

Clinical report

Management of rare postoperative ureterocolic fistula

Chun-Min Su, Yueh-Jung Wu, Jen Chin, Tung-Yuan Chen

Division of Colorectal Surgery, Department of Surgery, Kaohsiung Armed Forces General Hospital, Kaohsiung 802, Taiwan

Background: Ureterocolic fistula after acute colonic diverticulitis and colovesical fistula occurs rarely in patients with colonic diverticula.

Objective: We present our experience with diagnosis and treatment of postoperative ureterocolic fistula.

Methods: A 61-year-old male patient with acute colonic diverticulitis and colovesical fistula developed ureterocolic fistula after resection of sigmoid and descending colon, partial cystectomy and T-loop colostomy.

Results: The identification and subsequent management of this rare postoperative ureterocolic fistula emphasizes the importance of adequate preoperative evaluation, including the preoperative placement of ureteral stents to facilitate identification of the ureters, minimize inadvertent ureteral injury and treat possible coloureteral fistulas.

Conclusion: Our experience suggests that placement of ureteral stents allows successful treatment of postoperative urinary leakage into the peritoneal cavity through the ureterocolic fistula and precludes major surgical intervention.

Keywords: Colonic diverticular disease, diverticulitis, fistulas, ureterocolic fistula

Ureterocolic fistula is rare, reported mainly by urologists focused on complications of urolithiasis, a recognized cause [1]. It may also be a complication of diverticular disease with abdominal symptoms associated with inflammation [2]. Colonic diverticular disease is usually symptomatic and uncomplicated, presenting with abdominal pain, constipation, bloating, and diarrhea without inflammation [3]. However, 10% to 25% of patients develop complicated diverticulitis with abdominal symptoms associated with inflammation [2, 4]. Up to 10% of acute attacks of diverticulitis with peridiverticular abscess (stages II-IV) involve fistula formation [5]. Urologic symptoms predominate, especially urinary tract infection (100%), fecaluria (75%), and abdominal (75%) or flank pain (50%) [6]. Most fistulas arising from acute diverticular disease are colovesical fistulas; other diverticulitis-related uncommon fistulas include colouterine, colosalpingeal, and between sigmoid colon and seminal vesicle [4]. Postoperative ureterocolic fistula is exceptionally rare [7, 8].

We present a case of postoperative ureterocolic fistula developed after acute colonic diverticulitis and colovesical fistula and describe our experience with diagnosis and treatment, aiming to contribute useful data for clinical practice.

Case report

A 61-year-old male was admitted to our institution on June 17, 2008 due to progressive left lower abdominal pain and general discomfort for three days. He had a 3-year history of hypertension, but no previous gastrointestinal problems such as constipation, melena, hematochezia, nausea or vomiting.

Acute distress developed after admission, including temperature of 37.5°C and bilateral lower abdominal tenderness with peritoneal signs. Systolic blood pressure was 77 mmHg, diastolic blood pressure 53 mmHg. White blood cell count was 32,000 cells/mm³. Creatinine was 5.8 mg/dl. Abdominal computed tomography (CT) demonstrated sigmoid colon diverticulitis with perforation, abscess formation and air accumulation in urinary bladder, corresponding to Hinchey's Stage IV (**Figure 1**). Preoperative differential diagnosis was colon carcinoma with perforation and cystitis. Exploratory laparotomy revealed perforated colon diverticulitis, multiple diverticula of sigmoid and descending colon, and

colovesical fistula (**Figure 2**). Feces contaminated the peritoneal cavity. Resection of sigmoid and descending colon and T-loop colostomy were performed after ureter identification. Partial cystectomy was performed for colovesical fistula. Patient was stable postoperatively. Systolic blood

pressure was 114 mmHg, diastolic blood pressure 95 mmHg. Creatinine decreased to 1.7 mg/dl. Hematuria in Foley catheter resolved two days postoperatively. Large amounts of yellowish peritoneal fluid drained continuously through J-P drain (about 800 ml per day; creatinine 61.5 mg/dl).



Figure 1. CT scan of the abdomen revealed segmental wall thickening over the sigmoid colon and an enhanced wall of protrusions surrounded by air containing pericolic abscess formation, and air accumulation in U-bladder indicating colovesical fistula.



Figure 2. Perforated diverticulitis and multiple diverticula of sigmoid and descending colon (each sterile cotton swab indicates a diverticulum)

Retrograde cystography was performed seven days postoperatively under the impression of urine leakage from urinary bladder, although no extravasation of contrast medium from U-bladder was found (**Figure 3**). Abdominal CT revealed contrast medium extravasation from urinary system into lower peritoneal cavity (**Figure 4**). Leakage was traced by bilateral ureteroscopy. Mucosa of lower third of left ureter was eroded with echymosis and swelling,

highly suspect of coloureteral fistula. Bilateral double-J catheters were placed smoothly with fluoroscopic confirmation (**Figure 5**). Drainage of peritoneal fluids decreased obviously after catheter implantation. Patient convalesced gradually and was discharged at two weeks. Condition was good at three months outpatient follow up. Double-J catheters were removed six months after discharge.



Figure 3. Cystography showed no evidence of extravasation of contrast medium from U-bladder

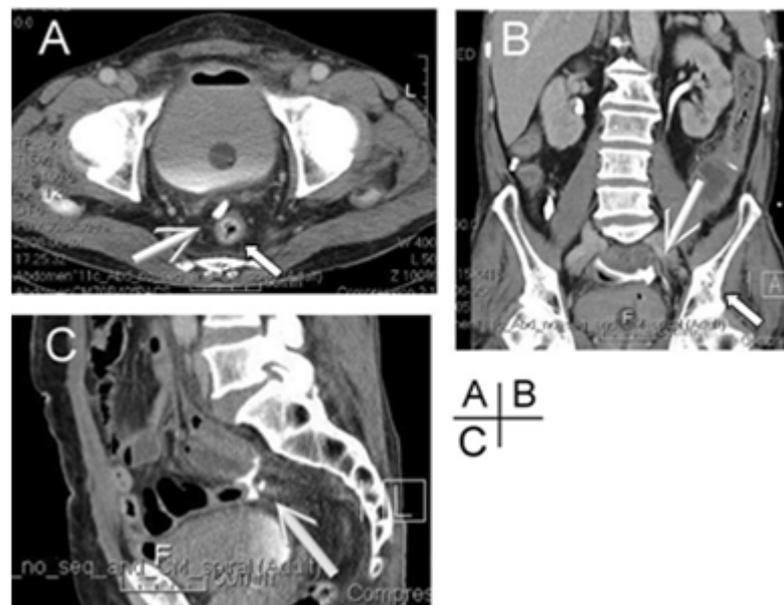


Figure 4. Computed tomography with transverse (A), coronal (B), and sagittal (C) views of the pelvis showing contrast medium extravasation from the urinary system into lower peritoneal cavity (arrow)



Figure 5. Installation of the double-J catheters bilaterally

Discussion

The present case of ureterocolic fistula occurred after acute colonic diverticulitis complicated with colovesical fistula. Although the ureter was identified during surgery, large amounts of yellowish peritoneal fluid drained through J-P drain postoperatively. Peritoneal fluid examination revealed elevated creatinine, suggesting urinary bladder leakage after partial cystectomy for colovesical fistula, but cystography showed no evidence of contrast extravasation. We suspected contrast leakage through the ureterocolic fistula, but patient's poor condition precluded barium enema. Ureteroscopy results strongly suggested ureterocolic fistula. No photos are available demonstrating ureterocolic fistula so we cannot rule out intraoperative ureteral injury. Highly suspect ureterocolic fistula was confirmed when bilateral double-J catheter insertion solved the clinical problem.

Diagnosis and treatment of this case suggests that thorough preoperative evaluation and diagnosis of acute colonic diverticulitis enables successful treatment of postoperative ureterocolic fistula. Severity of colonic diverticulitis was graded using Hinchey's criteria [3]; Stage I: diverticulitis with wall thickening and strong wall enhancement or small pericolic abscess, Stage II: large peridiverticular abscess, Stage III: perforated diverticulitis with purulent peritonitis, Stage IV: diverticulitis associated with fecal peritonitis.

On admission, abdominal CT revealed segmental wall thickening over the sigmoid colon, an enhanced wall of protrusions surrounded by air-containing pericolic abscess formation, and air accumulation in U-bladder indicating Hinchey's stage IV colovesical fistula. Laparotomy confirmed perforated colon diverticulitis, multiple diverticula of sigmoid and descending colon, and colovesical fistula and fecal contamination of peritoneal cavity, leading to surgical resection of sigmoid and descending colon, T-loop colostomy after ureter identification, and partial cystectomy for colovesical fistula.

When not associated with calculus, rarely reported ureterocolic fistulas are often complications of colonic diverticular disease [6-11], including exceptionally rare spontaneous ureterocolic fistula [6]. We relied on abdominal CT to reveal contrast medium extravasation from the urinary system into the lower peritoneal cavity. Bilateral ureteroscopy traced the leakage, revealing erosion with ecchymosis and edema of left ureter mucosa and prompting placement of bilateral double-J catheters. CT is the diagnostic modality of choice for symptomatic colonic diverticulitis and important in choosing the proper surgical approach for repair [3]. When suspecting uncommon fistula, abdominal and pelvic CT with rectal contrast is recommended; CT is minimally invasive, readily accessible, and clearly delineates the fistula course [4, 10]. Compared with intravenous pyelogram (33%) or retrograde pyelogram (25%), barium enema is also reliable in demonstrating fistula (75%) [6], but carries risk of contrast extravasation if perforation is present and may cause artifacts in abdominal and pelvic CT images. Use of water soluble agents may prevent peritonitis if perforation is suspected [3].

One-stage colon resection is typical for colovesical fistulas, with fistula takedown, primary resection with anastomosis, bladder repair, and omental interposition [3]. To achieve successful outcomes with complex entero-urinary fistula, a staged multidisciplinary approach with delayed reconstruction is recommended [12]. Urological and gastrointestinal surgeons jointly treat patients in three stages; 1) acute stage—proximal defunctioning and distal drainage of both gastrointestinal and urinary tracts to isolate the fistula and eradicate sepsis, 2) recovery stage—total parenteral nutrition, organ support, radiological planning of surgical reconstruction and intensive nursing, and 3) reconstructive stage—mean time to reconstruction five months (range 1 to 20 month) when

patient is stable, nutritionally replenished and intra-abdominal sepsis is definitively controlled [12]. With only two cases of postoperative ureterocolic fistula reported, we cannot generalize treatment and instead focus on prevention in surgical treatment of complicated colonic diverticulitis.

In conclusion, our experience with this case of postoperative ureterocolic fistula emphasizes the importance of adequate preoperative evaluation. Comprehensive preoperative measures can identify ureters and minimize inadvertent ureteral injury that may lead to ureterocolic fistula. Preoperative placement of ureteral stents allows successful treatment of postoperative urinary leakage into the peritoneal cavity and helps avoid major surgical intervention.

The authors have no conflict of interest to report.

References

1. Lee WK, Chang SD, Roche CJ, Duddalwar VA, Rowley VA, McLoughlin MG. [Spontaneous ureterocolic fistula secondary to calculous pyohydroureteronephrosis](#). *Br J Radiol*. 2005; 78:954-5.
2. Comparato G, Pilotto A, Franze A, Franceschi M, Di Mario F. [Diverticular disease in the elderly](#). *Dig Dis*. 2007; 25:151-9.
3. Liu CK, Hsu HH, Cheng SM. [Colonic diverticulitis in the elderly](#). *Int J Gerontology*. 2009; 3:9-15.
4. LaSpina DO, Facklis K, Posalski I, Fleshner P. [Coloseminal vesicle fistula: report of a case and review of the literature](#). *Dis Colon Rectum*. 2006; 49: 1791-3.
5. Farrell RJ, Farrell JJ, Morrin MM. Diverticular disease in the elderly. *Gastroenterol Clin North Am*. 2001; 30: 475-496.
6. Cirocco WC. Spontaneous ureterocolic fistula: a rare complication of colonic diverticular disease. *Am Surg*. 1994; 60:832-5.
7. Punga-Maole A. Postoperative ureterocolic fistula: a case report. *Prog Urol*. 2005; 15:93-5.
8. Ornellas AA, Correia Seixas AL, Marota A, Winesnesky A, Campos F. Uretero-ureterocolic fistula 10 months after enterocystoplasty (Mainz pouch). *Prog Urol*. 1994; 4:87-90.
9. Yu NC, Raman SS, Patel M, Barbaric Z. [Fistulas of the genitourinary tract: a radiologic review](#). *Radiographics*. 2004; 24:1331-52.
10. Jarrett TW, Vaughan ED. Accuracy of computerized tomography in the diagnosis of colovesical fistula secondary to diverticular disease. *J Urol*. 1995; 153: 44-6.
11. Maeda Y, Nakashima S, Misaki T. [Ureterocolic fistula secondary to colonic diverticulitis](#). *Int J Urol*. 1998; 5: 610-2.
12. Shackley DC, Brew CJ. The staged management of complex entero-urinary fistulae. *BJU Int*. 2000; 86: 624-9.