

Gastrocolic and Gastrojejunocolic Fistulae: Report of Twelve Cases and Review of the Literature

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Seven gastrocolic and five gastrojejunocolic fistulae were recorded at Charity Hospital between 1940 and 1970. Such fistulae occurred in males more often than females. In this series, as in others, the most common cause was gastric surgery for peptic ulcer disease. Pain, diarrhea, and weight loss were clinical findings in half the patients; anemia, leukocytosis, electrolyte disturbances and hypoalbuminemia were common laboratory findings. A fistula was demonstrated radiologically in nine of the twelve patients. Management of these patients included no operation (3); two-stage procedure (2); and one-stage procedure (7); with a recent trend toward the one-stage procedure. A case report of a fistula resulting from postoperative complications of perforative appendicitis in which a successful combination of hyperalimentation and diverting colostomy was used is presented.

PRIOR to the advent of gastric surgery, direct communication between the stomach and the colon was usually secondary to cancer, syphilis, tuberculosis, or trauma. By 1900, there was only 90 cases reported in the literature. In the late 1800s, Wolfer and von Hacker devised the gastroenterostomy as treatment for ulcer disease. As early as 1903, Czerny defined a gastrojejunocolic fistula following gastroenterostomy.²² Since then, the entity has become a well-defined clinical syndrome, and its etiology following gastroenterostomy recognized. With the advent of vagotomy and drainage, and higher gastrectomy, the incidence of marginal ulceration has been reduced considerably from the previous estimate of 15%.¹⁰ The incidence of gastrocolic and gastrojejunocolic fistulae also should have declined, leaving the causes of fistulization to the spontaneous varieties seen early in this century.

This report details the experience of the Louisiana State University Department of Surgery in the care of 12 pa-

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tients with gastrocolic and gastrojejunocolic fistulae at Charity Hospital in New Orleans as well as a review of the experience of others.

Results

The records of 12 patients treated for gastrocolic and gastrojejunocolic fistulae from 1940 through 1973 were reviewed. The clinical course, laboratory data, and management of these patients were evaluated.

The ages ranged from seven to 84 years, with a median of 52 years. There were eight males and four females. Seven patients had a gastrocolic fistula, and five had a gastrojejunocolic fistula.

The types and causes of gastrocolic and gastrojejunocolic fistulae are shown in Table 1. The etiologies of these fistulae were varied, the most common cause being gastric surgery for peptic ulcer disease.

Pain, diarrhea, and weight loss were the most common clinical findings in the 12 patients studied (Table 2). Malnutrition was the most common presenting sign. Only one patient presented with fecal vomiting, which usually is considered a classic symptom of this disease. Steatorrhea, postprandial pain, and heartburn were not present in any of these patients.

Laboratory findings included anemia, leukocytosis, electrolyte disturbances, and hypoalbuminemia in all. In this series, the hematocrit was less than 35% in half the patients, with a median of 35.7%.

Radiologic diagnosis of the fistula was made in nine of the 12 patients, five by barium enema, and two by upper gastrointestinal series. Two patients' fistulae were demonstrated by both barium enema and upper gastrointestinal series. Gastroscopy was performed in five patients,

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TABLE 1. *Gastrocolic and Gastrojejunocolic Fistulae at Charity Hospital in 12 Patients*

Type and Cause	
Gastrocolic	
Gastroenterostomy for peptic ulcer disease	2
Benign gastric ulcer (not operated)	1
Pancreatic abscess	1
Perforated appendix with subphrenic and lesser sac abscess	1
Perforated diverticulum	1
Unknown	1
Gastrojejunocolic	
Gastroenterostomy for peptic ulcer disease	3
Malignant disease of the colon	1
Regional enteritis	1

TABLE 2. *Clinical Findings in 12 Cases of Gastrocolic and Gastrojejunocolic Fistulae*

Pain	6
Weight Loss	6
Diarrhea	4
Malnutrition	4
Nausea	4
Anemia	3
Hematemesis	2
Abdominal mass	1
Constipation	1
Fecal Vomiting	1
Flatulence	1
Melena	1
Pain relieved by foods/antacids	1

but the fistula was demonstrated in only two. Colonoscopy was not performed on any patient in this series.

The management of the 12 patients with gastrocolic and gastrojejunocolic fistulae (Table 3) included a one-stage procedure in seven. The only mortality, due to *Candida* sepsis, was in this group. Two patients had a two-stage procedure with neither complications nor mortality. Three patients were not operated upon.

Long term followup of the patients revealed that of the three patients who had no operations, two died of undetermined causes, and one was lost to followup. Of the nine remaining patients, three have been lost to follow-up. The remainder have been followed for periods ranging from six months to 17 years. The only one who continues to have problems is the patient with chronic inflammatory disease of the small bowel.

The following is a case report of an unusual gastrocolic fistula.

Case Report

A seven-year-old Negro male was admitted to Charity Hospital on October 11, 1972 with a two-day history of lower abdominal pain accompanied by nausea and vomiting. His past history included the usual childhood illnesses, but no previous operations.

On examination the child was found to be in no distress with normal vital signs for his age and a temperature of 38.4C. Pertinent physical findings were limited to the abdomen, which was rigid, diffusely tender, and had no bowel sounds.

Laboratory studies revealed a normal urinalysis, WBC count of 19,300 with a marked shift to the left, hematocrit of 40.4% and normal electrolytes. Chest and abdominal films were within normal limits.

A diagnosis of acute perforated appendicitis was made. The patient was started on parenteral antibiotics and taken to the operating room where he was found to have a free perforation of his appendix with generalized contamination of the abdominal cavity.

The patient's postoperative course was complicated by bilateral subphrenic abscesses, a cul-de-sac abscess, lesser sac abscess and multiple interloop abdominal abscesses requiring four different surgical drainage procedures.

In January, 1973, two and one-half months after admission to the hospital and six weeks after drainage of an interloop abscess, the patient continued to run a low-grade temperature, was losing weight, and in

general was doing poorly. Intravenous hyperalimentation was begun and an upper gastrointestinal series and barium enema were obtained in an effort to demonstrate additional intra-abdominal abscesses. The upper gastrointestinal series was within normal limits, but the barium enema demonstrated a small gastrocolic fistula between the stomach and the midtransverse colon. Hyperalimentation was continued for an additional two weeks at which time the patient underwent a right transverse colostomy. He did well postoperatively and was discharged on the 10th postoperative day, afebrile and gaining weight.

In June, 1973 barium enema showed no abnormalities with apparent closure of the gastrocolic fistula. His colostomy was closed and he has continued to do well and is free of complications.

Discussion

Gastrocolic and gastrojejunocolic fistulae have enough in common in the clinical presentation and diagnosis that they can be discussed together. However, their incidence and etiology differ so that a distinction between the two must be made. The forerunner to the development of a gastrojejunocolic fistula is the marginal ulcer, and as long as marginal ulcers exist, an occasional fistula will develop. Marshall reported that one out of seven individuals with marginal ulceration develops a gastrojejunocolic fistula. In his own series of 257 jejunal ulcers, 49 developed fistulae, an incidence of 18%.¹⁶ A report from the Henry Ford Hospital in Detroit showed that in 81 diagnosed marginal ulcers, seven fistulae developed, an incidence of 8.6%.¹ In our own series, four of five gastrojejunocolic fistulae occurred due to marginal ulcer after gastroenterostomy, but an accurate appraisal of the number of marginal ulcers is not available. A significant question to be considered is whether or not the incidence of gastrojejunocolic fistula has changed significantly since surgery for peptic ulcer has become more aggressive. This question apparently cannot be answered completely as yet. Although the incidence of marginal ulcer is suggested to have fallen since the addition of vagotomy and resection to the treatment of peptic ulcer, not enough cases have been reported to make a definite statement. However, Hardy states that the series reporting the usual $\frac{2}{3}$ distal gastric resection have an incidence of marginal ulcer of less than 5% as compared to the incidence of 15% following gastroenterostomy alone.²

TABLE 3. *Management and Results of Gastrocolic and Gastrojejunocolic Fistulae at Charity Hospital of Louisiana*

Sex	Age	Etiology	Type of Fistula	Operative Procedure	Outcome
M	7	perforated appendix and intra-abdominal abscess	gastrocolic	colostomy, hyperalimentation, colostomy closure (II stage)	2 years postop., doing well
M	70	gastroenterostomy for peptic ulcer disease	gastrocolic	gastrectomy, colectomy, (I stage)	2 months postop., doing well
F	46	pancreatic abscess	gastrocolic	gastrectomy, colectomy, (I stage)	died 15 days postop. from intra-abdominal abscess— <i>Candida</i> sepsis
F	71	perforated diverticulum	gastrocolic	colostomy, gastrostomy, colectomy, colostomy closure ((II stage)	lost to followup
M	55	postop. gastric surgery for peptic ulcer disease	gastrocolic	none	died, cause unknown
M	53	recurrent ulcer disease. (not operated)	gastrocolic	none	died, cause unknown
M	84	unknown	gastrocolic	none	lost to followup
F	29	recurrent regional enteritis	gastrojejunocolic	resection of fistula and ileocolostomy	continued to have problems with primary disease
M	53	malignant disease of colon	gastrojejunocolic	gastrectomy, colectomy, resection jejunum (I stage)	1 year postop., gaining weight asymptomatic
M	44	postop. gastric surgery for peptic ulcer disease	gastrojejunocolic	gastrectomy, colectomy, resection jejunum (I stage)	asymptomatic, 17 years postop.
F	62	postop. gastric surgery for peptic ulcer disease	gastrojejunocolic	revisionary gastroenterostomy, colectomy, resection jejunum (I stage)	lost to followup
M	48	postop. gastric surgery for peptic ulcer disease	gastrojejunocolic	revisionary gastroenterostomy, colectomy, resection jejunum (I stage)	lost to followup

The exact incidence of gastrocolic fistula cannot be tabulated, but it remains a rarity. Carcinoma of the stomach or colon remain the commonest causes of such fistulae. In a large series from the Lahey Clinic where a combined total of 4700 cases of carcinoma of the stomach and colon were reviewed, 11 fistulae were found.¹⁶ In a review spanning 51 years from the Mayo Clinic, Smith et al. found 29 cases, 12 of which were associated with carcinoma of the stomach, and the remaining 17, with carcinoma of the colon.²⁰ These, along with 167 cases reported by MacMahon and Lund, represent the majority of

cases reported in the literature.¹⁵

Trauma, intra-abdominal abscess, tuberculosis, syphilis, ulcerative colitis, and unusual causes as that occurring as a complication of gastrostomy reported by Cook, have been reported.⁶ Of particular interest, however, is the recognition of benign gastric ulcer as a cause of gastrocolic fistulae. Firth reported the first case of gastrocolic fistula secondary to benign gastric ulcer in 1920. Miller and Delaney reported 15 cases they had found in the world literature, and added one case of their own.¹⁷ We were able to find an additional 8 cases in the literature plus

one case of our own—reported by Ganji et al—in 1967.⁸ This brings the total now to 25 cases with 18 being reported since 1964.^{5,7,9,11,13,18,23} Benign gastric ulcer has become a prime differential in the diagnosis of gastrocolic fistula.

The end result of such a communication in the alimentary tract can become a devastating syndrome, manifested by weight loss, anemia, and severe diarrhea with fecal vomiting. The mechanism of this syndrome was uncertain until Kiskaddon, Templeton, and Renshaw reported an extensive experimental and clinical investigation to document the pathogenesis of this syndrome.¹² They concluded that deranged digestive and absorptive functions of the small intestine, caused by the regurgitation of colonic contents through the fistula into the stomach, bring about the syndrome. Damage occurs by transit of fecal material through the small intestine.

The diagnosis of gastrocolic or gastrojejunal fistula is not a difficult one and can often be made on the basis of history and physical examination alone. The majority of these patients will present with the classic symptoms of diarrhea, weight loss and feculent vomiting, and in the case of gastrojejunal fistula will usually have some previous history of peptic ulcer disease and gastric surgery. Most will present a picture of severe malnutrition with dehydration and electrolyte imbalance.

Laboratory findings usually reflect a severe state of malnutrition and dehydration with electrolyte imbalance, diminished serum proteins and vitamin deficiencies. A slight leukocytosis may be present as well as a mild to moderate anemia which may be observed because of hemoconcentration. Gastric acidity has been shown to be of little value; however, the quality of nasogastric aspiration may be significant if fecal material is aspirated.

The most reliable diagnostic aid in establishing this diagnosis is the barium enema. In 1960, Thoeny, Hodgson and Scudamore studied 66 gastrojejunal or gastrocolic fistulae in 65 patients and found that barium enema was the most accurate roentgenologic means of diagnosis.²¹ They reported a 95% success rate with barium enema as opposed to only 27% with upper gastrointestinal series in both types of fistulae.

Other diagnostic aids such as gastroscopy and colonoscopy have not thus far been proven to be as beneficial diagnostically. However, with recent advances in technology and more experienced endoscopists, these procedures should be considered in the preoperative evaluation of these patients. Other simple diagnostic aids may be of some benefit. Once such test involves placement of a nasogastric tube, followed by a high enema of tap water with indigo carmin. The nasogastric aspirant is then observed for presence of the dye, and if positive indicates a communication between the stomach and colon.¹⁹

Because of the debilitating nature of gastrocolic and

gastrojejunal fistulae, careful clinical and laboratory evaluation must be carried out in the preoperative period. Many of these patients are malnourished, anemic, and in electrolyte imbalance. In a series of cases reported from the Mayo Clinic over 50% of patients were noted to have clinical evidence of avitaminosis.³ These conditions should be corrected as nearly as possible preoperatively. An important adjunct to the management of these patients is intravenous hyperalimentation. This is an excellent method of replacing deficiencies in calories, protein, and vitamins in the debilitated patient, particularly those who cannot tolerate oral feedings.

In addition to the case reported here in which a gastrocolic fistula was managed by diverting colostomy and hyperalimentation, a case managed in a similar manner was reported by Miller.¹⁷ In that case the fistula also closed after the diverting colostomy was created and hyperalimentation utilized. However, definitive surgery was subsequently carried out in this patient for correction of his ulcer diathesis. Perhaps this method of management should be considered in selected cases, thus obviating the need for extensive surgical procedures in some patients.

Systemic antibiotics are usually not needed in the preparation of the patient unless a concomitant infection is present. However, oral antibiotics are usually administered for the purpose of bowel preparation prior to surgery. In our institution oral kanamycin with laxatives and cleansing enemas is used for preparing the colon for surgery.

Over the years the surgical management of gastrocolic and gastrojejunal fistulae has varied a great deal, ranging from simple colostomy to three-stage procedures consisting of colostomy followed by resection of the fistula, followed by closure of the colostomy. As was stated earlier, the mechanism of this syndrome is the transit of fecal material through the small intestine with subsequent derangement of digestive and absorptive functions.

It should be noted that all of these procedures have one thing in common—the diversion of the fecal stream away from the upper gastrointestinal tract, which allows the small intestine to function normally. This makes these procedures beneficial in the management of gastrocolic and gastrojejunal fistulae. Prior to the 1930s treatment generally consisted of resection of the fistula without attempts at correction of the ulcer diathesis. Recurrence rates of ulcer and/or fistula were high. Localio, Stone and Hinton reviewed 115 cases between 1943 and 1953 and found a recurrence rate of 50% among those treated with resection of the fistula as compared with 4% among those treated with correction of the ulcer diathesis.¹⁴

In the late 1930s defunctionalizing colostomies and staged operative procedures became popular in the treatment of fistulae of either benign or malignant origin. Pfeiffer and Kent proposed the simplest of these which was a

three-stage procedure consisting of: 1) colostomy; 2) resection of the fistula; and 3) closure of colostomy. The obvious disadvantage to this is that three major surgical procedures are required. Lahey in 1938 proposed a two-stage procedure consisting of a proximal defunctionalizing ileosigmoidostomy followed by resection of the fistula, subtotal gastrectomy and colectomy, thus obviating the need for a third-stage, colostomy closure.¹⁶ This procedure also had other advantages such as maintenance of bowel continuity as well as absence of skin contamination and lack of fixation of the hepatic flexure. This procedure significantly reduced the mortality and morbidity in the treatment of this disease and was generally accepted as the procedure of choice.

Despite the advantages of Lahey's procedure and the significant reduction in the mortality and morbidity, steady advances in pre- and postoperative care during the 1940's made the one-stage procedure with correction of the fistula and ulcer diathesis seem more feasible. With progress in antibiotic therapy, blood replacement, and a greater knowledge of electrolyte balance, the mortality and morbidity of such extensive procedures was significantly reduced. Barber, Waugh, and Priestly reviewed 76 patients who underwent one stage procedures from 1941 to 1960 for gastrojejunal fistulae due to peptic ulcer disease.⁴ Sixty-three of these patients were followed up to five years. The mortality rate was 2.6% and there were three recurrences for a rate of 4.3%. There are several smaller series studied with similarly good results. Marshall et al. pointed out the steady decline in operative mortality, from 25% in 1927-1936 to 4% in 1937-1946 when the two-stage procedure was commonly employed, to no deaths from 1947-1955 when the one stage procedure was performed in 18 cases.¹⁶

Data available at the present time seem to indicate that the one-stage procedure consisting of resection of the fistula, colectomy, and subtotal gastrectomy is feasible in selected patients with gastrocolic or gastrojejunal fistulae.

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