Available online at www.sciencedirect.com

ScienceDirect

journal homepage: http://Elsevier.com/locate/radcr

Case Report

Bilateral spontaneous urinary extravasation shown by computed tomography urography in a patient with benign prostatic hyperplasia

Haopeng Pang MD, PhD[a], *Xuefei Dang MD*[b], *Zhenwei Yao MD, PhD*[a], *Xiaoyuan Feng MD, PhD*[a,*], *Guangyao Wu MD, PhD*[c]

[a] *Department of Radiology, Affiliated Huashan Hospital of Fudan University, Middle Urumqi Road, Jingan District, Shanghai, 200040, PR China*

[b] *Department of Breast Cancer, The 307th Hospital of Chinese People's liberation Army, East avenue, Fengtai District, Beijing, 100071, PR China*

[c] *Department of Radiology, Zhongnan Hospital of Wuhan University, East Lake Road, Wuchang District, Wuhan, 430071, PR China*

ARTICLE INFO

Article history:
Received 26 June 2015
Accepted 25 July 2015
Available online 15 September 2015

Keywords:
Spontaneous urinary extravasation
Computed tomographic urography
Benign prostatic hyperplasia

ABSTRACT

Spontaneous extravasation of urine (SUE) is a rare urologic manifestation. Predisposing conditions of SUE include ureteric calculus, retrograde pyelography, pregnancy, abdominal aorta aneurysm, tumors, or enlargement of the prostate gland. Usually, SUE is a self-limiting condition that mandates differentiaton from other catastrophic conditions of pelviureteric ruptures. Most reported cases of SUE based on urograms are unilateral in presentation. Herein, we report a case of bilateral SUE evident on computed tomography urography in a patient with benign prostatic hyperplasia. We also review the literature briefly.

Introduction

Spontaneous extravasation of urine (SUE) is a relatively rare urologic condition evident in only 0.08%-1% of urograms [1]. It was defined first by Schwartz et al. in 1966 [2]. Until now, most reported cases have had a unilateral presentation. There has been only one case of bilateral SUE, reported by Niggemann et al. [3], but that patient had undergone stent placement for an infrarenal aortic stenosis.

Often, SUE is a self-limiting condition with a favorable prognosis on conservative treatment. Rarely, surgery is indicated because of the repeated urinary extravasation that induces secondary retroperitoneal fibrosis, which leads to compression of the ureters or urinoma formation [4–6].

Herein, we report bilateral SUE in a patient with benign prostatic hyperplasia (BPH) that was imaged by computed tomography urography (CTU). Also, a brief review of the literature is described.

Case report

A 67-year-old man with previously diagnosed BPH presented to our hospital complaining of dysuria, colicky abdominal

Competing Interests: The authors have declared that no competing interests exist.

* *Corresponding author.*
E-mail address: xyfeng@shmu.edu.cn (X. Feng).

http://dx.doi.org/10.1016/j.radcr.2015.07.001

pain, and abdominal distension of 3-hour duration. He did not have any other symptoms, and medical history was uneventful.

Physical examination did not reveal any abnormality. There was slight fullness in the suprapubic region that was mildly tender on palpation. All laboratory investigations (including renal function) were normal except for microscopic hematuria. Ultrasonography revealed an enlarged prostate gland measuring $4.3 \times 6.2 \times 2.8\ cm^3$ with ≈691 mL of retained urine.

CTU demonstrated bilateral moderate hydronephrosis and hydroureter with pre-renal thickened (Fig. 1). Extravasation of urine and contrast medium was evident in the bilateral renal hilum, anterior renal and periureteric spaces, and with evidence of an obstructed bladder and prostatic hyperplasia (Figs. 2 and 3).

The patient was administered conservative treatment (antibiotics and antispasmodic agents) for 2 days. However, abdominal distension worsened. Urethral catheterization with drainage of ≈2200 mL urine resulted in immediate disappearance of abdominal distension and symptom alleviation. Follow-up CT (Fig. 4) carried out 2-weeks later demonstrated complete absorption of urine and contrast medium from the bilateral renal hilum, periureteric space, and retroperitoneal spaces.

Discussion

In SUE, for the extravasation to be considered "spontaneous," 6 main criteria must be fulfilled, that is, absence of (1) ureteric instrumentation during the past 3 weeks; (2) previous surgery on the kidney, upper ureter, or in the immediate vicinity of either; (3) external trauma; (4) destructive kidney lesions; (5) external compression; and (6) cleft produced in the ureter or pelvis by pressure necrosis of the stone [1]. Pyelorenal backflows have been categorized into pyelovenous, pyelolymphatic, pyelotubular, pyelointerstitial, or pyelosinus types [6].

In acute ureteral obstruction, cortical hypoperfusion occurs as a manifestation of decreased renal blood flow and glomerular filtration rate (GFR). Increased tubular reabsorption is a compensatory mechanism that overcomes increased

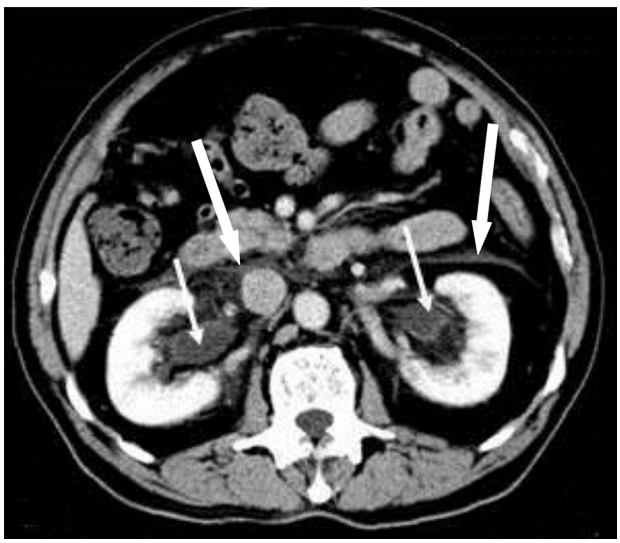

Fig. 1 – In the renal medulla, spontaneous urinary extravasation (large white arrow) in the anterior pararenal space and bilateral hydronephrosis (small white arrow) can be observed.

Fig. 2 – Pyelography demonstrates the right pyelosinus backflow (white arrow) and bilateral pyelotubular backflow (black arrows) of urine.

Fig. 3 – Coronal maximum intensity projection image demonstrates the possible position of clefts (black arrows), and extravasation of contrast from bilateral renal collecting systems (white arrows).

Fig. 4 – Follow-up computed tomography after 14 days of conservative treatment shows extravasated urine and contrast medium completely absorbed.

intratubular pressure and which maintains the GFR. Pyelotubular outflow is considered to be a normal physiological phenomenon [7].

Ureteric calculi are the most common predisposing factor for SUE [8]. Other conditions include retrograde pyelography, pregnancy, abdominal aorta aneurysm, tumors or, as in our case, enlargement of the prostate gland [9,10]. All cases reported so far have involved unilateral involvement with a right-sided predilection, whereas the bilateral involvement observed in our patient using CTU has not been described [11].

The differential diagnosis of SUE can pose a problem because of other causes of acute abdomen such as pyelonephritis, ureteral colic due to stones, cholelithiasis, appendicitis, or gynecologic or obstetric causes [12]. Recognition of SUE has considerable clinical implications for overall management. Various radiologic patterns help to distinguish SUE from leakage from a cleft in the pelvis or ureters. Contrast material specifically around a calyx and visualization of ureters favors the diagnosis of SUE. In addition, follow-up examination after the onset of SUE will demonstrate marked absorption, whereas the appearance remains unchanged if a perforation is present [13]. CT has been reported to better demonstrate the extent of urine collection than urography alone [14].

Only certain cases with complications such as urinoma formation or associated significant retroperitoneal fibrosis due to repeated extravasation require surgical intervention [4]. CTU can have a pivotal role in the overall management of SUE by identification of symptoms and signs, recognition of the extent of urine collection, and close follow-up.

REFERENCES

[1] Schwartz A, Caine M, Hermainn G, Bittermann W. Spontaneous renal extravasation during intravenousurography. Am J Roentgenol Radium Ther Nucl Med 1966;98(1):27–40.

[2] Cooke GM, Bartucz JP. Spontaneous extravasation of contrast medium during intravenous urography. Report of fourteen cases and a review of the literature. Clin Radiol 1974;25(1):87–93.

[3] Niggemann P, Brehmer B, Schuermann K. Bilateral renal fornix rupture following intraarterial contrast medium application for infrarenal aortic stent placement. Cardiovasc Intervent Radiol 2006;29(1):157–9.

[4] Vaglio A, Salvarani C, Buzio C. Retroperitoneal fibrosis. Lancet 2006;367(9506):241–51.

[5] Puri A, Bajpai M, Gupta AK. Bilateral spontaneous perinephric urinomas: case report and review of the literature. Urology 2004;64(3):590–1.

[6] Friedenberg R, Moorehouse H, Gade M. Urinomas secondary to pyelosinus backflow. Urol Radiol 1983;5(1):23–9.

[7] Pelaez LI, Juncos LA, Stulak JM, Lerman LO, Romero JC. Non-invasive evaluation of bilateral renal regional blood flow and tubular dynamics during acute unilateral ureteral obstruction. Nephrol Dial Transplant 2005;20(1):83–8.

[8] Koktener A, Unal D, Dilmen G, Koc A. Spontaneous rupture of the renal pelvis caused by calculus: a case report. J Emerg Med 2007;33(2):127–9.

[9] Lo KL, Nq CF, Wong WS. Spontaneous rupture of the left renal collecting system during pregnancy. Hong Kong Med J 2007;13(5):396–8.

[10] Singh I, Joshi M, Mehrotra G. Spontaneous renal forniceal rupture due to advanced cervicalcarcinoma with obstructive uropathy. Arch Gynecol Obstet 2009;279(6):915–8.

[11] Matsubara S, Morita T, Saito Y, Sato S, Suzuki M. Non-traumatic rupture of the left upper urinary tract during pregnancy without discernable underlying disorders. Arch Gynecol Obstet 2010;282(1):111–3.

[12] Lien WC, Chen WJ, Wang HP, Liu KL, Hsu CC. Spontaneous urinary extravasation: an overlooked cause of acute abdomen in ED. Am J Emerg Med 2006;24(3):347–9.

[13] Lopez F. Pelvicalyceal extravasations. Am J Roentgenol Radium Ther Nucl Med 1971;112(3):593–9.

[14] Mitty HA. CT for diagnosis and management of urinary extravasation. AJR Am J Roentgenol 1980;134(3):497–501.