Case Report

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Traumatic Pseudoaneurysm of the Renal Artery on Ectopic Kidney

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ABSTRACT

The ectopic pelvic kidney is defined as a kidney placed atypically due to abnormal migration from the fetal pelvis during development embryological. Ectopic kidneys can be more exposed to trauma, since they are in a less protected anatomical position. Today, these anomalies are generally noted as fortuitous discoveries during the initial assessment by ultrasound or computed tomography (CT scan). A post-traumatic renal artery pseudoaneurysm rarely occurs after abdominal trauma blunt. Common symptoms include acute hematuria, abdominal pain, a lump pulsatile in the abdomen or flank, or arterial hypertension. We report the case of a patient with post traumatic renal artery pseudoaneurysm on two fortuitously discovered ectopic pelvic kidneys.

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Received: November 04, 2021; **Accepted:** November 08, 2021; **Published:** November 11, 2021

Introduction

The ectopic pelvic kidney is defined as a kidney that is atypically placed due to abnormal migration from the fetal pelvis during embryologic development [1]. Ectopic kidneys may be more prone to trauma, as they are in a less protected anatomical position. Today, these abnormalities are usually noted as incidental findings during the initial workup by ultrasound or CT scan. Post-traumatic pseudoaneurysm of the renal artery rarely occurs after blunt abdominal trauma. Common symptoms include acute hematuria, abdominal pain, a pulsatile mass in the abdomen or flank, or high blood pressure [2, 3]. We report the case of a patient with a post-traumatic pseudoaneurysm of the renal artery on two pelvic ectopic kidneys that was discovered incidentally.

Observation

A 10-year-old child was admitted to the emergency department for macroscopic hematuria and abdominal pain following abdominal and cranial point-of-impact trauma after an MVA that occurred a few hours ago. There was no significant pathological history. Clinical examination revealed blood pressure at 96/54 mmHg, heart rate at 109 beats per minute, hypogastric pain with a painful pelvic mass. As part of a workup of the polytrauma patient an emergency abdominal ultrasound was performed which objectified: both kidneys at the pelvic level with heterogeneous echogenic cortex, without dilatation of the pyelocaliceal cavities with a semi-repleting bladder seat of a hyperechogenic mobile blood clot. A complementary uroscannography after injection of PDC showed that the two kidneys are visible at the pelvic level poorly rotated with fusion of their upper and lower poles realizing the aspect of a sigmoid kidney with a spontaneously dense sub capsular collection not enhanced after injection of PDC, measuring 5.5 mm of maximum thickness, in relation to a sub capsular hematoma associated with two upper polar fractures at the level of the kidney above arriving at the contact of the excretory tracts with extravasation of PDC at the time of the urination. The patient

was taken in charge in the department of child surgery, the follow-up in hospital has objectified a persistence of the macroscopic hematuria of small abundance, a control ultrasound carried out on the 7th day, which has identified at the level of the superior pole of the single sigmoid kidney a collection measuring 2.1 x2 cm, located at the medullary level and presenting a thick wall with a turbulent flow within it vascularized in the color Doppler realizing a sign of vortex, with an arterial spectrum in the pulsed Doppler in connection with a pseudo aneurysm of one of the branches of division of the renal artery of the kidney above located. For a better characterization of the aspect found on ultrasound, a complement by angioscan was requested, which confirmed the aspect of Pseudoanerysm.

Discussion

The prevalence of crossed renal ectopy is estimated at 1/7000 [4]. Since Mc Donald and Mc Clellan in 1957 [5], a distinction has been made between cross-renal ectopia with fusion, cross-renal ectopia without fusion, cross-renal ectopia on a single kidney and bilateral cross-renal ectopia. Crossed renal ectopia with fusion constitutes 90% of crossed renal ectopias [4, 5] and their prevalence in the general population is estimated between 0.05 and 0.1%. They are described in 6 types: Crossed ectopy with superior fusion; the ectopic kidney occupies a superior position. The lower pole of the ectopic kidney fuses with the upper pole of the orthotopic kidney, the rotation is incomplete and the 2 renal pelvises are in anterior position. Crossed ectopia with inferior fusion, the most frequent, the upper pole of the ectopic kidney fuses with the lower pole of the orthotopic kidney, the 2 renal pelvises being anterior. The ectopic kidney is low situated. The lump kidney is characterized by a fusion of the lateral faces of the two kidneys. The shaped kidney where the ectopic kidney is in a transverse position forming the letter with the normal kidney. The disc kidney is characterized by the fusion of the 2 upper poles and the 2 lower poles. The S-shaped or sigmoid kidney the upper

pole of the ectopic kidney is fused with the lower pole of the orthotopic kidney as in an inferior fusion but the renal pelvises occupy a lateral position. The position of the renal pelvis depends on the time of fusion. The earlier the fusion the more anterior the pelvis and the later the fusion the more lateral the renal pelvis. Sigmoid kidneys are therefore late inferiorly fused cross renal ectopias with more or less complete rotation. Sigmoid kidneys are extremely rare with a prevalence of 1/4000 in child autopsies and 1/16000 in adult autopsies [6].

Because the ectopic kidney lies directly in front of the lumbar spine without protection from the chest wall, it can be more easily compressed and injured in blunt abdominal trauma. Even when the finding is incidental, the patient should be informed of its presence because of an increased incidence of urinary tract infection, pyelonephritis, nephrolithiasis, and benign and malignant tumors [7]. Cross-fused and non-fused renal ectopia is usually identified incidentally during trauma or imaging performed for other reasons, often antenatally. Its incidence is approximately 1:2000 and also has an increased incidence of infection, obstruction and stone formation [8]. Clinicians should be aware of these abnormalities as their incidental presence at the time of injury may contribute to the presentation of symptoms and the findings may alter management. FAST echo is routinely used to identify free fluid in the abdomen by visualizing the planes between the intraperitoneal solid organs and the kidneys [9]. An empty renal fossa should prompt the sonographer to look for a horseshoe kidney or ectopy. The ectopic kidney also has variants of the vasculature that can be the site of trauma such as ruptures, arteriovenous fistulas and pseudoaneurysms. Furthermore, surgeons must be aware of the latter to avoid iatrogenic injury to these vessels. Post-traumatic pseudoaneurysms of the renal artery are most often related to iatrogenic causes (surgery, biopsy...), and exceptionally secondary to closed trauma. Indeed, pseudoaneurysm may be secondary to direct injury in penetrating trauma, whereas it is considered a consequence of deceleration forces in closed trauma. Indeed, in our patient's case, the pseudoaneurysm was secondary to a non-penetrating abdominal trauma, the arterial injury was probably favored by the anterior position of the renal hilum and the presence of a hard posterior plane. The clinical presentation may include sudden hemorrhage, anemia, hypertension, low back pain, and a pulsatile abdominal mass [10]. Pseudoaneurysms may also be asymptomatic for a long period of time and progress to spontaneous thrombosis. The time to onset of symptoms is highly variable, with a median of 17 days (1-45 days) [2]. Our patient presented with persistent macroscopic hematuria related to a pseudoaneurysm seven days after the closed abdominal trauma.

Figure 1: Sagittal section of an arterial abdominal CT scan

Figure 2: Axial section of an abdominal CT scan in arterial Time

Figure 3: Sagittal section of a late-time CT scan after 15 Min

Figure 4: 3D reconstruction of the abdominopelvic floor in Angio mode

Figure 5: **A:** ultrasound image in color Doppler mode showing vascularization of the two ectopic sigmoid kidneys. **B and C:** ultrasound image in color and pulsed Doppler mode showing the appearance of a pseudo-renal aneurysm

Conclusion

Post-traumatic pseudoaneurysm of the renal artery is a very rare pathological entity. Its occurrence on a pelvic ectopic kidney is exceptional, despite the vulnerability and exposure of the kidney at this site.

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