Case Report

Spontaneous rupture of the ureter mimicking acute appendicitis:
Two case reports

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Abstract

Spontaneous rupture of the ureter is rare and usually associated with calculous diseases. The presentation may mimic other more common causes of acute abdomen, such as acute appendicitis and diverticulitis. Although urinary tract symptoms and abnormal urinalysis findings are the usual telltale signs of urological disorders, these clinical manifestations may be atypical or absent in ureteral rupture. We report two patients with spontaneous ureteral rupture who presented to our emergency department with right lower quadrant abdominal pain without urinary tract symptoms, and were initially misdiagnosed with acute appendicitis. The final diagnosis in both cases was confirmed by contrast extravasation from the ureter on computed tomographic scans.

Keywords: Acute appendicitis; Spontaneous rupture; Ureteral rupture; Ureteral stone

1. Introduction

Spontaneous rupture of the ureter, which is defined as extravasation of urine from the ureter without previous trauma such as surgery, ureter manipulation, and external trauma of the ureter,1 is a rare urological disorder and only a small number of cases have been reported in the literature. The average age of reported patients is 42 years old and there is no sex predominance.2 Urolithiasis is the major contributor to the condition. As a result of peritoneal irritation by urine, this disease often presents with an acute abdomen mimicking acute appendicitis or diverticulitis. Although abnormal urinalysis results, urinary tract symptoms, and flank pain may be helpful signs of a urological problem, these symptoms may be absent. We report two cases of spontaneous ureteral rupture, which were initially misdiagnosed as acute appendicitis.

2. Case reports

2.1. Case 1

A 71-year-old healthy man presented to our emergency department with severe right lower quadrant abdominal pain for 1 day. Nausea and poor appetite were also noted. He had no urinary tract symptoms or flank pain. Initially, his vital signs were stable and body temperature was 37.1°C. Physical examination revealed no costovertebral angle knocking pain on either side. However, marked tenderness over Mcburney’s point with abdominal muscle guarding and rebound tenderness were noted. Laboratory studies revealed no leukocytosis and the C-reactive protein level was normal. Neither pyuria nor hematuria was found. Acute appendicitis was suspected.

As a result of a lack of abdominal migrating pain, enhanced abdominal computed tomography (CT) scan was performed. It showed mild right hydronephrosis with a marked fluid collection at the right perirenal and pararenal spaces. There was contrast medium leakage around the right ureteropelvic junction, causing an absence of enhancement of the right...
ureter (Fig. 1). A tiny calculus was also noted at the right ureterovesical junction.

He was treated conservatively with analgesics and prophylactic antibiotics. After improvement of symptoms 4 days later, retrograde pyelography showed no urolithiasis or extravasation of contrast medium. It was assumed that the rupture of the ureter had healed, and he was discharged uneventfully.

2.2. Case 2

A 21-year-old previously healthy woman presented with right abdominal pain for 3 days. She had no fever or urinary tract symptoms. Marked tenderness over the right lower quarter of the abdomen with rebound tenderness and knocking pain in the right flank were noted. Laboratory analyses showed an elevated white blood cell count (12,420/mL). Urinalysis revealed only five white blood cells per high-power microscopic field, with no red blood cells.

Initially, acute appendicitis was suspected and surgery was suggested. However, because of the knocking pain in the right flank, urological disease was suspected. Enhanced abdominal CT showed contrast extravasation from the right ureteropelvic junction (Fig. 2). Some fluid accumulation over the right perirenal space and a stone over the right ureterovesical junction were also noted.

The abdominal and flank pain persisted, therefore, a percutaneous nephrostomy was performed. The ureteral stone was subsequently removed by ureterorenoscopic manipulation. The patient recovered uneventfully and was discharged 9 days later.

3. Discussion

Spontaneous rupture of the ureter is a rare condition that usually results from ureteral stones. Two underlying mechanisms have been proposed. First, impaction of stones may cause erosion of the ureteral wall directly leading to ureteral rupture. Second, ureteral trauma and ulceration may result from a downward-moving calculus that obstructs the distal ureter, with elevation of the intraureteric pressure, which subsequently leads to ureteral rupture at the weakest point.

Other causes of spontaneous ureteral rupture have also been reported, including obstruction, tuberculosis, cancer of the ureter, high-dose steroid therapy, infection, and an inflammatory reaction.

Spontaneous ureteral rupture often presents as sudden-onset severe abdominal and flank pain, often associated with nausea, vomiting, dysuria, urinary frequency and hematuria. Urinalysis usually shows pyuria and hematuria. Extravasation of urine may occur in close proximity to the peritoneum and hence cause peritoneal irritation. Misdiagnosis as acute appendicitis or diverticulitis is not uncommon. Trapnell has reviewed eight cases of spontaneous ureteral rupture, half of which were initially diagnosed as acute appendicitis. Diamond et al have reviewed 34 patients with spontaneous urinary extravasation, nine of whom were treated by exploratory laparotomy for acute abdomen. Both of our cases were initially incorrectly diagnosed as acute appendicitis.

Negative findings on urinalysis and absence of urinary tract symptoms may not be reliable in excluding urological problems in an acute abdomen survey. In concert with the finding of Trapnell’s case series, in which positive urinary tract symptoms were found in only two of eight patients, urinary tract symptoms were absent in both of our patients. The urinalysis was normal in one case, and only slight pyuria was noted in the other. Although flank pain may be another hint of urological disease, it is also not always present. There was no flank pain in one of our cases. Therefore, although the presence of flank pain, abnormal urinalysis results, or urinary tract symptoms may help in distinguishing spontaneous ureteral rupture from other causes of acute abdomen, absence of these symptoms is insufficient to exclude the diagnosis.
Previously, an intravenous pyelogram was the gold standard in the diagnosis of ureteral rupture. However, with advances in technology, ultrasonography and CT scan have gained popularity. Ultrasonography is a real-time, inexpensive, repeatable, and radiation-free diagnostic tool. It is easily accessible and time-saving in the emergency department. In cases of ureteral rupture, ultrasonography can detect well a small fluid collection in the perirenal, pararenal and retroperitoneal spaces, and hydronephrosis, and exclude other abdominal pathologies. CT is also an excellent tool in evaluating urological disease. It has high sensitivity and specificity. Not only is a CT scan less time-consuming than an intravenous pyelogram, but it can also detect urological pathological conditions that may be missed on excretory urography, such as tumor, infection, and renal infarction. Moreover, it also helps in the diagnosis of diseases other than urogenital problems, including gastrointestinal diseases such as acute appendicitis, diverticulitis or cholecystitis, and vascular disease including abdominal aortic or iliac artery aneurysm.

After reviewing 1500 patients with acute flank pain evaluated by CT scan, Hanno et al have reported that 88 patients (6%) had findings other than urinary tract calculi requiring immediate treatment, and 119 (8%) had findings requiring deferred treatment. Most of these findings would probably have been missed on an intravenous pyelogram. Therefore, we prefer ultrasonography and abdominal CT scan in assessing patients with suspicious ureteral rupture in the emergency department, rather than the traditional intravenous pyelogram.

Traditionally, the treatment of choice for spontaneous rupture of the ureter is surgery, including nephrectomy, incision and drainage, ureteral stenting, percutaneous nephrostomy, and retrieval of the stones. However, successful conservative treatment of the condition has been reported in several case series in the past decade. Alpinar et al have successfully managed three of four cases of spontaneous ureteral rupture with supportive measures alone, including hydration, analgesics, and antibiotic coverage under careful monitoring. Lien et al also have reported another three cases of successful conservative treatment. In our series, the promising outcome of one of our cases after the conservative approach further validates the applicability of this strategy in selected patients. We therefore suggest that nonoperative management should be considered first for patients in stable clinical condition to avoid unnecessary surgery and its associated complications.

It is important to distinguish spontaneous rupture of the ureter from fornical rupture, which is a more common and relatively benign condition. Fornical rupture is considered a pathological condition resulting from a microscopic tear in the caliceal fornix due to an increase in intrapelvic pressure. Like spontaneous rupture of the ureter, a calculus is the most common etiological factor. The presence of contrast medium around the calyx is highly suggestive of fornical rupture, whereas nonvisualization of the ureter on the affected side usually indicates rupture of the ureter.

In conclusion, spontaneous rupture of the ureter often presents as acute abdomen and may be misdiagnosed as other surgical conditions. Urinary tract symptoms, physical examination, and urinalysis are unreliable. Thus, a high level of vigilance is important. Further examination including ultrasonography or abdominal CT should be considered for suspicious cases. Although surgical intervention is the conventional treatment, nonoperative management may be considered in stable patients.

References