Non-traumatic Ureteral Rupture Despite Initial Normal Appearance Assessed by Computed Tomography

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Summary

Rupture of the urinary collecting system with urinary extravasations is a condition that leads to presentation of abdominal pain. The most common cause is usually associated with urolithiasis related obstructive nephropathy. A man aged 69 years suddenly suffered from intense pain over the left hemi-abdomen and flank area. The initial imaging studies of plain film, abdominal sonography, and enhanced and non-enhanced computed tomography scan were unremarkable. Post-contrast plain film showed left-sided urinary extravasations. Surgical intervention ensued and the patient recovered without later urinary complaints. We found that a delayed plain film after intravenous contrast media for computed tomography is helpful to evaluate the urinary tract in its entirety. It is also practical and useful for the detection of leakage from the urinary tract. [International Journal of Gerontology 2009; 3(1): 85–87]

Key Words: computed tomography, extravasation, non-traumatic ureteral rupture

Introduction

Non-traumatic ureteral rupture (NTUR) was first described in the year of 1952 by Orkin. Ureteral rupture usually occurs secondary to ureteral stones either inside or outside the ureter¹. In the elderly, the mean age of NTUR is 72 years, and NTUR may have an atypical symptom presentation. We report about a patient with negative findings of urine extravasations by a series of initial imaging studies including plain abdominal film, abdominal sonography, and computed tomography (CT) scan. Delayed plain films after intravenous contrast media of CT were crucial to the detection of the urinary extravasations, and may be helpful to assist a diagnosis.

Case Report

A man aged 69 years presented to our emergency department (ED) with severe and sudden left flank pain. He had a history of right-side, lower third ureteral stone after ureteroscopic lithotripsy. Vital signs were: temperature, 36.7°C; pulse rate, 68 beats/minute, respiratory rate, 20 breaths/minute; and blood pressure, 121/69 mmHg. Physical examinations revealed marked tenderness of the left flank region with radiation to the left upper abdomen. We gave him 30 mg of intramuscular ketorolac, and he felt much better. His white blood count was 5.50 × 10³/μL, hemoglobin was 13.3 g/dL, and creatinine was 1.0 mg/dL. Urine analysis showed gross hematuria. A plain film of the abdomen showed no significant findings. Abdominal sonography revealed no evidence of hydronephrosis or ascites. After 6 hours of observation in the ED, he suffered from sustained severe left flank pain, and we administered 10 mg of intravenous morphine HCl. Abdominal CT scan (Aquilion ONE; Toshiba Medical Systems, Tokyo, Japan) enhanced...
with 100 mL of intravenous iopromide 62.3% was performed and showed all negative findings. We suspected that the radiolucent lesions were related to a urinary tract obstruction. Therefore, we ordered a delayed plain film (50 minutes after contrast injection; 70 kV). The effect of the delayed films looked like an intravenous urogram and showed a ruptured left-sided ureter and suspicious extravasations of the urinary tract (Figure 1). Repeated plain film (90 minutes after contrast injection) showed an obvious left contrast leakage of the urinary system (Figure 2).

A ureterorenoscopy showed multiple radiolucent stones over the left lower third of the ureter. There were no other obstructions or obvious perforations found by ureterorenoscopic examination. The surgeon suspected spontaneous healing of tiny leakage. A 6F double-J catheter was placed smoothly. The patient was discharged 5 days after admission. The catheter was removed 1 month later, and there were no further urinary complaints.

**Discussion**

Urinary extravasations of the urine collection system are most commonly caused by trauma. The most common cause of traumatic ureteral rupture is iatrogenic trauma, followed by penetrating trauma, and occasionally, blunt abdominal trauma. NTUR includes transmitted backpressure from downstream obstructions caused by a ureteral stone, surgical complications or compression by masses. NTUR is an infrequent urologic disorder with an incidence of only 0.08–1% per urogram. It is attributed to ureteral calculi in approximately 50% of cases. The other unusual origins are ureteropelvic malformations with bladder ureteral reflux, pregnancy, and malignancies.

The most common presentations of NTUR are nausea, vomiting, fever or abrupt, severe, persistent abdominal pain with severe peritoneal irritation. The plain abdominal X-ray study and serial sonography are tools to evaluate the urinary system initially. Plain films of the abdomen may reveal disappearance of the retroperitoneal landmark, radiopacity of stones, and signs of paralytic ileus. Serial sonography may detect the obstructive site, fluid extravasations or hydronephrosis. There are some advantages of sonography; it is easy to perform in real-time, noninvasive, less time-consuming, and relatively inexpensive with no ionizing radiation. As a result, it is useful and convenient to identify some problems of severe abdominal pain in the ED. NTUR is indistinguishable from renal colic only clinically. If persistent or rapidly recurrent flank pain after analgesics were given and sonography reveals no evidence of hydronephrosis or hydroureter, NTUR should be on the list of differential diagnoses.
case, there was no evidence of urine extravasation by a series of imaging studies including a plain film of the abdomen, abdominal sonography, and CT scan. Delayed plain films as the role of intravenous urography detected the left-side urinary extravasation. Some authors suggested that delayed phase CT scans (obtained 5–20 minutes after contrast material injection) are optimal for demonstrating ureteral entity. However, delayed phase plain films may reveal more information about a urinary tract obstruction.

Management of a fornix rupture or ureteral rupture caused by obstructive stones includes controlling extravasation and removal of the obstruction. Stenting of the ureter is the choice for infected fornix rupture or upper ureteral or ureteropelvic junction stones. For distal and middle obstructive ureteral stones with a fornix rupture, ureteroscopic lithotripsy with double-J stenting of the ureter may be an alternative therapeutic choice. Conservative treatment of NTUR is an alternative option and reveals successful prognosis.

In conclusion, sometimes urinary complications may also be present with colicky pain in patients with a history of urolithiasis with severe abdominal pain. To closely follow up the symptoms and signs in patients with acute abdominal pain is important, especially since there is not yet a definite diagnosis after imaging modalities, such as plain abdominal films, serial sonography and CT scans. We suggest post-contrast abdominal plain films may be a useful diagnostic tool for NTUR.

**References**