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Crossed Fused Renal Ectopia: A Rare Malformation Diagnosed in Context of Pyelonephritis in Yaounde – Cameroon

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Abstract

The authors report a case of crossed renal ectopia with fusion of the upper renal poles, a rare congenital anomaly of the urinary system in which one of the two kidneys is on the contralateral side, the ureter of the ectopic kidney crosses the midline to plug into the bladder on the normal side. For this 8-year-old male patient, radiological exploration was performed for periumbilical and hypogastric abdominal pain with fever and dysuria caused by a pyelonephritis. Some cases of crossed-renal ectopia remain asymptomatic and the diagnosis is often incidental. Abdominal ultrasound is the first-line imaging technique for the diagnosis which is confirmed by the CT-scan. The interest of this case is both epidemiological, diagnostic and didactic because it is very rare and the medical imaging plays an important role to underpin this diagnosis.

Keywords: Crossed renal ectopia, Renal fusion, Pyelonephritis, Yaoundé

Introduction

Crossed renal ectopia (CRE) is a rare congenital anomaly, firstly described by Wilmer in 1938 [1-3] in which one of the two kidneys sits on the contralateral side, the ureter of the ectopic kidney crossing the midline to plug into the bladder often in the normal position. In this malformation, the parenchymal fusion is frequent, found in 85-90% of cases. Crossed renal ectopia can often be confused with the horseshoe kidney, from which it is distinguished essentially by the position of the vascular pedicles and ureters. Its incidence ranges from 1/2000 to 1/7500 births in autopsy series [2-4]. The pathology is asymptomatic in almost all cases. In symptomatic patients, it may be associated with a greater occurrence of urinary tract infections and in some cases with non-specific abdominal pain. We report here a case of a crossed renal ectopia, with fusion of the upper renal poles, diagnosed in a child during an abdominal ultrasound in context of urinary tract infection, associated with recurrent lower abdominal pains.

Case presentation

This is an eight-year-old male child received in radiology department for an abdominal ultrasound indicated for a two years periumbilical and hypogastric intermittent moderate abdominal pains without any aggravating factor nor transit disorder. He also had a fever and dysuria. No notion of prematurity or previous hospitalization. The physical examination found a good general condition, hypogastric tenderness, pain on right lumbar and a bilateral extra finger. Biologically, the patient had a leucocyturia without nitrituria nor hematuria. Plasma creatinine was normal at 0.8 mg/dL (normal: 0.5-1.2 mg/dL) and glomerular filtration at 102 ml/min. The blood count showed neutrophil-dominated hyperleukocytosis at 14800/mm3. The urine cytobacteriological exam confirmed the urinary tract infection and a probabilistic antibiotic therapy was instituted, secondarily adapted to the results of the antibiogram.

In the etiological exploration of this upper urinary tract infection, an abdominal ultrasound was requested. This exploration objectified an empty left renal compartment (Figure 1A), a right kidney in a low topography, arciform, with in Color Doppler Velocity two vascular pedicles, one on the right and the other on the left (Figure 1B). In these unusual morphological aspects, a CT-scan complement was performed, confirming the emptiness of the renal compartments with a low-lumbar right kidney. The left kidney was located at the right side with a fusion of their upper poles (Figure 1C). Cortical thicknesses, contrast enhancement, renal secretion and excretion were normal. In addition to fusion, there was a crossing of the midline by the

left ureter with normal plug in the bladder (Figure 1D). In the end, mindful of the clinical and paraclinical aspects, the diagnosis of crossed fused renal ectopia complicated by pyelonephritis, was underpinned.

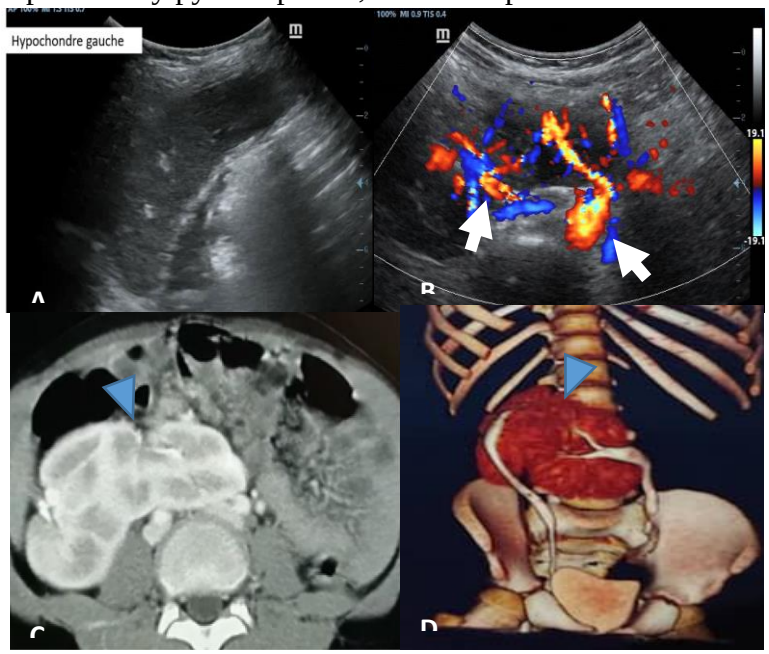

Figure 1. Ultrasound (A and B) and CT-scan (C and D) cross-sections and 3D VRT of urinary tract

The renal compartments are empty (A, D) with kidneys low located (C, D), the left kidney coming to the right side and fusing to the right kidney through their upper poles (blue arrowheads). Note on the Color Doppler Velocity image (B), the existence of two vascular pedicles (white arrows). The 3D volume rendering (D) shows the left ureter crossing the midline to plug-in to the left part of the bladder.

Discussion

Crossed renal ectopia is a rare birth malformation in which a kidney is transposed to the contralateral side while its ureter remains normally plugged in the bladder [5]. In Ivory-Cost, Lagou *et al*. had found in 2019 a hospital prevalence of 0.19% [3]. More recently in Cameroon, Moulion *et al.* in 2021, working on malformative congenital uropathies, have found a prevalence of 0.0071% [6]. The CRE has a male predominance as in this case, with a sex-ratio of 3:1 in all series [3, 5].

The discovery of the CRE is often fortuitous. In some cases, abdominal pain is reported as in the study by Lagou *et al.* which found abdominal pain in half of cases. The crossing of the left kidney on the right side, as in our case, is the most common form of crossed renal ectopia [5]. Crossed ectopic kidneys are usually located in the lower abdomen or in pelvis.[7] For our patient, the topography of crossed kidney was hypogastric.

In most cases, the ureteral orifices are usually orthotopic. But ureteral meatus can also be ectopic in 3% of cases [8], associated or not with ureteral reflux, ureterocele, renal lithiasis or ureteral obstruction [8]. We did not find any associated urinary abnormalities in this case. Concerning complications, recurrent infection of the urinary tract was found in 8.33% of cases in Ivory-Cost, as well as renal lithiasis (8.33%). These infection recurrences may lead to chronic kidney disease. Our patient had intermittent abdominal pain associated with clinical and biological pyelonephritis.

The place of imaging in the diagnosis of CRE is essential. Abdominal ultrasound detects the emptiness of the affected renal compartment and evaluates the vascular pedicles, the renal cavities and ureters in case of dilation. Intravenous urography often provides sufficient information to confirm the diagnosis and functional value of the kidney. The uroscanner confirms the diagnosis and looks for a fusion. It allows, on the late series, to individualize the two ureters, especially the crossing of the midline by the crossed kidney ureter. Arteriography is recommended if surgery is planned [9]. In our case, ultrasound suspected the diagnosis by highlighting two vascular pedicles and an empty left renal compartment. The CT-scan confirmed the diagnosis of ectopia and demonstrated the renal fusion associated to ureteral crossover.

Conclusion

The interest of this case is epidemiological, diagnostic and didactic. In such rare pathology, the existence of an empty renal compartment on ultrasound, associated with a double vascular pedicle on the contralateral renal structure must be considered for this diagnosis. Management is therapeutic abstention if the pathology is asymptomatic or the treatment of complications if there is symptoms.

Conflict of interest and ethics

The authors declare that they have obtained the informed consent from the parent of the child for this publication. There is no conflict of interest in relation with this article.

Authors‘ contributions

All authors have contributed to this work. All authors have read and approved the final version of the manuscript.

References:

1. McDonald JH, Mc Clellan DS. Crossed Renal Ectopia. *The American Journal of Surgery* 1957;93(6):995-1002.

2. Muoni A, Caccetta F, Caroppo M, Musio F, Accogli A, Zacheo MD, et al. Crossed fused renal ectopia: case report and review of the literature. *J Ultrasound* 2017;20:333-7.
3. Lagou DA, Coulibaly PA, Guei MC, Tia WM, Konan SD, Ackoundou-N'guessan KC, et al. L'ectopie rénale : à propos de 43 cas colligés en milieu hospitalier en Côte d'Ivoire. *AJOL* 2018;41(1):9-16.
4. Loganathan AK, Bal HS. Crossed fused renal ectopia in children: a review of clinical profile, surgical challenges, and outcome. *Journal of Pediatric Urology* 2019;15(4):315-21.
5. Babu CSR, Agrawal B, Sharma V, Kumar A, Jain R, Gupta OP. Crossed renal ectopia without fusion: a multidetector computed tomography study. *Int J Anat Res* 2015;3(4):1585-92.
6. Moulion Tapouh JR, Dongmo Fomekong S, Mbouche LO, Kafando Barkwende E, Ngo Um Kinjel SA, Onguene J et al. Particularités cliniques et radiologiques des uropathies malformatives de l'enfant au Cameroun. *J Afr Imag Méd* 2022;14(1):1-7.
7. Bhattar R, Maheshwari A, Tomar V, Yadav Singh S. Crossed Fused Ectopic Kidney: A Case Report. *J Clin and Diagn Res* 2017;11(8):11-12.
8. Abeshouse BS, Bhisitkul I. Crossed renal ectopia with and without fusion. *Urol Int* 1959;9:63.
9. Elbouti A, Rafai M, Jidane S, Belkouch A, Bakkali H, Belyamani L. Ectopie rénale croisée de découverte fortuite chez l'adulte : à propos d'un cas. *Pan Afr Med J* 2019;33(178):1-4.