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Spontaneous Ureteral Rupture in a Patient Without a History of Trauma: A Rare Case Report

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Introduction

Spontaneous ureteral rupture is defined as a non-traumatic perforation of the ureteral wall in the absence of iatrogenic intervention. It is a rare clinical entity that may mimic various causes of acute abdomen, often leading to diagnostic challenges.

In the majority of cases reported in the literature, the underlying etiology is related to urinary tract obstruction, most commonly due to ureteral or renal calculi. Other less frequent causes include malignancies, retroperitoneal fibrosis, infections, pregnancy, and ureteral strictures.

Increased intraluminal pressure secondary to ureteral obstruction may lead to rupture at vulnerable sites within the ureteral wall. As a result, urine extravasates into the retroperitoneal space, resulting in perirenal and pararenal fluid collections.

Clinically, patients most commonly present with flank or abdominal pain, which may mimic renal colic, acute appendicitis, or other causes of acute abdomen, often leading to diagnostic uncertainty.

Contrast-enhanced abdominal computed tomography (CT), particularly with delayed-phase imaging, is considered the gold standard for diagnosis. Typical CT findings include contrast extravasation along the ureter and the presence of perirenal fluid collections.

The primary goals of treatment are to relieve the obstruction, ensure adequate urinary drainage, and prevent complications such as perirenal urinoma, infection, and sepsis.

In this report, we present a case of spontaneous ureteral rupture in a patient without a history of trauma who presented to the emergency department with right lower quadrant and right flank pain.

Case Presentation

A 63-year-old male patient presented to the emergency department with a two-day history of right lower quadrant and right flank pain. He had no history of trauma. His medical history was notable for prior urinary stone passage.

On physical examination, tenderness was present in the right lower quadrant without guarding or rebound tenderness. Right costovertebral angle tenderness was positive.

Laboratory investigations revealed a glomerular filtration rate (GFR) of 67.95 mL/min, a serum creatinine level of 1.2 mg/dL, blood urea nitrogen (BUN) of 16.6 mg/dL, and a C-reactive protein (CRP) level of 28 mg/L. All other biochemical parameters, complete blood count, blood gas analysis, and urinalysis findings were within normal limits.

A contrast-enhanced abdominal computed tomography (CT) scan was performed. Imaging demonstrated contrast extravasation extending from the proximal one-third of the right ureter into the perirenal space and anterior pararenal space. Additionally, a fluid collection with a maximum thickness of approximately 6 mm was identified between Gerota's and Zuckerkandl's fasciae.

These findings were considered consistent with spontaneous ureteral rupture in the absence of trauma. Furthermore, minimal contrast passage was observed at the level of the vesicoureteral junction in the distal one-third of the right ureter.

Following consultation with the urology department, the patient was admitted to the urology service. Diagnostic ureterorenoscopy and endoscopic retrograde pyelography were performed, followed by placement of a double-J ureteral stent.

A marked improvement in the patient's pain was observed after treatment. On the sixth day of follow-up, laboratory tests

demonstrated a glomerular filtration rate (GFR) of 99.82 mL/min, serum creatinine of 0.79 mg/dL, and blood urea nitrogen (BUN) of 11 mg/dL.

With the improvement in clinical and laboratory parameters, the double-J ureteral stent was removed. The patient's general condition was assessed as good, and he was discharged with appropriate recommendations.

Discussion

Spontaneous ureteral rupture (SUR) is a rare complication of the urinary tract that occurs in the absence of trauma or iatrogenic intervention. Only a limited number of cases have been reported in the literature, and the true incidence is considered to be low.

The condition was first described in the mid-20th century, and its reported frequency has increased over time, particularly with advances in imaging modalities that have improved diagnostic accuracy.

Spontaneous ureteral rupture is typically associated with increased intraluminal pressure secondary to urinary tract obstruction. In the majority of cases reported in the literature, the underlying etiology is ureteral calculi. Chen et al. reported that ureteral stones represent the most common cause of spontaneous ureteral rupture.[1] Similarly, a review by Aggarwal and Adhikary emphasized that spontaneous ureteral rupture is frequently associated with obstructive uropathy, with ureteral calculi being the predominant etiological factor.[5]

From a pathophysiological perspective, ureteral obstruction leads to increased intrapelvic pressure, which may result in rupture of the collecting system or ureteral wall. Zhang et al. noted that most upper urinary tract ruptures develop as a consequence of pressure elevation due to obstruction.[2] In the present case, the patient's history of prior stone passage suggests that an obstructive mechanism may have contributed to the pathogenesis.

In addition to urolithiasis, other reported causes include ureteral strictures, ureteral or bladder malignancies, retroperitoneal fibrosis, ureteropelvic junction obstruction, pregnancy, and congenital weakness of the ureteral wall.

The clinical manifestations of spontaneous ureteral rupture are variable and often nonspecific, which may lead to it being overlooked during emergency department evaluation or misinterpreted as other causes of acute abdomen. One of the major challenges in clinical practice is its ability to mimic acute abdominal conditions, potentially resulting in misdiagnosis and unnecessary surgical interventions.[5]

Therefore, this diagnosis should be considered, particularly in elderly patients and in those with a history of urolithiasis. Eken et al. reported that spontaneous ureteral rupture most commonly presents with flank or abdominal pain and that its clinical presentation closely resembles renal colic.[4]

In the present case, the patient's presentation with right lower quadrant pain initially necessitated consideration of acute abdominal conditions in the differential diagnosis. The absence of guarding and rebound tenderness on physical examination, together with the presence of costovertebral angle tenderness, suggested a urinary tract pathology.

The clinical significance of spontaneous ureteral rupture extends beyond pain alone. Increased pressure secondary to obstruction, along with urine extravasation into the retroperitoneal space, may lead to the formation of a urinoma. Zhang et al. reported that if left untreated, this process can result in serious complications, including infection and sepsis.[2] Similarly, Gershman et al. demonstrated that upper urinary tract ruptures are associated with a risk of urinoma formation and subsequent infection.[3]

Therefore, early diagnosis and prompt management are crucial not only for symptom control but also for preventing potentially life-threatening complications.

Contrast-enhanced computed tomography (CT) is currently considered the most sensitive imaging modality for the diagnosis of spontaneous ureteral rupture. Typical CT findings include contrast extravasation along the ureter, perirenal or pararenal fluid collections, dilatation of the ureter or renal pelvis, and obstructive causes such as calculi or strictures. Chen et al. reported that CT is the most sensitive method for detecting urinary extravasation.1 In addition, Aggarwal and Adhikary emphasized the importance of delayed-phase imaging for demonstrating contrast extravasation.[5]

In the present case, CT imaging demonstrated contrast extravasation extending from the proximal portion of the right ureter into the perirenal and anterior pararenal spaces, supporting the diagnosis. Furthermore, the presence of fluid collections between Gerota's and Zuckerkandl's fasciae was consistent with the formation of a retroperitoneal urinoma.

The primary goals in the management of spontaneous ureteral rupture are to ensure adequate urinary drainage, relieve obstruction, and prevent infectious complications. Treatment options reported in the literature include double-J ureteral stent placement, percutaneous nephrostomy, ureteroscopy, and, in selected cases, surgical repair.

From a therapeutic perspective, minimally invasive approaches have gained increasing prominence. Eken et al. reported that ureteral stent placement provides effective treatment in the majority of patients.[4] Similarly, Pace et al. demonstrated that spontaneous ureteral rupture secondary to ureteral calculi can be successfully managed with ureteral stenting.[6]

In the present case, ureteral stent placement provided effective treatment. The resolution of the patient's symptoms, along with improvement in biochemical parameters, supports the effectiveness of the management approach.

In conclusion, this case demonstrates a clinical course consistent with the existing literature, characterized by the absence of a history of trauma, presentation with right lower quadrant pain, early diagnosis using computed tomography, and successful management with minimally invasive intervention.

Conclusion

Although spontaneous ureteral rupture is a rare condition, it represents an important urological emergency that should be considered in the differential diagnosis, particularly in patients presenting with acute abdominal pain. Owing to its often nonspecific clinical presentation, diagnosis may be delayed, and the condition may be misinterpreted as other causes of acute abdomen. Therefore, a high index of clinical suspicion is essential, especially in patients with a history of urolithiasis.

Contrast-enhanced computed tomography (CT) is the most

sensitive and reliable imaging modality for the diagnosis of spontaneous ureteral rupture and facilitates early detection. Early diagnosis is crucial to prevent serious complications such as urinoma formation, infection, and sepsis.

Minimally invasive approaches constitute the mainstay of treatment, and favorable outcomes are achieved in most patients with double-J ureteral stent placement.

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