Fistulous complications of Crohn's disease

Sezer GÜRER*, M.D, Mehmet GÜREL*, M.D

The fistulas encountered in Crohn's disease are a quite frequent complication. Fistulas may be internal, i.e., gut-to-gut, or external, i.e., gut-to-skin. Treatment of these fistulas can be a considerable problem with mortality rates avaraging about 6-10 % . The present article examines the various types of fistulas encountered with Crohn's disease and their possible treatment according to the recent contributions in literature. [Journal of Turgut Özal Medical Center 1(2):175-181,1994]
Key Words: *Crohn's disease, fistula, treatment*

Crohn hastalığının fistüloz komplikasyonları

Crohn hastalığının seyri sırasında fistülöz komplikasyonlar oldukça sık görülür. Fistüller internal veya eksternal olabilir. Tedavisi oldukça problemli olan bu fistüller ortalama 6-10% mortalite oranlarına sahiptir.

Bu makalede Crohn hastalığının seyri sırasında görülebilen çeşitli fistüller ve son literatür bilgisi şığında olası tedavi yöntemleri gözden geçirilmiştir..[Turgut Özal Tıp Merkezi Dergisi 1(2):175-181,1994]
Anahtar Kelimeler*: Crohn hastalığı, fistül, tedavi*

Since the first description of this cronic intestinal inflammation in 1932 by Crohn, Ginzburg and Oppenheimer[1,2], we have known about the characteristically high incidence of complications it involves. Among these, fistulas arise in 20-60% of Crohn's disease patients with a mean incidence of 30%[3-5].

Fistulas may be either external or internal. The former link a section of intestine to the body surface, whereas the latter are epithelised fistulas linking two intestinal segments[6].

From the nutritional and metabolic standpoint, fistulas may be divided into high (>500 ml/day) and low (<500 ml/day) flow types[4].

External fistulas include enterocutaneus (subdivided into ileocutaneus, colocutaneus and peri-ileostomic), which occur in 9-21% of Crohn's disease patients and perianal fistulas encountered in 25-36% of the patients[6-8]. External fistulas are highly disabling, often requiring externally applied bags and leading the patient to seek for an early treatment. Though medical treatment with immunosupressive drugs may be helpful in about 8% cases[9,10], the side effects may be severe and recurrences after treatment are frequent[3].

Internal fistulas are found in 16-33% of Crohn's disease cases, depending on series[6,7,11]. These fistulas do not necessarily constitute an indication for surgery unless they are responsible for a long intestinal by-pass causing a short bowel syndrome or are associated with an abcess or sepsis and finally unless they form a connection with genito-urinary tract[3,10,12,13].

Treatment of fistulous complications in Crohn's disease can be a considerable problem and mortality rates of 6-10% are reported[14,15]. Nevertheless cures in as many as 96% of the cases treated are also reported[3].

* : İnönü University School of Medicine General Surgery Department - Malatya

ETIOLOGY

Fistulas are very often encountered in intestinal segments affected by Crohn's disease. In a number of studies, the possibility of fistula prevention via the identification of causative factors has been investigated. Petit and Gerson[16,17] showed that the intestinal segments affected by Crohn's disease have a much greater capacity of ascorbic acid concentration than the healthy intestinal segments in the same patient. However, the segments from which the fistula originates do not have this excess capacity and indeed have a lower ascorbic acid capacity than either the affected but not fistulous segment or the healthy intestinal segments.

The higher concentration of ascorbic acid in inflamed segments is probably attributable to chemotaxis and the concentration of leucocytes in the diseased areas (ascorbic acid contend of leucocytes is 50 times higher than the plasma) and is needed for collagen synthesis, which is the most important phase of the inflammatory response[16,17].

The fact that the fistulas originate do not contain as same ascorbic acid concentrations as the inflamed but not fistulous segments may well be attributable in clinical course to a somehow locally altered collagen production.

DIAGNOSIS

Radiological investigations using contrast medium and endoscopic examinations of the upper gastrointestinal tract remain the most commonly used tools in the diagnosis of Crohn's disease or its recurrences or its complications such as fistulas[11,18]. Fistulography is also essential in cases of enterocutaneus fistulas[1].

Recently, however, several contributors have emphasised the value of CT scans[19-21], ultrasonography[22-24] and NMR[11]. CT and NMR are better in the detection of abcess and fistulas than USG especially in cases in which several loops of the small intestine, mesenterium and anorectal region are involved[25]. NMR not only offers the advantage of three dimensional imaging but also does not expose the patient to high doses of ionizing radiation when repeated and frequent check-ups are required[11].

Classification of the fistulas related with Crohn's disease is summarised in Table 1.

Table I. Possible types of fistula in Crohn's disease

EXTERNAL ⇒	Entero-cutaneus ⇒	Ileo-cutaneus		
		Colo-cutaneus		
		Peri-ileostomic		
	Perianal			
INTERNAL ⇒	Entero-enterior ⇒	Ileo-ileal		
		Ileo-jejunal		
		Ileo-caecal		
		Ileo-sigmoid		
		Gastro-colonic		
		Colo-duodenal		
		Colo-colonic		
	Genito-urinary ⇒	Entero-vesical	⇒	Ileo-vesical
				Ileo-sigmoid-vesical
				Colo-vesical
		Entero-vaginal	⇒	Ileo-vaginal
				Colo-vaginal
				Recto-vaginal
		Recto-urethral		

EXTERNAL FISTULAS

External enterocutaneus fistulas may appear either right after surgery or spontaneously.There are significantly more of the former than the latter. The cutaneus outlet is almost always visible in the postoperative scar tissue. These fistulas may be *'early fistulas'* which appear soon after surgery or *'tardive fistulas'* occurring long after surgery[4,6].

For any correct assesment of treatment and prognosis, it is apparently important to distinguish between enterocutaneus fistulas originating from healthy intestinal segments and those developing in segments affected by Crohn's disease[1].

Early postoperative fistulas caused by infiltration of an anastomosis performed on *healthy* tissue are not significantly different from the ordinary anastomotic fistulas observed after resections for other reasons than Crohn's disease[25]. Such fistulas may close spontaneously or after assistance in the form of bowel rest and total parenteral nutrition. However, repeated resection and a new anastomosis may be required[1].

On the contrary, the evolution of early postoperative fistulas deriving from the *anastomosis containing remnants of tissue invaded by Crohn's disease* is different. These are almost always high flow fistulas combined with severe intraabdominal sepsis and they usually do not heal spontaneously[4,26].

Treatment includes tissue bags and protective barriers to control the release of material from the fistula, drainage of abcess, high calorie total parenteral nutrition and surgery unless spontaneous healing occurs within 6-8 weeks. The surgery is delayed to avoid the problems of adhesive peritonitis after the intestinal dissection.

Tardive postoperative fistulas may be caused by recurrence of the disease, generally on the preanastomotic site and are therefore comparable to spontaneous fistulas. Alternatively, they may follow the drainage of an intraabdominal abcess[6].

Spontaneous fistulas are rare[6,27]. The affected segment may adhere to the abdominal wall, forming an abcess, that can be diagnosed as brownish-red swelling on the abdominal surface, often with a spontaneous release of pus, mucus or feces.

Otherwise the fistula may reflect the spread of a transmural inflammation, causing an intraabdominal abcess, seeking for an external outlet to form an external fistula[5-29].

The explanation for the predilection of both postoperative and spontaneous fistulas for sites like scars or the sites of early drainage of the abdominal wall. This type of fistula also rarely heals spontaneously and need surgical interventions[4,6,27].

We should in fact distinguish between fistulas originating in intestinal segments invaded by active Crohn's disease, whether spontaneous or postoperative, early or late and those deriving from healthy tissue, since the former does not heal spontaneously and inevitably require surgical treatment. The protocol proposed by Hill in 1988[4], and subsequently adopted by most of the surgical teams, is a sequence of four overlapping phases in which :

Phase 1 is devoted to the surgical or percutaneus drainage of abcess to control the sepsis;

Phase 2 corrects the metabolic deficiencies with parenteral nutrition (it should, however, be borne in mind that a true anabolism is not obtainable because of the high protein loss due to the diesase);

Phase 3 involves the accurate anatomical definition of the fistula, by means of a fistulogram, or barium enema, or a small bowel enema; and finally

Phase 4 involves resection of the segment incorporating the fistula, with either immediate reanastomosis or in the presence of substantial inflammation with edema and friable intestinal wall with attachment of the two intestinal stumps to the skin and dilation of the anastomosis several months later once the sepsis is eliminated and the patient is in a better metabolic/nutritional condition.

Most of the fistulas can be closed using this method with less than 10% morbidity[4,30]. As an exception, peri-ileostomic fistulas which are very rare [15 out of 1010 patients of Greenstein's series[6]] and requires the removal of the diseased segment with a new ileostomy, possibly on the contralateral side of the abdomen.

PERIANAL FISTULAS

The high frequency [17-28% of Crohn's disease patients[9]] of perirectal and perianal fistulas probably reflects the fact that the ulcers typical of Crohn's disease tend to penetrate the full depth of rectal wall and spread sepsis through perirectal tissues[31]. It is believed that this phenomenon is due to the constrictive action of the sphincter which prevents the upward spread of the inflammation which is therefore forced into the perirectal tissues[31].

The course of the fistulous process may vary in length before it finds an outlet on the skin surface. Moreover if obstructed, it may cause abcess in the

sphincter, the ischiorectal fossa or more rarely in the pelvirectal fossa.

There are significant differences between the opinions about the treatment of the perianal fistulas: from the excessively conservative to a preference for the surgical approaches traditionally adopted for specific perianal fistulas[8].

Actually, surgery is only required in a carefully selected number of cases and several authors recommend caution before being hooked on the idea of overhasty surgical treatment of perianal lesions[8,31]. According to Alexander-Williams "incontinence is more likely to be the fruit of aggressive surgery than aggressive disease"[32]. Van Dongen, on the other hand, claims that where indicated fistulectomy can prevent incontinence which he feels to be more probably attributable to sphincteric deficiency caused by the chronic proctitis as a result of recurring anorectal sepsis than to inappropriate surgical manouvres[8]. One indication to conservative treatment comes from the observation that anorectal Crohn's disease may resolve spontaneously in a certain number of cases[33]. Though there has been no long-term controlled trials designed to assess the efficiency of medical treatment alone in control of the Crohn's disease it does seem to give good results in cases of fistulas, ulcers and 'skin tags' with a benign and non aggressive course[31]. Some reports suggest that immunosuppressor drugs, such as Azothioprine may be effective in perirectal fistulas[9,34,35], but some studies do not confirm this view[36].

In contrast, treatment with Metranidazole has proved to be particularly effective, despite the fact that recurrences have been observed in 72% of cases on suspension of treatment and distal paresthesia in the extremities of 50% of patients[37,38].

Conservative surgery has its place not only in the drainage of abcess but also in anal fistulas (mostly associated with pain) which have not responded to medical treatment[8,31,39,40]. Sohn et al. suggest fistulotomy for surface fistulas that do not involve the anal sphincter. They also proposed that partial internal sphincterotomy for intersphincteric fistulas and report good results[33]. Levien, recommends surgery in lower inter- and trans-sphincteric fistulas with an orifice on the pectinate line in a rectum which is not seriously affected by Crohn's disease and also proposes a protocol for the treatment of the perianal complications (Figure 1).

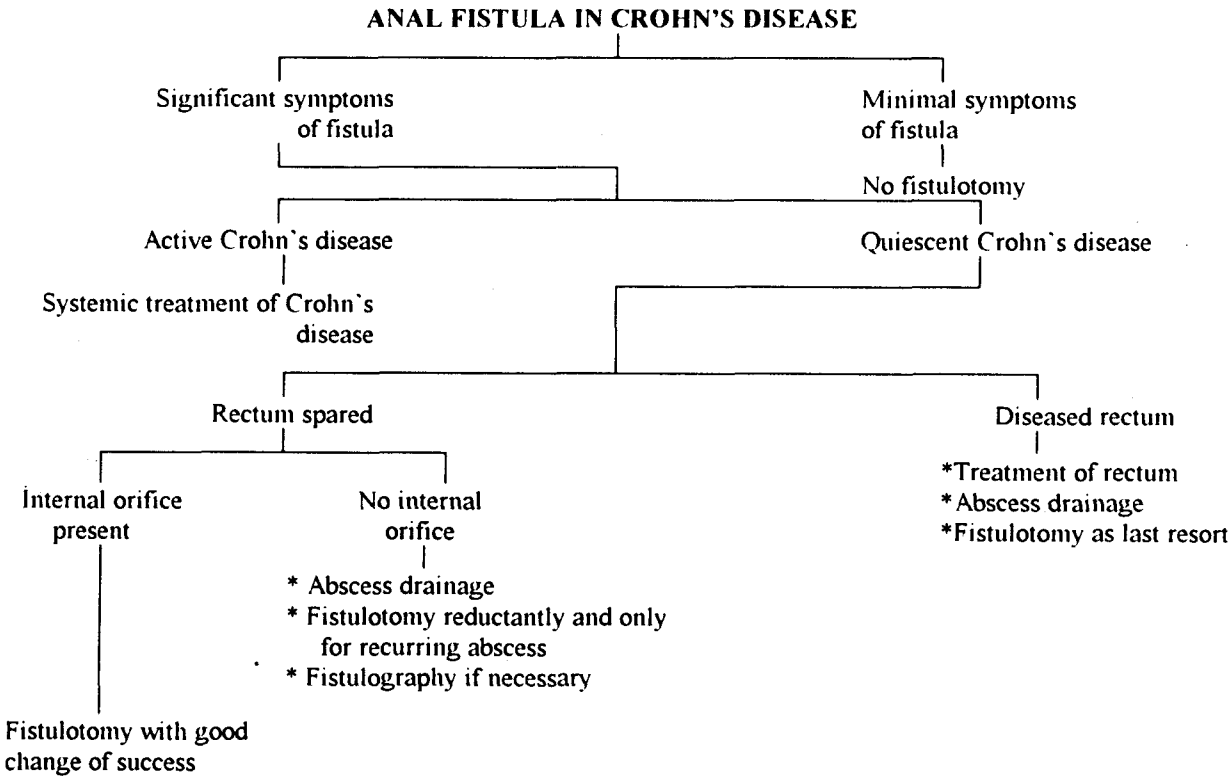

Figure 1. Treatment protocol of anal fistulas in Crohn's disease [from Levien[33]]

Some reports suggest that perianal Crohn's disease should not be treated surgically before proximal (colon or small intestine) medical or surgical control of the disease[41,42], whereas some others have observed no improvement in the perianal conditionafter proximal resection[40]. In the experience of the Mayo Clinic, perianal improvements after treatment of the disease are frequent but often short lived (from six months to two years). Hence, resection of actively diseased segments is only recommended when there is a certainity of removing all diseased segments[39].

Opinions also differ on the value of the fecal stream, generally in the form of loop ileostomy in the treatment of perianal Crohn's disease. Some authors report their good results after performing diversion colostomy in the patients later subjected to proctectomy , whereas some others declare that there is no significant benefit of diversion in perianal condition[13].

All these suggest that proctectomy should be the last resort, only to be considered in particularly difficult cases with multiple anal fistulas and/or severe proctitis.

INTERNAL FISTULAS

These appear in about 40% of Crohn's disease patients and as stated before rarely require surgical intervention[6,43].

Enteroenteric fistulas

The results of immunosupressive therapy, high calorie nutrition and basic diets do not appear to be satisfactory in these cases[6,9,12,44].

Ileo-ileal fistulas are usually asymptomatic since they create a short bypass that has no nutritional percussion and usually no treatment is required[13].

Ileo-jejunal fistulas which may sometimes cause a short bowell syndrome, and therefore malabsorbtion, surgical interventions are essential and involves the resection of the diseased segment with simple closure of the jejunal orifice[12,13].

Ileo-caecal fistulas are usually accidental findings during ileo-caecal resections for the symptoms of intestinal stenosis. They are rarely symptomatic since the by-pass is very short, and eliminated by the resected segment[6].

Duodeno-colic fistulas are also rare with fewer than 40 reported cases in the literature. They are more common in males and usually arising after a right hemicolectomy for distal ileitis. They are most often found in the second or third segment of the duodenum. The forthcoming symptoms include weight loss, abdominal pain anorexia and diarrhea. Most common surgical indications are stenosis caused by the recurrence of the disease, failure of the medical treatment to restore the body weight and septic complications.

The surgical approach that is adopted by most of the surgical teams is the simple suturing of the duodenal fissure[6], although some authors report the life threatening consequences of this technique in the event of dehiscence of sutured duodenal fissure[3,45]. In cases in which primary suturing is impossible due to edema and friable duodenal wall, it is possible to omit the direct closure of the duodenum, but instead a Roux-y jejunal loop can be anastomosed to the healthy duodenal segment surrounding the fistula[3].

Gastro-colonic fistula are extremely rare, since the gastric involvement is secondary to the invasion of transverse colon by the illness[6].

Ileo-sigmoid fistulas are the most common type of enteric fistulas which hold about 30% of fistulas and are the most difficult to treat[6]. Though the need of resection of the ileal segment is certain, there are different opinions on the treatment of the fissure on the sigmoid wall. Most of the authors agree on the 'double resection', mainly the resection of both ileal and sigmoid segment involved by the disease[6]. On the other hand some object this approach due to the high incidence of complications[46]. These recommend a simple closure, unless severe involvement is identified peroperatively.

ENTERO-GENITO-URINARY FISTULAS

Entero-vesical fistulas occur in about 1.9-5.6% of Crohn's disease patients[6,44]. They are more common in men, probably due to the protective actions of the uterus and vagina in women[6]. Patients usually declare a long history of lower urinary tract disorders (such as dysuria,pyuria,chronic prostatitis, etc.) and may eventually develop fecaluria or pneumonia, which are both pathognomonic symptoms of entero-vesical fistula.

Most of the time, it is quite difficult to identify the outlet of the fistula. Barium enema or radiological investigation of urine may be useful in unidentified cases . CT scale may reveal a thickening in the intestinal segment which adheres to the bladder[47].

Although these fistulas are unlikely to heal

spontaneously, surgery may be delayed for a considerable time, since the most of the patients are young and do not suffer from difficult urinary flow . The operation of choice is the resection of the ileal segment and simple closure of the vesical fissure[44].

In patients with *ileo-sigmoido-vesical* fistulas, the illness is quite likely to be more aggressive and recurrences are often seen[48,49]. Surgical interventions must be performed immediately due to the risk of massive bacterial invasion of the bladder through both the ileal and colonic segments, leading to severe cystitis. The closure of bladder is quite straightforward. Most of the time resection of both ileal and colonic segment, due to either the severity of the inflammation or due to the complications during the dissection of the inflamed mass including the fistula[18].

Vaginal fistulas in Crohn's disease are always associated with an active colonic form and result from the extention of an ulcer or fissure through the entire depth of the rectal wall[49]. They may also be complicated with perianal abcess or fistulas and constitute a difficult surgical problem[6]. In any event, extensive involvement of the rectum means that local surgical treatment is unlikely to be curative and inevitably demands a proctectomy . One of the rare complication of entero-vaginal fistulas are carcinoma[49].

REFERENCES

1. Crohn BB, Ginzburg L, Oppenheimer GD. Regional ileitis: Pathologic and clinical entity JAMA 1932;99:1323-9.
2. Farmer RG, Hawk WA, Turnbull RB. Clinical patterns in Crohn's disease: a statistical analysis of 615 cases Gastroenterology 1975;68:627-35.
3. Petit SH, Irwing MH. The operative management of fistulous Crohn's disease Surg Gynecol Obstet 1988;167:223-8.
4. Hill GL, Bourichier RG, Witney GB. Surgical and metabolic management of patients with external fistulas of the small intestine associated with Crohn's disease World J Surg 1988;12:191-7.
5. Schaurt WH, Abraham VS. A comparison of complications following ileocolonic resection for Crohn's disease and for non-inflammatory bowel disease. Colo-proctology 1987;9:289-95.
6. Greenstein AJ. Surgery for Crohn's disease Surg Clin North Am 67:573-96.
7. Rankin JB, Watts DH, Melkynk CS, Kelly ML. National Cooperative Crohn's disease study: extraintestinal manifestations and perianal complications Gastroenterology 1979 77:914-20.
8. Van Dongen LM, Lubbers EJC. Perianal fistulas in patients with Crohn's disease Arch Surg 1986; 121: 1187-90.
9. Korelitz BI, Present DH. Favourable effect of 6-mercaptopurine on fistulae of Crohn's disease Dig Dis Sci 1976;30:58-64.
10. Wolff BG. Surgical management of Crohn's disease Probl Gen Surg 1984;1:51-9.
11. Koelbel G, Schmidel U, Majer MC. Diagnosis of fistulae and sinus tracts in patients with Crohn's disease: Value of MR imaging AJR 1989;152:999-1003.
12. Broe PJ, Bayless TM, Cameron LJ. Crohn's disease: Are enterogenital fistulas an indication for surgery? Surgery 1982;91:249-53.
13. Givel JC, Hawker P, Allan R. Enteroenteric fistulas complicating Crohn's disease J Clin Gastroenterol 1983;5:312-23.
14. Steinberg DM, Cooke WT, Alexander-Williams JC. Abcess and fistulae in Crohn's disease Gut 1973;14:865-9.
15. Fazio VW, Coutsoftides T, Steiger E. Factors influencing the outcome of treatment of small bowell cutaneus fitula World J Surg 1983;7:481-8.
16. Petit SH, Irwing MH. Does local intestinal ascorbate defficiency predispose to fistula formation Dis Colon Rectum 1987;30:352-7.
17. Gerson CD, Fabry EM. Ascorbic acid defficiency and fistula formation in regional enteritis. Gastroenterology 1974;67:428-33.
18. Goldberg HI, Caruthers SB, Nelson JA, Singleton JW. Radiologic findings of the national Cooperative Crohn's Disease Study. Gastroenterology 1979;77:925-37.
19. Goldberg HI, Gore RM, Margulis AR, Moss AA, Baker EL. Computed tomography in the evaluation of Crohn's disease AJR 1983;140:277-82.
20. Yoseum DM, Fishman EK, Jones B. Crohn's disease: Perirectal and perianal findings at CT. Radiology 1988;167:331-4.
21. Fishman EK, Wolf EJ, Jones B, Bayless TM, Siegelmann SS. CT evaluation of Crohn's disease: Effect on patient management AJR 1987;148:537-40.
22. Kaftori JK, Percy M, Kleinhaus U. Ultrasonography in Crohn's disease. Gastrointest Radiol 1984;9:137-42.

23. Di Candio G, Mosca F, Campatelli A, Bianchini M, D'Elia F, Deliagiovanni PC. Sonographic detection of postsurgical recurrence of Crohn's disease AJR 1986;146:523-6.
24. Gore RM. Cross sectional imaging of inflammatory bowel disease. Radiol Clin North Am 1987;24:132-55.
25. Hill LG. Operative strategy in the treatment of enterocutaneus fistulas. World J Surg 1983;7:495-501.
26. Hawker PC, Givel CJ, Keighley MRB, Alexander-Williams J, Allan RN. Management of enterocutaneus fistulae in Crohn's disease. Gut 1987;24:284-87.
27. Jensen JA, Mc Clenathan JH. Umblical fistulas in Crohn's disease Surg Gynec Obstet 1987;164:445-6.
28. Hiley P, Cohen N, Present D. Spontaneous umlical fistula in granulamatous (Crohn's) disease of bowel. Gastroenterology 1971;60:103-7.
29. Rentz TW Jr., Warden CS, Kovalcik PJ. Crohn's disease with spontaneous ileoumlical and ileovesical fistula. Dig Dis Sci 1979;24:316-8.
30. Irwing M. Assesment and management external fistulas in Crohn's disease. Br J Surg 1983;70:233-8.
31. Allan A, Keighley MRB. Management of perianal Crohn's disease. World J Surg 1988;12:198-202.
32. Alexander-Williams J. Fistula in ano: management of Crohn's fistula. Dis Colon Rectum 1976;19:518-9.
33. Alexander-Williams J, Buchmann P. Perianal Crohn's disease. World J Surg 1980; 4:203-7.
34. Brooke BN, Cave DR, King DR. The place of Azothiopurine for Crohn's disease. Lancet 1976;1:1041-2.
35. Present DM, Korelitz BI, Wisch N, Glass JL, Sachar DB, Pasternac BS. Treatment of Crohn's disease with 6-mercaptopurine. N Engl J Med 1980; 302:981-7.
36. Summers RW, Switz DM, Sessions J. National Cooperative Crohn's Disease Study: results of drug treatment. Gastroenterology 1979;77:847-69.
37. Bernstein LH, Frank MS, Boley SJ, Brandt LJ. Healing of perianal Crohn's disease with metranidazole. Gastroenterology 1980;79:357-65.
38. Brandt LJ, Bernstein LH, Boley SJ, Frank MS. Metranidazole therapy for perianal Crohn's disease. A long term follow up study. Gastroenterology 1982;83:383-7.
39. Wolf BG, Culp CE, Beart RW, Ilstrup DM, Ready RL. Anorectal Crohn's disease: A long term perspective. Dis Colon Rectum 1985;28:708-11.
40. Marks CG, Ritchie JK, Lockheart-Mummery HE. Anal fistulas in Crohn's disease. Br J Surg 1981;68:525-7.
41. Hobbiss JH, Schoefield PF. Management of perianal Crohn's disease. J R Soc Med 1982;75:414-7.
42. Bermann JH, Thompson H, Cooke WT, Alexander-Williams J. The effect of diversion of intestinal content on the progress of Crohn's disease in the large bowel. Gut 1971;12:11-5.
43. Bury KD, Stephens RD, Randall HT. Use of a chemicallly refined liquid elemental diet for nutritional management of fistulas of the alimentary tract. Am J Surg 1971;121:174-83.
44. Lee KKW, Schraut WH. Diagnosis and treatment of duodenoenteric fistulas complicating Crohn's disease Arch Surg 1989;124:712-5.
45. Van Dongen LM, Lubbers EJC. Surgical management of ileosigmoid fistulas in Crohn's disease. Surg Gynec Obstet 1989;159:325-7.
46. Merine D, Fishmann EK, Kuhlmann JE. Bladder involvment in Crohn's disease: Role of CT detection and evaluation. J Comput Assist Tomogr 1989; 13(1): 90-3.
47. Nugent FW, Veidenheimer MC, Meissner WA. Prognosis following colonic resection for Crohn's disease of the colon. Gastroenterology 1973; 65:389-402.
48. De Dombal FT, Burton I, Goligher JC. Recurrence of Crohn's diseaseafter primary excisional surgery. Gut 1971;12:519-27.
49. Alexander-Williams IM, Irwing M. İntestinal fistulae Bristol. Wright Publishers 1982: 230-40.

Correspondence: Sezer GÜRER, M.D.
İnönü University School of Medicine
General Surgery Department
44300 - MALATYA
Tel: 0422- 323 00 11