Stricture of the Anorectum in Crohn's Disease Involving the Colon

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Crohn's disease involving the colon was complicated by anorectal stricture in 12 of 160 patients (7.5%). The clinical features of these 12 patients have been evaluated and compared with 148 control patients. The average interval from onset to development of stricture was 14 years, which contrasts with ulcerative colitis in which a significant proportion of strictures develop during the first attack. These anorectal strictures were of a diaphragm-like or of annular or tubular variety and resulted from transmural and submucosal inflammatory disease, perianal sepsis, and post-ileostomy atrophy. They were clearly associated with multiple complex perianal fistulae (83%), and proximal radiological narrowing or stricture (83%). There was no association with intraabdominal abscess, internal fistulae, or extraintestinal manifestations. Two of 12 patients required surgical diversion because of severe narrowing. The clinical, radiological, and pathological features of anorectal strictures occurring in Crohn's ileo-colitis have been compared with strictures occurring in other forms of inflammatory bowel disease.

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RECTAL INVOLVEMENT is the rule in ulcerative colitis, whereas in Crohn's disease of the colon the rectum is spared much more frequently, with macroscopic disease in only 40–50% of cases.[13,20,23] Microscopic disease may be present more frequently.[3] Because the rectum is of a comparatively large diameter compared to other areas of the bowel, the development of significant narrowing is relatively infrequent and true strictures rarely progress to clinically apparent obstruction.

Clinical Material

During 1944–1973, 160 patients classified as non-specific colitis, and excluding ulcerative colitis were admitted to the Ward and Private Services of the Mount Sinai Hospital. Only those patients who fulfilled our diagnostic criteria were studied. All indeterminate cases were excluded. One-hundred and sixty patients, 30 with granulomatous colitis and 130 with ileocolitis, were available for analysis. There were 12 patients with anorectal strictures (four with granulomatous colitis and eight with ileocolitis), for comparison with a control series of 148 patients.

The diagnosis of granulomatous disease was based on the criteria elaborated in detail by Lockhart-Mummery and Morson,[19] Lindner, Marshak *et al.*,[18] Korelitz *et al.*,[17] and Cook and Dixon.[2] The final selection of cases was made according to the standard criteria enumerated in another publication.[12] The major features required for the diagnosis of Crohn's disease included radiological, pathological or endoscopic evidence of deep transverse fissure formation or fistulization; asymmetrical mucosal involvement; aggregated inflammatory pattern, confluent linear ulceration; discontinuity or segmental disease; right-sided involvement; rectal sparing; non-caseating epithelioid granulomas of the submucosa, skin or lymph nodes; and transmural inflammation. All indeterminate cases, and patients in whom ulcerative colitis, ischemic colitis, amebiasis, tuberculosis, and obscure malignancy could not be ruled out were excluded from this series.

The age of these 12 patients ranges 10-79 years (mean-38 years), at the time of development of stricture (Table 1). The duration from onset to development of significant stricturing was relatively long, with a mean of 14 years. The mean age at the time of onset of disease was actually 23 years, little different from the control series of 148 patients

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TABLE 1. *Age, Sex Distribution, and Duration to Stricture Formation in 12 Patients with Anorectal Strictures in Crohn's Colitis and Ileocolitis*

	Colitis	Ileocolitis	Total
Total Number in Series	30	130	160
With Stricture	4	8	12
	(13%)	(6%)	(7.5%)
Without Stricture (Control)	26	122	148
	(77%)	(94%)	(93%)
Male : Female	2:2	3:5	5:7
Mean Age°	25	43	14
Onset to Stricture†	7	18	14

° At the time of development of anorectal stricture.
† Mean duration from onset of disease to time of stricture formation.

in whom the mean onset age was 25 years. In patients with stricture, the disease commenced at approximately the same age as in other patients with colitis and ileocolitis, but the stricture did not develop for a period of 14 years. This relatively long period contrasts with ulcerative colitis in which 25% of strictures occur during the first attack.[5] The younger age of patients with colitis when compared with ileocolitis, and the shorter duration from onset of symptoms to stricture formation are due to the presence of two young colitis patients with a short history.

Definitions

The classification of anorectal stricture in the past has left much to be desired, and the actual size of the lesion has been very loosely defined in the many publications. The anatomy of the rectum and anus has been clearly described by numerous authors.[9,21] Strictures may be subdivided into anal and rectal groups, accepting that the rectum commences 4 cm from the anal verge, and that many strictures extend from one area to the other.

In general, rectal strictures may be subdivided into three categories depending upon the underlying pathogenic process; a diaphragmatic variety, a long tubular variety, and postileostomy "atrophy." A short diaphragmatic stricture resulting from healing ulceration may occur in ulcerative and granulomatous colitis and is not infrequent in amebic proctitis.[16]

Strictures may be further classified according to severity as mild, moderate and severe. Mild strictures are transient and respond rapidly to dilatation, and resolution of the inflammatory process. A severe stricture may be defined as one which is a major determinant of the natural history of the disease, and on occasion the indication for surgical intervention, as in two of our patients.

Results

Nine of the 12 patients had strictures which commenced ½–4 cm from the anal verge and among these were three limited to the anal canal as short diaphragmatic, fibrous strictures. The other five strictures extended into the rectum as anorectal areas of narrowing for varying distances. Three true rectal strictures commenced, 4, 5 and 7 cm above the anal verge (Fig. 1). The strictures, which were either annular (<2 cm) or tubular (>2 cm), were of varying lengths, and on occasion did extend all the way to the rectosigmoid junction, and were associated with narrowing of the distal or proximal colon (Figs. 1 and 2). The three strictures localized to the anus were narrow and would not admit more than the tip of the little finger. They may be characterized as being of the diaphragmatic variety. In the majority a sigmoidoscope could not be passed until adequate dilatation of the stricture had been accomplished. Thereafter, a pediatric sigmoidoscope could be used in some patients to assess the extent of the stricture, and evaluate disease proximal to the area of narrowing. In some the upper limit could not be clearly defined.

The symptoms and clinical characteristics of anorectal stricture have been compared with the control series of 148 patients in Tables 2a and 2b. Incontinence was found in three of the 12 patients (25%). Other clinicopathological

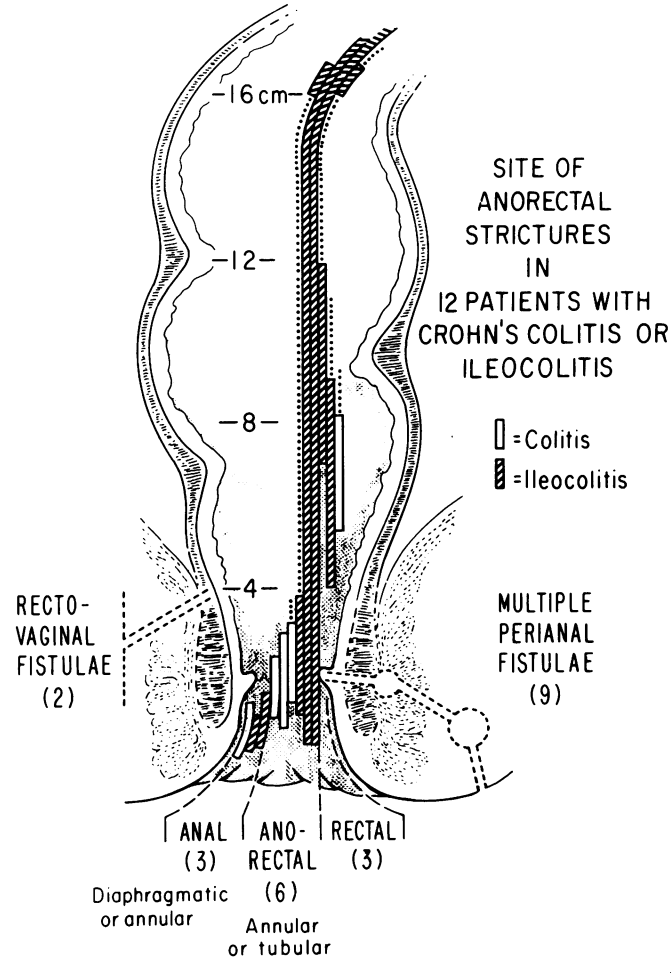
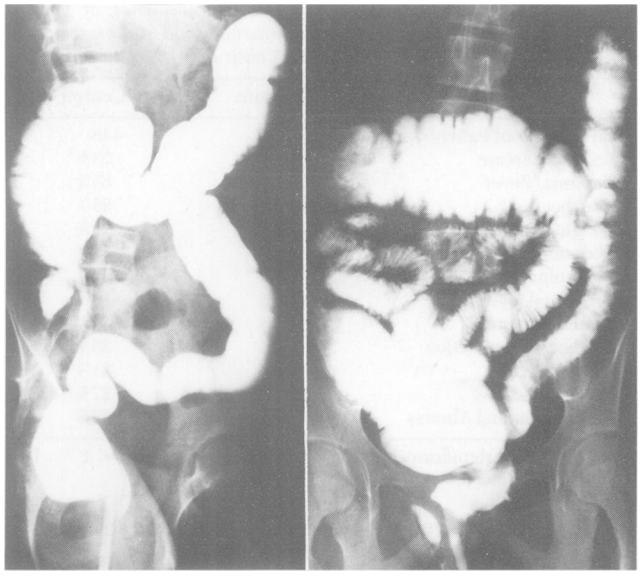


FIG. 1. Site of anorectal strictures in 12 patients with Crohn's Colitis or ileocolitis.



FIGS. 2a, b. (Left) 1966: Patient with Crohn's Ileocolitis showing ileocecal disease and minimal involvement of distal colon. (Right) 1970: Same patient following ileocolectomy with thumbprinting, cobblestoning and early fissure formation of left colon. The large perianal fistula and chronic abscess may be noted.

and radiological features are enumerated in Table 3. The pertinent clinical features of this entity include perianal disease, associated fibrous stricture or radiological narrowing, and discontinuity of disease. Associated internal fistulae,

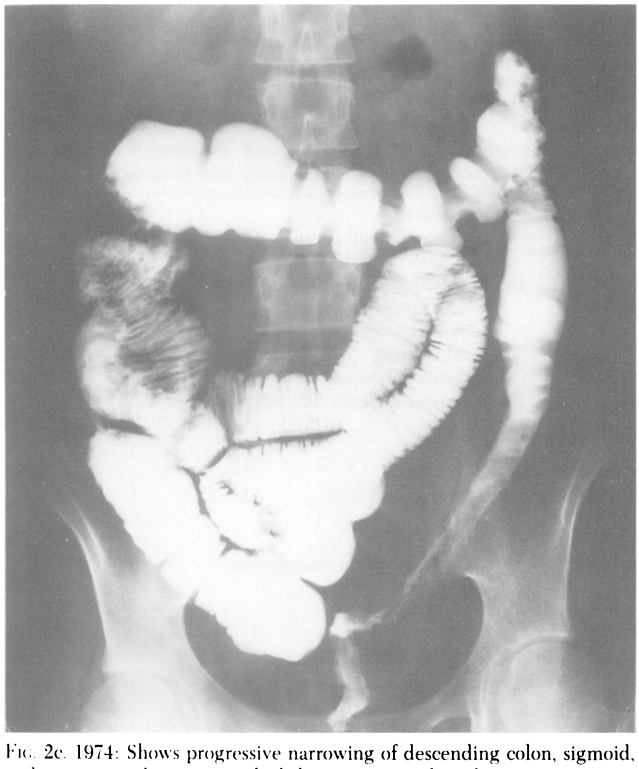


FIG. 2c. 1974: Shows progressive narrowing of descending colon, sigmoid, and rectum, with recurrent ileal disease proximal to the anastomosis.

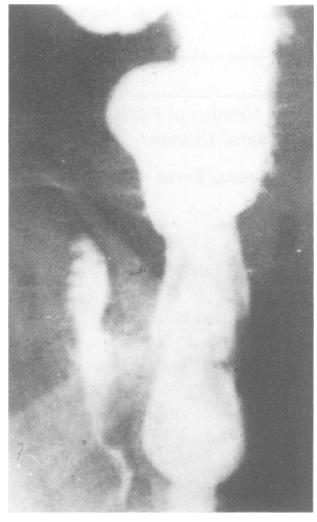


FIG. 2d. 1974: Detailed spot view taken at same time as Fig. 2C showing fistula tracts and large complex chronic perianal abscess.

and shortening of the bowel, occurred in five, and three patients respectively. In six of the 12 patients (50%) non-caseating granulomas were recognizable histologically. Other features noted in Table 3, are, anemia in 11 patients, and extraintestinal manifestations in seven patients.

There was a clear association with fibrous strictures or radiological narrowing in the other areas of the gastrointestinal tract. Thus stricture or radiologic narrowing was found at other sites in 10 of 12 cases (83%) (Fig. 2c and Table 4) with anorectal stricture. This was significantly different from the control series in which radiological narrowing or stricture at sites other than the rectum occurred in 41 of 148 patients or 28% ($X^2 = 13.36$, DF = 1, $P = <0.001$). There was in addition significant shortening of the colon due to cicatrising contraction in at least four patients. In other patients with fairly extensive involvement, shortening did not occur because of intervening normal areas.

Perianal abscesses and fistulae were characteristically associated with anorectal stricturing, and were found in 10 patients (Figs. 2b and 2d). Of the two without this feature, one had a solitary hemorrhoidal tag and only one was completely free of any perianal or perirectal involvement. Perianal disease is characteristic of Crohn's colitis with anorectal stricture formation, and shows a statistically significant difference from the incidence in the control series ($P = <0.05$). When present, perianal disease is multiple, complex, recurring, and chronic (Fig. 2b-d). It is also a feature of lymphogranuloma venereum but not of amoebic strictures.[16]

Discussion

Non-malignant strictures may occur in inflammatory disease of the bowel involving colon. With the growing recognition of vascular disease involving the bowel, rectal strictures have been described following vascular ischemia

TABLE 2a. *Clinical Features of 12 Patients With Rectal Strictures in Crohn's Colitis and Ileocolitis*

	Colitis	Ileocolitis	Total
Total Number of Patients	4	8	12
Perianal Disease	4	7	11 (92%)
Toxemia/Fever	3	7	10 (83%)
Diarrhea	2	7	9 (75%)
Weight Loss	3	6	9 (75%)
Abdominal Pain	2	5	7 (58%)
Abdominal Tenderness	1	6	7 (58%)
Peripheral, Systemic	3	4	7 (58%)
Fistulae, Internal	1	4	5 (42%)
Sub-acute Obstruction	1	4	5 (42%)
Overt Bleeding	3	1	4 (33%)
Abdominal Mass	—	4	4 (33%)
Intro-abdominal Abscess	—	3	3 (25%)
Incontinence	1	2	3 (25%)

TABLE 2b. *A Comparison of the Percentage Incidence of Clinical Features in 12 Patients With Rectal Strictures and a Control Series of 148 Patients With Crohn's Colitis and Ileocolitis*

	Stricture	Control
Total Number of Patients	12	148
Perianal Disease	92%	53%*
Toxemia/Fever	83%	65%
Diarrhea	75%	95%
Weight Loss	75%	72%
Abdominal Pain	58%	89%
Abdominal Tenderness	58%	48%
Peripheral, Systemic	58%	48%
Fistulae, Internal	42%	39%
Sub-acute Obstruction	42%	33%
Overt Bleeding	33%	31%
Abdominal Mass	33%	27%
Intra-abdominal Abscess	25%	22%

* Statistically significant Difference: $X^2 = 5.3$ D.F. = 1 $P = <0.05$

of the more chronic variety, usually associated with sigmoid involvement.[1,4,7,24]

To clarify the various inflammatory and ischemic processes leading to benign anorectal stricture, we have tabulated various aspects of the epidemiology, character of the stricture, and associated extraintestinal, radiological and pathological findings in five conditions found to be associated with such strictures (Table 7). Most of these inflammatory processes tend to occur in young adults. The exception is the ischemic stricture which occurs in elderly patients associated with ischemic vascular disease elsewhere in the body, and occasionally following inferior mesenteric artery occlusion.[25]

The long tubular stricture, characteristic of lymphogranuloma venereum and found in recent cases of ischemic proctitis, may also be found with granulomatous colitis. In two patients, the stricture extended from the anus to descending colon (Fig. 2c). This type is associated either with extensive perianal disease, or with an extensive rectal submucosal inflammatory process which may extend up to the rectosigmoid or even to involve the whole bowel in the process of narrowing and shortening.

Ulcerative colitis, which almost always involves the rectum, with or without synchronous or metachronous proximal colonic disease may result in rectal stricture on occasion. Colonic strictures are not infrequent, occurring in 2–5% of patients, with disease at any particular site in the colon.[5] These authors find a somewhat higher incidence (7.8%) in the rectal region. The incidence in various series varied from 4–9%.[5,6,11,15,18] In one series from the Mayo Clinic,[22] the postileostomy patients with diversion of the fecal stream were found to have anorectal strictures in 47% of cases! These strictures, which may on occasion occur with the first attack of ulcerative colitis, usually develop in the chronic continuous form of disease,[6] and are associated with either healing ulceration or extensive inflammatory sclerosis.

When strictures involve the colon, there is a clearly defined as pathogenetic difference between strictures in ulcerative as opposed to Crohn's colitis. This has been recognized in a recent paper by Goulston and McGovern.[10] Whereas in Crohn's colitis progressive fibrous stricture results from the "Cicatrising" inflammatory process, in ulcerative colitis, the major thickening occurs in the muscle layers particularly the muscularis mucosae; the muscle contraction and hypertrophy contribute to the strictures which develop. Even in ulcerative colitis, malignant strictures, al-

TABLE 3. *Distinguishing Features of 12 Patients With Anorectal Strictures Due to Crohn's Colitis and Ileocolitis*

I.	Perianal Disease	
	Abscesses and Fistulae	10*
	Hemorrhoidal Tag Only	1
II.	Intestinal Complications	
	Associated Stricture	10
	Associated Fistulae	5
	Abscesses†	4
	Toxic Dilatation	1
III.	Extra-intestinal Manifestations‡	
	Skin	5
	Joint	2
	Liver	1
	Duodenal Ulcer	1
	Amyloid	1
	Eye	1
	Malabsorption, osteoporosis	1
IV.	Hematological	
	Anemia	11
V.	Radiological	
	Discontinuity	11
	Assymmetry	7
	Cobblestone	7
VI.	Pathological	
	Non-caseating Granulomas	6

* Multiple complex perianal and ischio-rectal abscess and fistulae.
† Intra-abdominal or retro-peritoneal.
‡ 7 Patients—some with multiple extra-intestinal manifestations.

though occurring on occasion, are the exception rather than the rule.[9]

The specific infective diseases, amebiasis and lymphogranuloma venereum occur most frequently in the tropics and subtropical regions, but with expanding world travel will doubtless be seen more frequently in northern Europe, Britain and America. Non-specific ulcerative colitis, Crohn's colitis and ischemic colitis, on the other hand, are already relatively common diseases in America, Britain and the Scandinavian Countries.

The anatomic pattern and distribution of these diseases is usually characteristic. Ulcerative colitis and lymphogranuloma venereum start distally, with proximal extension of the disease. Lymphogranuloma venereum may extend to the sigmoid, and ulcerative colitis may spread to involve the entire colon. By contrast, ischemic disease usually affects predominantly the splenic flexure and less frequently the sigmoid, while Crohn's disease and amoebic colitis are predominantly right-sided diseases. Discontinuity of disease is characteristic of granulomatous disease (Fig. 2a-d).

The natural history of anorectal stricture in Crohn's disease involving the colon is generally that of a self-limited narrowing, or fibrous stricture which responds to finger or instrumental dilatation and ceases to be a problem if the major related factor, the complex perianal fistulae is treated and controlled. This was the course in four of the patients, particularly those in whom the narrowing was confined to the anal canal and relatively short in length.

Of the longer low anorectal strictures, three required repeated dilatation. Of these patients, at least one is undergoing regular dilatation at the present time, and may ultimately require surgical intervention.

In one patient toxic dilatation developed proximal to the stricture which narrowed progressively following proximal diverting ileostomy. Because of extensive perianal disease and subsequent fibrosis with progressive postiliectomy stricturing reconstitution of gastrointestinal continuity could not be carried out.

In two patients stricturing associated with rectal disease proximally resulted in the development of a rectovaginal fistula. One required no further treatment apart from medical measures to control the disease. The other patient, however, eventually came to subtotal colectomy, and ileostomy for extensive perianal disease, rectovaginal fistulae, and tight rectal stricture. One patient with extensive stricturing from anus to involve almost all of the colon was advised total proctocolectomy, but this was not carried out as the patient was too old and too ill. One patient came to major surgery following successful resolution of the inflammatory disease following right hemicolectomy. The perianal inflammatory disease and the rectal stricture subsided. Complex and extensive perianal disease requires incision and drainage on occasion, but should be treated conservatively whenever possible because of the difficulty in obtaining satisfactory surgical healing.

TABLE 4. *Sites of Associated Stricture or Radiological Narrowing in 10* of 12 patients with Anorectal Strictures*

Terminal Ileum	6††
Ascending Colon	2
Transverse Colon	1
Splenic Flexure	3
Descending Colon	3
Sigmoid Colon	3
Rectosigmoid	4
Anorectum	12

* Includes three patients with multiple strictures and one with narrowing of distal small bowel and all of large bowel.
† Multiple ileal strictures in two patients.

TABLE 5. *Associated Fistulae in 5 of 12 Patients with Anorectal Strictures*

Rectovaginal	2
Sigmoidoduodenal	1
Ileocecal	1
Ileosigmoid	1
Colocavitory	1
Ileomesenteric (multiple)	1

Conclusions

Anorectal stricture occurred in 12 of 160 patients (7.5%) with Crohn's disease involving the colon. These strictures, although benign, constitute a major clinical problem, and will often resolve with control of the frequently associated perianal inflammatory process.

In approximately half of the involved cases rectal narrowing may lead to partial or complete obstruction of a significant degree. In this series of 12 cases, four were mild, four moderate and four severe.

In contrast to a localized process such as lymphogranuloma venereum, rectal stricture in granulomatous disease should be considered as part of the total disease picture and may be associated with perianal disease, rectovaginal fistulae, proximal stricturing in the bowel, and activity of the Crohn's disease elsewhere in the gastrointestinal tract and throughout the body. Although rarely a major determining factor in the course of the disease, on occasion such a stricture can determine the treatment to be carried out, and necessitate surgical intervention.

TABLE 6. *Operative Procedures in 12 Patients With Anorectal Strictures in Crohn's Colitis and Ileocolitis*

Non-operative		3
Surgical		9
I.	Dilatation of Rectal Stricture	3
II.	Incision & Drainage of Intra-abdominal Abscess	3
III.	Ileostomy*	2
IV.	Colostomy Diverting + Closure of Colostomy	1
V.	Ileocolostomy†	4
VI.	Bypass	2
VII.	Resection: Ileocolic Resection	2
	Subtotal Colectomy	1
VIII.	Appendectomy	2

* Diverting 1 complementary to subtotal colectomy
† 2 with bypass 2 with resection

TABLE 7. *Features of Rectal Stricture Occuring in Inflammatory and Vascular Disease of the Colon*

Age	Crohn's 30–50	Ulcerative 20–40	Ischemic 50–70	Amebic 16–40	Lymph. Venereum 20–60
Epidemiology	UK, USA, Sweden etc.	UK, USA, Sweden etc.	USA & Europe etc.	South Africa Tropics etc.	West Indies Tropics etc.
Incidence of Strictures	11%	5–8%	0–6%	0–5%	25–45%
Major Site of Disease	Ileum & rt. colon	Rectum & lt. Colon	Spl. flex & sig. col	Cecum	Rectum & sig. Colon
Assoc. Perianal Disease	80%	5–7%	none	none	frequent
Assoc. Stricture of Bowel	80%	5–10%	occasionally sig. & splenic flexure	occasional cecum and rectum	occasionally up to splenic flexure
Type of Stricture	diaphragmatic, tubular, annular	diaphragmatic, tubular, annular	tubular	diaphragmatic, acute tubular, annular	tubular usually to sigmoid
Site of Stricture	Anorectum 1–5 cm from anal verge	anorectum	midrectum	low rectum	anorectum 3–5 cm from anal verge
Assoc. Internal Fistula	common (50%)	rare except recto-vaginal	none	rare	none
Extra-intestinal Manifestations	frequent (50%)	frequent	ischemic disease elsewhere	amebic hepatitis	none
Radiology	fissures, deep ulcers, fistulae, discontinuity	shallow ulcers in continuity	thumb-printing sacculation, tubular narrowing	ameboma with tubular stricture	long tubular stricture, saw tooth or smooth edge, perianal fistula
Histopathology	sarcoid reaction, transmural disease	mucosal disease, crypt abscesses	fibrosis, hemosiderin laden macrophages, vas. lesion	ameba, ameboma, acute & chronic inflammation	granulation tissue, plasma cells, lymph's
Course	relapsing	relapsing, tendency to carcinoma	acute self limited	progressive	progresive with obstruction
Treatment	Azulf. steroids, dilatation, surgery	azulf. dilatation, surgery	conservative	emetine, chloroquine	antibiotics tetracycline

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