A rare cause of segmental ureteral stenosis

Clinical History:

A 73-year-old woman presented to the emergency department with symptoms of left renal colic. Her previous history included superior left pulmonary lobectomy due to adenocarcinoma. Additional information is withheld. The patient had neither a history of previous lithotomy, ureteroscopy, ureteral catheterisation or radiation therapy, nor previous episodes of ureteral lithiasis.

Imaging Findings:

Abdominal contrast-enhanced CT showed a diffuse parenchymal atrophy of the left kidney and a dilated collecting system (Fig. 1) with a stenotic ureteral segment (Fig. 2). No ureteral stones, mechanical obstruction or extrinsic compression were noted. Percutaneous antegrade ureteral stenting was performed; fluoroscopy confirmed the CT findings (Fig. 3) and added important features such as the “beaded” or “corkscrew” appearance of the distal segment of the left ureter (Fig. 4), suggestive of genitourinary tuberculosis. The patient was diagnosed with active pulmonary tuberculosis 16 months earlier, demonstrating a diffuse “tree-in-bud” pattern and centrilobular nodules on the chest CT (Fig. 5), confirmed by the presence of Mycobacterium tuberculosis in the bronchoalveolar lavage.

Discussion:

Tuberculosis is one of the most frequent infectious causes of morbidity and mortality in the world. Its usual causative agent is Mycobacterium tuberculosis. Despite the efforts to increase its detection and treatment, it is estimated that one-third of the world's population has latent tuberculosis [1].

Genitourinary tuberculosis (GUTB) is the infectious inflammation of the urogenital tract caused by Mycobacterium tuberculosis (80-95%) or Mycobacterium bovis [2] and is the second most common form of extrapulmonary tuberculosis after lymph node involvement [3].

Active genitourinary tuberculosis presents 5 to 25 years after the primary infection [4].

The usual frequency of organ involvement in GUTB is: kidney, bladder, fallopian tube and scrotum [4].

The clinical presentation depends on the level of the urogenital organ involved. Involvement of the kidney and ureter cause symptoms including recurrent or resistant urinary tract infection with sterile pyuria, irritative voiding complaints (frequency, urgency, dysuria), and hydronephrosis or pyonephrosis. The physical examination in these cases may be nonspecific, making imaging pivotal for the differential diagnosis.

The collecting system is the most commonly involved site [5] and dilatation of all or a part of the collecting system is
the most frequent finding. Ureteral involvement in GUTB ranges between 20–50% [6, 7] and is due to the passage of tubercle bacilli.

In the early stages, ureteral dilatation (secondary to atony) and wall thickening with enhancement after intravenous contrast administration may be expected [8].

Progressive mucosal erosion and scarring causes multiple ureteral irregularities, producing a beaded, “corkscrew” or “pipe stem” appearance of the ureter. Foci of calcification may be present [6].

The ideal primary treatment of GUTB is anti-tuberculous drugs, namely a regimen including isoniazid, rifampicin, pyrazinamide and streptomycin [9].

In cases of late diagnosis, medical therapy is usually insufficient and tailored surgical intervention is frequently necessary [10]. All patients with GUTB and urinary obstruction should have temporary diversion. Definitive ablative or reconstructive therapy should be delayed until at least 4 weeks of anti-tuberculous drug therapy has been administered.

Ureteral strictures may be treated with stent insertion or catheter balloon dilation or may require surgical alternatives, such as ureteral reimplantation or ileal ureteral interposition.

**Differential Diagnosis List:** Ureteral strictures due to genitourinary tuberculosis, Iatrogenic stricture, Inflammatory fibrosis, Postoperative stricture, Retroperitoneal fibrosis, Malignant stricture, Vascular compression

**Final Diagnosis:** Ureteral strictures due to genitourinary tuberculosis.

**References:**

Kulchavenya, E (2014) Urogenital Tuberculosis: Definition and Classification. Therapeutic Advances in Infectious Disease 2.5-6: 117–122 (PMID: 25745561)
Tublin et al. (2016) Diagnostic Imaging Genitourinary. 3rd ed Elsevier; 336 - 337
Kulchavenya, E (2013) Best Practice in the Diagnosis and Management of Urogenital Tuberculosis. Therapeutic Advances in Urology 5.3: 143–151 (PMID: 23730329)
Figure 1

Description: (A) Abdominal contrast-enhanced axial CT image and (B) coronal reformation show dilated left pyelocalceal system and diffuse parenchymal thinning. Right kidney appears normal.

Origin: Department of Radiology, IPO Porto, Portugal
Description: (A) Abdominal contrast-enhanced axial CT image and (B) coronal reformation show dilated left pyelocalyceal system and diffuse parenchymal thinning. Right kidney appears normal.

Origin: Department of Radiology, IPO Porto, Portugal
Description: Sagittal reformations of CECT where (a) is more medial than (b) demonstrate left ureteral dilation (arrows) with a stenotic segment (\( \rightarrow \)) in the transition to the inferior ureter. Origin: Department of Radiology, IPO Porto, Portugal
Description: Sagittal reformations of CECT where (a) is more medial than (b) demonstrate left ureteral dilation (arrows) with a stenotic segment (→→) in the transition to the inferior ureter. Origin: Department of Radiology, IPO Porto, Portugal
**Figure 3**

(a) AP fluoroscopic image during antegrade pyelography demonstrates a short segment stricture in the distal left ureter (arrows). (b) Digital subtraction AP fluoroscopic image shows upper third of the left ureter and pyelocalyceal dilation. **Origin:** Department of Radiology, IPO Porto, Portugal
Description: (a) AP fluoroscopic image during antegrade pyelography demonstrates a short segment stricture in the distal left ureter (arrows). (b) Digital subtraction AP fluoroscopic image shows upper third of the left ureter and pyelocalyceal dilation. Origin: Department of Radiology, IPO Porto, Portugal
Description: AP fluoroscopic image during antegrade nephrostogram where (a) is superior to (b) shows multiple distal left ureteral irregularities (arrows), producing a “beaded” appearance. Origin: Department of Radiology, IPO Porto, Portugal
**Description:** AP fluoroscopic image during antegrade nephrostogram where (a) is superior to (b) shows multiple distal left ureteral irregularities (arrows), producing a “beaded” appearance. **Origin:** Department of Radiology, IPO Porto, Portugal
Description: Axial images of chest CT (lung window) where (a) is superior to (b) performed 16 months previously (see text). Origin: Department of Radiology, IPO Porto, Portugal
Description: Axial images of chest CT (lung window) where (a) is superior to (b) performed 16 months previously (see text). Origin: Department of Radiology, IPO Porto, Portugal