Pyelo-ureteral junction stenosis
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Section: Uroradiology & genital male imaging
Case Type: Clinical Cases
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Patient: 27 years, female

Clinical History:
A 27 years old patient experienced several episodes of mild left lumbar back pain during the last year with spontaneous resolution and three episodes of intense pain and vomiting during the last month.

Imaging Findings:
The patient was submitted to an ultrasound investigation which detected a left calico-pyelic dilatation in absence of stones or ureteral dilatation. A CT study confirmed the suspect of pyelo-ureteral junction stenosis, showing a relatively large calico-pyelic dilatation in a left kidney with normal dimension and normal cortical thickness and a delayed opacification of the kidney. The examination revealed also a normal ureteral canalisation with regular diameter and the absence of any stones, parietal lesions, peri-junctional fibrotic tissue, abnormal renal blood vessels or contralateral anomalies. Afterwards, the patient was subjected to a dynamic renal scintigraphy with intravenous diuretic administration which documented a normal renal function.

Discussion:
Pyelo-ureteral junction stenosis is classified as a type of obstructive uropathy which can involve one or, rarely, both kidneys and is characterised by congenital anomalies of the junction, like longitudinal rather than spiral smooth muscular cells, smooth muscular cells hypoplasly or fibrosis. The clinical presentation of the disease is related to the patient’s age: children experience a growth delay or halt, lack of appetite, fever, lumbar back pain, vomiting and recurrent urinary infections; adults can be asymptomatic or can refer pain, recurrent urinary infections and urinary stones. The diagnosis of pyelo-ureteral junction stenosis is based on the exclusion of any other causes of obstructive uropathy that are included in the differential diagnosis: intrinsic congenital stenosis due to ureteral valves or flaps, ureteral polyps or papillomas and ureteral atresia; extrinsic congenital stenosis caused by abnormal crossing vessels or ureteral adhesions; intrinsic acquired stenosis due to stones or tumors (urotheliomas, leiomyomas, hemangiomas...) and, finally, extrinsic acquired stenosis due to peri-pyelo-ureteral fibrosis. The diagnosis requires an ultrasound examination of kidneys and urinary tract to demonstrate pyelic or calico-pyelic dilatation, normal ureteral diameter and the absence of urinary calculi, and a CT study with administration of endovascular contrast medium in order to confirm the ultrasound scan findings and exclude urotheliomas, fibrosis and abnormal vessels. The optimal CT study includes: a basal acquisition, to exclude radio-opaque urinary calculi; an arterial phase acquisition, to document arterial map of the kidney, to exclude abnormal blood vessels or peri-junctional abnormal tissue, and to allow a correct surgical management if required; a venous phase acquisition, to study the renal parenchyma, and an urographic phase acquisition to document urinary tract morphology. To reduce radiation dose to the patient, it is possible to administer a first bolus of contrast media six minutes before administration for vascular study; this protocol allows the contemporary acquisition of vascular (arterial or venous) and urographic phases. MRI allows to evaluate renal parenchyma, urinary tract and vessels and can be performed for diagnosis and follow-
up. This is paramount for children patients due to absence of radiations. Dynamic renal scintigraphy is used to evaluate renal function and differentiate obstructive and not obstructive disease, eventually with intravenous furosemide administration. Blood and urinary examinations are performed in order to evaluate renal function and exclude urinary infections. In patients with recurrent urinary infections or pyelonephritis, increasing hydronephrosis or with reduced renal function, treatment is surgical. Anderson-Hynes pyeloplasty, with traditional or laparoscopic approach, is the technique most frequently used, but also percutaneous and endoscopic techniques can be use successfully.

**Differential Diagnosis List:** Pyelo-ureteral junction stenosis.

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

**References:**

**Figure 1**

**a**

*Description:* Ultrasound investigations during two lumbar back pain episodes. They document the calico-pyelic dilatation, the absence of renal stones and a normal renal parenchyma, while the ureter can not be detected. *Origin:*

**b**

*Description:* Ultrasound investigations during two lumbar back pain episodes. They document the calico-pyelic dilatation, the absence of renal stones and a normal renal parenchyma, while the ureter can not be detected. *Origin:*
**Figure 2**

*Description:* 3D reconstructions of the basal acquisition: they document the absence of radio-opaque urinary calculi bilaterally. *Origin:*
**Description:** MIP reconstructions of the basal acquisition: they document the absence of radio-opaque urinary calculi bilaterally. **Origin:**
**Description:** MPR reconstructions of the venous phase of CT examination document the left calico-pyelic dilatation, the delayed opacification of the kidney and the normal renal dimensions. **Origin:**
Description: The urographic phase acquired 5 minutes after the e.v. contrast media administration documents the left calico-pyelic dilatation, the normal renal dimensions and parenchimography, and the contemporary urinary e.v. contrast media elimination. Origin:
**Description:** MIP reconstructions of the venous phase of CT examination. They document the left caliceo-pyelic dilatation, the left renal artery and the two adjacent branches of left renal vein, without extrinsic vascular compression of the junction. **Origin:**
Description: MPR reconstructions of the venous phase of CT examination. They document the left calico-pyelic dilatation, the left renal artery and the two adjacent branches of left renal vein, without extrinsic vascular compression of the junction. Origin:
Description: Dynamic renal scintigraphy before (Fig. 6a) and after (Fig. 6b) e.v. furosemide administration. These images document a contemporary radiopharmaceutical urinary elimination.

Origin:
Description: Dynamic renal scintigraphy before (Fig. 6a) and after (Fig. 6b) e.v. furosemide administration. These images document a contemporary radiopharmaceutical urinary elimination.

Origin:
Description: MIP reconstruction of urographic phase of CT examination, acquired 15 minutes after e.v. contrast media administration. It documents a symmetric urinary tract opalescence and the absence of radio-transparent stones. Origin:
Description: 3D reconstruction of the same phase of CT examination. It documents a left pyelic dilatation without ureteral dilatation nor signs of external compression on pyelo-ureteral junction. Origin: