Pyelo-ureteral junction stenosis
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Section: Uroradiology & genital male imaging
Area of Interest: Abdomen Kidney
Procedure: Diagnostic procedure
Imaging Technique: CT
Imaging Technique: Image manipulation / Reconstruction
Special Focus: Congenital Case Type: Clinical Cases
Patient: 35 years, female

Clinical History:

A 35-year-old female patient came to our department complaining of asthaenia and menorrhagia. At clinical evaluation an indolent palpable mass in right hypochondrium was appreciated. Laboratory evaluation (haemoglobin, leucocytosis formula, creatinine and urinalysis) and tumoral markers (CEA, Ca19.9, Ca15.3) were negative.

Imaging Findings:

A previous Ultrasound (US) investigation performed in another centre (no imaging available) detected a large anechoic formation (20 x 10cm) extending to epigastrium, characterised by internal septations with rare vascular spots. Right kidney was not displayed; left kidney was hypertrophic (longitudinal axis 13.5 cm) without signs of lithiasis or stasis.

Abdominal Computed Tomography (CT) evaluation showed a marked hydronephrosis of the right kidney with cortical thickness reduced to a thin band of tissue; a voluminous calico-pyelic dilatation (AP x LL x CC:17 x 14 x 19 cm) constricting and displacing liver, gall-bladder and pancreas was observed.

At ultra-delayed phase acquisition, a minimal opacification of right renal calyxes with accumulation of iodinated urine in lower portions was depicted; right ureter was scarcely opacified and only recognisable distally to pyelo-ureteral junction as wiry.

Double renal arteries were depicted at the right side. Neither intra-luminal stones nor parietal lesions were detected. Imaging findings were suggestive for severe uretero-pelvic junction disease and the patient underwent laparoscopic right nephrectomy.

Discussion:

Pyelo-ureteral junction stenosis is the most common type of obstructive uropathy which might involve one or, rarely, both kidneys. Bilateral obstruction occurs in 10-30% of case and the left ureter is more frequently involved.

Aetiological factors of the stenosis might be external (high position of the ureter, segmental maturation arrest, crossing vessel, obstructive scar) or internal (neuromuscular changes in pyeloureteral segment, muscle tissue cicatrical transformation, ureteral valves, lack of recanalisation of the lumen). Major secondary causes include infections, calculous obstruction and previous operations [1].

Clinical manifestations might vary from asymptomatic to presence of abdominal mass, lumbar pain, sickness and vomiting. If symptomatic, it is frequently diagnosed in childhood, otherwise it might be found as collateral finding or become clinically evident in adults [2].

Imaging is necessary to identify the obstruction site and to detect the cause (internal or external). If the cause is not
identified, it is usually assumed that the obstruction is congenital. Ultrasound (US) evaluation is easily accessible for serial examination and it is able to assess the presence of hydronephrosis, the ureteral diameter, the absence of urinary calculi and the calico-pyelic dilatation [3].

Baseline CT examination is useful to exclude radio-opaque urinary calculi. CT study performed with administration of endovascular contrast-medium is useful to confirm US findings and to exclude urotheliomas, fibrosis and abnormal vessels. Arterial scan is needed to evaluate arterial map of the kidney, to exclude abnormalities in blood vessels or in peri-junctional tissues and to allow a correct surgical management if required. Venous phase study is able to study the renal parenchyma; urographic phase acquisition is helpful to document urinary tract morphology [4]. Magnetic Resonance Imaging (MRI) is useful for children due to absence of radiation.

Surgical treatment is necessary in case of pyelonephritis, recurrent urinary infections, increasing hydronephrosis or reduced renal function. Anderson-Hynes pyeloplasty with traditional or laparoscopic approach is the most frequently used technique, but also percutaneous and endoscopic treatments might be successfully used [2]. Laparoscopic or open surgery nephrectomy is rarely necessary in marked hydronephrosis and renal failure, like in our case.

**Differential Diagnosis List:** Pyelo-ureteral junction stenosis, Ureteral valves or flaps, Polyps or papillomas, Ureteral atresia, Abnormal crossing vessels, Ureteral adhesion, Calculi, Tumours (urotheliomas/leiomyomas/haemangiomas), Peri-pyelo-ureteral fibrosis

**Final Diagnosis:** Pyelo-ureteral junction stenosis

**References:**

Robbins and Cotran Pathologic Basis of Disease.
**Figure 1**

**a**

*Description:* Baseline CT examination showing marked hydronephrosis of the right kidney, constricting and displacing liver, gallbladder and pancreas. *Origin:* Department of Diagnostic and Interventional Radiology, University Hospital of Pisa, Italy

**b**

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**Description:** Baseline CT examination showing marked hydronephrosis of the right kidney. Cortical thickness is reduced to a thin band of tissue by the voluminous calico-pyelic dilatation. **Origin:** Department of Diagnostic and Interventional Radiology, University Hospital of Pisa, Italy
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Description: Coronal CT reconstruction showing marked hydronephrosis of the right kidney and cranio-caudal axis of the voluminous calico-pyelic dilatation (19 cm). Origin: Department of Diagnostic and Interventional Radiology, University Hospital of Pisa, Italy
Description: Sagittal CT reconstruction showing marked hydronephrosis of the right kidney, antero-posterior (17 cm) and latero-lateral (14 cm) axes of the voluminous calico-pyelic dilatation. Origin: Department of Diagnostic and Interventional Radiology, University Hospital of Pisa, Italy
Description: Maximum Intensity Projection (MIP) CT reconstruction in coronal view showing the lack of opacisation of the right kidney, calyx, pelvis and ureter. Origin: Department of Diagnostic and Interventional Radiology, University Hospital of Pisa, Italy