feature	Study Group 64 Patients		Recurrent Disease 29 Patients		No Recurrence 35 Patients	
	Number (of Patients)	%	Number (of Patients)	%	Number (of Patients)	%
Sex	38 M	59%	17 M	59%	21 M	60%
% Males	26 F		12 F		14 F	
Age of onset	34 ± 13 years	—	33 ± 14 years	—	35 ± 12 years	—
Abdominal mass	14	22%	4	14%	10	40%
External fistula	14	22%	9	31%	5	14%
Anal complications	21	32%	15	52%	6	17%
Involved bowel (inches)	15.4 ± 11 inches	—	18.8 ± 10 inches	—	12.7 ± 9 inches	—
Normal bowel resected with specimen (inches)	15.3 ± 6 inches	—	14.7 ± 5 inches	—	15.9 ± 5 inches	—
Skip areas	4	6%	3	10%	1	3%

function on each step according to a predetermined rule. The rule used for this analysis was an F level greater than 1 for inclusion and less than 1 for deletion. (The "F" statistics are the likelihood ratio tests of equality over the groups of the conditional distribution of the individual variables given the entered variables).

The computer program output includes means and standard deviations for each variable within groups, a within groups covariance matrix and correlation matrix and a step by step summary of the generation of the discriminant function. When the F level has reached a point where no further variables may be added or deleted the coefficients for the discriminant function are printed and the cases are classified into groups.

Results

The eight clinical variables that were studied are shown in Table 1. The sex distribution shows a mild preponderance of males with a similar pattern in the recurrent and non-recurrent groups. The two groups are also very similar in regard to age of onset. About 1/5th of the total group had either a palpable abdominal mass or an external fistula by the time they came to definitive surgery. Although it is not shown on Table 1, a more common indication for surgical therapy was chronic partial intestinal obstruction.

The incidence of anal complications is high but is consistent with the experience reported from other hospitals.^{3,11,9} The length of the involved ileum was determined from the surgeon's operative report and in most instances it was possible to state how far above the gross disease the bowel had been transected.

The results of the statistical analysis included six variables in the final discriminant function because they had "F" values greater than 1.0 (Table 2). These were (a) anal suppuration (b) length of involved bowel (c) pyloric metaplasia (d) neuromas (e) lymphoid follicles and (f) external fistulas. Only two of these variables proved to

be statistically significant in predicting recurrence. These were anal suppuration at the 99% level of confidence and length of involved bowel at the 95% level. The presence of rectal problems made recurrent disease more likely, as did an increased length of involved bowel.

The length of normal bowel included in the resected specimen varied from zero to as far as 40 inches above the gross disease. There was no statistical correlation between the amount of normal ileum removed and the incidence of recurrent disease. Therefore, the importance of the extent of disease present at the time of the first operation cannot be explained by the fact that the surgeon might be anastomosing the bowel further away from the diseased area when a short segment is involved.

The mean length of involved intestine in the non-recurrent group was 12.7 inches. However, the recurrent group did not exhibit unusually extensive disease in that the mean value increased to only 18.8 inches.

The incidence of the 10 histologic features is summarized in Figure 6. Pyloric metaplasia was evident in 69% of the resected specimens and was actually more common than the sarcoid-like granulomas, thought to be pathognomonic lesions in regional enteritis.

Thirteen of the 64 patients had granulomas in mesenteric lymph nodes although in two patients no granulomas were evident in the bowel wall. Neuromatous and vascular changes were present in approximately 40% of

TABLE 2.

No. Variables Included	Variable	F value	p value
1	Anal suppuration	9.6282	p = <0.01
2	Length of involved bowel	4.9270	p = <0.05
3	Pyloric metaplasia	3.2472	p = >0.05
4	Neuromas	2.2820	p = >0.05
5	Dilated lymphatics	1.5844	p = >0.05
6	External fistulas	1.2891	p = >0.05

the patients, while microscopic abscesses and fistulas were slightly less common (both 34%). Dilated lymphatics and lymphoid nodules were observed in the majority of the specimens and hypertrophy of the muscularis mucosae was also a common finding.

The correlation matrix was examined to determine the relationship of individual histologic features to each other as well as to the gross and clinical features. No significant correlations were present as evidenced by the fact that all "r" values were between -0.5 and +0.5. As expected, the highest value ($r = +0.47$) was seen in the relationship between granulomas in the bowel wall and those in mesenteric nodes but even this was not significant because many patients with granulomas in the intestine did not show these lesions in the regional lymph nodes. Interesting enough, there was no correlation between microscopic fistulas and external fistulas even though these features were present with approximately the same frequency.

Because the correlation matrix failed to show a significant correlation between any of the individual histologic features, each feature was considered separately in order to see how it related to the patient's postoperative course (Fig. 7). While discriminant analysis selected two of the clinical features as bearing on prognosis, none of the histologic features was significant. Pyloric metaplasia had the highest "F" value and Fig. 7 shows that the presence of these glands was more common in the group that did well but this value was well below the level of significance.

Discussion

We have analyzed a uniquely homogeneous group of surgically treated patients with regional enteritis in an

effort to identify factors that might be associated with long term surgical remission. The study group was limited to patients with chronic regional ileitis, all treated by ileocelectomy at the Presbyterian Hospital between 1932 and 1957. In every case the operation that enrolled the patient into the study group constituted the first resection for the disease and the patients were followed from a minimum of 10 to a maximum of 32 years. Despite the general concern regarding late recurrences in regional enteritis 35 of the 64 patients were doing well at the time of the study, thus casting considerable doubt on the concept that all patients will recur if followed long enough. Certainly selection was involved in the makeup of the study group and the recurrence figures should be regarded in the light of that fact. However, the recurrence rate of 45% is compatible with reports from other hospitals, provided that patients with ileocolitis are excluded.¹⁶

A number of studies dealing with regional enteritis have attempted to correlate clinical data with the subsequent course of the disease but these efforts have been hampered both by inadequate follow-up and patient material that could not readily be subjected to statistical analysis. In attempting to associate certain clinical or pathological features of the disease with the postoperative result, errors are inevitable if patients are listed as surgical cures at the time of the study but then go on to develop recurrent disease. The average follow-up of 17.4 years in the present study minimizes this problem.

The present study confirms previous work, indicating that postoperative recurrences in regional enteritis are not related to the extent of the resection.^{4,22} This applies both to the small intestine as well as its mesen-

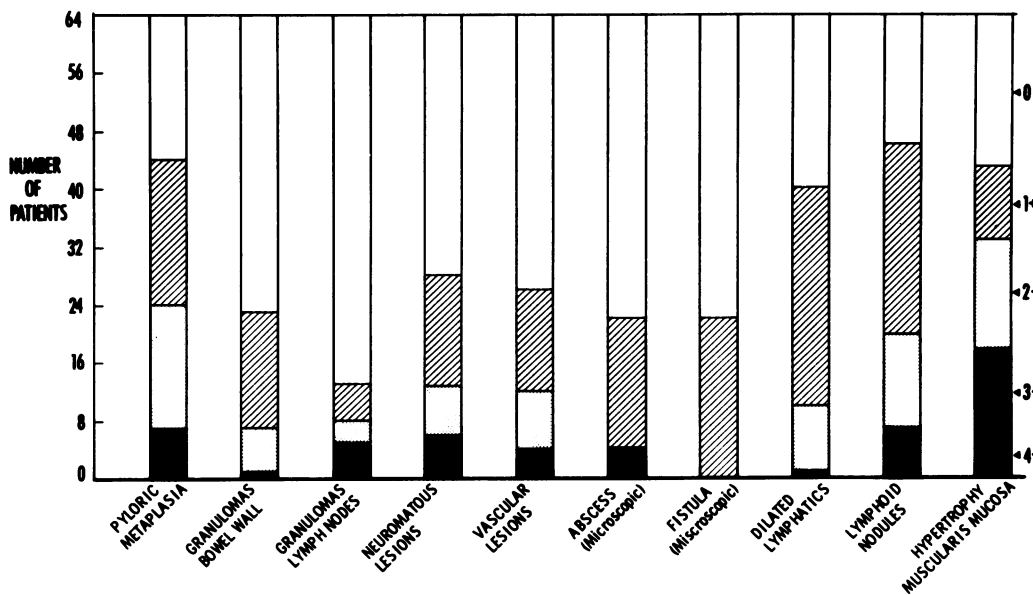


FIG. 6. The incidence of the 10 histologic features in 64 patients. When present, individual features were roughly quantitated from + to +++++.

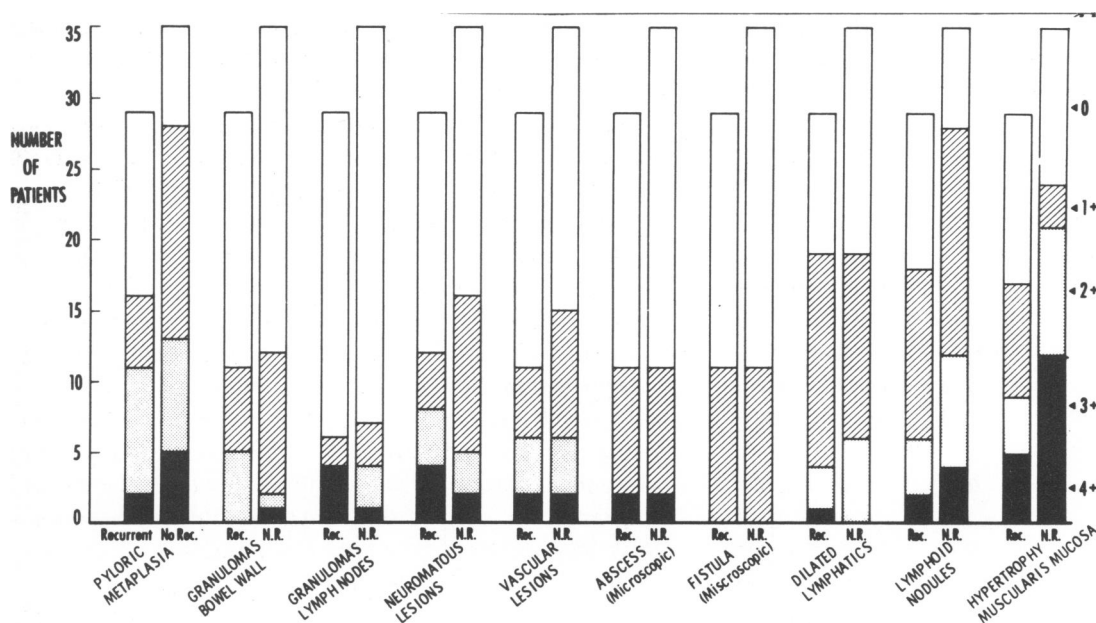


FIG. 7. The study group was divided up into the patients who recurred (29 patients) and those who did not (35 patients). The incidence of the 10 histologic features was then tabulated for each group.

tery¹⁰ so the disease appears to possess inherent biological differences in patients who experience recurrence as opposed to prolonged remission. Efforts to explain these differences by focusing on the nature of the original surgical procedure have not been particularly fruitful and, in fact, the debate concerning recurrence rates following various types of surgical procedures has largely subsided with the demise of bypass operations.

The 18 clinical, gross pathologic and histologic features selected for this study were only partially successful in separating the study patients into those that recurred and those who did well. No single feature was exclusively associated with either long-term postoperative remission or the development of recurrent disease. However, discriminant analysis did reveal a statistically significant association in two of the 18 features selected for analysis. An increased length of involved bowel was an ominous sign and when anal complications were noted prior to or at the time of the original operation recurrence was also more likely. The anal lesion anteceded the development of intestinal symptoms in eight of the 21 patients who had this complication and five actually responded, although reluctantly, to local surgical measures.

Previous authors have commented on the chronicity of anal complications in certain patients with regional enteritis,^{2,12,19} and the possibility of a higher recurrence rate has also been inferred by Atwell and his colleagues, who noted that six of nine patients with anal fistulas developed recurrent disease.² The chronicity of anal lesions and their desultory response to the usual surgical measures suggests that factors in addition to irritation by frequent stools are involved. A number of authors have

pointed out that these lesions frequently show sarcoid reactions on microscopic examination^{8,17} indicating actual involvement of the rectum by regional enteritis. Anal suppuration thus signifies colon involvement, and not surprisingly anal problems are more common in patients with ileocolitis than with regional enteritis confined to the small intestine.^{2,7} Furthermore, it has been suggested that anal complications are harbingers of more generalized colonic involvement.²³ Under such circumstances the higher recurrence rate noted in patients with anal complications becomes understandable. Anal lesions, because of their association with colonic involvement, are an indication that the disease is actually more extensive than evidenced by the gross findings noted at the time of operation.

The relationship between extent of disease and postoperative recurrence has been explored in a number of previous reports. Bockus felt that the length of involved intestine did not affect the incidence of postoperative recurrence⁶ but other authors have sought to present evidence of an improved prognosis when the disease is well localized. Van Patter and associates reported a higher recurrence rate when more than 50 cm. of ileum was involved.²² This figure corresponds to 19.7 inches, which is within one inch of mean value noted for those patients who developed recurrent disease in the present study. Atwell² also suggested that recurrence is more frequent when the disease involves a longer segment of intestine. He divided his patients into three groups: less than 3 inches, between 3 and 12 and over 12 inches. The recurrence rates were 38, 60 and 67%, respectively, but statistical analysis was not undertaken.

Extension of the disease by means of skip areas was

not common in the present study. Only four patients showed such lesions (6.3%) while figures from 9%¹⁴ to 25%²² have been quoted elsewhere. Recurrence was noted in three of the four patients confirming the importance of extent of disease in determining prognosis.

A number of other clinical features have been considered to have a bearing on postoperative recurrence. The importance of age has received the most discussion and a number of authors have suggested that the disease is modified in the elderly and pursues a more benign course.^{21,22} Others have focused on the second and third decades, feeling that the worst surgical results occur in patients whose symptoms are first noted at that time.^{2,14} Still other reports dispute these impressions^{13,16} and the effect of age on prognosis remains uncertain. Age at onset of symptoms varied widely in the present series; the youngest patient was 11 years old and the oldest 68. However, mean ages were similar in the recurrent and non-recurrent groups and no significant correlations of age with the likelihood of postoperative recurrence was noted in the statistical analysis.

Efforts have also been made to utilize the histologic features of the disease as seen in the resected specimen as a guide to prognosis. The detailed study by Van Patter and associates²² focused on the sarcoid-like granulomas since they are considered to be a characteristic feature of the disease. They reported granulomas in 117 of 297 specimens yielding an incidence of 39%. This is similar to the incidence noted in the present study (36%) and other authors have also confirmed the fact that this "characteristic" histologic feature is absent in the majority of resected specimens. Van Patter could find no difference in recurrence rate in the patients with or without granulomas.

A more promising report appeared in 1955 when Kawel and Tesluk¹⁵ noted a high recurrence rate in those patients whose resected specimens contained "pyloric glands" whereas no recurrences developed in the 18 patients in whom this histologic feature could not be demonstrated. Unfortunately, the length of postoperative observation was not recorded and it has not been possible to confirm these interesting findings. The present study failed to show a significant correlation between the presence or absence of pyloric glands and recurrent disease.

The concept that careful histologic examination might identify those patients who go on to long-term postoperative remission remains a challenge. Since no single histologic feature is characteristic of the disease, simultaneous evaluation of many features as was carried out in the present study will undoubtedly be necessary. The diversity of histologic findings is noteworthy as is the fact that the correlation matrix failed to show significant correlation between individual features. Random distribution rather than a pattern of individual features was

evident and under such circumstances even the most detailed histologic definition failed to distinguish between patients who recur and those who do well.

The failure to distinguish recurrence from remission histologically cannot alter the fact that regional enteritis does not behave in the same fashion in all patients. Unfortunately, the presently available technics for identifying the patient whose operation will result in long-term remission are still rudimentary. However, when extent of disease and anal suppuration are combined, these two factors can play a role in helping to predict the outcome after operation. For instance, there were 19 patients who had limited ileal involvement (less than 12 inches) and the lack of anal complications and only three patients developed postoperative recurrences. At the other end of the scale 12 patients combined more extensive disease (more than 12 inches) and anal suppuration. Recurrence constituted a formidable problem in this group and was documented in 11 of the 12 patients. Prognosis was obviously a more difficult problem in the remaining 33 patients who combined anal complications with a short segment of involved bowel or vice versa. Since postoperative recurrence in regional enteritis is not related to the extent of operation, future studies will have to carefully examine the nature of the disease itself. Careful statistical analysis of the multiple features that make up the disease in each patient may not only serve as a guide to prognosis but may also help to clarify the pathogenesis of regional enteritis.

Summary and Conclusions

The recent emphasis on recurrence following operation for regional enteritis has obscured the fact that some patients do very well postoperatively, even though follow-up periods now extend to more than 30 years. A uniquely homogeneous group of 64 surgically treated patients with chronic regional enteritis was studied in an effort to identify clinical and pathological features that might be associated with long-term surgical remission. All patients had their first definitive operation at Presbyterian Hospital, ileocolicectomy was the only procedure used and the patients were followed from a minimum of 10 to a maximum of 32 years. A series of five clinical, three gross pathologic and ten histologic features was recorded in each patient and the information was then analyzed using stepwise discriminant analysis. Evaluation of the correlation matrix indicated that none of the 18 individual features were significantly correlated to each other. Therefore, it was possible to test each feature individually for its predictive value in regard to the postoperative period. Two of the clinical features revealed a statistically significant correlation with postoperative remission or recurrence. Both these features bear a relationship to the extent of disease at

the time of the initial operation, so that their prognostic importance is not surprising. The length of normal bowel removed above the gross disease and the age of onset of symptoms were not significant factors in postoperative recurrence in this study. The long postoperative follow-up period (mean 17.4 years) in the present study makes it possible to anticipate permanent surgical remission in some patients. Since neither the operative procedure nor its extent is a factor in recurrence, attention to the nature of the underlying disease will be necessary to better understand the variable results that follow surgical therapy.

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