

Always Take Renal Colic Seriously: A Rare Complication of Renal Stone

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ABSTRACT

Pelvis rupture secondary to renal colic is an exceptionally rare but severe complication of nephrolithiasis. This case report describes a 32-year-old male who presented with intense flank pain, gross hematuria, and urinary obstruction. A computed tomography (CT) scan revealed a 3-mm calculus at the ureterovesical junction causing hydronephrosis and, notably, a rupture of the renal pelvis with urine extravasation into the retroperitoneal space. Immediate intervention included ureteroscopic lithotripsy, stent placement, and antibiotic therapy, leading to symptom resolution and improved renal function. This report highlights the diagnostic challenges associated with pelvis rupture, which often mimics typical renal colic symptoms, and emphasizes the critical role of contrast-enhanced CT in detection. Prompt management is essential to prevent complications such as sepsis and long-term renal damage. The case underscores the importance of recognizing this rare entity to optimize patient outcomes and guide future clinical approaches to similar presentations.

Introduction

Renal colic, characterized by severe, sudden-onset pain resulting from the passage of kidney stones through the urinary tract, is a common urological emergency. Typically, renal colic leads to complications such as urinary obstruction, hydronephrosis, and infection [1]. However, in rare instances, the intense intraluminal pressure generated by a blocked urinary system can result in an even more severe and unusual complication: pelvis rupture. Pelvis rupture in the context of renal colic is an extremely rare event, with few cases documented

in medical literature. This condition occurs when the high pressure within the urinary tract causes a breach in the pelvis wall, leading to urine extravasation into surrounding tissues. Given its rarity, the diagnosis of pelvis rupture due to renal colic poses significant challenges, often requiring advanced imaging techniques for accurate detection. Understanding this rare complication is crucial for prompt diagnosis and effective management, as delays can lead to severe outcomes such as infection, sepsis, and long-term renal damage [2]. This report discusses the clinical presentation, diagnostic approach, and management strategies for pelvis rupture secondary to renal stone, highlighting the importance of early recognition and intervention in improving patient outcomes.

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Case Presentation

A 32-year-old male presented to the emergency department with severe, sharp pain in the right flank, lower abdomen, and groin, which had begun suddenly two hours prior to his arrival. The patient described the pain as radiating down to his groin and associated with nausea, vomiting, and a sensation of abdominal fullness. He reported a history of recurrent renal colic over the past five years, for which he had been treated with analgesics and occasional extracorporeal shock wave lithotripsy (ESWL). He also noted a history of hypertension and obesity but denied any recent trauma to the abdominopelvic region.

On arrival, physical examination revealed the patient was in severe distress due to pain, with a blood pressure of 140/85 mmHg, a heart rate of 110 beats per minute, and a temperature of 37.5°C. Abdominal examination revealed tenderness over the suprapubic region and the right flank, without guarding and rebound tenderness.

Laboratory investigations revealed leukocytosis with a white blood cell count of 13,500/ μ L, and elevated serum creatinine at 1.9 mg/dL (baseline 1.0 mg/dL). Urinalysis revealed gross hematuria, with numerous red blood cells per high-power field, and no evidence of infection. Given his history and symptoms, a preliminary diagnosis of renal colic was made, and a non-contrast computed tomography (CT) scan of the abdomen and pelvis was performed.

The non-contrast CT scan revealed free fluid around the right pelvis and a 3-mm calculus lodged in the right ureterovesical junction, causing mild hydronephrosis (Figure 1, 2).

Additionally, in the IV contrast CT scan, there was evidence of a rupture of the right pelvis wall with extravasation of urine into the retroperitoneal space, secondary to the pressure exerted by the obstructed urinary tract (Figure 3). The patient was immediately admitted to the urology department and underwent emergency ureteroscopic lithotripsy to remove the obstructing stone. A double-J stent was placed to ensure proper drainage of the kidney and prevent further complications. The patient also received broad-spectrum antibiotics and intravenous fluids. Postoperatively, the patient's pain subsided, and his renal function gradually improved. A follow-up CT scan performed one week later confirmed the resolution of the pelvis rupture, with no further urine leakage.

Discussion

Pelvis rupture secondary to renal colic is an exceptionally rare and serious complication of nephrolithiasis [3]. Renal colic, typically caused by the passage of a kidney stone through the urinary tract, is known for its severe, acute pain, often described as one of the most intense pain experiences. The usual complications of renal colic include urinary obstruction, hydronephrosis, infection, and hematuria [4]. However, the occurrence of a pelvis rupture due to the pressures generated by this condition is extremely unusual and presents a unique set of diagnostic and therapeutic challenges.

The pathophysiology underlying pelvis rupture in the context of renal colic revolves around the increased intraluminal pressure within the urinary tract. When a renal stone obstructs the urinary flow, typically at the ureteropelvic junction, the resulting increase in pressure can lead to distension of the renal pelvis and



Fig. 1. Free fluid around right renal pelvis is seen at non-contrast CT scan.



Fig. 2. In axial image of non-contrast CT scan showed a 3-mm calculus lodged in the right ureterovesical junction



Fig. 3. Contrast extravasation is revealed in delayed phase of IV contrast CT scan.

calyces. In rare instances, this pressure can become so extreme that it causes the pelvic wall to rupture. The rupture typically occurs in the weakest part of the pelvic wall, which may already be compromised due to chronic inflammation or previous episodes of renal colic [5].

The rupture results in extravasation of urine into the retroperitoneal or peritoneal space, leading to a host of secondary complications, including urinomas, infection, and sepsis. The combination of a physical rupture and urine leakage into the surrounding tissues can provoke significant local and systemic inflammatory responses, further complicating the patient's clinical picture [6].

The clinical presentation of pelvis rupture due to renal colic can be deceptively similar to that of uncomplicated renal colic, making it difficult to diagnose based on symptoms alone. Patients may present with severe abdominal or flank pain, gross hematuria, and signs of urinary obstruction. However,

the pain associated with pelvis rupture may be more diffuse, extending beyond the typical flank and groin regions to involve the lower abdomen or pelvis, and may be accompanied by signs of peritoneal irritation, such as guarding and rebound tenderness. In cases where urine leaks into the retroperitoneal space, the patient may also develop symptoms related to local inflammation, such as fever, malaise, and an elevated white blood cell count, which might initially be misinterpreted as a urinary tract infection or pyelonephritis [7].

Given the rarity of pelvis rupture in the context of renal colic, it is often a diagnosis that is considered only after more common causes of severe abdominal pain have been excluded. Imaging plays a crucial role in the diagnosis. While ultrasound may reveal hydronephrosis and the presence of a renal stone, it may not always detect a pelvis rupture, particularly if the rupture is small or the extravasation of urine is minimal. Contrast-enhanced computed tomography (CT) is the diagnostic modality of choice, as it allows

for detailed visualization of the urinary tract and surrounding structures. CT can identify the site of the obstruction, the presence of any pelvic rupture, and the extent of urine extravasation. The use of contrast can help delineate the rupture and the pathways of urine leakage, providing essential information for guiding treatment [8].

The management of pelvis rupture secondary to renal colic is multifaceted, requiring prompt intervention to address both the renal stone and the rupture. The primary goal is to relieve the obstruction and reduce the pressure within the urinary tract. This is typically achieved through ureteroscopic removal of the stone or percutaneous nephrostomy in cases where immediate drainage is required. The placement of a ureteral stent or a nephrostomy tube is often necessary to ensure continuous drainage and to allow the ruptured pelvic wall to heal. In cases of extensive rupture with significant urine leakage, surgical repair may be necessary, although this is not always required. The administration of broad-spectrum antibiotics is crucial to prevent or treat infection secondary to urine extravasation [9].

Recent case reports have highlighted the diagnostic and therapeutic challenges associated with pelvis rupture secondary to renal colic. Battista et al. (2016) reported pelvic rupture secondary to obstruction in a patient with recurrent nephrolithiasis, underscoring the diagnostic challenge posed by this condition and the necessity of timely intervention [10]. Similarly, Yanaral et al. (2017) highlighted a case of spontaneous rupture of the renal pelvis caused by a stone obstructing the ureteropelvic junction, leading to significant extravasation. Prompt surgical management and drainage resulted in complete recovery [11]. Additionally, Piwoński and Kucharczyk (2016) reviewed cases where delayed-phase CT imaging was essential in identifying small ruptures and guiding minimally invasive management strategies [12].

The prognosis for patients with pelvis rupture due to renal colic largely depends on the timeliness of the diagnosis and the effectiveness of the intervention. Early recognition and appropriate management can lead to complete recovery, with minimal long-term sequelae. However, delays in diagnosis or treatment can result in severe complications, including sepsis, renal impairment, and chronic pain. Given the rarity of this complication, there is limited data on long-term outcomes, but evidence suggests that most patients recover well if treated promptly. Follow-up imaging is often required to ensure the resolution of the rupture and to monitor for any recurrence of stone disease [13].

Conclusion

Pelvic rupture due to renal colic is a rare but serious complication that requires a high index of suspicion, particularly in patients presenting with atypical symptoms or those with a history of severe or recurrent renal colic. Prompt diagnosis using advanced imaging techniques and timely surgical intervention are key to preventing serious complications and ensuring a favorable outcome. Increased awareness of this condition among clinicians can lead to earlier recognition and better management of this potentially life-threatening complication.

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Ethical Considerations

Ethical considerations

All information, including the photographs and radiological images, has been deidentified. We affirm our awareness of the journal's ethical publication standards and confirm that this case-based review adheres fully to those guidelines

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Conflict of Interests

The authors have no conflict of interest to declare.

Informed consent

The patient gave written consent for the publication of her clinical information and/or medical images.

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