A rare but serious complication of continuous ambulatory peritoneal dialysis: delayed perforation of the colon by the Tenckhoff catheter

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Case report

A 68-year-old male had end-stage renal failure due to diabetes mellitus. He underwent Tenckhoff catheter insertion in 2013 for continuous ambulatory peritoneal dialysis (CAPD). The catheter was flushed regularly once a week and was functional in the first 2 months following insertion.

The catheter became blocked 2 months following insertion after an episode of CAPD peritonitis. Peritoneal dialysate showed scanty growth of *Stenotrophomonas (Xanthomonas) maltophilia*. Kidney, ureter, and bladder X-ray (KUB) was ordered to identify catheter tip position that was subsequently revealed to be in the central part of the pelvic cavity (Fig 1a). The cause of blockage was suspected to be omental wrap. Omentectomy was planned and the Tenckhoff catheter was left in situ; CAPD peritonitis was successfully treated with antibiotics and the patient was discharged. The peritoneal membrane was rested for 2 weeks and the patient maintained on temporary twice-weekly haemodialysis.

The patient was admitted to Tuen Mun Hospital again in early 2014 because of fall. Computed tomographic (CT) brain revealed a significant left acute subdural haemorrhage. Urgent craniotomy with clot evacuation was performed. At that time, abdominal X-ray demonstrated inferior migration of the catheter tip with loss of coiling of the distal tip (Fig 1b). A few days later, the tip of Tenckhoff catheter was noticed in the anus of the patient. Follow-up KUB confirmed the clinical finding (Fig 1c).

The patient had no symptoms or signs of acute peritonitis. Contrast-enhanced CT abdomen and pelvis confirmed perforation of the Tenckhoff catheter through the sigmoid colon with the tip in the anus (Fig 1d).

The contrast-enhanced CT demonstrated Tenckhoff catheter perforation through the sigmoid colon (Fig 2a) with soft-tissue fibrosis around the catheter at the site of the perforation (Fig 2b). There was no ascites or inflammatory fluid collection. Contrast enema showed no evidence of contrast extravasation.

The patient became chair-bound after the head injury. It was decided not to remove or reposition the Tenckhoff catheter or perform omentectomy. The rectal side of the catheter was cut short.

Discussion

The pathogenesis of late perforation of the bowel has been proposed to involve intimate contact between the peritoneal catheter and the intestinal wall. The continuous pressure causes local ischaemia, eventually leading to erosion, laceration, and frank perforation.[1] Lack of fluid in the peritoneal space after cessation of CAPD predisposes to pressure-induced necrosis because of loss of the fluid cushion.[2,3] In our patient, perforation was unlikely when the catheter was in daily use because it did not come into continuous close contact with the bowel for any long period of time.[4]

In most previous studies, delayed perforation of the bowel was associated with acute peritonitis.[1,3,5,6] Kagan and Bar-Khayim[1] reviewed the publications from 1980 to 1995 and identified 24 cases of bowel perforation during the study period. All cases were associated with acute peritonitis, with 29% mortality and significant morbidity. The age of patients ranged from 22 to 80 years, with no gender predominance. The time to bowel perforation also ranged broadly from 0.5 to 96 months after initiation of dialysis. Sigmoid was the most common site of perforation, accounting for 14 of the 24 cases. Asymptomatic delayed perforation of the bowel by Tenckhoff catheter was rarely reported.[7,8]

Our patient had acute peritonitis in late 2013. The KUB showed normal position of Tenckhoff catheter (Fig 1a) . Since the Tenckhoff catheter was not functioning, omental wrap was suspected.

Later X-rays revealed progressive inferior migration of the catheter and loss of coiling of the catheter tip, suggesting perforation of the bowel (Figs 1b and 1c). The CT abdomen and pelvis confirmed perforation of the sigmoid by the Tenckhoff catheter in addition to soft-tissue fibrosis around the catheter

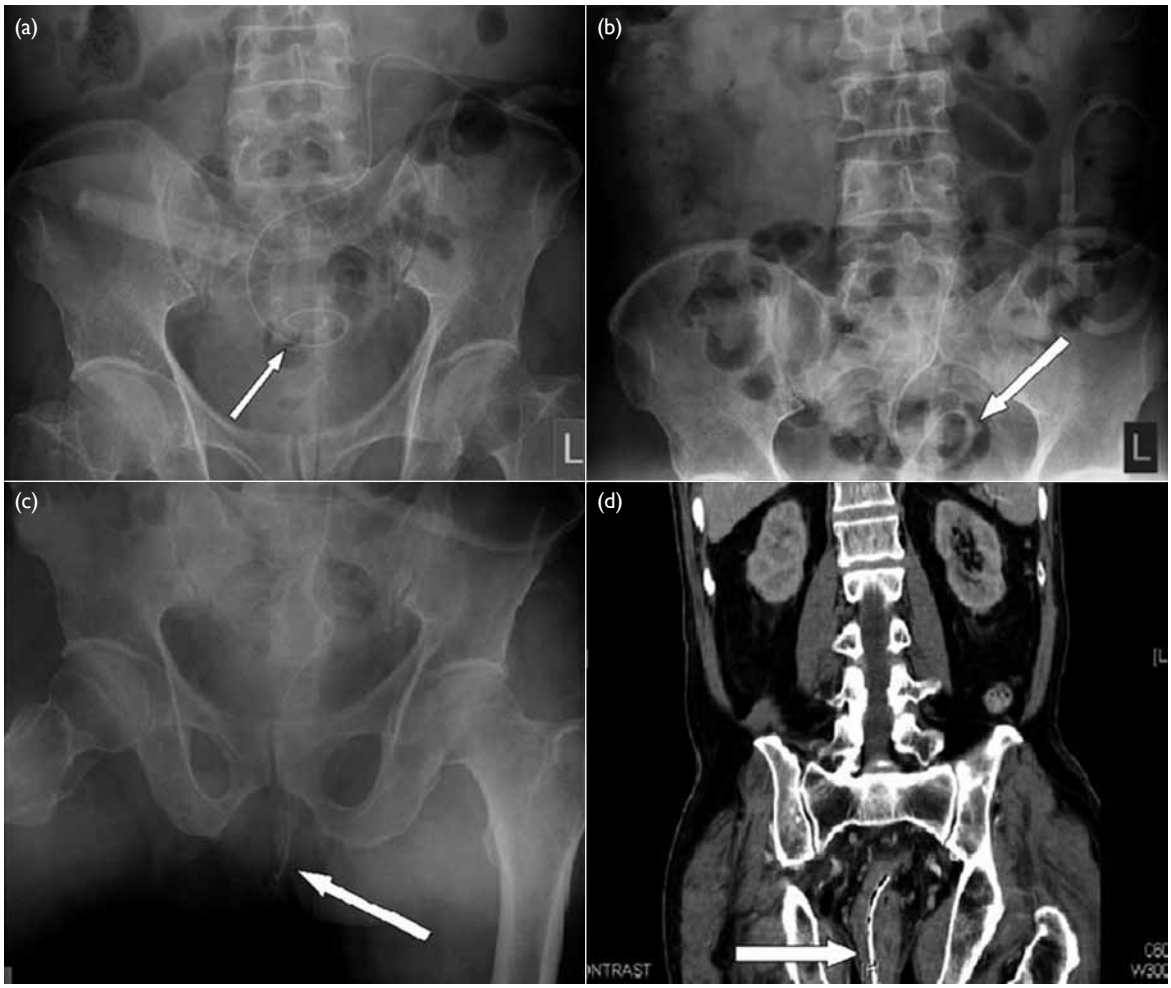

FIG 1. (a) Initial kidney, ureter, bladder X-ray showing the Tenckhoff catheter in the central pelvic cavity (arrow), with coiling of catheter tip; (b) abdominal X-ray 5 months after insertion demonstrating inferior migration of the catheter tip with loss of tip coiling (arrow); (c) pelvic X-ray a few days after (b) showing the Tenckhoff catheter passing out through anus (arrow); (d) contrast-enhanced computed tomography of abdomen and pelvis showing Tenckhoff catheter perforation through the sigmoid colon (arrow)

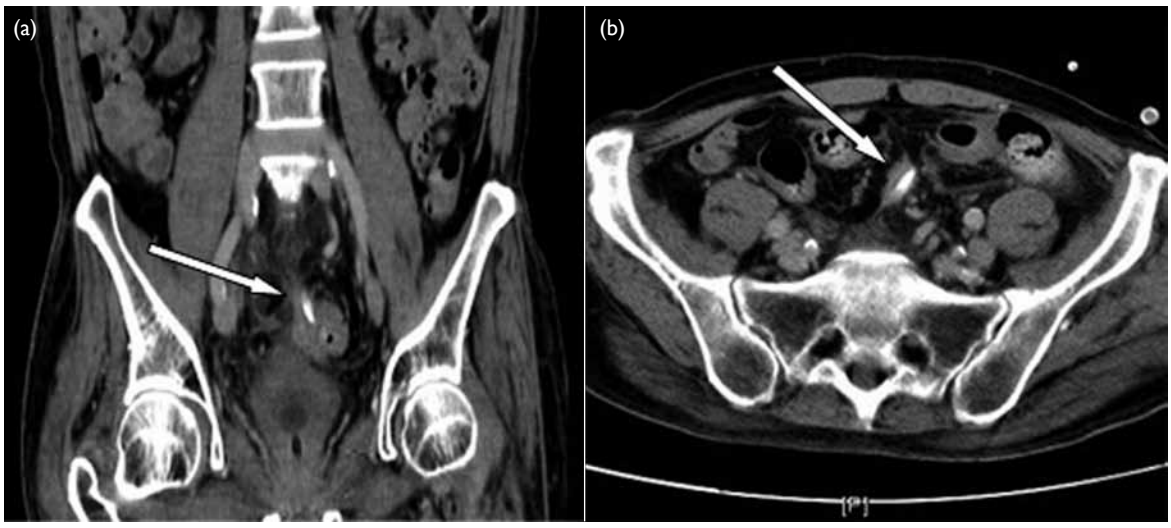

FIG 2. Contrast-enhanced computed tomographic abdomen and pelvis
(a) Tenckhoff catheter perforation through the sigmoid colon (arrow), and (b) soft-tissue fibrosis (arrow) around the catheter at the site of the perforation are shown

tip (Figs 1d and 2).

In our case, in addition to the lack of peritoneal dialysis fluid, there were probably peritoneal adhesions arising from previous peritonitis that resulted in decreased bowel mobility. This in turn created a predisposition to impingement of bowel loops by the Tenckhoff catheter that subsequently led to pressure erosion and perforation.

The patient had no clinical or radiological evidence of peritonitis, possibly due to plugging of the bowel perforation site by the catheter and later sealed off by inflammatory adhesion and fibrosis. Thus, there was no leakage of faecal material from the sigmoid into the peritoneal cavity to incite inflammation and consequent faecal peritonitis. Occasionally the omentum can also surround and wall off focal inflammation to prevent extension of the inflammation to involve the rest of the peritoneal cavity, as may be seen in the formation of phlegmon or an abscess in ruptured acute peritonitis.

We present a rare but clinically important case of delayed perforation of the bowel by Tenckhoff catheter. According to this case report and several reported cases, regular flushing of the dialysis catheter and early removal if not in use (dysfunctional or not required) may help prevent this complication.

Declaration

No conflicts of interest were declared by the authors.

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