Nephro-cutaneous fistula

A middle-aged, 45-year-old female with history of urolithiasis, type 2 diabetes mellitus, and long-standing HIV infection under antiretroviral therapy, presents with painful swelling in the left lumbar region. Currently apyretic after empiric antibiotic treatment.

Elevated acute phase markers including minimal Leukocytosis and 93 mg/L C-Reactive Protein. Estimated glomerular filtration rate 70 ml/min.

Imaging Findings:

Five years ago, she had radiographic and CT evidence (Fig.1) of left staghorn nephrolithiasis. A few months later, follow-up CT-urography showed bilaterally preserved renal function and parenchymal thickness, patent non-dilated excretory systems (Fig.2).

Following nephrolitotripsy three months ago, careful physical examination now reveals a cutaneous ulcer on her left lumbar region, draining smelly, greenish urinary fluid. Multidetector CT (Fig. 3) detected left-sided hydronephrosis with reduced parenchymal thickness, residual calcific lithiasis in lower calyces and lumbar ureter. The excretory tract showed enhancing, thickened walls, particularly severe in the ureteropelvic junction, proximal and mid-ureter.

Additional findings included ipsilateral fascial thickening and homogeneously enhancing perirenal lymph nodes. A thin fluidlike tract consistent with the clinical diagnosis of nephrocutaneous fistula could be traced, directed posteroinferiorly from the kidney through the posterior renal fascia and pararenal space, and quadratus lumborum muscle, to the cutaneous orifice.

Surgical treatment included nephro-ureterectomy with fistula debridement.

Discussion:

Currently an exceptional occurrence in urological practice, a nephrocutaneous fistula corresponds to the spontaneous development of an abnormal communication between the kidney and the skin, crossing through the retroperitoneum and abdominal wall structures following the lowest resistance points such as the Petit's triangle and the Grynfelt quadrilateral. Clinically, the hallmark is represented by local tenderness and swelling near the flank or lumbar region plus urine leakage from a cutaneous orifice [1, 2].

Invariably associated with chronic urinary tract infection and long-standing nephrolithiasis, nephrocutaneous fistulas are found in literature as sparse case reports, related to xanthogranulomatous pyelonephritis, bacterial infections with formation of renal abscesses or pyelocalyceal diverticula, tuberculosis, renal trauma or malignancies. Not unusually, diagnosis is late with staghorn calculi and poorly functioning kidneys [1-6].

In the past, most cases have been investigated with retrograde pyelogram and/or fistulography, with injected contrast directly opacifying the abnormal tract and the urinary collecting systems but without cross-sectional
information concerning the surrounding anatomical structures [1, 2, 7]. As this case exemplifies, multidetector CT (MDCT) including multiplanar reformations noninvasively depicts the fistulous track. Furthermore, MDCT provides additional information about size, parenchymal thickness and function of the involved kidney, comprehensive characterization of the underlying infectious or neoplastic disease, and depiction of its extent of involvement, for instance with psoas muscle or groin abscess collections amenable to drainage [6, 7]. Particularly in patients with non-functioning kidneys and staghorn calculi, nephrectomy and fistulectomy is the standard treatment, to eradicate infection and prevent sepsis. Conservative treatment with antibiotics is reserved for debilitated patients [1, 2].

**Differential Diagnosis List:** Nephrocutaneous fistula with pyonephrosis, in a HIV-positive diabetic patient., Acute pyelonephritis w/o abscess, Xanthogranulomatous pyelonephritis, Urolithiasis with acute renal colic, Urinary tuberculosis

**Final Diagnosis:** Nephrocutaneous fistula with pyonephrosis, in a HIV-positive diabetic patient.

**References:**

Singer AJ. (2002) Spontaneous nephrocutaneous fistula. Urology60:1109-1110
Description: Supine plain abdominal radiograph discloses left-sided "staghorn" calcific nephrolithiasis (arrows). Origin: Tonolini M, Department of Radiology, "Luigi Sacco" University Hospital – Milan (Italy)
Description: Unenhanced CT images (b,c) confirm hyperdense "staghorn" lithiasis of left renal pelvis and upper calyces. Incidental finding of 1-cm maximum transverse diameter perirenal lymph node (arrowhead). No accessory signs indicating acute renal colic. Origin: Tonolini M, Department of Radiology, "Luigi Sacco" University Hospital – Milan (Italy)
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Description: Excretory phase volumetric CT acquisition with multiplanar reformations confirm left "staghorn" nephrolithiasis. Both kidney show normal size, parenchymal thickness, and function.

Origin: Tonolini M, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Excretory phase volumetric CT acquisition with multiplanar reformations confirm left "staghorn" nephrolithiasis. Well-opacified, patent and non-dilated excretory systems. Origin: Tonolini M, Department of Radiology, "Luigi Sacco" University Hospital – Milan (Italy)
Description: Excretory phase volumetric CT acquisition with multiplanar reformations confirm left "staghorn" nephrolithiasis. Both kidney show normal size, parenchymal thickness, and function.

Origin: Tonolini M, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
**Description:** Excretory phase volumetric CT acquisition with multiplanar reformations confirm left "staghorn" nephrolithiasis. Stable centimetric perirenal lymph node (arrowhead). Both kidneys show normal size, parenchymal thickness, and function. **Origin:** Tonolini M, Department of Radiology, "Luigi Sacco" University Hospital – Milan (Italy)
Description: Unenhanced image detects appearance of left-sided hydronephrosis with mild inflammatory perirenal fat stranding and fascial thickening (*), thickened collecting system wall (arrows), increased (at least 3, the largest 1.4 cm transverse diameter) lymphadenopathies (arrowheads). Origin: Tonolini M, Department of Radiology, “Luigi Sacco" University Hospital – Milan (Italy)
Description: Post-contrast images confirm left-sided hydronephrosis with reduced parenchymal thickness, thickened enhancing collecting system wall (arrows), residual lower pole lithiasis, increased (at least 3, the largest 1.5 cm maximum transverse diameter) lymphadenopathies (arrowheads). Origin: Tonolini M, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
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Origin: Tonolini M, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
**Description:** Oblique sagittal reformations (f,g) and axial images (h,i) show the longitudinal extent of severe, enhancing ureteropelvic mural thickening (arrows), with some calcific fragments in the mid-ureter. **Origin:** Tonolini M, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Oblique sagittal reformations (f,g) and axial images (h,i) show the longitudinal extent of severe, enhancing ureteropelvic mural thickening (arrows), with some calcific fragments in the mid-ureter. Origin: Tonolini M, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
Description: A thin, fluidlike track with enhancing walls consistent with clinical diagnosis of nephrocutaneous fistula (arrowheads) can be tracked through the posterior pararenal fat, quadratus muscle, and subcutaneous tissue, to the skin. Origin: Tonolini M, Department of Radiology, "Luigi Sacco" University Hospital – Milan (Italy)