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WisdomGale

CASE REPORT

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From bladder distension to ureteral dissection: A radiologic examination

Wijdane Talbi, Rabab Hassani, Youssef Sakhy, Houria Tabakh, Abdellatif Siwane, Najwa Touil, Omar Kacimi
CHU Ibn Rochd, Casablanca, Morocco

ABSTRACT

Introduction: Ureteral dissection (UD) is an extremely rare urological condition that is best diagnosed through computed tomography (CT).

Case Report: A 54-year-old man with no significant medical history presented with long-standing dysuria and sudden-onset left flank pain. Ultrasonography revealed bilateral ureterohydronephrosis with a distended bladder. CT showed spontaneous left UD secondary to bladder distension from benign prostatic hypertrophy. Conservative management with bladder drainage led to complete recovery.

Discussion: UD represents a transient stage before rupture. Diagnosis relies on CT imaging showing the "double-lumen sign." Recognition of this finding enables early management to prevent rupture, urinoma, or infection.

Conclusion: Although spontaneous UD is rare, it should be considered in patients with atypical flank pain and urinary obstruction. Early CT evaluation ensures accurate diagnosis and favorable outcomes.

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Ureteral dissection; bladder distension; benign prostatic hypertrophy; computed tomography

Introduction

Ureteral dissection (UD) is an uncommon urological condition characterized by separating the ureteral wall layers due to urine infiltration between the mucosa and muscularis. This phenomenon may precede spontaneous ureteral rupture (UR), which can result in urinoma, perirenal abscess, or sepsis. Spontaneous UR usually occurs secondary to obstructive causes, such as ureteral calculi or iatrogenic injury. However, the precise pathophysiological mechanisms underlying UD remain poorly understood. Early recognition through imaging is essential for avoiding the progression to rupture and its associated morbidity [1,2].

Case Report

A 54-year-old man, without relevant medical history, presented with longstanding dysuria evolving for approximately 9 months and sudden-onset left flank pain of severe intensity rated 8/10, radiating to the groin. No fever, chills, or lower urinary tract infection symptoms were observed. On examination, the patient's vital signs were stable (blood pressure: 12/08 mmHg, pulse: 96/min, temperature: 37°C). A physical examination revealed bilateral lumbar tenderness. Laboratory analysis showed normal renal function (serum creatinine of 92 µmol/l) and normal white blood cell count (8450 /mm^3), with no elevation of inflammatory markers. Ultrasound examination revealed bilateral uretero-hydronephrosis with a distended bladder. Contrast-enhanced computed tomography (CT) of the abdomen and pelvis performed with a 64-slice scanner using 82 ml iodinated contrast at 3 ml/s with delayed phase at 10 minutes demonstrated a spontaneous left UD associated with bladder distension secondary to benign prostatic hyperplasia (Fig. 1). The dissection appeared as an intramural separation of the ureteral wall layers with measurable wall thickening of 9 mm (Fig. 2), producing a clear double-lumen sign on delayed-phase imaging, with the true lumen narrowed and the false lumen contrast-filled (Fig. 3). Periureteral fat stranding was observed, with no evidence of urinoma or abscess.

Contact Wijdane Talbi twijdane.1996@gmail.com CHU Ibn Rochd, Casablanca, Morocco.

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Figure 1. Sagittal contrast-enhanced CT reconstruction showing a distended bladder (yellow asterisk) secondary to benign prostatic hypertrophy.



Figure 2. Axial contrast-enhanced CT showing thickened left ureteral wall (yellow arrow) with submucosal edema and marked mucosal enhancement.

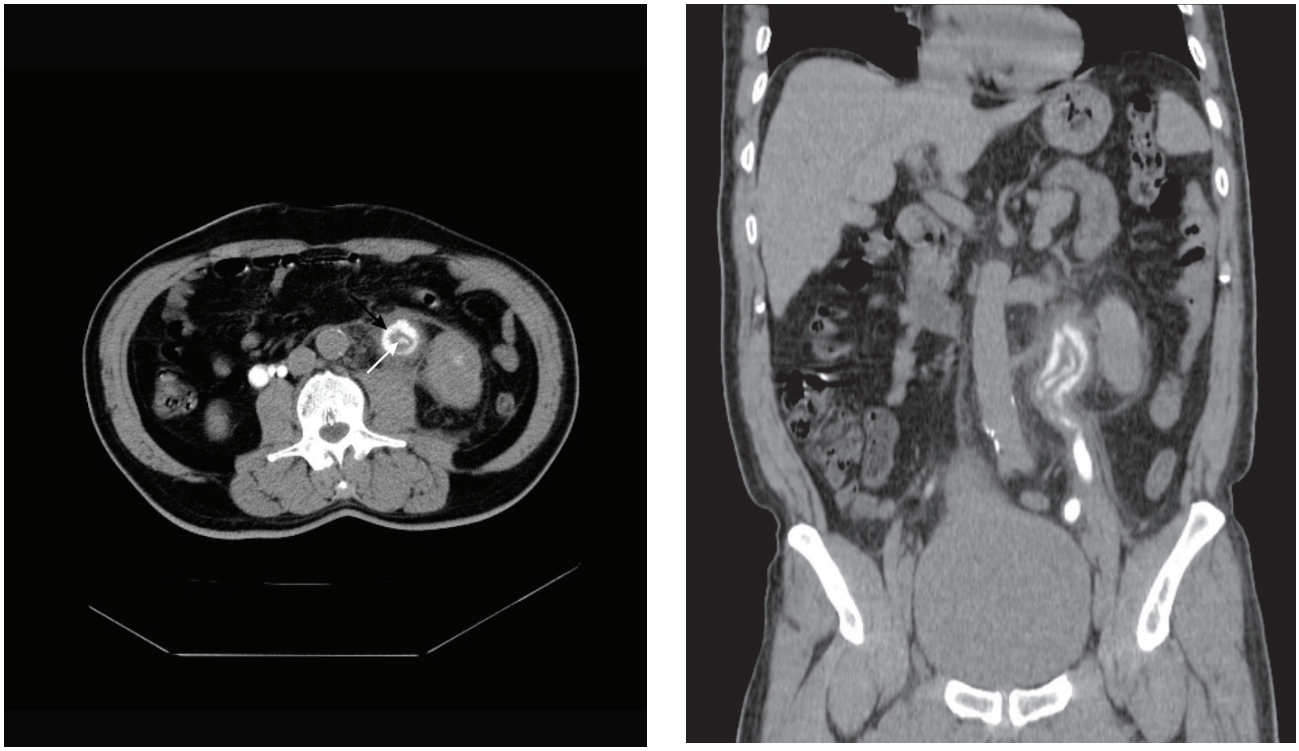


Figure 3. Delayed-phase axial (a) and coronal reconstruction (b) CT images demonstrating extravasation of contrast between ureteral wall layers with false lumen (black arrow) and true lumen (white lumen) forming a double-lumen sign.

Although the hydronephrosis was bilateral, the dissection was unilateral on the left side, possibly related to asymmetric pressure transmission or anatomical susceptibility.

The patient was conservatively managed with bladder catheterization. Symptoms progressively improved, and follow-up ultrasound imaging performed after 7 days demonstrated regression of hydronephrosis and resolution of the dissection. No surgical intervention was required.

Discussion

Spontaneous UD is an uncommon and poorly documented complication. Most reported cases are associated with obstructive processes, such as urinary stones or external compression [1,2]. The pathophysiology involves increased intraluminal pressure leading to microtears of the ureteral mucosa, allowing the dissection of urine between the ureteral wall layers. If left untreated, this condition can progress to UR.

This case highlights the critical role of contrast-enhanced CT, particularly delayed-phase imaging, in demonstrating the characteristic double-lumen sign. The dissection plane typically shows contrast attenuation similar to urine, with possible differential enhancement between the true and false lumens. The assessment of ureteral wall thickness and peri-ureteral fat stranding is also important to distinguish UD from other causes of ureteral wall thickening, such as ureteritis, urothelial neoplasms, or inflammatory processes. The extent of the dissection and its progression can be better appreciated on delayed images, reinforcing the need for extended acquisition protocols in suspected ureteral pathology.

The bladder distension volume and prostate enlargement likely contributed to the increased intraluminal ureteral pressure. CT can be used to estimate bladder volume and prostate size, supporting the pathophysiological mechanism. Contrast-enhanced CT and retrograde pyelography are the most useful diagnostic modalities on imaging. The typical "double-lumen sign" is a characteristic radiologic feature representing the separation between the contrast-filled ureteral wall layers. Extravasation of contrast beyond the ureteral wall may indicate progression to rupture in delayed phases [1].

Differential diagnosis includes ureteral duplication, cystic pyeloureteritis, blood clot, or fibroepithelial polyp. Unlike congenital duplication, UD shows concentric lumens with contrast tracking between ureteral wall layers, confirming its acquired nature [1]. UD management depends on the underlying cause and severity of associated obstruction. Conservative management with urinary drainage and observation is often sufficient, especially when the rupture is identified. In severe or complicated cases, stenting or surgical repair may be required. To ensure resolution, regular follow-up imaging is recommended [3]. Our case aligns with the literature suggesting that UD can occur secondary to benign prostatic hyperplasia, leading to bladder distension and subsequent back pressure on the ureters. The absence of trauma or previous surgery supports the spontaneous nature of this presentation.

Follow-up imaging, preferably ultrasound to limit radiation, is recommended unless complications are suspected. Hydronephrosis resolution and dissection disappearance confirm successful conservative management.

Conclusion

Spontaneous UD is a rare urological finding that must be promptly recognized to avoid complications such as rupture. Contrast-enhanced CT with delayed-phase acquisition remains the gold standard for diagnosis. Early detection enables appropriate conservative management to prevent morbidity.

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