

Malignant duodenocolic fistula

Various therapeutic surgical modalities

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ABSTRACT

Malignant duodenocolic fistulas are the most rare and evolutive complication of colonic cancer due to their rapid nutritional disturbances and difficult surgical management. This case report details a 23-year-old female who presented with diarrhea, anorexia, weight loss, anemia and abdominal pain. A series of examinations showed a transverse colon carcinoma with a malignant duodenocolic fistula and direct infiltration of the right lobe of the liver. The patient underwent extended right hemicolectomy with wide local excision of the duodenum and segmental hepatic resection. Postoperative recovery was uneventful. The analysis of other similar cases from the literature treated with this procedure or less frequently, with right hemicolectomy and pancreaticoduodenectomy, allows us to discuss the indications and results of radical surgery. Whenever feasible, resection offers the best treatment as lesser techniques such as bypass and exclusion result only in minimal palliation. The benefit of exploration should almost always be offered, even in such secondary fistulas, as a better quality of life and long term survival are realistic goals and prognostically justifiable.

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Duodenocolic fistulas created by invasive cancer of the colon are rarely reported in the literature and their frequency is probably underestimated.¹ The incidence of malignant duodenocolic fistulas has been estimated to be 1 in 900 colorectal carcinomas.² A total of 97 primary malignant duodenocolic fistulas have been reported in the literature.³ Profound nutritional and electrolyte disturbances, the extent of tumor spread and the patient's general medical state preclude a uniform surgical approach. If the tumor is encompassable by resection, one-stage resection offers both the hope of cure and palliation.⁴ The procedures include right hemicolectomy along with pancreaticoduodenectomy or wide local excision of the duodenum with primary closure of the duodenal defect. When the tumor is unresectable due to

massive retroperitoneal involvement, gastrojejunostomy in conjunction with ileotransverse colostomy may be employed, thus, excluding the stomach and colon from the fistula.⁵ Dehiscence of the duodenal wound closure associated with partial duodenectomy can be prevented by using the mucosal or serosal patch techniques with intestinal loops. These therapeutic principles are also applicable for colonic carcinomas which massively involve the duodenum without fistulous communication. This case report and review of literature illustrates the characteristic features of malignant duodenocolic fistulas and outlines the challenges of management peculiar to such lesions which differ markedly from uncomplicated colonic carcinomas.

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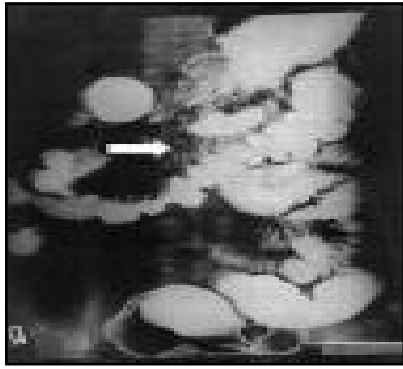


Figure 1 - Barium enema outlining the fistula between the transverse colon and the second part of the duodenum (arrow).

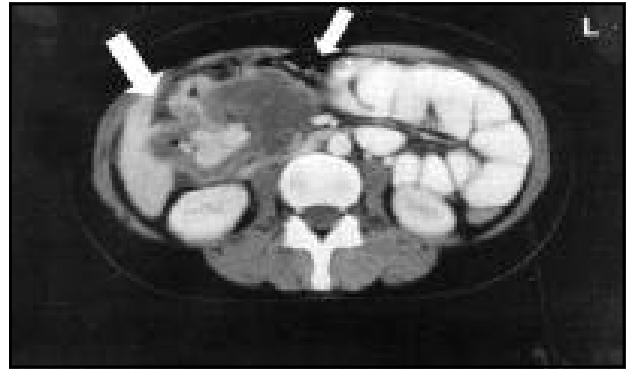


Figure 3 - Computed tomography of the abdomen demonstrating a transverse colonic mass infiltrating the adjacent visceral surface of the liver and the second part of the duodenum (arrows).

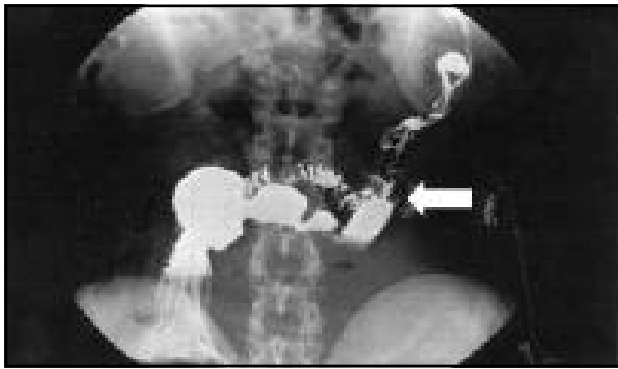


Figure 2 - Barium meal illustrating the duodenocolic fistula (arrow) with sudden filling of the transverse colon with contrast.

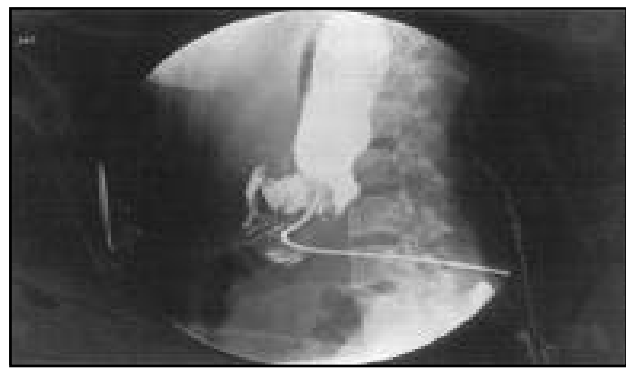


Figure 4 - A post operative contrast study through gastrostomy tube revealed a patent duodenum without leak.

Case Report. A 23-year-old Saudi woman was admitted through the emergency room with complaints of abdominal pain, anorexia and non bloody diarrhea of 2 weeks duration. Pain was mostly confined to the right hypochondrium, stabbing in nature, non radiating and showed mild exacerbation with oral intake. It was associated with 7-8 episodes of loose stools per day but with no overt blood or mucus. The patient's extreme anorexia led to a weight loss of 9 kg over 9 months. The patient appeared pale and chronically ill, and her abdominal examination revealed a firm, non tender 6 x 5 cm ill defined mass in the epigastrium. There was no clinical evidence of organomegaly or ascites and her bowel sounds were normal. Digital rectal examination was unremarkable. The rest of the systemic review was normal.

The baseline investigations including complete blood count, urea and electrolytes, lung function tests, blood glucose, coagulation profile were all normal. Serum carcinoembryonic antigen level was 52.7 ng (normal: 0-3) and stool was positive for occult blood. Ultrasound of the abdomen outlined a circumferentially thick walled transverse colon.

Double contrast barium enema demonstrated an irregular narrowing of the transverse colon and a fistulous communication at this site with the second part of the duodenum. The contrast was seen passing freely into the duodenum, stomach and jejunal loops (**Figure 1**). A barium meal confirmed this finding (**Figure 2**). Computed tomography (CT) scan of the abdomen suggested a large hypodense mass in the transverse colon inseparable from the lateral wall of the second part of the duodenum and visceral surface of the right lobe of the liver (**Figure 3**). Colonoscopy surfaced an ulcerated mass at the commencement of the transverse colon, with air bubbles and bile seen coming through the lesion. Multiple biopsies were taken and the histopathology report suggested the possibility of an adenomatous polyp. After preoperative management with adequate electrolyte replacement and total parenteral nutrition, the patient was subjected to exploratory laparotomy. At operation, a huge fungating mass was seen at the commencement of the transverse colon found to be infiltrating the anterior wall of the second part of the duodenum and inferior surface of the right lobe of the liver. Per

operative frozen section confirmed a moderately differentiated adenocarcinoma of the colon. A right hemicolectomy with segmental duodenectomy was undertaken, followed by closure of the duodenal defect (4 x 3 cm) in 2 layers. Resection of the hepatic segment showing tumorous infiltration was then performed. A protective tube gastrostomy was carried out and positioned to drain both the stomach and the duodenum so as to avoid using a nasogastric tube which, if pulled out accidentally could jeopardize the duodenal anastomosis and predispose to a duodenal leak. Histopathology of the specimen confirmed a grade II moderately differentiated adenocarcinoma of the colon with dukes stage D. Proximal and distal resection margins of the colon as well as duodenal margins were free of tumor while the resected hepatic segment and 3 out of 15 lymph nodes were positive for metastatic carcinoma. Post operatively, the patient underwent an uneventful recovery and a gastrografin study on the 5th post operative day demonstrated a patent duodenum with no evidence of contrast leakage (Figure 4). The patient was discharged on the 10th post operative day with a plan for chemotherapy as per protocol.

DISCUSSION. A malignant duodenocolic fistula is a development in the natural history of right sided colonic cancers. This rare manifestation of advanced carcinoma of the colon was first recorded by Haldane⁶ in 1862. Later on, in 1947, Calmenson and Black⁷ reviewed 1400 cases of right colonic cancer at the Mayo clinic and found only 2 to be complicated by duodenocolic fistulas. The mean age of the patients reported in the literature is 54.7 years (range 27-85). Our case is the youngest reported thus far. The male to female ratio was 3.8:1 which is much higher than that found in uncomplicated carcinomas of the right colon.⁸

The anatomic relationship between the hepatic flexure and the second and third parts of the duodenum on one hand and the transverse colon on the other, allows the simultaneous neoplastic and inflammatory involvement of both organs. A locally advanced carcinoma of the colon is the most common cause of a primary malignant duodenocolic fistula; other causes being carcinomas of the duodenum and the gall bladder.⁹

Symptoms of a malignant duodenocolic fistula are related to the malignant disease and to the abnormal communication and include, persistent or alternating diarrhea, feculent vomiting and belching attributed to: 1. regurgitation of the colonic contents into the duodenum through the fistulous tract, altering the intestinal flora and producing bacterial enteritis; 2. shunting of the small intestinal contents into the colon and; 3. irritation of the colonic mucosa by unconjugated bile acids and hydrochloric acid (Table 1).¹⁰

Abdominal masses are present in at least 20% of the patients.¹¹ Most authors believe that the barium enema is a more accurate diagnostic study, although both upper gastrointestinal series and a barium enema should be performed.⁷ Characteristically, retrograde obstruction to the flow of barium is usually present at the hepatic flexure with sudden filling of the small bowel. Ultrasound and double contrast CT studies may delineate the fistulous tract and colonoscopic biopsies, when positive confirm the malignant nature of the lesion. Preparation for surgery requires the correction of dehydration, anemia, hypoproteinemia, vitamin deficiencies, negative nitrogen balance, decreased glycogen stores and electrolyte imbalance. Intravenous hyperalimentation would certainly be of value in restoring an adequate preoperative nutritional state. In a review of the 97 cases of malignant duodenocolic fistulas reported in the world literature, Izumi et al¹² discussed various surgical modalities and divided them into 4 groups.

I. Right hemicolectomy with partial duodenectomy and primary closure of the duodenal wall defect.¹³ In the English literature, a total of 28 (72% being respectable) cases were treated by this procedure¹⁴ whereas in Japanese literature, there were only 7 cases (29%), treated by the same procedure. The postoperative mortality rate was as high as 28% which can be mainly attributed to the difficulty in closure of the duodenal defect followed by subsequent leakage and peritonitis. The largest reported duodenal defect to be closed primarily was 2 x 3 cm, while in our case it was 4 x 3 cm and rewarded with favorable outcome. Our repair was tension free and protected by the gastrostomy tube being passed into the duodenum.

II. Right hemicolectomy with partial duodenectomy and "patching" of the duodenal

Table 1 - Clinical features of malignant duodenocolic fistulas.*

Finding	Incidence n (%)
Diarrhea	51 (80)
Weight loss	46 (72)
Pain	37 (58)
Feculent vomiting	27 (42)
Palpable abdominal mass	24 (38)
Undigested food in stools	11 (17)
*Collected from 64 cases. ¹⁰	

defect using an intestinal loop.¹⁵ The use of a jejunal patch for the repair of the duodenal wall defect following wide local excision permits adequate tumor clearance with a tension free closure. However, as the general rules of the Japanese Research Society for cancer of the colon and rectum¹⁶ require a 10 mm cancer free margin, this procedure is applicable only to those cases in which the duodenal invasion is smaller than 2 x 2 cm.

III. Right hemicolectomy with pancreaticoduodenectomy.¹⁷ According to the English literature, this procedure has been performed on 11 patients, 7 of whom have survived for more than one year. Similarly in the Japanese literature, it has been performed on 14 patients, 8 of whom have survived for more than one year. This procedure therefore has resulted in the highest one-year survival rate which may be due to en bloc excision of the tumor and fistula as well as sufficient dissection of the regional lymph nodes. Vieta et al¹⁸ have shown in their study that 46% of their cases survived at least 2.5 years after this procedure with the longest survivor reported alive 26 years after the operation (Table 2).

IV. Ileotransverse colostomy with gastrojejunostomy.¹⁹ This surgical modality is applicable to locally unresectable advanced colonic cancer with massive retroperitoneal involvement. Such bypass operations are thus, less effective but improve the quality of the patient's remaining life.

Malignant duodenocolic fistulas are an infrequent manifestation of colonic cancer. Correction of fluid and electrolyte derangements, total parenteral nutrition, nasogastric decompression and bowel

preparation are mandatory preoperative measures. In the absence of disseminated disease, the treatment of choice is an "extended right hemicolectomy" which includes right hemicolectomy with either pancreaticoduodenectomy or segmental duodenectomy. We believe that resection and reconstruction are reasonable goals in properly selected cases and afford the best palliation.

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Table 2 - Results of right hemicolectomy with either pancreaticoduodenectomy or segmental duodenectomy for malignant duodenocolic fistula.

Reference	Postoperative follow up	Lymph node status
Linton ¹⁷	Case 1 died 10 months Case 2 recurred	Unknown Negative
Calmenson and Black ^{7†}	8 months	Unknown
Janes and Mills ⁴	Died 2.5years	Unknown
Hopkins ¹⁹	Alive >18 years	Negative
Vieta et al ^{18*}	Alive >11 years	Negative
Hirsch ^{11†}	Alive >26 years	Negative
Welch and Warshaw ²	Alive >14 years	Negative
Present study	Alive >16 months	Positive

*Modified from Vieta et al³
†Segmental duodenectomy without partial resection of pancreas.