Learning from errors

Ischaemic enteritis in a patient with chronic renal failure: diagnosis and management decisions

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Summary

Ischaemic enteritis is rare in patients with chronic renal failure not on dialysis. Here we report a case of ischaemic enteritis in an 81-year-old woman with chronic renal failure secondary to hypertension (not dialysis dependent) who presented with acute onset of abdominal pain, non-bloody diarrhoea and subsequent oliguria. The abdominal CT with angiography showed diffuse segmental wall thickening and decreased perfusion of the long segment of the ileum, with decreased enhancement of the vessels that supply the distal ileum. The clinical diagnosis of ischaemic enteritis was made. The patient responded initially to total parenteral nutrition and intravenous antibiotics. After the initiation of haemodialysis, because of the oliguria, the ischaemic enteritis progressed to bowel infarction, and an open laparotomy was performed. This report illustrates some of the difficult therapeutic decisions in a patient with ischaemic enteritis and chronic renal failure.

BACKGROUND

Patients with chronic renal failure have many risk factors for the development of mesenteric ischaemia. The clinical presentation is dependent on the site and extent of bowel involved. Whereas ischaemic colitis is a relatively well-recognised entity with many reports detailing its clinical and radiographic features, its counterpart in the small intestine, referred to as ischaemic enteritis, has rarely been described in patients with chronic renal failure. Because of the low incidence and the difficulty in diagnosing ischaemic enteritis, only a few cases have been reported. Although it is known to occur more often in patients on dialysis compared to the general population, ischaemic enteritis has rarely been described in patients with chronic renal failure who are not on dialysis. Here we report a rare case of patient who presented with chronic renal failure (not on dialysis) due to hypertension, who presented with sudden onset of acute abdominal pain and diarrhoea. The radiological and histological findings were compatible with the diagnosis of ischaemic enteritis. The difficulty in managing ischaemic enteritis in a patient with chronic renal failure is discussed.

CASE PRESENTATION

An 81-year-old woman with a history of chronic renal failure due to hypertension was admitted to our hospital with dyspnoea for 3 weeks. The chronic renal failure was managed by conservative treatment, including administration of antihypertensive agents and diuretics, without dialysis. In addition, the patient had a smoking history of 35 pack years and a history of chronic obstructive pulmonary disease (COPD). The physical examination revealed coarse breathing sounds with inspiratory crackles over all lung fields with no evidence of peripheral oedema. Laboratory findings at the time of admission showed a blood-urea nitrogen of 53.3 mg/dl, serum creatinine of 3.11 mg/dl, haemoglobin of 7.6 g/l, total cholesterol of 202 mg/dl, triglyceride of 178 mg/dl and intact parathyroid hormone (PTH) of 186.5 pg/ml. The baseline ECG showed normal sinus rhythm, and the

echocardiographic findings revealed normal systolic function with concentric left-ventricular hypertrophy. The pulmonary function testing on admission showed a decreased forced expiratory volume in 1 s (FEV₁) with 46% of predicted value and a decreased FEV₁/forced vital capacity (FVC) at 74%; these results were worse compared to previous studies. The patient was considered to have an exacerbation of her COPD and was treated with inhaled and oral steroids. Throughout the admission period, the patient was never at her best baseline despite multiple therapeutic interventions for the COPD. The patient continued to take anti-hypertensive and diuretic medications.

Fourteen days after admission, the patient complained of a sudden onset of watery diarrhoea and lower abdominal discomfort. A mild fever up to 37.8°C developed. The physical examination was remarkable for a mildly tender abdomen. Along with the diarrhoea, oliguria and subsequent pulmonary oedema developed, with elevation of the serum creatinine to 5.15 mg/dl. The laboratory studies revealed a leucocytosis (white blood cell count 24 250/mm³). Colonoscopy showed no visible mucosal lesions, except for multiple colon polyps. The abdominal CT scan showed diffuse segmental wall thickening and decreased perfusion of the long segment of the ileum. It also revealed severe atherosclerotic changes of the aorta and the superior mesenteric artery, with decreased enhancement and blurring of the margins of the vessels supplying the distal ileum (figure 1). With the presumptive diagnosis of non-occlusive ischaemic enteritis involving the distal ileum, the patient was managed with conservative treatment, including total parenteral nutrition and intravenous antibiotics. The subsequent increases in the doses of diuretics had no effect on the oedema, and haemodialysis was initiated. One week later, the gastrointestinal symptoms were much improved, and the follow-up CT scan of the abdomen showed an interval improvement of the diffuse wall thickening and mild dilatation of the ileum. However, the continued oedema required a gradual increase in the ultrafiltration without significant

Figure 1 CT angiography shows severe atherosclerotic findings of the aorta with luminal narrowing of the superior and inferior mesenteric arteries, with decreased enhancement of vessels that supply the distal ileum. It also reveals luminal narrowing of both renal arteries and total occlusion of the right common iliac artery with multiple collateral vessels.

Figure 2 Abdominal CT scan shows long segmental infarction of the distal ileum, with a relatively spared terminal ileum.

Figure 3 Gross finding of the resected specimen shows dilated and thin-walled bowel from distal to middle ileum.

hypotensive episodes during haemodialysis over the course of the management of the ischaemic enteritis.

OUTCOME AND FOLLOW-UP

Two weeks after the initial development of diarrhoea, the patient's abdominal pain, tenderness and rebound tenderness suddenly increased. A repeat abdominal CT scan revealed regression of the wall thickening and mural enhancement, with dilatation, of the corresponding area of the ileum, which indicated a bowel infarction (figure 2).

The patient underwent an emergency laparotomy. Intraoperatively, gangrenous changes of the distal ileum were observed on the abdominal CT scan. An intestinal resection of approximately 96 cm in length followed by a side-to-side anastomosis was performed, preserving the terminal ileum. Macroscopically, the resected ileum was dilated and thin-walled, with a necrotic aspect of the surface of the intestinal lumen (figure 3). Histopathological examination showed acute inflammation with extensive necrosis throughout all of the layers of the resected ileum (figure 4). Within 4 days,

Figure 4 Microscopic examination shows acute necrotising inflammation including all bowel layers (H&E, $\times 200$).

the patient developed pneumonia with subsequent sepsis and multi-organ failure, and died 3 days later. Autopsy and postmortem examination were not performed.

DISCUSSION

Ischaemic enteritis is considered a transitional condition between abdominal angina and mesenteric infarction.¹ As in other mesenteric ischaemic diseases, the central abnormality of ischaemic enteritis is an inadequate blood supply to the abdominal viscera; there are two types that have been described: occlusive and non-occlusive. Embolism or thrombosis of the superior mesenteric artery is the cause of occlusion in the majority of patients.² Non-occlusive ischaemic enteritis occurs in 25% of all patients with ischaemic enteritis, and this entity usually manifests in the setting of haemodynamic decompensation superimposed on a severely stenosed mesenteric vasculature.^{2 3}

Patients with ischaemic enteritis usually complain of diffuse abdominal pain, which subsequently localizes to the approximate site of involvement. Nausea, vomiting and diarrhoea with or without melena or haematochezia may be seen. Peritoneal signs may also be present along with paralytic ileus, which can be seen on a simple abdominal x-ray.¹ The diagnosis of ischaemic enteritis is difficult because of the non-specific symptoms and laboratory investigations. In this setting, imaging procedures can offer some clues to the diagnosis. Dilated intestinal loops and thickening of the intestinal wall with an intraluminal collection of fluid can be observed on ultrasound, x-ray and CT scans.⁴ With the introduction of contrast-enhanced MR angiography (MRA) it became feasible to generate high-quality and high-resolution images of the mesenteric vasculature. In comparison with CT and ultrasound, the MRA is

more time-consuming and, similar to other non-invasive methods, it provides no therapeutic options. Therefore, MRA is not considered a diagnostic tool in critically ill patients or patients with severe acute abdominal disorders, including patients with suspected mesenteric ischaemia.⁵ Angiography findings may confirm the diagnosis of arterial occlusion and indicate non-occlusive mesenteric ischaemia with the findings of the 'defoliated tree' sign that refers to the absence of contrast dye in the smaller mesenteric vessels.^{4 6} However, a definite diagnosis of ischaemic enteritis requires histopathology evaluation as the differential diagnosis includes other bowel diseases such as inflammatory bowel disorders, intestinal tuberculosis and carcinoma.^{1 2}

In patients with chronic renal failure, various ischaemic conditions involving the stomach, small bowel and large intestine can be present.⁷ Similar to other gastrointestinal abnormalities found in patients with chronic renal failure, ischaemic enteritis may be among the clinical manifestations of uraemia. The dialysis population is especially prone to the development of non-occlusive mesenteric ischaemia. This is particularly common in haemodialysis patients but occurs in patients on peritoneal dialysis. In the latter group there can be difficulty differentiating this entity from peritonitis.⁸ The increased susceptibility of dialysis patients to non-occlusive ischaemic enteritis is likely due to the fact that they have many of the predisposing risk factors for bowel ischaemia. Diabetes, hypertension and ischaemic heart disease are common predisposing factors both for renal failure and ischaemic enteritis.¹ Other risk factors include wide-spread atherosclerosis, smoking, advanced age, hyperlipidaemia, secondary hyperparathyroidism, use of digoxin (a drug with potential vasoconstrictive effects on mesenteric vessels), bleeding diatheses and mechanical

problems such as volvulus and an incarcerated hernia.^{3 6 9} In addition, vasculitis, fibromuscular dysplasia and arterial dissection may also present with ischaemic enteritis.^{2 10} The fact that patients on chronic dialysis have more cardiovascular comorbidity compared to the general population may explain the higher frequency of non-occlusive mesenteric ischaemia.⁶ An aggressive ultrafiltration protocol and increased time on haemodialysis can cause a hypotensive episode during haemodialysis. This hypotension, especially when recurrent, is a significant risk factor for non-occlusive mesenteric ischaemia in patients on dialysis.^{3 6}

Although mesenteric ischaemia appears more frequently among dialysis patients than in the non-dialysis population, ischaemic enteritis can occur in non-dialysed patients with chronic renal failure. The actual incidence of ischaemic enteritis in patients with chronic renal failure and who are not on dialysis is not known, but may be similar to the general population. Of note is the higher incidence of this condition in women, especially those presenting with mesenteric ischaemia, including those who are on dialysis and not on dialysis.¹¹ The present patient had risk factors for mesenteric ischaemia such as generalised atherosclerosis, hypertension and smoking. In addition, optimising patient blood pressure and controlling oedema, with antihypertensive and diuretic agents, may have been important factors in triggering the mesenteric hypoperfusion and ischaemic insults. The subsequent oliguria after the development of ischaemic enteritis, in this patient, was likely precipitated by a severe reduction in renal perfusion resulting from overuse of diuretics and antihypertensive drugs, combined with the ischaemic enteritis-related diarrhoea.

Although early diagnosis remains the cornerstone of successful treatment, the management of ischaemic enteritis remains challenging and controversial. The treatment of ischaemic enteritis depends on the evolution of the disease, the extent of the vessel(s) compromised and the available collateral circulation.¹ In general, early surgery or endovascular therapy is advised. In cases with transient reversible ischaemia, the patient can be treated conservatively with analgesics and total parenteral nutrition. If the bowel is seen to progressively dilate, associated with clinical deterioration, a presumption of impending gangrene is made, and immediate resection is indicated.^{1 2} If ischaemic enteritis resolves and progresses to stricture formation over the course of 3–4 weeks, without evolving to gangrene, such patients can be observed and surgery performed only if bowel obstruction develops.¹ Continuous and selective infusion of substances such as vasodilator or thrombolytic agents via angiography has also been suggested for revascularisation;¹² however, no significant improvement in survival has been demonstrated, and the mortalities are reported to be as high as 80–95%.¹³ Although the recent recommendations tend to prefer prompt laparotomy,^{12 13} the general condition of patients, cause of mesenteric ischaemia and intraoperative findings of the extent of bowel involvement can affect decision making. Our patient was initially treated with total parenteral nutrition and improved both clinically and radiographically. However, as the haemodialysis treatment was continued, ischaemic enteritis rapidly progressed to intestinal necrosis. The haemodialysis procedure to remove large volumes of fluid from the intravascular space likely led to relative hypovolemia,

even without significant hypotension, and this must have been the main factor affecting the clinical course of the ischaemic enteritis. Furthermore, in our case, the advanced age and multiple other problems influenced the decision of whether to perform an early surgical procedure. Especially, COPD with FEV₁ <50% of predicted value and FEV₁/FVC <75%, current smoking history, and resistance to multimodal treatments, including chest physical therapy, bronchodilators, smoking cessation, antibiotics and corticosteroids, raised the risk of development of postoperative pulmonary complications.¹⁴

In summary, ischaemic enteritis is an uncommon but potentially fatal condition that usually requires an aggressive diagnostic and therapeutic approach. The general condition of patients remains the main issue for surgical decision making. Appropriate guidelines for the decisions regarding surgical or supportive treatment of patients with both ischaemic enteritis and chronic renal failure need to be further defined.

Learning points

- ▶ Ischaemic enteritis in patients with chronic renal failure is a rare but a potentially fatal disorder.
- ▶ Hypotension is considered the most important and precipitating factor for non-occlusive mesenteric ischaemia in patients on dialysis.
- ▶ Perioperative morbidity should be taken into consideration because the majority of these patients have poor general health secondary to underlying disorders.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. **Friedman G**, Sloan WC. Ischemic enteropathy. *Surg Clin North Am* 1972;**52**:1001–12.
2. **Delikoukos S**, Christodoulidis G, Zacharoulis D, *et al*. Multiple small bowel ruptures due to ischemic enteritis: a case report. *World J Gastroenterol* 2006;**12**:4262–3.
3. **Korzets Z**, Ben-Chitrit S, Bernheim J. Nonocclusive mesenteric infarction in continuous ambulatory peritoneal dialysis. *Nephron* 1996;**74**:415–18.
4. **Zeier M**, Wiesel M, Rambašek M, *et al*. Non-occlusive mesenteric infarction in dialysis patients: the importance of prevention and early intervention. *Nephrol Dial Transplant* 1995;**10**:771–3.
5. **Trompeter M**, Brazda T, Remy CT, *et al*. Non-occlusive mesenteric ischemia: etiology, diagnosis, and interventional therapy. *Eur Radiol* 2002;**12**:1179–87.
6. **Brener ZZ**, Bergman M, Ohm HK, *et al*. Acute non-occlusive mesenteric ischemia of the small bowel in a patient started on hemodialysis: a case report. *Cases J* 2008;**1**:217.
7. **Vaziri ND**, Dure-Smith B, Miller R, *et al*. Pathology of gastrointestinal tract in chronic hemodialysis patients: an autopsy study of 78 cases. *Am J Gastroenterol* 1985;**80**:608–11.
8. **Archodovassilis F**, Lagoudiannakis EE, Tsekouras DK, *et al*. Nonocclusive mesenteric ischemia: a lethal complication in peritoneal dialysis patients. *Perit Dial Int* 2007;**27**:136–41.
9. **Fagin RR**, Straus FH, 2nd April E, *et al*. An unusual case of ischemic enteritis mimicking regional enteritis. *Gastroenterology* 1970;**59**:917–20.
10. **Ling FJ**, Eskandari MK. Young women presenting with chronic mesenteric ischemia—two case reports. *Vasc Endovascular Surg* 2005;**39**:351–3.
11. **Ori Y**, Korzets A, Neyman H, *et al*. Celiac territory ischemic syndrome in a patient on chronic hemodialysis. *Clin Nephrol* 2007;**68**:253–7.
12. **Clavien PA**. Diagnosis and management of mesenteric infarction. *Br J Surg* 1990;**77**:601–3.

13. **Levy PJ**, Krausz MM, Manny J. Acute mesenteric ischemia: improved results—a retrospective analysis of ninety-two patients. *Surgery* 1990;**107**:372–80.

14. **Smetana GW**. Preoperative pulmonary assessment of the older adult. *Clin Geriatr Med* 2003;**19**:35–55.

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Please cite this article as follows (you will need to access the article online to obtain the date of publication).

Yu J, Kim B, Chung S, Park CW, Chang YS. Ischaemic enteritis in a patient with chronic renal failure: diagnosis and management decisions. *BMJ Case Reports* 2010;10.1136/bcr.09.2009.2249, date of publication

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