An uncommon idiopathic case of Wunderlich syndrome
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Section: Uroradiology & genital male imaging
Area of Interest: Urinary Tract / Bladder
Procedure: Diagnostic procedure
Imaging Technique: Ultrasound
Special Focus: Haemorrhage Case Type: Clinical Cases
Authors: Tonolini Massimo, MD.
Patient: 86 years, female

Clinical History:
An elderly lady without significant past medical history was rushed to the Emergency Department because of sudden, severe left-sided thoraco-abdominal pain for three hours. She denied recent trauma and medication intake.

Imaging Findings:
Haemodynamic and respiratory parameters remained stable. Laboratory findings indicated blood loss (haemoglobin fell from 10.3 to 9.3 g/dL in 3 hours). Emergency abdominal ultrasound excluded haemoperitoneum and aortic aneurysm, whereas a fairly large (8 cm) hypo-anechoic collection was seen abutting the left kidney.
With renal function normal for age, further investigation with multidetector CT with intravenous contrast administration revealed hyperdense (60 Hounsfield Units, HU) perirenal haematoma without detectable active bleeding. Both kidneys appeared of normal size without mass lesions or vascular abnormalities.
Conservative treatment included two red blood cell transfusions with stabilised (8.1 g/dL) haemoglobin and regressed symptoms. CT follow-up after 5 days revealed well-demarcated haematoma with slightly decreased thickness and attenuation.
Following hospital discharge, repeat CT at 3 months definitely excluded underlying renal diseases, showing stabilised evolution of haematoma as a hypodense collection with moderately thick, enhancing walls. Performance status, haematocrit and renal function remain within limits.

Discussion:
Dating back from initial description in 1856, the eponym Wunderlich syndrome (WS) refers to the occurrence of spontaneous renal haemorrhage into the subcapsular and/or perinephric spaces, in absence of trauma and anticoagulation [1-4].
Although uncommon, WS represents a urological emergency. Most commonly, patients clinically present with the classical triad of manifestations including acute abdominal pain, palpable flank mass and variable-degree haemodynamic compromise [1, 4, 5].
The majority (two-thirds) of WS cases are related to ruptured tumours, both benign such as angiomyolipoma and malignant (renal cell carcinoma). Another 20-30% of occurrences are reported to be secondary to bleeding vascular lesions such as polyarteritis nodosa, renal artery aneurysms, artero-venous fistulas and venous thrombosis. Other even more uncommon causes include cystic kidney diseases, infections, coagulation disorders and anticoagulation therapy. Idiopathic WS (without underlying abnormalities) is diagnosed in 5-10% of patients [1, 3-6].
In literature, nephrectomy is reported as the most common (70-75%) surgical procedure performed in patients with...
perirenal haemorrhage. To avoid unnecessary nephrectomy, knowledge of the spectrum of aetiologies and imaging appearances, correct imaging and follow-up protocols are necessary. Arteriography with selective embolisation represents an increasingly employed treatment [2, 4, 5].

As with our patient, ultrasound is valuable to promptly detect perinephric haematoma as variable echogenicity collections compressing or displacing the kidney, but is insensitive to detect possible underlying diseases since solid masses are difficult to distinguish from clotted blood [1, 2, 4, 6].

Unenhanced and post-contrast CT, better performed on current multidetector scanners with multiplanar and vascular reformations, is recommended as the mainstay modality to confirm or detect subcapsular or perirenal haematoma, which appear hyperdense (40 to 70 HU) on unenhanced scans. CT is necessary to visualise or rule out active contrast extravasation indicating ongoing bleeding, to identify the underlying cause in most instances and to monitor evolution during conservative treatment [1-3, 6, 7].

Determining the aetiology may prove challenging, and sensitivity of CT has been reported to approach 90% with a correct acquisition technique. In some (10-20%) patients, the underlying cause remains uncertain or obscured by perirenal blood during initial imaging workup. Practically, when no renal tumours or aneurysms are identified on initial CT study and the patient is haemodynamically stabilised, surgery is deferred with the aim to preserve the kidney. When the cause is initially unclear, serial CT until haematoma resolves and sometimes MRI are recommended to identify or exclude subtle underlying disorders [1, 3, 5, 6].

**Differential Diagnosis List:** Idiopathic spontaneous perinephric haemorrhage (Wunderlich syndrome), Ruptured renal carcinoma, Bleeding renal angiomyolipoma, Acute renal colic, Acute pyelonephritis, Bleeding visceral aneurysm, Acute pancreatitis, Ruptured aortic aneurysm

**Final Diagnosis:** Idiopathic spontaneous perinephric haemorrhage (Wunderlich syndrome).

**References:**


Figure 1

a

Description: A large (8-cm maximum diameter) hypo-anechoic collection is observed abutting the left kidney. Origin: Tonolini M, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)

b

Description: The contralateral right kidney shows a similar, moderate diffuse reduction of parenchymal thickness and some small cysts. Origin: Tonolini M, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
**Figure 2**

**a**

*Description:* Unenhanced images (a,b) show hyperdense (attenuation 60 HU) perinephric hemorrhagic collection surrounding the left kidney. *Origin:* Tonolini M, Department of Radiology, "Luigi Sacco" University Hospital – Milan (Italy)

**b**

*Description:* Unenhanced images (a,b) show hyperdense (attenuation 60 HU) perinephric hemorrhagic collection surrounding the left kidney. *Origin:* Tonolini M, Department of Radiology, "Luigi Sacco" University Hospital – Milan (Italy)
Description: CT-angiography (c,d) confirms perinephric haematoma without compression of the renal parenchyma. Renal masses and contrast extravasation indicating active bleeding are not appreciable. Origin: Tonolini M, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Coronal (e) and sagittal (f) reformatted images depict the entire extent of the perinephric haematoma (2.5 cm maximum thickness), without renal masses and bleeding arterial lesions. Origin: Tonolini M, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Coronal (e) and sagittal (f) reformatted images depict the entire extent of the perinephric haematoma (2.5 cm maximum thickness), without renal masses and bleeding arterial lesions. Origin: Tonolini M, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
Figure 3

Description: Unenhanced (a) and corresponding contrast-enhanced (b) images depict persistent, well-demarcated perirenal haematoma with slightly reduced attenuation values. Origin: Tonolini M, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Axial (a,b) and coronal reformatted (c) images show stabilised evolution of haematoma as a hypodense collection with demarcated, thick wall abutting the kidney. Confirmed absence of underlying lesions. Origin: Tonolini M, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Axial (a,b) and coronal reformatted (c) images show stabilised evolution of haematoma as a hypodense collection with demarcated, thick wall abutting the kidney. Confirmed absence of underlying lesions. Origin: Tonolini M, Department of Radiology, "Luigi Sacco" University Hospital – Milan (Italy)