

# Coloduodenal fistula: a rare complication of right-sided diverticulitis

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## ABSTRACT

Coloduodenal fistula is an uncommon disease entity. It can be caused by either a malignant or benign disease. We report the fifth case of coloduodenal fistula secondary to colonic diverticulosis. Our patient, a 60-year-old man, presented with severe diarrhoea and recurrent severe hypokalaemia. A partial colectomy with en bloc excision of the fistula was performed, and the duodenal defect was closed primarily. A literature review was carried out on the aetiology, presentation, diagnosis and management of coloduodenal fistula.

**Keywords:** diverticulum, coloduodenal fistula, colonic diverticulum, diverticulitis, enteric fistula, fistula

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## INTRODUCTION

Colonic diverticulosis is a common disease worldwide. Diverticulitis, abscess and fistula formation are well-known complications of this disease. In western countries, the sigmoid colon is the most commonly affected segment, while right-sided colonic diverticular disease is more commonly seen in the asian population.<sup>(1,2)</sup> We describe a patient with proximal transverse colon diverticulitis complicated by coloduodenal fistulation, presenting with recurrent severe diarrhoea and hypokalaemia.

## CASE REPORT

A 60-year-old retired fisherman presented to the emergency department with severe diarrhoea for one week. He complained of bowel opening of about eight times per day, associated with watery stools and mucus. There was otherwise no abdominal cramp or any other systemic complaints, and an abdominal examination was unremarkable. Blood tests showed severe hypokalaemia, with a serum potassium level of 1.5 (normal range [NR] 3.5–5.0) mmol/L. He was admitted to the intensive care unit (ICU) for close cardiac monitoring and potassium replacement. The serum potassium level was gradually normalised. He was treated as a case of severe gastroenteritis during that admission, although

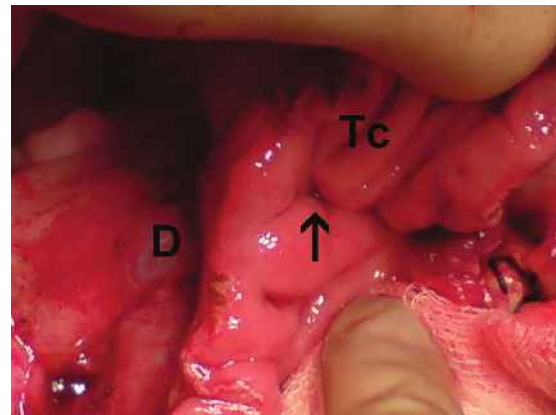


Fig. 1 Operative photograph shows the coloduodenal fistula (arrow).

Tc: transverse colon (cut open); D: second part of duodenum

no specific pathogen was found in the stool.

However, the patient developed severe diarrhoea again shortly after discharge, resulting in significant weight loss over a period of one month. He attended the emergency department again, and the blood results were as follows: pH was 7.271 (NR 7.350–7.450) with a base excess of  $-14.6$  (NR  $-3.0$  to  $3.0$ ) mmol/L; potassium was 1.8 (NR 3.5–5.0) mmol/L; sodium was 130 (NR 135–146) mmol/L; haemoglobin was 9.4 (NR 12.5–17.5) g/dL; white cell count was  $12.7$  (NR  $3.8$ – $10.0$ )  $\times 10^9$ /L; liver function tests were normal. He was again admitted to the ICU for close monitoring and correction of electrolytes. The electrolyte abnormalities were gradually corrected. Again, no specific pathogen could be identified on repeated stool examination and culture. In view of the associated anaemia and weight loss, a colonoscopy was performed to exclude large bowel pathology. On endoscopic examination, a stenotic circumferential growth which precluded further advancement of the endoscope, was found at the ascending colon. Multiple biopsies of the lesion, however, revealed only inflammatory tissue with ulceration. The serum carcinoembryonic antigen level was normal; chest radiographs and abdominal ultrasonography were also unremarkable. Despite these, the clinical picture was compatible with a hyper-secreting ascending colon tumour, resulting in severe diarrhoea and hypokalaemia.

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**Table 1. Aetiology of coloduodenal fistula in published cases from 1966 to 2007.**

Aetiology	No. of cases
<b>Malignant causes</b>	
Colonic cancer	39
Pancreatic cancer	3
Primary duodenal cancer	2
Non-Hodgkin's lymphoma	1
Oesophageal cancer	1
<b>Benign conditions</b>	
Duodenal ulcer	33
Crohn's disease	32
Tuberculosis	20
Duodenal diverticulum	15
Spontaneous	15
Iatrogenic	6
Ulcerative colitis	6
Colonic diverticulum	4
Foreign body penetration	4
Appendicitis	3
Amoebiasis	1
Hydatid cyst	1
<b>Total</b>	<b>186</b>

In view of the colonoscopic findings and recurrent severe hypokalaemia, an operation was arranged once the electrolytes had been corrected. During surgery, the transverse colon was found to be densely stuck to the duodenum, forming an inflammatory phlegmon while the peritoneal cavity was otherwise clean, without inflammatory exudates or free fluid. Upon further dissection, a 5-mm coloduodenal fistula was identified between the first part of the duodenum and the proximal part of the transverse colon (Fig. 1). A right hemicolectomy with en bloc excision of the fistula was performed, and the duodenal defect was closed transversely. The patient recovered after surgery with complete resolution of metabolic acidosis and hypokalaemia. Histological examination of the resected specimen revealed transverse colon diverticulitis with coloduodenal fistula formation.

## DISCUSSION

Coloduodenal fistula is an uncommon disease entity. A literature review was performed in MEDLINE from 1966 to August 2007 using the terms "duodenocolic fistula", "duodeno-colic fistula", "coloduodenal fistula" or "colo-duodenal fistula" as keywords. 119 reports were retrieved, with a total of 186 affected patients (Table I). 46 patients suffered from malignant fistulae, while the remaining 140 patients had benign pathology. For the malignant fistulae, the majority of these (85%) were caused by colon cancer invading into the duodenum. The remaining causes included pancreatic cancer, primary duodenal cancer, oesophageal cancer and lymphoma.

Among the benign coloduodenal fistulae, Crohn's disease and peptic ulcer were the commonest underlying conditions. Other causes included tuberculosis and duodenal diverticulum. Surprisingly, only four patients had colonic diverticulosis as a primary cause of the coloduodenal fistulation, taking into account the relatively high incidence of colonic diverticular disease and its frequent complication of fistula formation.<sup>(3)</sup> Our patient was thus the fifth case to have this rare clinical condition.

Patients with coloduodenal fistula, whatever the causes, usually present with severe diarrhoea and abdominal pain. A classic feature absent in our patient is faeculent vomiting, which is caused by high pressure in the large bowel, resulting in the retrograde flow of large bowel content back into the duodenum. The subsequent bacterial overgrowth in the small bowel leads to malabsorption, diarrhoea, dehydration and electrolyte disturbance. In addition, marked acidosis is a frequent biochemical finding, as exemplified by the present case. The probable explanation for this is that the fistula opens close to the ampulla of Vater, causing a loss of alkaline pancreatic juice directly into the large bowel, with resultant metabolic acidosis. This phenomenon was first described by Benn et al in 1997.<sup>(3)</sup> The diagnosis of coloduodenal fistula is usually made by barium enema, which has a sensitivity of 85%–90%.<sup>(4,5)</sup> Colonoscopy and oesophagogastroduodenoscopy are the alternatives.

The surgical management of coloduodenal fistula poses a specific challenge due to the complex anatomy around the duodenopancreatic region. For malignant fistulae, the options include colectomy and partial duodenectomy with primary duodenal closure in cases of small fistulae, colectomy and partial duodenectomy with patch repair of the duodenum for large fistulae, or colectomy with Whipple's operation. In a review by Izumi et al, the last approach achieved the highest one-year survival rate as an adequate regional lymph node dissection can be performed at the same time.<sup>(6)</sup> For benign conditions, the most commonly-performed procedure is a colectomy with en bloc excision of the fistula and partial duodenectomy. The duodenal defect is either closed primarily or repaired with serosal patches, depending on the defect size. Primary closure of the duodenal defect is the preferred treatment in the literature.<sup>(7-9)</sup> It is important to note that the fistula might close spontaneously after medical treatment in cases of Crohn's disease and tuberculosis.<sup>(10,11)</sup> Therefore, these diagnoses should be borne in mind when treating patients with coloduodenal fistulae.

In conclusion, coloduodenal fistula is uncommon

in clinical practice. Coloduodenal fistula secondary to colonic diverticulosis is exceedingly rare. The patient is usually very ill because of severe dehydration, electrolyte disturbance and malabsorption. A partial colectomy with en bloc excision of the fistula and partial duodenectomy is recommended.

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