Spontaneous ureteral rupture: An unusual cause of acute abdomen

A 67-year-old male patient with a known history of benign prostatic hyperplasia (BPH) came to our attention because of signs and symptoms of acute abdomen, with bowel closed to faeces and gas. Haematocritical examinations showed leucocytosis (12.330 WBC/microL), increase of creatinine levels (7.23 mg/dL) and LDH (230 U/L). Diuresis was preserved.

Imaging Findings:

Plain X-ray of the abdomen revealed air-fluid levels within the small bowel. Chest X-ray showed minimal pleural effusion (Fig.1, 2). At US abdominal examination, a fluid collection was observed in the retroperitoneum on both sides. Bilateral, multiple, parapyelic cysts and hydroureronephrosis were also detected; small bowel peristalsis was present in all explored tracts (Fig.3).

Baseline CT revealed a large retroperitoneal hydric collection with bilateral hydronephrosis and without intraperitoneal fluid (Fig. 4). Dynamic arterial and venous phases allowed excluding small bowel disease (Fig. 5). In the urographic phase, a clear extravasation of iodinated contrast material (CM) from both ureters was visible, with leakage at the level of the renal pelvis on the right and at the calico-pyelic level on the left (Fig. 6). The distal ureters were normal. BHP was confirmed.

Discussion:

Ureter rupture (urinomas) is quite a rare event, more frequently it is caused by penetrating traumas or by iatrogenic events, which might occur during surgical/percutaneous procedures [1, 2] or after renal biopsy or extracorporeal shock wave lithotripsy [3]. Spontaneous rupture, like our case, is a very rare event, and it is generally due to downstream obstruction phenomena, that cause a transmitted back pressure, such as calculi, surgical ligature, abdominal or pelvic mass, pregnancy, retroperitoneal fibrosis, posterior ureteral valves, and very rarely, by benign prostatic hypertrophy [4]. Urinomas may initially be clinically occult and may manifest with delayed complications such as hydronephrosis, paralytic ileus, electrolyte imbalances [5], and abscess formation, so it should be kept in mind as a differential diagnosis in patients with acute abdominal pain.

Imaging plays a key role in diagnosis: US is able to detect perinephric fluid and is easily accessible for serial
evaluation, while enhanced CT examinations may indicate the site of rupture by showing the leakage of iodinated CM in the retroperitoneal space. Using 100–150 mL of CM, on delayed phase images (5′–20′ after CM injection) a urine leakage may be detected as an increase of attenuation of the urinoma over time. 3D-CT images may further define the extent of injury.

Sometimes small urinomas may reabsorb spontaneously; in other cases, and especially in cases of large or persistent urinomas, as well as in cases of sepsis development, percutaneous US/CT-guided placement of a drainage catheter is usually necessary. After this procedure, fluid-culture and empiric antibiotic therapy are performed.

If the urinoma output from drainage does not decrease, even if it is correctly positioned, a nephrostomy catheter must be placed. An alternative therapeutic option in case of nephrostomy failure is ureteral stenting, which can be performed retrogradely through the bladder or anterogradely through a percutaneous nephrostomy catheter. Ureteral stents are left in place for 4–8 weeks, thus allowing uroepithelium to cover the site of ureteral injury. Furthermore, nephroureteral catheters may be placed across the site of ureteral injury. All these therapeutic options divert the urine away from ureters and promote ureter healing by preserving renal function [6]. Delayed-open-surgical-repair of ureters is the last option in case of failure of the previous treatments.

**Differential Diagnosis List:** Spontaneous bilateral ureteral rupture., Ordinary ascites, Abdominal or pelvic abscesses or haematomas, Cystic masses, Pancreatic pseudocysts

**Final Diagnosis:** Spontaneous bilateral ureteral rupture.

**References:**


Figure 1

Description: Abdominal X-ray in the PA projection showing air-fluid levels. Origin: Emergency Department AOU Pisa, Italy
Description: Abdomen X-rays lateral view showing air-fluid levels. Origin: Emergency Department AOU Pisa, Italy
Description: Arterial phase CT image showing large retroperitoneal fluid collection and faint parenchymal enhancement of both kidneys. Origin: Department of Diagnostic and Interventional Radiology, University Hospital of Pisa, Italy
Description: Urographic phase CT image shows retroperitoneal leakage of iodinated contrast material. The small bowel is unremarkable. Origin: Department of Diagnostic and Interventional Radiology, University Hospital of Pisa, Italy
Description: Coronal MPR view showing extensive extravasation of iodinated contrast material at the level of the renal pelvis on the right and of the calico-pyelic region on the left. Origin: Department of Diagnostic and Interventional Radiology, University Hospital of Pisa, Italy
Description: Thick-slab coronal MIP reconstruction showing extensive extravasation of iodinated contrast material at the level of the renal pelvis on the right and of the calico-pyelic region on the left.

Origin: Department of Diagnostic and Interventional Radiology, University Hospital of Pisa, Italy
Figure 4

Description: Chest X-ray showing pleural effusion. Origin: Emergency Department AOU Pisa, Italy
Description: US examination showing retroperitoneal fluid. Origin: Emergency Department AOU Pisa, Italy
**Description:** US examination showing right kidney parapielic cysts and hydroureteronephrosis. **Origin:** Emergency Department AOU Pisa, Italy
Description: US examination showing right kidney parapielic cysts and hydroureteronephrosis. Origin: Emergency Department AOU Pisa, Italy
Description: US examination showing hydroureteronephrosis. Origin: Emergency Department AOU Pisa, Italy
Description: US examination showing right kidney parapielic cysts and hydroureteronephrosis. Origin: Emergency Department AOU Pisa, Italy
Figure 6

Description: Baseline CT examination showing retroperitoneal hydric collection, as well as bilateral hydronephrosis without intraperitoneal fluid. Origin: Department of Diagnostic and Interventional Radiology, University Hospital of Pisa, Italy