Case Report

Journal of Emergency Medicine Case Reports

Spontaneous Forniceal Rupture in the Emergency Department

Mehmet Yorgun[1], Arif Mehmet Duran[2], Ramazan Sami Aktaş[1], Osman Taş[1]

[1]Department of Emergency Medicine, Van Training and Research Hospital, University of Health Sciences, Van, Türkiye

[2]Department of Urology, Van Training and Research Hospital, University of Health Sciences, Van, Türkiye

Abstract

Spontaneous rupture of the renal fornix and urine extravasation is a very rarely encountered condition in the practice of urological emergencies in emergency department admissions. A 50-year-old woman presented to the emergency department with sudden severe abdominal pain and nausea, without a history of trauma. Laboratory findings were normal except for anemia (Hb: 8.2 g/dL). Physical examination revealed abdominal rebound and right costovertebral angle tenderness. Due to acute abdomen findings, an urgent contrast-enhanced abdominal CT was performed, revealing a 5 mm stone in the right proximal ureter, perirenal urine leakage, and grade 2 hydronephrosis. Ureterorenoscopy was performed, confirming a rupture site in the lower pole fossa. The obstructing stone was pushed back into the kidney, and a double-J stent was placed. Follow-up showed resolution of extravasation. Four weeks later, the stone was successfully removed via retrograde intrarenal surgery (RIRS). Spontaneous renal fornix rupture is a rare case in the emergency department, and since patients may present with various clinical symptoms and findings, it should always be considered in the differential diagnosis of patients presenting with abdominal pain.

Keywords: Kidney, spontaneous forniceal rupture, ureteral calculi

Introduction

Rupture of the renal collecting system is frequently related to blunt or penetrating renal trauma and rarely occurs as a result of accompanying pathologies such as obstruction, hydronephrosis, tumour and infection, and its mechanism is increased pressure in the collecting system (1,2). Spontaneous rupture of the renal calyx and fornix leading to extravasation of urine into the perirenal or retroperitoneal space is very rare among the complications of obstructive nephropathy. However, most renal fornix ruptures are associated with ureteral obstruction due to ureteral or ureteropelvic junction stones and the pressure increase caused by this obstruction (3,4). Other causes of secondary ureteral obstruction include trauma, idiopathic retroperitoneal fibrosis, previous urinary tract surgery, posterior urethral valve, prostatic hyperplasia, pregnancy and malignancy-related masses. However, fornix rupture may present with a variety of clinical symptoms and signs at presentation different from the typical renal colic clinic at presentation to the emergency department. These include diffuse low back pain, abdominal pain, abdominal peritoneal irritation findings, leucocytosis, increase in body temperature in most cases, loss of psoas shadow, antalgic posture to the diseased kidney in the vertebrae, findings related to stones and gastrointestinal paresis on plain abdominal radiography, fluid of various qualities which may be associated with periureteral pyelocalial dilatation (1,2). In the diagnosis; The high sensitivity of intravenous contrast-enhanced computed tomography has been reported in the literature (2). The treatment of fornix rupture due to ureteral stone disease is mainly aimed at eliminating obstruction and controlling extravasation. Treatment should be individualised and varies depending on the patient's condition. Minimally invasive endourological procedures with double-J catheter placement and percutaneous drainage give excellent results. Conservative treatment with analgesics and antibiotics may be an alternative to surgery.(1,2)

Case Report

A 50-year-old woman presented to the emergency department with complaints of diffuse severe abdominal pain and nausea. There was no history of trauma and she had a known history of previous spinal surgery and hypertension. The patient described that the pain started a few hours ago and spread to the whole abdomen and nausea followed. The patient told us that the pain was more severe at the time of onset of the pain and the pain intensity suddenly decreased

Corresponding Author: Mehmet Yorgun
e-mail: dryorgun1991@gmail.com
Received: 09.05.2025 • **Revision:** 21.07.2025 • **Accepted:** 02.08.2025
DOI: 10.33706/jemcr.1695836

Cite this article as: Yorgun M, Duran AM, Aktas RS, Tas O. Spontaneous Forniceal Rupture in the Emergency Department. Journal of Emergency Medicine Case Reports. 2025;16(4): 130-133

after a while. Physical examination revealed abdominal rebound in the right and left lower quadrants and right costovertebral angle tenderness. Other systemic examination findings were normal. Blood pressure was 122/85 mmHg, pulse rate was 82/min, Spo2: 98% and body temperature was 36.6°C. In routine complete blood analysis, except for haemoglobin value (8.2 g/dl), other laboratory values were normal and there was no feature. Since the patient was in the acute abdomen clinic and the clinic was noisy, the patient was taken to the tomography room for intravenous contrast-enhanced abdominal computed tomography rapidly after the laboratory results without waiting for the urine test result and without radiography. Intravenous contrast-enhanced abdominal computed tomography revealed a 5-mm stone in the right proximal ureter, perirenal urine leakage thought to be secondary to rupture at the level of the right renal pelvis, right renal grade 2 hydronephrosis, thickening and edema in the right renal pelvis and proximal ureter (Figure-1). Since spontaneous forniceal rupture secondary to an obstructing proximal ureteral calculus was considered in this case, ureterorenoscopy was performed. During the procedure, retrograde pyelography was first performed, and a rupture was detected in the lower pole fossa. Subsequently, the stone in the ureter was removed, the stone was pushed back into the kidney, and a double-J stent was placed. The patient's postoperative pain decreased, and alpha-blocker therapy was initiated during follow-up. During this period, control ultrasonography showed that the extravasation had subsided and the hydronephrosis had gradually disappeared. The patient's double-J stent was removed in the fourth postoperative week. The kidney stone was fragmented using a laser during retrograde intrarenal surgery (RIRS).

Discussion

Spontaneous forniceal rupture is a rare condition and is primarily associated with a sudden increase in intrapelvicalyceal pressure secondary to urinary tract obstruction. The stone in the ureter may cause erosion and ulceration on the ureteral wall during displacement in the ureteral cavity and may lead to ureteral obstruction and ureteral rupture (2,5,6). Malignancy, idiopathic retroperitoneal fibrosis, posterior urethral valves, bladder outlet obstruction, Klinefelter syndrome, as a complication of extracorporeal shock wave lithotripsy during renal biopsy and increased urine flow from fluid bolus have been reported to lead to spontaneous rupture of the ureter (1,2). Our patient had no previous history of renal stone surgery. Spontaneous forniceal rupture has no characteristic clinical findings and patients may present with different presentations of symptoms and signs. On physical examination, patients may have abdominal tenderness and pain with costovertebral angle tenderness on the ipsilateral side. In some cases, the diagnosis may be difficult due to nonspecific symptoms. In the differential diagnosis, urinary lithiasis, appendicitis, cholecystitis, diverticulitis and other possible causes of abdominal pain should be kept in mind. Forniceal rupture usually presents with gastrointestinal symptoms close to the peritoneum and may cause chemical peritoneal irritation mimicking diverticulitis or appendicitis (7). In our case, physical examination revealed rebound tenderness in the abdomen and signs of peritoneal irritation. The patient reported that the pain was very severe at onset and that she experienced temporary relief before presenting to the emergency department. In the present case, the pain is associated with increased pressure in the urinary tract, and it is known that pain decreases after forniceal rupture. We can also state that peritoneal irritation findings developed due to urinary leakage following the rupture. Additionally, the patient's physical examination demonstrated that spontaneous forniceal rupture can present with various symptoms and findings. Although spontaneous ureteral rupture has been reported in the literature, the present case represents forniceal rupture associated with ureteral obstruction, rather than primary ureteral wall perforation.

In the present case, due to the noise in the patient's clinic, in order not to waste time and to recognise potentially life-threatening pathologies early, intravenous contrast-enhanced abdominal computed tomography was performed directly without waiting for the results of urine examination

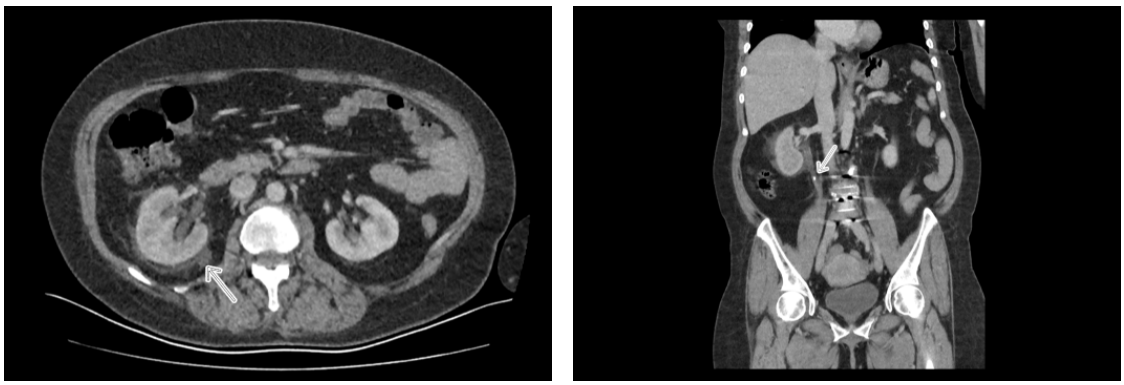

Figure 1. Abdominal CT shows a right ureteral stone and right perirenal fluid collection

DOI: 10.33706/jemcr.1695836
Journal of Emergency Medicine Case Reports. 2025;16(4): 130-133

and imaging methods such as USG and radiography could not be performed in the patient. In the tomography image of the patient, stone in the proximal ureter, pararenal urine leakage, right renal grade-2 hydronephrosis, thickening and oedema in the right renal pelvis and ureter were observed; no haematoma, abscess and urinoma were observed except around the kidney.

Spontaneous forniceal rupture with urinary extravasation can cause serious complications. Urinoma, perinephric or retroperitoneal abscess formation and urosepsis may occur. Consequently, spontaneous forniceal rupture should be managed promptly to relieve obstruction and control urinary extravasation. Treatment should be individualised and varies according to the patient's condition and the degree of ureteral rupture. Antibiotic treatment is a necessary practice for all patients (8). In the present case, ureterorenoscopy was performed. During the operation, retrograde pyelography was performed and contrast extravasation was observed in the lower pole fossa of the right kidney. Then, a stone causing obstruction in the ureter was pushed back into the kidney. Finally, a double-J catheter was placed. The fragmentation of the stone due to rupture was not performed simultaneously. Stravodimos et al. reported successful treatment of ureteric rupture by placing a double-J stent under fluoroscopy and similarly achieved uneventful urine output, healing of the perforation, and stabilisation and gradual resorption of the urinoma (8). Although ureteral rupture has been reported to be treated with open surgery, many studies suggest that minimally invasive endourological procedures such as double-J catheter placement and percutaneous drainage are the treatment protocol that should be applied in the first stage and are more beneficial (9). Recently, successful conservative treatments with analgesics and antibiotic coverage have been published in the literature. These studies have recommended nonoperative treatments in stable patients, but have suggested to us that endourological intervention may still be necessary if conservative treatment fails (10).

Although it is reported in the literature that late complications may occur in 10% of perirenal abscess cases, the use of conservative or interventional treatments in the treatment of renal fornix rupture due to obstructive stones is still controversial. In a case series treated conservatively, complications did not develop in 40.7% of the patients, whereas the rest of the patients who developed complications were treated with interventional methods (11). Small diameter urinomas may reabsorb spontaneously without the need for drainage. Recently, treatment of spontaneous renal pelvis rupture has been successfully performed using ureteral stents (12). Interventional treatment with ureteral stent alone can repair hydronephrosis and urinary extravasation and complete recovery can be achieved. This method provides a solution in the acute period; however, it should be noted that 59.1% of patients require additional interventional treatments such as stone crushing therapy and ureterorenoscopic lithotripsy (13). In addition, open surgical intervention has been reported to be successful especially in cases with late diagnosis or large urinomas (14). In this case, ureteral stent was preferred. The most important criteria for choosing this method were the patient's clinic, the size and localisation of the ureteral stone, and the localisation and size of the urinoma diameter. However, in our case, endoscopic treatment was decided because it was predicted that the patient could be treated with endoscopic intervention in the first stage in the light of clinical and radiological findings. Similarly, open surgery was not required during the follow-up of the patient.

Conclusion

Renal fornix rupture due to obstructive ureteral calculi is a rare clinical entity in the emergency department. These patient groups may present to the clinic with nonspecific signs and symptoms and it may sometimes be difficult to make a diagnosis. In addition, it should be kept in mind in the differential diagnosis of patients presenting to the emergency department because of its serious complications in the late period as a treatment protocol in these patients. Conservative, interventional or surgical treatments can be applied according to the size and localisation of the ureteral stone, the diameter of the urinoma, other additional pathologies and the severity of the symptoms.

References

1. Gökkaya CS, Baykam MM, Yahşi S, Bulut S, Aktaş BK, Memiş A. Spontaneous fornix rupture due to obstructive ureteral stone. J Clin Pract Res 2014; 36(2): 91 93 doi: 10.5152/etd.2013.48
2. Eken A, Akbas T, Arpaci T. Spontaneous rupture of the ureter. Singapore Med J. 2015 Feb;56(2):e29-31. doi: 10.11622/smedj.2015029. PMID: 25715862; PMCID: PMC4350460
3. Kettlewell M, Walker M, Dudley N, De Souza B. Spontaneous extravasation of urine secondary to ureteric obstruction. Br J Urol 1973;45(1):8-14.
4. Paajanen H, Kettunen J, Tainio H, Jauhiainen K. Spontaneous peripelvic extravasation of urine as a cause of acute abdomen. Scand J UrolNephrol 1993; 27(3): 333-6.
5. Searvance K, Jackson J, Schenkman N. Spontaneous Perforation of the UPJ: A Case Report and Review of the Literature. Urol Case Rep. 2016 Nov 26;10:30-32. doi: 10.1016/j.eucr.2016.11.007. PMID: 27920987; PMCID: PMC5128821.
6. Celik A, Altuntas M. Spontaneous Forniceal Rupture Identified by Point-of-care Ultrasound. J Coll Physicians Surg Pak. 2022 Oct;32(10):1341-1343. doi: 10.29271/jcpsp.2022.10.1341. PMID: 36205283.
7. Moore EE, Cogbill TH, Jurkovich GJ, et al. Organ injury scaling. III: Chest wall, abdominal vascular, ureter, bladder, and urethra. J Trauma 1992; 33:337-9.

8. Stravodimos K, Adamakis I, Koutalellis G, et al. Spontaneous perforation of the ureter: clinical presentation and endourological management. J Endourol 2008; 22:479-84.
9. Reva S, Tolkach Y. Spontaneous pelvic rupture as a result of renal colic in a patient with klinefelter syndrome. Case Rep Urol 2013; 2013:374973
10. Chen CC, Chang CH, Liu YL, Liu JH, Huang CC. A tiny stone induced ureteral rupture. Urolithiasis. Ann Acad Med Singapore 2010; 39:948-2.
11. Chapman JP, Gonzalez J, Diokno AC. Significance of urinary extravasation during renal colic. Urology 1987; 30(6): 541-5.
12. Kıraç M, Akyüz S, Üre İ, Batur AF, Çelik M, Tunç L. Rupture of the renal pelvis due to to ureteral stone. Turkish Journal of Urology 2007; 33(3): 369-71.
13. Holsten DR. Fornix rupture of the kidney as a complication of infusion pyelography. Rontgenblatter 1973; 26(10): 447-9.
14. Valero Puerta JA, Medina Pérez M, Valpuesta Fernández I, Sánchez González M. Surgical treatment of kidney pelvis spontaneous rupture. ArchEspUrol 1998; 51(7): 728-30.