

# Outcomes in the management of gastrocolic fistulas: A single surgical unit's experience

## Gastrokolik fistül tedavisinde sonuçlar: Tek cerrahi merkez deneyimi

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**Background/aims:** Gastrocolic fistula has been associated with a variety of diseases. Causative factors are most commonly gastric/colonic cancers and benign gastric ulcers. Treatment modalities may change according to etiology. **Methods:** In this study, we present our cases with gastrocolic fistula and the treatment modalities utilized for this uncommon complication. The records of the patients with gastrocolic fistula between November 1996 and June 2006 were retrospectively analyzed. **Results:** Six patients with a mean age of 57.5 were determined. Of these, four had malignancy and two had gastric ulcer. The predominant symptoms were diarrhea and vomiting, weight loss, and abdominal pain. Diagnostic studies included barium enema, endoscopy, barium meal, colonoscopy, and computed tomography. After preoperative nutritional support, en-bloc resection of the involved gastrocolic region (4), simple excision (1), and wedge resection of the gastric part and closure of the colonic wall (1) were performed. One patient died of respiratory disorders and there was only one recurrence. In our series, therapeutic management for this unusual disorder included various resection procedures such as simple excision, which may result in recurrence, and wedge resection or en-bloc resection for benign cases, whereas en-bloc resection and reconstruction procedures remained the most applied management for malignant cases. En-bloc resection followed by combination of adjuvant chemotherapy results in long disease-free survival. **Conclusion:** Gastrocolic fistula should be suspected in patients with chronic diarrhea and vomiting of unknown cause with a high suspicion of gastrointestinal malignancy.

**Key words:** Gastrocolic fistula, gastric-colonic carcinoma, en-bloc resection

## INTRODUCTION

Currently, the most common etiology of gastrocolic fistula (GCF) is gastrointestinal malignant disease, especially locally invasive gastric and colon carcinoma. The other rare malignant causative factors include gastric lymphomas, carcinoid tumors of the colon, and metastatic and infiltrating tumors of the biliary tract, duodenum, and pancreas (1-3). It is less frequently encountered as a

**Amaç:** Gastrokolik fistüller birçok hastalığa eşlik edebilirler. Etken faktörlerin en sık görülenler arasında gastrik veya kolonik kanserler ile gastrik ülserler yer almaktadır. Tedavi modelleri bu faktörler doğrultusunda planlanır. **Yöntem:** Biz bu çalışmada ile nadir bir komplikasyon olan gastrokolik fistüllü hastalarımıza tedavi yaklaşımını ve sonuçlarını değerlendirdik. Kasım 1996- Haziran 2006 arası yapılan retrospektif hasta kayıt taraması ile gastrokolik fistül tanısı alan ve tedavi edilen hastalar analiz edildi. **Bulgular:** Yaş ortalaması 57.5 olan altı hasta bulundu. Altta yatan sebep olarak dört hastada malignite iki hastada ise gastrik ülser tespit edildi. En sık görülen semptomlar arasında diyare, kusma, kilo kaybı ve karın ağrısı mevcuttu. Tanı yöntemi olarak baryum enema, endoskopi, oral baryum tetkiki, kolonoskopi ve tomografi kullanıldı. Preoperatif beslenme desteği ardından patolojik gastrokolik bölgenin en-blok rezeksiyonu ve gastroenterostomi (4), basit eksizyon(1) ve wedge rezeksiyon ile kolon duvarının primer kapatılması prosedürü (1) uygulandı. Bir hastada rekürrens gelişirken ve bir diğeri solunumsal komplikasyonlar nedeniyle erken dönemde kaybedildi. Sonuç olarak bu nadir görülen patolojinin cerrahi tedavisinde rekürrens ihtimali olan basit eksizyon, wedge rezeksiyon ya da en-blok rezeksiyon benign natürlü olgularda uygulanabilirken, malign orijinli hastalarda en sık olarak uygulanan cerrahi prosedür olarak en-blok rezeksiyon ve uygun rekonstrüksiyon tekniği karşımıza çıkmaktadır. En-blok rezeksiyon ve adjuvan kemoterapinin kombine uygulanması hastalara uzun yaşam şansı sağlar. **Sonuç:** İzah edilemeyen kronik diare ve kusma yakınmalarında ayırıcı tanıda gastrokolik fistülden şüphelenilmelidir. Etiyolojide gastrointestinal kanser önemli yer tutar.

**Anahtar kelimeler:** Gastrokolik fistül, gastrik- kolonik kanser, en-blok rezeksiyon

complication of benign gastric ulcers, especially due to use of proton pump inhibitors. In 2004, Mimidis et al. (4) reported a case with GCF secondary to nonsteroidal anti-inflammatory drug abuse. Clinical manifestations are generally nonspecific, but in the presence of long-lasting diarrhea accompanied by nausea and vomiting, GCF should be considered. Diagnosis may be confirmed with a

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high certainty by barium enema examination. The optimal management of GCFs is individual surgery in the light of preoperative findings. Management modalities include medical treatment or resection of the involved portion for benign GCF and mostly en-bloc resection of the fistula with surrounding structures for malignant pathologies. The significant risk of underlying malignancy determines the medical management. Long-term survival in patients with malignant etiology is rarely reported (5).

## MATERIALS AND METHODS

Between November 1996 and June 2006, we retrospectively analyzed the patients with diagnosis of GCF; six patients were detected. All patients except one were male with a mean age of 57.5 years (range: 43-80). All patients underwent surgical treatment and were followed at Ege University School of Medicine, Department of General Surgery. Demographic features, presenting symptoms, diagnostic studies, and treatment modalities were reviewed from the case records.

## RESULTS

### Presenting Symptoms

All of the patients suffered severe diarrhea because of gastric acid irritation of the colon, and half of the patients had fecal halitosis. The other symptoms included nausea and vomiting, weight loss due to malnutrition, and abdominal pain (Table 1). The mean symptomatic duration was 11 months (range: 3-36 months). Supportive parenteral nutrition was preoperatively provided for all the patients to improve their general condition.

### Diagnosis

Barium enema and endoscopy were performed in four patients to investigate possible malignancies. Endoscopy and colonography were used in one patient only (Figure 1). Barium meal was used in only one patient. Biopsy samples of the mucosa were obtained during endoscopic evaluation from the fistula site. Computerized tomography (CT) of thorax and abdomen and whole body bone scintigraphy were performed in four patients.

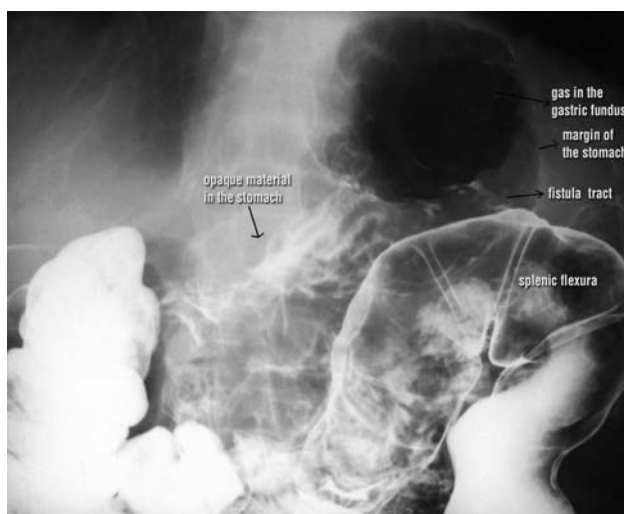
### Intraoperative Findings

GCF was located in the transverse colon region in all patients, except in one who had GCF with a splenic flexure location. Combined gastrojejunal fistula was also detected in only one patient (Fi-

gure 2). No isolated gastrojejunal fistula was observed. One of the patients with malignancy had undergone a subtotal gastric resection due to benign ulcer approximately 25 years ago and another case also had a history of previous gastric resection performed 16 years ago.

### Treatment

Four patients underwent en-bloc resection of the involved gastrocolic region by appropriate reconstruction method for gastrointestinal continuity, mostly gastroenterostomy. Roux-en-Y gastroenterostomy was performed for the patient with gastrojejunal fistula. In one patient with GCF secondary to gastric ulcer who had history of gastric resection procedure due to benign ulcer many years before, simple excision of the fistula was per-



**Figure 1.** Opaque leakage into the stomach through the fistula tract as shown under scopy and superposition of the jejunum (filled with opaque, alike) with splenic flexure.



**Figure 2.** Intraoperative view of a gastrojejunal fistula.

**Table 1.** Table 1. Data analysis of the patients with GCF

Patient no	Age	Etiology	Symptoms	Diagnostic method	Localization of the fistula	Operation	Complication	Pathological examination	Follow-up (month)
1	43	Benign gastric ulcer	Diarrhea, nausea, vomiting, fecal halitosis	BE, endoscopy	Transverse colon	WR+primary closure of the colonic wall	None	Acute and chronic inflammation	96
2	62	Adenocarcinoma of the colon	Diarrhea, nausea, vomiting, weight loss	BE, endoscopy, CT	Transverse colon**	En-bloc resection of the GCR+GE	None	Mild-differentiated adenocarcinoma of the colon, 57x42 mm	54*
3	53	Adenocarcinoma of the colon	Weight loss, fatigue	BE, endoscopy, CT	Transverse colon***	En-bloc resection of the GCR+GE	None	Mild-differentiated adenocarcinoma of the colon, 45x33 mm in diameter	68
4	48 <sup>a</sup>	Benign gastric ulcer	Nausea, vomiting, diarrhea, fecal halitosis	BE, endoscopy	Transverse colon	1-simple excision 2-en bloc resection	Recurrence of the fistula	Acute and chronic inflammation	85
5	80 <sup>a</sup>	Adenocarcinoma of the colon	Diarrhea, nausea, vomiting, weight loss	Endoscopy, colonography, CT	Splenic flexure	En-bloc resection of the GCR+GE	Exitus	Poor-differentiated adenocarcinoma of the colon, 64x42 mm	-
6	59	Carcinoid tumor	Abdominal pain, diarrhea, nausea, vomiting, fecal halitosis, weight	Barium meal, endoscopy, colonography, CT	Transverse colon***, jejunum	En-bloc resection of the GCR+GE (Roux-en-Y)	None	Well-differentiated carcinoid tumor of the colon, 35 mm	28

BE: Barium enema; WR: Wedge resection; GCR: Gastrocolic region.

GE: Gastroenterostomy; CT: Computed tomography.

<sup>a</sup> History of previous gastric operation due to gastric ulcer.

\* Death due to cardiac problems.

\*\* Left hemicolectomy and \*\*\*Transverse colon resection performed.

formed as the initial operation but recurrence was seen. We had aimed not to enlarge the resection margins in the first surgical intervention but we had to perform gastric resection and partial colectomy in the second operation. Therefore, the other case with GCF secondary to benign ulcer underwent wedge resection of the gastric ulcer and primary closure of the colonic wall.

### Pathology

Histological examination of three patients confirmed the diagnosis of adenocarcinoma of the colon, the most common malignant tumor of the colon. The other malignant tumor, which was diagnosed in only one patient, was carcinoid tumor of the transverse colon. Pathological examination of the remaining two patients revealed acute and chronic inflammation compatible with gastric ulceration. In both of these cases, nonsteroidal anti-inflammatory drugs were implicated for the development of ulcer and subsequent fistula.

### Postoperative Period

There was only one mortality. This patient died of severe respiratory complications because of underlying comorbid conditions and chronic obstructive pulmonary disease. Coagulase-negative staphylococcus was isolated from one patient's hemoculture. Only one patient, who previously underwent wedge resection of the gastric ulcer and primary suture repair for the colon, required a second operation due to the recurrence of the fistula after six months. Adjuvant chemotherapy was planned for the four patients whose GCF was secondary to the malignancy. One patient died in the postoperative period; thus, chemotherapy could only be administered in three of them. The patient who died succumbed in the early postoperative period due to occurrence of respiratory complication. The mean follow-up period was 66.2 months for five patients who survived after operation; another patient died of cardiac complications in the 54th month of the follow-up period.

### DISCUSSION

The literature reveals few reports of GCF and they have mostly involved case studies. GCF is a well-recognized complication of malignancy arising from the stomach and colon (6,7). In the last two decades, although the etiology of GCF is commonly benign gastric ulcer, it has become a complication of gastric or colon carcinoma due to widespread use of proton pump inhibitors. The localization differs depending on the geographical fea-

res of the areas in which adenocarcinoma of the transverse colon is common, particularly in the Western world (3,8,9). On the other hand, gastric adenocarcinoma is the most frequent etiology in Japan (5). In this study, the etiology was comparable with the results reported for the Western world. GCF originated from the stomach in only two of the patients in our series, and histological examination of the preoperative and postoperative tissue samples showed benign gastric ulcer. Nevertheless, two of our patients had previous gastric operation because of benign gastric ulcer. These operations may have been a cause of GCF as well. Smith et al. (10) reported that the cause of GCF was usually a complication secondary to previous gastric operation for benign gastric ulcer, which is supportive of our findings. Although it has been rarely reported, GCF development even many years after the first operation for gastric ulcer may occur (11,12). However, in the present study, it might have been secondary to malignancy or gastric ulcer; the underlying reason could not be clearly defined. Coronary artery bypass procedure has also been reported as a cause of GCF (13). The development of a GCF may also be secondary to invasion of the tumor or inflammatory reaction induced by the tumor ulceration. In the present study, large infiltrative tumors of the transverse colon with a surrounding severe inflammatory reaction were observed in four patients. Inflammatory reaction of Crohn's disease is also considered among the etiologies of GCFs (14).

The characteristic triad of clinical manifestations includes diarrhea (cold and acidic), nausea-vomiting, and weight loss (15,16). However, complaints of nutritional deficiency, abdominal pain, and fecal halitosis may also accompany this triad. Preoperative diagnostic interventions contribute to the diagnosis and determination of the proper surgical procedure. GCF is best detected radiologically by barium enema, which confirms the diagnosis in 90%–100% of cases, while a barium meal may miss the diagnosis in 30%–70% of cases (17). Nevertheless, barium enema was performed in four patients (66%) in our series and barium meal in one (16%). In these patients, standard upper endoscopic examination combined with biopsy was also applied to rule out any underlying malignancy. Upper and lower gastrointestinal endoscopy is essential preoperatively to detect underlying gastric or colon carcinoma as a causative factor. In addition, it is an excellent tool to view the fistulous opening (especially in the stomach) and



allows preoperative histological confirmation as well (4,15). The contribution of CT to the diagnostic studies is not necessary, but it may be of value in detecting extension of tumor in case of malignancy and subsequent preoperative planning. Thus, CT of the abdomen and thorax was performed in only four patients, for whom histological examination of biopsy samples revealed malignancies. Furthermore, full body bone scintigraphy in the patients with malignant biopsy was also assessed for any unsuspected occult metastatic disease.

Treatment is primarily based on nutritional support, including both enteral and parenteral nutrition, to improve the patient's general condition as fast as possible. Although the management of GCF has traditionally been surgical, medical management has recently been recommended as the first line of treatment when an underlying malignancy can be ruled out. On the other hand, with recent improvement in agents used in the treatment of peptic ulcers, the occurrence of GCF secondary to malignancy has relatively increased. Conservative management may be successful, including endoscopic injection of the fistula tract with fibrin sealant, especially when peptic ulcer disease is found to be the underlying cause of the GCF (17). If malignancy is preoperatively diagnosed, radical resection with tumor-free margin should be performed. Surgical procedure is individually planned for each patient. The main principle of the surgery, if the underlying etiology is a malignant disease, is excision of the fistulous tract and obtaining a tumor-free resection margin without any complication. Radical en-bloc resection of the involved gastrocolic region is the optimal treatment (14), as was performed in our patients. Other surgical interventions include resection of the main diseased part of the fistula and primary closure of the other side of the fistula (18). Recon-

struction procedures or temporary diverting colostomy may be performed. Despite all the therapy methods used, the prognosis is poor (not more than nine years) (5). In a study of 16 patients with GCF, postoperative mortality was 25% and recurrence of fistula, 12% (18). These results are comparable to the results of our study. Forshaw *et al.* (19) reported the youngest patient with the longest disease-free survival and, subsequently, the success of the radical en-bloc resection with adjuvant chemotherapy. In our study, postoperative mortality was encountered in a comorbid patient of advanced age and was secondary to the respiratory disorder. It was not related to the underlying disease. The recurrence of the fistula is thought to be dependent on inadequate treatment including simple excision of the fistula tract. Unfortunately, in our series, recurrence was seen in one patient who had undergone simple excision and primary repair of both sides of the fistula. Although the method seemed to be effective in the first three months, the fistula recurred, and both gastric resection and partial colectomy had to be performed in the second operation. Thus, if it is applicable, we suggest complete resection of the region of inflammation, which otherwise may lead to fistula recurrence, even when the underlying disease is benign in nature.

In conclusion, GCF should be suspected in patients presenting with chronic diarrhea and vomiting with a high suspicion of gastrointestinal malignancy. Since simple excision of the fistula tract in benign cases may result in recurrence, it should be kept in mind. If the underlying cause is benign, the extent of inflammation should be considered when determining the type of surgical procedure. Surgical treatment of GCF involves en-bloc resection of the involved regions and appropriate reconstruction procedures for malignant cases.

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