Original Article

Surgical and Nutritional Intervention of Crohn's Disease

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Key Words
Crohn's disease;
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Purpose. Crohn's disease is usually treated conservatively. The surgery is reserved for treating complications of Crohn's disease. Experience of surgical treatment and nutritional interventions of Crohn's disease for most physicians is relatively limited because of incidence of Crohn's disease in Taiwan is much lower than western countries. This is retrospective review of a single surgeon's experience of indications, procedures, and results of surgery, and nutritional interventions for Crohn's disease.
Materials and Methods. We collected 19 patients, from December 1983 to October 2006, who had surgical treatment for Crohn's disease by a single surgeon. Data including surgical indications and type of surgery for Crohn's disease, number of operations (including operations in other hospitals), mortality, morbidity, nutritional parameters, TPN related complications were analyzed.
Results. There were 12 males and 7 females. The average age was 38.1 year old (range from 14 to 65 years). The most common indications for surgery were intractable disease (56.2%). The most common operation was right partial colectomy with anastomosis (56.2%). One patient was lost in follow up, the rest of patients all had recurrent or persisted disease. Five patients expired. Majority of patients had preoperative malnutrition manifested by abnormal nutritional parameters.
Conclusions. The surgery is reserved for treating complications of Crohn's disease. Malnutrition is common in the patient who had Crohn's disease. Preservation of length of bowel is essential to avoid short bowel syndrome. Perioperatively parenteral nutrition is frequently indicated due to persisting malnutrition or associated complications.
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Inflammatory bowel disease (IBD) is the term used to describe two enigmatic disease processes of ulcerative colitis and Crohn's disease. No defined etiology has been identified for IBD, although a number of factors contribute to its etiopathogenesis, including genetic, microbial, inflammatory, immunology, and permeability abnormalities. The symptomatology of ulcerative colitis and Crohn's disease are similar. Radiological investigation may pose a problem in differentiation. Pathologic evaluation, even in the best center, may reveal an indeterminate colitis in as many as 15% of patients. The incidence is considerably lower in Asia, Africa, and South America, and among the nonwhite population in the United States. Jews have three times higher incidence than non-Jews. There is a relatively equal distribution between genders. Ulcerative colitis occurs in 8 to 15 people per 100,000 populations in the United States and Northern Europe.

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The incidence of Crohn's disease is slightly lower, 1 to 5 people per 100,000 populations in the United States.

Crohn's disease is mainly managed by non-operative means. Upon failure of medical management, surgery should be considered. In addition, many patients with Crohn's disease were known to have nutritional problems necessitated nutritional therapy. Because of low incidence of the disease in our country, experiences of most physician of management especially surgical management of the patients are limited.

This is a retrospective review of a single surgeon's experience of the indications, procedures, and results of surgical treatment and nutritional intervention of Crohn's disease.

Materials and Methods

The study used the Mackay memorial hospital administrative database of colorectal surgery and we identified all patients who had surgical intervention for Crohn's disease. From December 1983 to October 2006, we collected 19 patients who had surgical treatment for Crohn's disease by a single surgeon (Tzu-Chi Hsu).

Demographic data including age and gender, surgical indications, type of first operation at MMH, total number of operations, morbidities, mortalities, nutritional parameters, and TPN related complications were analyzed.

Results

There were 12 males and 7 females. The average age was 38.1 year old (range from 14 to 65 years). The most common surgical indication is intractable disease which occurred in 10 patients (52.6%), followed by enterocutaneous fistula in four patients (21%), and colonic obstruction in two patients (10.5%, Table 1). Intractable disease included severe bleeding, serious and persistent diarrhea, serious side effects of medication, persisted low body weight and retarded growth etc. The most common type of surgery is right partial colectomy with anastomosis in 10 patients (52.6%), followed by left partial colectomy with anastomosis in three patients (15.8%). Five patients had a stomy constructed in the first operation at the MMH (Table 2). One patient was lost in follow up, the remaining patients all had recurrent or persisted disease. Five patients expired during follow up. The causes of five mortalities were summarized in the Table 3.

Except one patient that had emergent surgery without preoperative biochemical data. Majority of patients had preoperative malnutrition manifested by abnormal nutritional parameters. Sixteen patients (84.2%) need parenteral nutritional support perioperatively (Table 4). The mean of duration of parenteral nutritional support is 71.1 days (range from 5 to 276 days). Nutritional status of the patients all improved. Complications related to TPN (16 patients) included catheter sepsis in two patients (12.5%), subclavian vein thrombosis in one patient (6.2%), penumothroax in two patients (12.5%), and clinical zinc deficiency in two patients (12.5%). Morbidities not related to parenteral nutrition included four patients (21%) with enterocutaneous fistula, three patients (15.8%) with abdominal wall dehiscence, and two patients

Table 1. Surgical indications in patients with Crohn's disease

Intractable disease	10 (52.6%)
Enterocutaneous fistula	4 (21%)
Perianal fistulous abscess	1 (5.2%)
Rectovaginal fistula	1 (5.2%)
Bowel perforation with peritonitis	1 (5.2%)
Colonic obstruction	2 (10.5%)

Table 2. Type of surgery in patients with Crohn's disease

Right partial colectomy with anastomosis	10 (52.6%)
Left partial colectomy with anastomosis	3 (15.8%)
Resection of ileum with anastomosis	1 (5.2%)
Left hemicolectomy with ileostomy	1 (5.2%)
Subtotal colectomy with ileostomy	2 (10.5%)
Total proctocolectomy with ileostomy	2 (10.5%)

Table 3. Causes of mortalities in patients with Crohn's disease

Sepsis following perforation of ileum	1
Catheter sepsis	1
Malnutrition with intra-abdominal sepsis in other hospital	1
Postoperative sepsis in other hospital	1
Respiratory failure due to multiple drug assistance TB	1

(10.5%) with postoperative bleeding (Table 5). Include operations in other hospitals, total numbers of operations were one operation in six patients, two operations in six patients, and over three operations in seven patients.

Discussion

The symptoms of Crohn's disease include diarrhea, abdominal cramps, rectal bleeding, body weight loss, tenesmus, vomiting, fever, constipation and anemia. The differential diagnosis of Crohn's disease of large intestine should include diverticulitis, amoebiasis, tuberculosis, ischemic colitis, radiation colitis, scirrhous carcinoma of colon, and ulcerative colitis.

About 25% of patients with Crohn's disease were in colonic type, 17.5% of patients were small-bowel type, and 57% of patients were ileocolic type lesion in one large series. The cumulative operation rates at 10 years in one series were 47% for colonic type, 58% for small-bowel type, and 71% for ileocolic type, respectively.[1] Diarrhea and rectal bleeding occurred significantly more often in colonic type of Crohn's disease, whereas fistula complicated ileocolic disease are more often than isolated involvement of small or large bowel[2]. Associated extraintestinal manifestation were seen in 55% patients (with joint disease in 21%, eye involvement in 12%, skin lesion in 8%), and most frequently related to colonic involvement.[2]

Surgical management of Crohn's disease should only be considered after failure of aggressive pharmacotherapy with high-dose of anti-immunity therapy and unsolvable complication of an acute attack or chronic disease. The medical management of inflammatory bowel disease included diet control, vitamins and mineral supplements, use of anti-diarrheal and antimicrobial agents, corticosteroids, azulfidine (sulphasalazine; sulphapyridine+5-ASA), mesalazine (5-ASA), and other immunosuppressive agents. Conservative management is usually followed by clinical remission in most patients. Recent data suggest anti-TNF monoclonal antibody (infliximab) can delay surgery in significant number of patients.

Indications for nutritional support in the patients with Crohn's disease included (i) pre-exiting malnutrition, especially preoperative preparation, (ii) enterocutaneous fistula, (iii) intestinal obstruction, (iv) toxic colitis with or without megacolon, (v) growth retardation, (vi) failure to obtain adequate nutrition, (vii) fluid and electrolytes abnormality. At the time of diagnosis, the majority of patients have lost body weight, mainly because of poor intake.[3] Hypoalbuminemia frequently accompany the malnutrition, more often caused by a protein-losing enteropathy than by inadequate protein intake.

Albumin level is a good predictor for nutritional status of patient. In our series, one patient had emergent surgery without preoperative biochemical data. Sixteen patients (88.9%) had albumin less than 3.0 gm/dL level and four patients (22.2%) less than 2.0 gm/dL level. The BMI level was less than 22 in16 patients (88.9%). Perioperatively parenteral nutrition supports were needed in 16 patients (88.9%).

The frequently seen complications related to the nutritional support of TPN include (1) catheter related sepsis, (2) venous thrombosis, (3) biochemical abnormalities such as hyperglycemia, and hypokalemia etc, (4) micronutrient abnormalities such as zinc, and copper deficiency etc, (5) physiopathology change such as gall stone, liver cirrhosis, and renal stone. In our series, the TPN related serious complications included two patients with catheter sepsis, one patient with

Table 4. Nutritional parameters and support (need for nutrition in patients with Crohn's disease)

Preoperative albumin	< 3.0 gm/dl	12
	< 2.0 gm/dl	4
BMI < 22		16
Preoperative cholesterol	< 130 mg/dl	15
Preoperative triglyceride	< 35 mg/dl	2
Perioperative parenteral nutrition		16

* One patient is without preoperative biochemical data due to emergent surgery.

Table 5. Morbidities in patients with Crohn's disease

Enterocutaneous fistula	4 (21%)
Abdominal wall dehiscence	3 (15.8%)
Postoperative bleeding	2 (10.5%)
TPN related complications	
Catheter sepsis	2 (12.5%)
Subclavian vein thrombosis	1 (6.25%)
Penumothroax	2 (12.5%)
Clinical zinc deficiency	2 (12.5%)

subclavian vein thrombosis, two patients with pneumothorax, and two patients with clinical manifestation of zinc deficiency. A patient actually died of catheter related sepsis.

Zinc is a constituent of numerous metallo-enzymes needed during anabolism. Zinc deficiency frequently occurs in patients with Crohn's disease following total parenteral nutrition support and excessive loss from the enterocutaneous fistula. The clinical symptom of zinc deficiency is characterized by consciousness alteration, diarrhea, vesicular squamous cutaneous lesions around orifices, often infected by bacteria and mycosis.[4]

In one report, the remission of Crohn's disease following elemental diet was around 60%, compared with 80% patients who used steroids.[5] The anti-inflammatory effect of elemental diet may cause decrease of ESR and CRP. Elemental diet is low in linoleic acid, which may inhibit eicosanoid generation and exert anti-inflammatory effect. Numerous studies have established that hypothetical mechanisms of the effect of elemental diets in Crohn's disease.[6]

The choice of operation of Crohn's disease included segmental resection, total colectomy with ileoproctostomy, total proctocolectomy with ileostomy, and stricture plasty. The recurrence that requires a new surgical intervention is 6% per year.[7]

The rate of early recurrence or persistent disease in Homan's report is 21% for bypass with exclusion and 45% for simple bypass as compared to 3% for resection in Crohn's disease.[8] Overall recurrence rates in Homan's series after primary surgery for ileocolic type were 25% for resection, 63% for bypass with exclusion, and 75% for simple bypass.[8] The resection is apparently the optimal choice of surgical treatment for ileocecal Crohn's disease.

The risk factors affecting recurrence following resection for Crohn's disease included family history of inflammatory bowel disease[9] smoking behavior,[10] duration of disease from onset to first resection,[11] number of sites involved,[12] location of site involved,[13] microscopic involvement at the line of resection,[14] distribution of disease,[15] type of surgery performed[16] and postoperative prescription of immunomodulator.[10] Other factors were not predictive of post-operative recurrence such as age at onset of disease, sex, family history of Crohn's disease, anatomical site of disease, length of resected bowel, presence of granuloma in the specimen, peri-operative blood transfusions and post-operative complications.[14]

Preservation of the length of the small intestine is essential in the patients with Crohn's disease because of high incidence of recurrence. Restorative proctocolectomy is not suitable for Crohn's disease. A permanent stomy is frequently unavoidable for the patients with Crohn's disease.

Conclusions

The incidence of Crohn's disease is rising in Taiwan. Malnutrition is common in the patient who had Crohn's disease. Conservative management is the first choice of treatment for Crohn's disease. The surgery is reserved for treating complications of Crohn's disease.

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原　著

克隆氏症的手術治療及營養治療

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目的　克隆氏症的治療，通常採取的是保守性治療。手術治療大都用於緩解克隆氏症的併發症。對於大多數的臨床醫師來說，由於克隆氏症在台灣地區的發生率遠比西方國家低，因此克隆氏症之手術治療及營養治療的經驗的確比較缺乏。這篇回顧性研究分析，主要是呈現單一外科醫師對於克隆氏症的手術適應症，手術術式，手術結果，及營養治療的結果。

方法　從 1983 年 12 月到 2006 年 10 月，共收集 19 位罹患克隆氏症患者資料，這些患者都接受同一位外科醫師的手術治療。這些研究資料包括克隆氏症手術治療的適應症，手術術式，手術次數 (包括在其他醫院的手術次數)，死亡率，併發症，營養指標，及全靜脈營養治療相關的併發症。

結果　這些克隆氏症患者共計有 12 位男性及 7 位女性。其平均年齡約 38.1 歲 (範圍從 14 歲到 65 歲)。最常見的手術適應症是頑固性疾病 (56.2%)。最常見的手術術式為右側部分大腸切除術合併腸道吻合術 (56.2%)。除了一位病患失去追蹤治療之外，其他病患皆呈現出復發性或持續性疾病。共有五位病患死亡。大多數患者可藉由異常的營養指標呈現出病患術前營養不良的狀況。

結論　外科手術治療應用於緩解克隆氏症的併發症。營養不良常併發於克隆氏症患者。應保留足夠的腸道長度以避免短腸症候群。手術前後全靜脈營養治療可適用於持續性營養不良或疾病相關併發症。

關鍵詞　克隆氏症患者、手術治療、營養治療。