



Inflammation and infection

Generalized peritonitis secondary to a renal forniceal rupture in an obstructed pelvic kidney – A case report

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ABSTRACT

Peritoneal fistulization of pyonephrosis is an uncommon condition, leading to a generalized peritonitis, considered as extreme life-threatening emergency. Secondary to an obstructive uropathy, increasing intra-renal pressure. In most cases, ureteral stones represent the underlying causes followed by stenosis, tumor, or connective tissue disease.

Through this case report, we present a 60-year-old patient with a history of urolithiasis, admitted for an atypical instance of spontaneous renal pelvis rupture in an ectopic right kidney managed surgically.

This case emphasizes the importance of considering renal etiology in cases of peritonitis and underscores the rarity of such occurrences.

1. Introduction

Pyonephrosis is a serious condition that can result in complete kidney destruction. It involves a pus retention in the upper excretory tract, inflammation of the renal parenchyma, and an inflammatory reaction of the perirenal fatty tissue.

Most often secondary to a urinary tract obstruction. If left undiagnosed, it rapidly progresses to life-threatening septic shock.

Peritoneal fistulization due to renal pelvic rupture is an extremely rare complication, with few reviews in the literature. The diagnosis is challenging, where it is often diagnosed during surgery.

Management is based on effective antibiotic therapy and renal drainage. For cases where there is a rupture in the renal pelvis without peritonitis, the percutaneous route appears to be the most effective.¹ However, in instances of peritonitis, an aggressive interventional approach is necessary to eradicate septic foci in the abdomen. Total nephrectomy, nonetheless, is considered as the second-strep treatment for a non-functioning kidney.

We present an atypical case of a renal pelvic rupture of an ectopic right kidney in a pelvic situation, which presented to the emergency department with generalized peritonitis and required surgical management.

2. Case presentation

A 60-year-old patient, with a urolithiasis disease, admitted to the emergency department with a clinical presentation of suspicion of generalized peritonitis with hemodynamic instability. His medical history dates back two years when the patient underwent a JJ stent placement for a kidney stone on an ectopic pelvic right kidney.

Clinically, the patient was disoriented with a GCS of 14, a heart rate at 140 bpm, blood pressure at 10/6 cmHg, a respiratory rate of 35 cycles per minute, while the abdominal examination revealed a distended abdomen with a diffuse abdominal guarding and hypoactive bowel sound.

From a biological standpoint, the white blood cell count was 24,200, platelets were 714,000, CRP was 480 mg/l, there was metabolic acidosis with bicarbonate reserves at 16, a pH of 7.37, PCO₂ at 34.2, HCO₃⁻ concentration at 19.5, with electrolyte imbalances.

Radiologically, after stabilization of the patient, he underwent an abdominal-pelvic CT scan with contrast injection, revealing pyelocaliceal dilatation due to calyceal stones measuring over 17 mm, with a double-J stent in place. Additionally, there were two para-renal collections in the upper pelvis measuring more than 40 mm, associated with signs of generalized peritonitis (Fig. 1).

Initially, the patient was admitted to an intensive care unit, where he received two bags of normal saline and one bag of ringer lactate, vasoactive drugs were initiated, and broad-spectrum antibiotic therapy

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was administered. Subsequently, the patient was urgently taken to the operating room for surgical exploration.

In a surgical perspective, a midline laparotomy was performed, during which exploration revealed purulent fluid in the perihepatic and perisplenic spaces, along with the observation of a fistulous tract adjacent to the ectopic kidney pelvis. Due to the constataion of preserved kidney parenchyma, the decision was to preserve the kidney, then we performed the extraction of all the kidney stones (Fig. 2), and a renal drainage was conducted through a nephrostomy tube ch12 and a double-J stent ch7.

The evolution was marked by an improvement on the urological aspect, an ultrasound examination was performed showing no collection or fluid accumulation, no pyelocaliceal dilation. However, the stay in the intensive care unit was complicated by the patient's demise due to nosocomial pneumonia.

3. Discussion

Renal Pelvic rupture is a highly uncommon complication, classified as an extreme urological emergency. It involves the extravasation of urine into the perirenal and retroperitoneal spaces. This extravasation typically remains confined to these spaces and exceptionally, it may fistulize into the abdominal cavity.

This rupture can be explained by a renoprotective mechanism aimed at reducing intra-renal pressure when it exceeds the tensile strength of the renal pelvis tissue, resulting in disruption and extravasation of urine.² This renal pelvis wall, weakened by a long-standing obstructive uropathy, becomes thinner, ischemic, and more susceptible to damage.

The most common location of rupture occurs at the pyelic level, associated with obstructive pathology leading to increased intraluminal pressure. The most frequent cause is urolithiasis, primarily related to ureteral stones, with proximal ureteral location implicated in 68.6 % of cases. The left kidney is affected in 58 % of cases¹ and other underlying

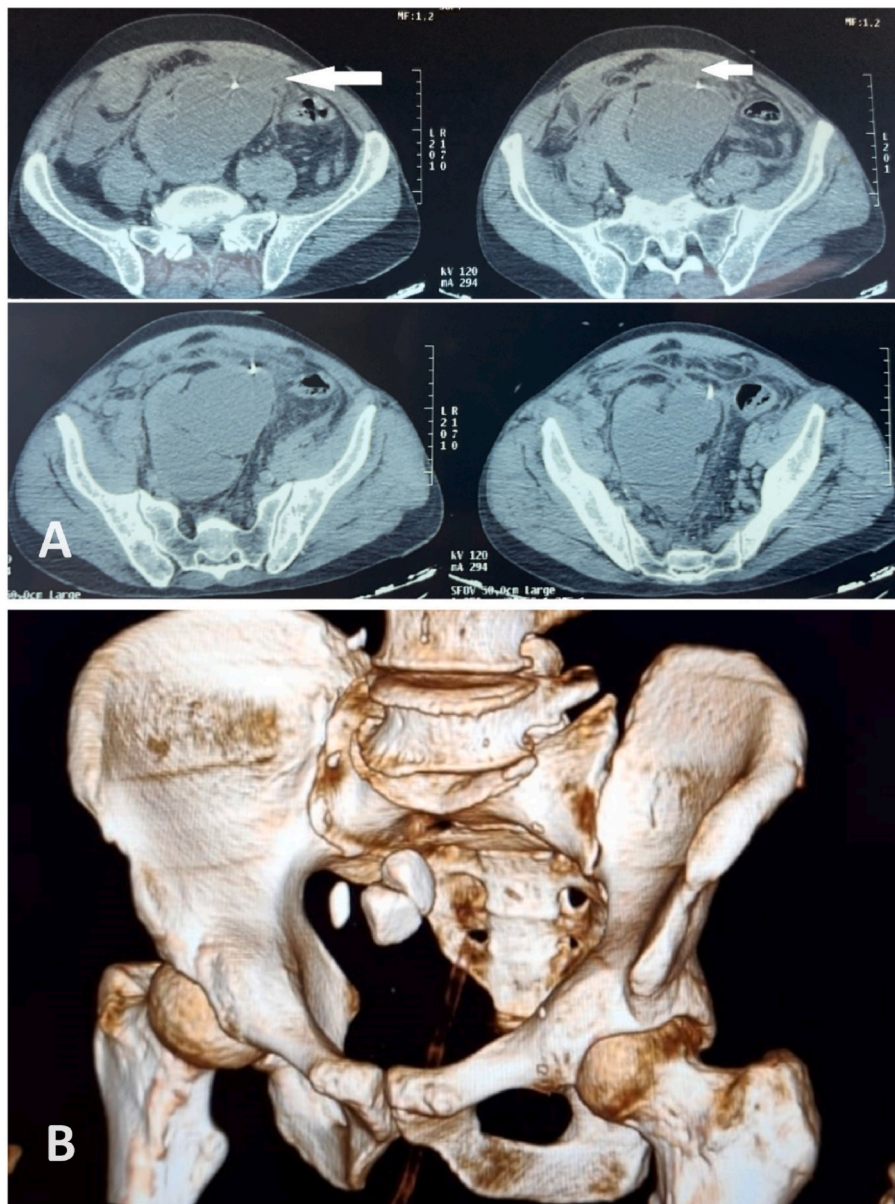


Fig. 1. CT-scan showing kidney stones, pyelocaliceal dilation, and para-renal collections

A: Cross section of a CT scan showing a huge pyelocaliceal dilatation in ectopic pelvic kidney complicated with two para-renal collections in the upper pelvis. **B:** 3D reconstruction of the CT-scan visualizing the responsible kidney stones (JJ removed).



Fig. 2. Image showing the macroscopic aspect of kidney stone in post-operative.

causes, such as stenosis, trauma, tumor, or connective tissue disease.

Few cases of intraperitoneal renal pelvis rupture have been reported in the literature. There are only 7 cases of generalized peritonitis due to pyonephrosis rupture related to urolithiasis.³

The clinical presentation takes the form of an acute abdomen accompanied by elevated biological markers of inflammation, sometimes preceded by lower back pain simulating renal colic. This clinical picture can be misleading, resembling a digestive cause such as intestinal perforation or complicated appendicitis, thus masking the renal origin.

Radiological exploration is interesting when the patient's hemodynamic condition is stable. The combination of an abdominal X-ray and ultrasound is useful, as it can reveal signs of paralytic ileus and a radio-opaque image corresponding to the urinary stone. Additionally, ultrasound can detect pyonephrosis with a sensitivity of 97%.⁴ However, the most sensitive examination is a CT scan, especially when combined with contrast agents. It looks for Contrast media extravasation in the peri-pyelic region and retroperitoneal space, as well as identifies the fistulous tract, which may not be evident due to inflammation and adhesions between parietal peritoneum and omentum.⁵

The treatment of this pathology at this advanced stage is delicate, requiring a combined approach with the intensive care anesthetist. Patient preparation involves correcting electrolyte imbalances and administering broad-spectrum antibiotics targeting urinary pathogens. In cases of peritonitis, surgical exploration is imperative. Therefore, when there is intra-peritoneal pyelic rupture, the approach remains the same, an aggressive interventional approach to eliminate septic foci in the abdomen. There is also a discussion regarding the potential benefits of simultaneous nephrectomy. The literature suggests that the preferred treatment is total nephrectomy when the kidney has lost all its functions, provided there is a functional contralateral kidney. Additionally, nephrectomy is associated with fewer complications compared to other treatments.⁴

4. Conclusion

This case report highlights the importance to recognize that a renal cause may be the origin of a peritonitis. The spontaneous renal pelvis rupture of an ectopic kidney into the intraperitoneal space is unusual, and this case is considered unique in the literature.

In terms of treatment, nephrectomy can be the preferred option when the affected kidney is not functioning adequately, and the contralateral kidney is healthy.

Availability of data and material

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Interests

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CRediT authorship contribution statement

Jihad Lakssir: Writing – original draft, Methodology, Investigation, Conceptualization. **Youssef Abaair:** Visualization, Data curation, Conceptualization. **Omar Bellouki:** Writing – review & editing, Supervision, Methodology. **Ahmed Ibrahim:** Writing – review & editing, Supervision, Data curation. **Hachem EL-Sayegh:** Writing – review & editing, Validation, Supervision. **Yassine Nouini:** Writing – review & editing, Validation, Supervision.

Declaration of competing interest

Our institution does not require ethical approval for reporting individual cases or case series.

Written informed consent was obtained from the patient(s) for their anonymized information to be published in this article.

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