


Left Pyelic Bifidity and Ectopic Ureteral Superolateral Intravesical Homolateral Ectopic Junction Revealed by a Urinary Calculus Apropos of a Case at the Pasteur Clinic

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Abstract

Introduction: Malformations of the excretory tract are abnormalities due to a disorder of embryogenesis. According to some authors, their frequency varies from 0.30 to 5.25 per 1000. The aim of this study was to highlight the CT uroskan aspect of pyelic bifidity with intravesical ureteral ectopic junction revealed by a urinary calculus and to explain the interest of CT uroskan in the management of urinary pathologies. **Result:** We report the observation of a 37-year-old overweight patient with a body mass index equal to 28, a history of surgery and extracorporeal litho-thipsis dating back 10 years. He was referred to the Imaging Department in the context of renal colic. The uroskaner made it possible to highlight a left pyelic bifidity associated with an ec-

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topic abutment of the left ureter on the superolateral wall of the bladder, a calculation in the left ectopic ureteral meatus measured at 4 mm in axial diameter. He noted upstream of these lesions, a uretero-pyelo-calicielle dilation on double homolateral pyelon. On late cuts, a slight delay in left renal excretion was noted. The right kidney was also the site of a hyperdense calculation of 1257 HU density and measured 4 mm in transverse diameter with a non-obstructive appearance. Due to a lack of means, our patient was subjected to oral medication, hygiene and dietary rules and rigorous monitoring. **Conclusion:** At the end of this study, the uroscanner is presented as the reference examination to better explore urinary pathologies. At the same time, it makes it possible to carry out a study of the organs surrounding the urinary tract. Always think about the association of several urinary pathologies each time you see a patient for renal colic.

Keywords

Bifidity, Pyelic, Uroscanner, Ectopia, Lithiasis

1. Introduction

Malformations of the excretory tract are abnormalities due to a disorder of embryogenesis. According to some authors, their frequency varies from 0.30 to 5.25 per 1000 [1].

They represent 25% of childhood surgical pathologies. Their seriousness lies in the kidney damage, which is often associated, hence the importance of early diagnosis and appropriate management [2]. These malformations can also be encountered in adults, in whom they are revealed by symptoms or incidental discoveries during a routine examination.

The anatomical anomaly usually generates stasis and therefore facilitates, by slowing down the urinary flow, the crystallization of supersaturated species, the proliferation of lithogenic bacteria or the retention of crystalline particles formed higher up in the urinary tract [3]. Ectopic insertions of the ureter are most often associated with a double system but are also found on single systems, often with a dysplastic or poorly functional kidney. Ectopic insertions of the ureter are most often associated with a double system but are also found in single systems, often with a dysplastic or poorly functional kidney [4]. In boys, ectopic implantation will most often be in the seminal vesicle, or in the lower part of the bladder. In girls, ectopic implantation can be done in the urethra, vagina, and more rarely in the uterus; there are frequently associated genital abnormalities (duplications). In a practical way, the antenatal discovery of multicystic renal dysplasia and a pelvic cystic structure should evoke ectopic ureteral implantation and requires additional postnatal examinations (ultrasound at least, or even uro MRI). They are accompanied by lithiasis in a variable proportion of cases, suggesting the participation of other metabolic or infectious factors in the develop-

ment of lithiasis [5].

C-Imaging modalities: The discovery of a malformation of the urinary tract can be made at any age, depending on the type and severity of the anomaly. Indeed, several malformations such as renal ectopia, hypoplasia or abnormalities of many of the kidneys can remain asymptomatic for a long time and be discovered fortuitously in adulthood. Others, such as renal agenesis, cystic kidney diseases, Bilateral pyeloteteral junction syndrome can be detected very early, as early as the antenatal period, or later, during an infectious episode, or when exploring renal failure, high blood pressure, hematuria. Ultrasound remains the first-line examination in the exploration of urinary tract malformations. Indeed, the non-irradiating, non-invasive, painless character and its availability, combined with the thinness of the abdominal wall and a low proportion of fat in children, make it a first-choice examination, with a very good spatial resolution. A complete ultrasound of the urinary tract is performed with several probes of different frequencies, ideally a sectoral probe of 5 to 7.5 MHz, a linear probe of 7.5 to 13 MHz and color Doppler and pulsed Doppler modules. The examination begins with the exploration of the bladder in the supine position, then continues with the study of the kidneys using probes adapted to the age and morphology of the child; in the smallest in a systematic way and in addition to examination in the largest, a renal study will be carried out using a superficial high-frequency probe in ventral decubitus. When the anatomy is difficult to specify in ultrasound, because of the absence of dilation, or on the contrary of massive dilation, a compliment by imaging in sections and in particular in MRI will be recommended. Common indications for MRI in children include the anatomical study of complex urinary malformations, such as certain double systems or ectopic ureteral positioning. MRI is also very useful to locate a site of obstruction on the urinary tree in the context of obstructive uropathies (low pyeloureteral junction versus medium ureter), assess the degree of obstruction or finally look for an extrinsic cause such as a polar vessel, a retro cave or retroiliac ureteral path, or congenital bridles. The MRI technique is based on the use of morphological sequences in T2, axial and coronal, allowing the study of the renal parenchyma and cortico-medullary differentiation; the examination is completed by sequences in high T2 weighting (type “bili-MRI”) for the study of fluids, providing a urographic image of the entire urinary tract, and by T1 sequences after gadolinium injection. The functional sequence is a sequence weighted in T1 in gradient echo, in coronal sections, and repeated in free breathing after injection of the bolus of contrast medium. An uro MRI can be performed at 1.5 T or 3 T and lasts between 20 and 70 minutes. The CT scan has few indications in the assessment of renal malformations; he keeps an interest in the detection of lithiasis, or in the assessment of infectious complications of unfavorable evolution. Finally, cystography remains today the reference examination for the diagnosis and evaluation of vesicoureteral reflux and for the anatomical evaluation of the male urethra. After checking for the absence of urinary tract infection using an ECBU, bladder filling is carried out by retrograde bladder probe or suprapubic cathete-

rization using a water-soluble iodine product until the need for urination. The realization of several cycles of bladder fillings is useful to raise awareness of the detection and quantify the real grade of reflux in the child who has not yet acquired cleanliness. It should be noted the bladder capacity. Pictures are taken before (abdomen without preparation), at the beginning of filling, in repletion, during urination and finally in immediate post-urination. Complications associated with retrograde cystography are rare. The discovery of high-grade reflux requires appropriate antibiotic treatment, prescribed immediately during the examination. Echocystography is a dynamic imaging technique using ultrasound coupled with intravesical administration of an ultrasound contrast medium [6]. It allows the visualization of the morphology of the urinary system. This method, non-irradiating, is an interesting alternative to conventional cystography, safe to use [7] and with very high concordance rates between the two examinations in the diagnosis of vesicoureteral reflux [8]. In addition, the authorization of the contrast agent Lumason® for the diagnosis of vesicoureteral reflux in children in the United States [9], then of the same contrast agent under another name (SonoVue®) [10] in Europe will allow the significant development of this technique in the months and years to come.

The uroscanner is the reference imaging examination for exploring the urinary tract. The indications for uroscanner are vast. They concern all pathologies of the urinary system. [11]

The rarity of visualization of this case in our current practices and the absence of a previous study on the case in our country was the subject of the choice of this theme.

The objective of this study was to highlight the CT uroscan aspect of pyelic bifidity with intravesical ureteral ectopic abutment revealed by a urinary calculus and to expose the interest of CT uroscan in the management of urinary pathologies.

2. Observation

This is a 37-year-old overweight patient measuring 1.90 m tall and weighing 100 kg overweight with a body mass index equal to 28. He has a history of surgery and extracorporeal litho thipsis dating back 10 years. He was referred to the medical imaging department for Uroscanner in the context of renal colic.

According to him, the beginning of the symptomatology dates back to 2 years marked by intermittent pain like renal colic of variable intensity between cut by long periods of calm.

The physical examination found a patient in good general condition. Biological assessment based on NFS, VS, blood sugar, creatinine, azotemia, ECBU, blood grouping and Rhesus factor was requested and returned almost normal.

The uroscan requested and carried out revealed a left pyelic bifidity and an ectopic abutment of the left ureter on the bladder. The left uretero-vesical junction, instead of being on the bladder floor, is identified on the left supero-lateral. It was associated with a hyperdense calculation of +556 HU density in the left

ectopic ureteral meatus measured at 7 mm in cranio-caudal diameter and 4 mm in axial diameter (**Figure 1**). Upstream of the lesions described above, uretero-pyelo-calicielle dilation with the double pyelon measured at 21 mm in height and 13 mm in transverse diameter was noted. Late acquisitions show a discrete left renal excretion. The right kidney was also the site of a hyperdense calculation of 1257 HU density and measured 4 mm in transverse diameter without pyelo-calicielle dilation at this level.

Due to a lack of resources, he was subjected to oral medication and strict hygiene and dietary rules.

Our great concern was to know what caused this dilation. To the lithiasis for which he had done the surgery before? Or to the one currently described but which is small for being obstructive or due to ectopia of the uretero-vesical junction?

This concern remained in vain because the patient no longer had any traces of these previous documents.

We must always think about a possible complication of urinary malformation in front of a request for renal colic in an adult.

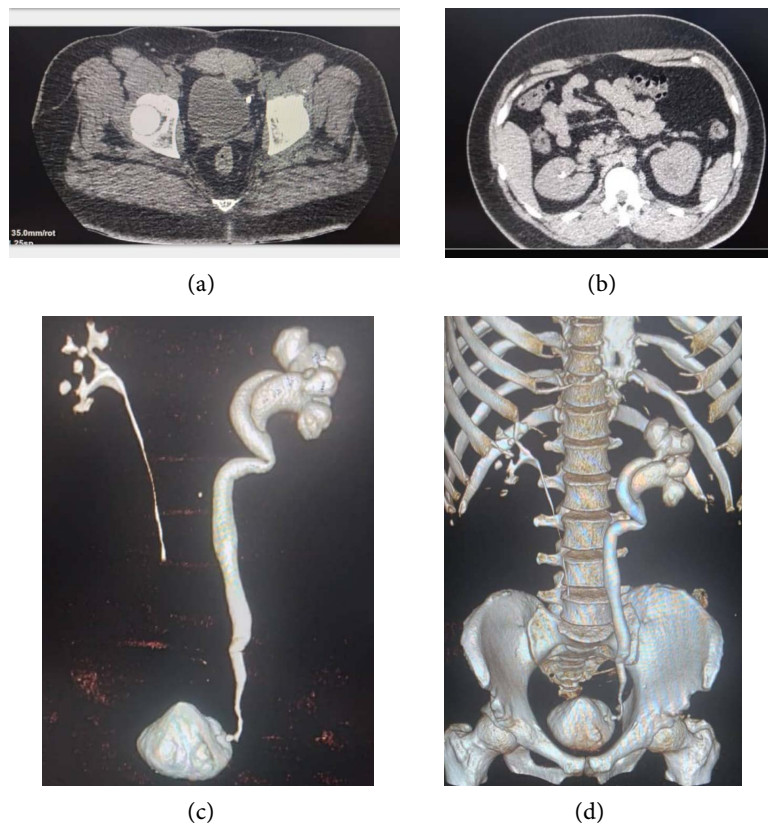


Figure 1. (a)-(c): Abdominal CT scan without injection in axial section, in 3D volume reconstruction showing evidence of a hyperdense calculus of +556 HU in the left uretero-vesical junction measured at 7 mm in maximum diameter (a), an ectopic abutment of the junction uretero-vesical at the level of its left supero-lateral wall (c), a uretero-pyelo-calicielle dilation upstream with a left pyelic bifidity ((c) and (d)). CT axial section without injection showing a non-obstructive right renal lithiasis (b).

3. Discussion

Malformations of the upper urinary tract are uncommon. They represent 25% of childhood surgical pathologies. Their seriousness lies in the often associated renal damage, hence the importance of early diagnosis and appropriate management [2]. These malformations can also be encountered in adults, in whom they are revealed by symptoms or incidental discoveries during a routine examination. Our patient was a 37-year-old subject who performed an uroscan for renal colic.

The uroscanner is a diagnostic examination whose purpose is to visualize and study all of the urinary excretory tracts: “from the calyces to the bladder”, involving the use of a multi-bar scanner in thin sections with an injection of contrast product [6]. They not only make it possible to confirm the existence of the malformation, to learn about its impact on neighboring organs, and guide clinicians towards a therapeutic choice. In addition, they make it possible to follow the evolution of the malformation during the pre, per and post treatment periods [12].

Uroscanner will highlight ectopic insertions of the ureter, which are most often associated with a double system but are also found on single systems, often with a dysplastic or poorly functioning kidney [4]. In our case, the system was double at the level of the left renal pelvis on a left kidney which showed a delay in excretion.

In boys, the ectopic implantation will most often be located in the seminal vesicle or in the lower part of the bladder. In our case, the left ureteral ectopia was located on the superolateral part of the bladder and was associated with a partially double system complicated by lithiasis and ureterohydronephrosis. This is a rare case because in addition to the bifidity of the left pylon, there was an ectopia of left ureteral insertion into the bladder, lithiasis and an ipsilateral uretero-hydronephrosis. Uroscanner will also make it possible to determine the origin of the obstacle at the ureteral level: intraluminal, intramural (intrinsic) or extramural (extrinsic) [13]. The causes of the intramural obstacle are either anatomical or functional. In the anatomical origins, there are ureteral stenoses, most often iatrogenic, as well as the disease of the pyelo-ureteral junction and benign or malignant tumors of the urothelium. In our case, this dilation could be related either to ectopia of the left ureterovesical junction or to lithiasis.

As for the functional causes, it is most often vesico-ureteral reflux during a defect in the anti-reflux mechanism. This sign was not seen in our patient. The extrinsic etiologies are extremely varied, benign or malignant in nature, and come from the genital system (in women from 60 years), vascular and digestive, as well as diseases of the retroperitoneum. In older men, pyelo-calicielle ureteral dilation may be the result of bladder emptying disorders in the context of benign or malignant prostatic hypertrophy, resulting in high-pressure urination that results in vesico-vesical reflux, which may become chronic [8]. In our patient, it seems to be linked to other factors of the lithiasis given the bilaterality of the

right renal lithiasis and the state of the ectopia of implantation of the left ureteral meatus [1].

The treatment of a birth defect depends on its tolerance. Thus, for a poorly tolerated congenital malformation causing (urinary tract infections, urinary tract stones, pain or even impaired renal function), then it requires treatment that must be adapted to its fair value (medical or surgical or even medical) [14]. To date, for lack of means, our patient has only benefited from drug-based treatment and rigorous monitoring of his malformation.

4. Conclusion

At the end of this study, the uroscanner is presented as the reference examination to better explore urinary pathologies. At the same time, it makes it possible to carry out a study of the organs surrounding the urinary tract. Always think about the association of several urinary pathologies each time you see a patient for renal colic.

Conflicts of Interest

The authors state that they have no conflict of interest.

Author Contributions

All the authors contributed to the acquisition of data, the analysis and interpretation of the data and to the drafting of the article.

Ethical Considerations

The study was carried out with the informed consent of the parents of the infant, and the collection of data was carried out with respect for the anonymity of the patient and the confidentiality of their information.

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