Spontaneous rupture of renal pelvis secondary to ureteral obstruction by urothelial tumor

Ruptura espontânea de pelve renal secundária à obstrução ureteral por tumor urotelial

Daniel Alvarenga Fernandes[1*], Ana Laura Gatti Palma[2], Ricardo Yoshio Zanetti Kido[2], Ricardo Hoelz de Oliveira Barros[1], Daniel Lahan Martins[3], Thiago José Penachim[3], Nelson Marcio Gomes Caserta[4]

[1]Radiologist, Assistant Physician, Department of Radiology, Faculty of Medical Sciences – State University of Campinas (FCM-Unicamp), Campinas, SP, Brazil.
[2]Resident Physician, Department of Radiology, FCM-Unicamp, Campinas, SP, Brazil.
[3]Radiologist, Assistant Physician, Department of Radiology, FCM-Unicamp; Radiological Center of Campinas – Hospital Vera Cruz; Pontifical Catholic University of Campinas (PUCC), Campinas, SP, Brazil.
[4]PhD-Professor, Department of Radiology, FCM-Unicamp, Campinas, SP, Brazil.

Study conducted at the Department of Radiology, Faculty of Medical Sciences – State University of Campinas (FCM-Unicamp), Campinas, SP, Brazil.

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***Correspondence:**
Address: Department of Radiology of Faculty of Medical Sciences – State University of Campinas (FCM-Unicamp), Campinas, SP, Brazil.
Rua Tessália Vieira de Camargo, 126, Cidade Universitária "Zeferino Vaz".
Postal Code: 13083-887
Campinas, SP – Brazil
daniel_alvafer@yahoo.com.br
daniel_alvafer@icloud.com

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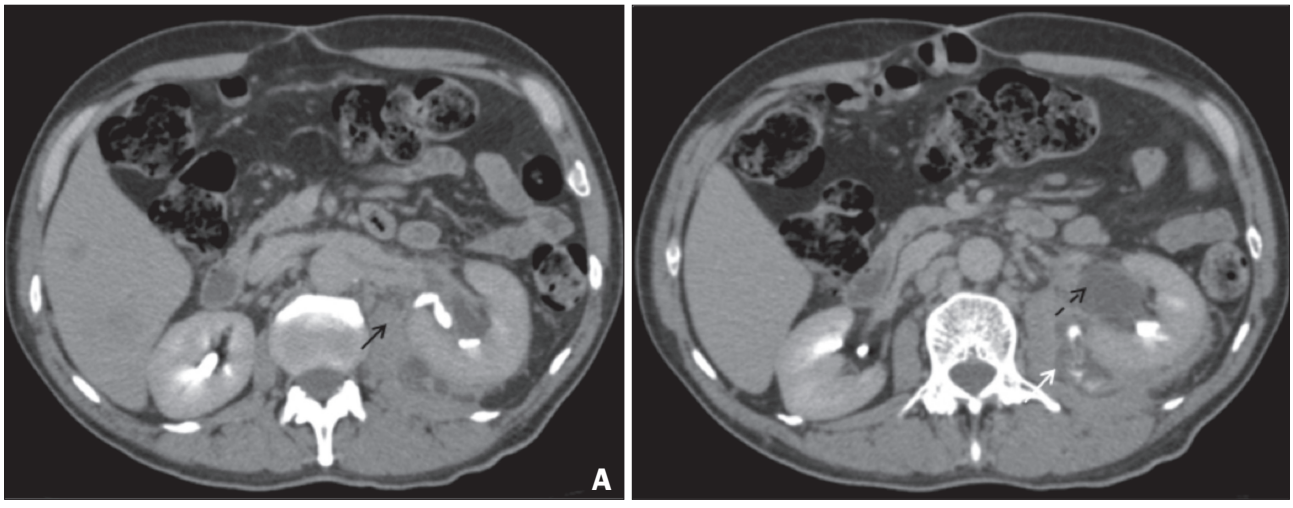
Introduction

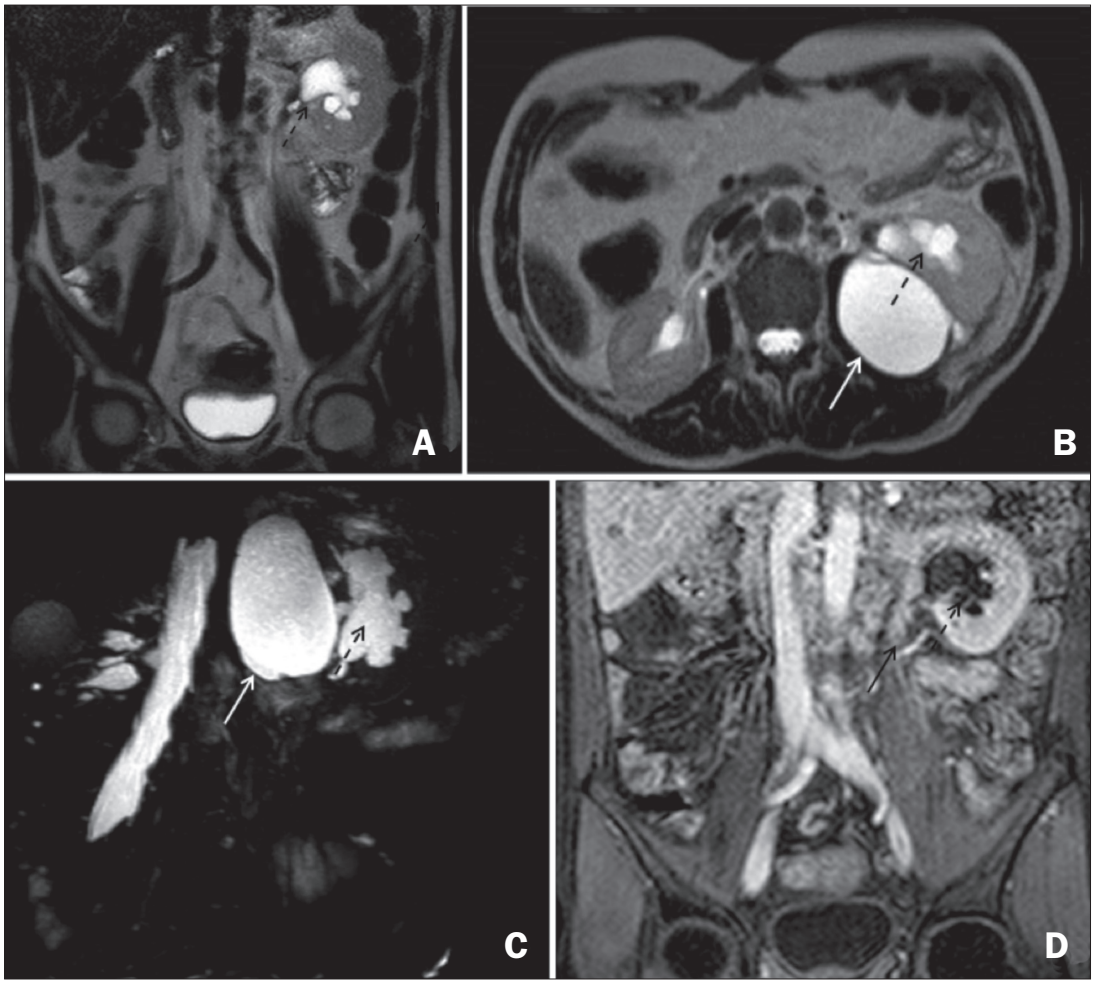
Partial spontaneous rupture of the upper urinary tract is rare and usually associated with nephrolithiasis. Other reported causes, apart from instrumentation and trauma, involve obstructive ureteral tumor in the pelvic cavity, retroperitoneal fibrosis, fluid overload, and pregnancy. We report a case of spontaneous rupture of renal pelvis secondary to ureteral obstruction caused by urothelial tumor, clinically suspected and evaluated by CT scans and MRIs, discussing the relevant findings for diagnosis.

Case report

Male patient, 55 years, with a clinical picture of macroscopic hematuria and insidious lower back pain similar to cramps for about six months, which became stronger in recent months. The patient reports a fever, not measured. Denies trauma, previous surgery, history of urolithiasis, other complaints, and past illnesses. Former smoker (22 packs/year, having quit smoking for eight years). On physical examination, the patient showed good general health, being thin (body mass index of 17.2 Kg/m^2), pallid (1+/4),



FIGURES 1A AND 1B Computed tomography, contrast-enhanced axial sections; excretory phase shows irregular parietal thickening of the left ureteropelvic junction, causing ureteral obstruction (black arrow) and moderate upstream pyelocaliceal dilatation (dashed arrow). Rupture of the renal pelvis with contrast extravasation and formation of posterior perirenal urinoma is also observed (white arrow).



FIGURES 2A, 2B, 2C AND 2D MRI with T2-weighted images, coronal (2A) and axial (2B), three-dimensional MR urography (2C) and post-contrast T1 image (2D) revealing vascularized tumoral thickening of the proximal left ureter (black arrow), causing ureteral obstruction and moderate pyelocaliceal upstream dilation (dashed arrow). Associated rupture of the renal pelvis with contrast extravasation and formation of posterior perirenal urinoma also observed (white arrow), displacing the kidney anterolaterally.

hypohydrated (2+/4), acyanotic, anicteric, eupneic and afebrile. Abdomen with bowel sounds present and preserved, slightly painful on palpation in the left flank and iliac fossa. Painful lumbar fist percussion on the left.

Based on the clinical picture, we requested a contrasted multi-slice computed tomography (Figures 1A and 1B) and subsequent complementation with MR urography - Uro--MRI (Figures 2A, 2B, 2C and 2D). Vascularized tumoral thickening of the proximal left ureter evident, causing ureteral obstruction and moderate pyelocaliceal upstream dilation. Associated rupture of the renal pelvis with contrast extravasation and formation of posterior perirenal urinoma is also observed, displacing the kidney anterolaterally.

Imaging diagnosis (with subsequent histopathological confirmation) led to the conclusion that it was a case of spontaneous rupture of renal pelvis and formation of urinoma secondary to ureteral obstruction due to urothelial tumor.

Discussion

In the case described, the spontaneous rupture of renal pelvis was caused by urothelial tumor. The rupture diagnosis can be clinically suspected and confirmed by imaging. The clinical picture includes macro or microscopic hematuria (75%), back pain (18%), dysuria (6%) and less frequently palpable mass, decreased appetite, weight loss, and may sometimes be asymptomatic.[1-4]

Urothelial tumors can affect any part of the urinary tract is relatively rare in the upper urinary tract (approximately 1% of all urothelial tumors), most frequently affecting patients in the sixth and seventh decades of life. The

histological subtypes include transitional cell carcinoma (TCC) (90%), squamous cell carcinoma (9%), mucinous adenocarcinoma (less than 1%), sarcomas, undifferentiated tumors and benign tumors (mesodermal inverted papilloma, and fibroepithelial polyp). Risk factors involve smoking, prolonged exposure to dyes such as aniline, petrochemical agents and tar, analgesic abuse (especially phenacetin), Balkan nephropathy, as well as factors that promote urinary stasis, as horseshoe kidneys. The use of cyclophosphamide, in turn, increases the risk of high-grade urothelial tumors. Chronic infection and calculi may also be associated with squamous cell carcinoma and mucinous adenocarcinoma. Schistosomiasis can be associated with the squamous cell carcinoma, and also seems to be associated with a greater degree of epigenetic changes in the epithelium of the genitourinary tract.[4-6]

There is a clear need in patients with upper urinary tract tumors for imaging investigation of the entire urinary tract, due to possible synchronous bladder cancer in 2-4% of patients. Furthermore, the need for follow-up is well established, as 40-50% of patients with TCC will develop metachronous tumours involving the lower urinary tract.[3-5]

Urotomography (Uro-CT) performed with equipment with multiple rows of detectors (MDCT) is being increasingly used for evaluation of synchronous and metachronous tumors in the upper urinary tract and primary evaluation of hematuria. Imaging studies are also used to differentiate tumors and benign urothelial changes which might not require additional invasive assessment such as ureteroscopy and retrograde pyelography.[7-9] The differential diagnosis of tumors in the upper urinary tract includes nephrolithiasis, blood clot, infection, tuberculosis, ectopic papilla, endometriosis and malakoplakia. Factors that help to reach a correct diagnosis include knowledge of the location, lesion density and pattern of impregnation, pericalicinal/periureteral opacification associated or not, and multiplicity of lesions. In the unenhanced phase of Uro-CT, TCCs are discreetly hyperdense compared to urine (15-30HU), unlike clots and stones (with respective densities at 40-80 HU and above 200HU). Since most of them are hypovascularized, they are discreetly impregnated by contrast (increase of 40-70HU), and to a lesser intensity than normal renal parenchyma, appearing in the excretory phase of the examination as fixed filling defects.[5] In addition to technological improvements in MDCT, refinements in the tests' radiological orientation have probably contributed to increase the capacity to detect urothelial abnormalities. Different techniques have been used, such as abdominal compression, administration of intravenous saline solution, diuretics or both, "log-rolling" (asking patients to roll 360°) prior to excretory phase to maximize opacification and distention of the urinary tract.

On MRI, TCCs can appear hypointense or isointense compared to the renal parenchyma on T1- and T2-weighted sequences, making it necessary to use paramagnetic contrast agents in non-dilated urinary tract, being the TCCs less contrasted than the renal parenchyma. In patients with impaired renal function, static MR urography can help detect tumors of the upper urinary tract, especially in obstructed kidneys, since TCCs are usually hypointense compared to urine on T2-weighted images, which facilitates their detection when associated to hydronephrosis. The use of diffusion-weighted imaging (DWI) sequences associated with conventional T1- and T2-weighted sequences increases the accuracy and sensitivity of Uro-MRI.[10,11]

Conclusion

Although rare, spontaneous rupture of renal pelvis secondary to ureteral obstruction caused by urothelial tumor may be suspected clinically, and the detailed radiological analysis of tomographic images and MRI-guided sequences, including Uro-MRI, is of great importance for both diagnosis and follow-up of these patients.

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