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RESEARCH ARTICLE

IMAGING OF SUPERNUMERARY KIDNEYS ABOUT A CASE IN BAMAKO

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Abstract

Supernumerary kidneys are very rare renal malformations, little described in the literature. Its diagnosis is difficult, most often discovered during a radiological exploration either fortuitously or during a complication. We report a case of bilateral supernumerary kidneys on fused crossed ectopia of the right kidney diagnosed by ultrasound and computed tomography in Bamako in a 16-year-old girl. The objective of this work is to provide the place of imaging in the diagnostic management of supernumerary kidneys.

Introduction:-

The supernumerary kidney is an extremely rare congenital renal malformation and little described in the literature **[1,2].** It is the rarest malformation among kidney malformations **[3].** Generally, the supernumerary kidney is separated from the ipsilateral kidney and drained by its own ureter or by a bifid ureter [**1**]. Its diagnosis is difficult and can be asymptomatic **[1,4].** The supernumerary kidney is generally discovered incidentally during radiological exploration or during its complications. The existence of 3 kidneys in humans, one of which is supernumerary, is most often observed, but the presence of four kidneys, of which 2 are supernumerary, is less seen in Africa and especially in Mali, or even absenteeism, hence the interest of our study to document a rare case and establish the role of imaging in the diagnosis of supernumerary kidneys.

Observation:-

We report the case of a female subject, aged 16, with no particular pathological history. She was seen at the referral health center of Commune III of Bamako for intermittent diffuse abdominal pain evolving for more than 2 days, not relieved by the usual analgesics. His clinical examination showed in palpation of a hypogastric mass. Renal function was normal. The abdominopelvic ultrasound was performed at the center by a GE (General Electric) type P3 ultrasound scanner, commissioned in 2008, equipped with 3 multifrequency probes. She had shown a right kidney and a left kidney of normal size and topography without visible hydronephrosis with a volume of (36 ml for the kidney and 85 ml for the left kidney). These two kidneys retained their corticosinusal differentiation. He had seen another kidney in the right iliac fossa badly rotated with a volume of 77 ml and another kidney in the right

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laterovesical with a volume of 119 ml, without dilation of the pyelocaliceal cavities. All four kidneys were taking color Doppler **(Figure 1).**

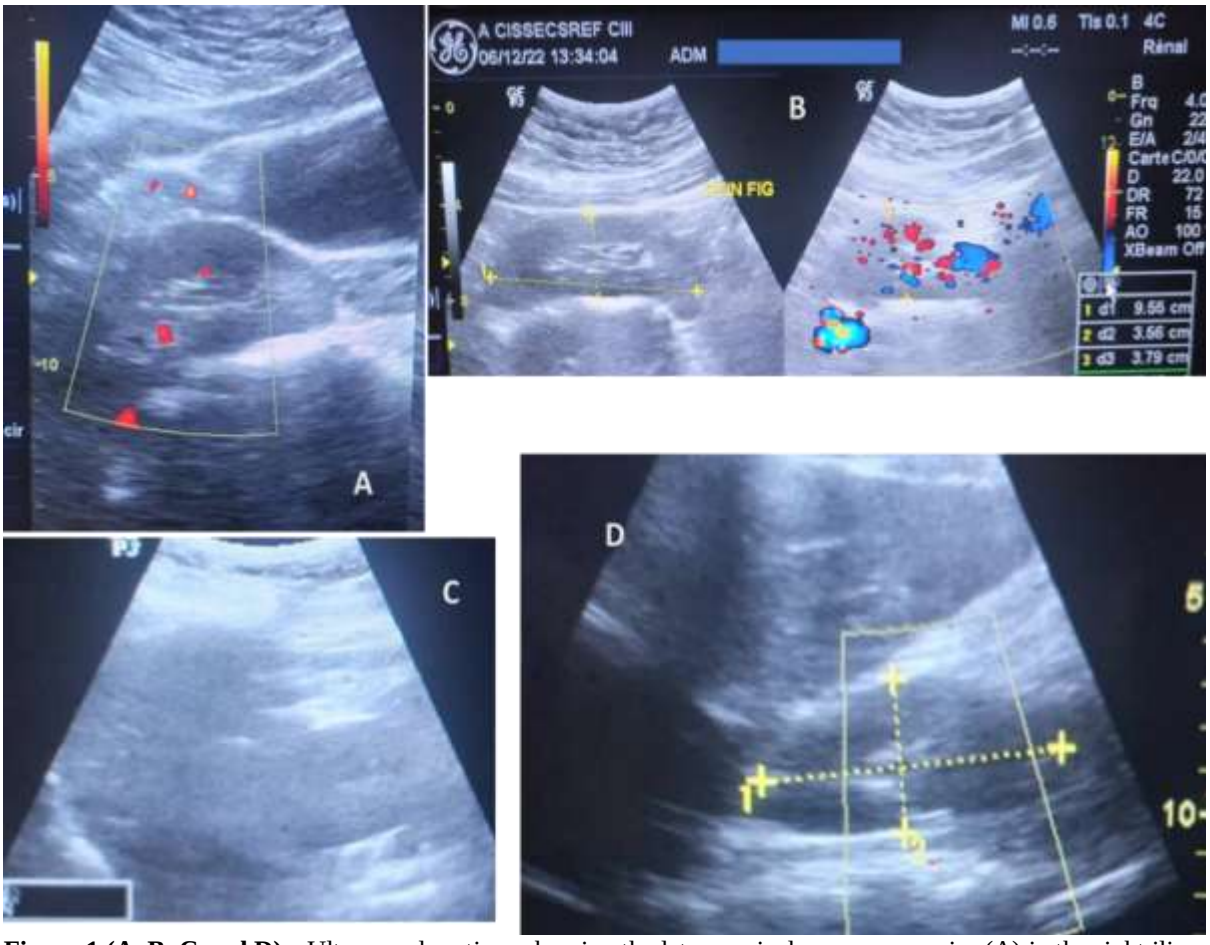

Figure 1 (A, B, C and D):- Ultrasound sections showing the laterovesical supernumeraries (A) in the right iliac fossa (B) with color acquisition by color Doppler and the two kidneys of normal right and left topography (D et C).

The remainder of the ultrasound examination of the abdomen and pelvis was unremarkable.

Computed tomography was requested for confirmation of supernumerary kidneys at the Marie Curie medical clinic in commune V of Bamako in Mali. The examination was carried out by a GE scanner of the Optima type, year 2013. It had shown the presence of multiple kidneys (four kidneys) including two kidneys in a normal anatomical situation in the right and left lumbar fossae. Two other kidneys are seen in an ectopic situation with the first which was in the right iliac fossa, badly rotated and its superior pole merges with the inferior pole of the ipsilateral kidney realizing an aspect of sigmoid kidney with the presence of a ureteral bifidity another kidney is located in the pelvis anterior to L4, L4 and S1 between the iliac vessels, it is also poorly rotated with the sinus looking to the left **(Figure 2 and 3).**

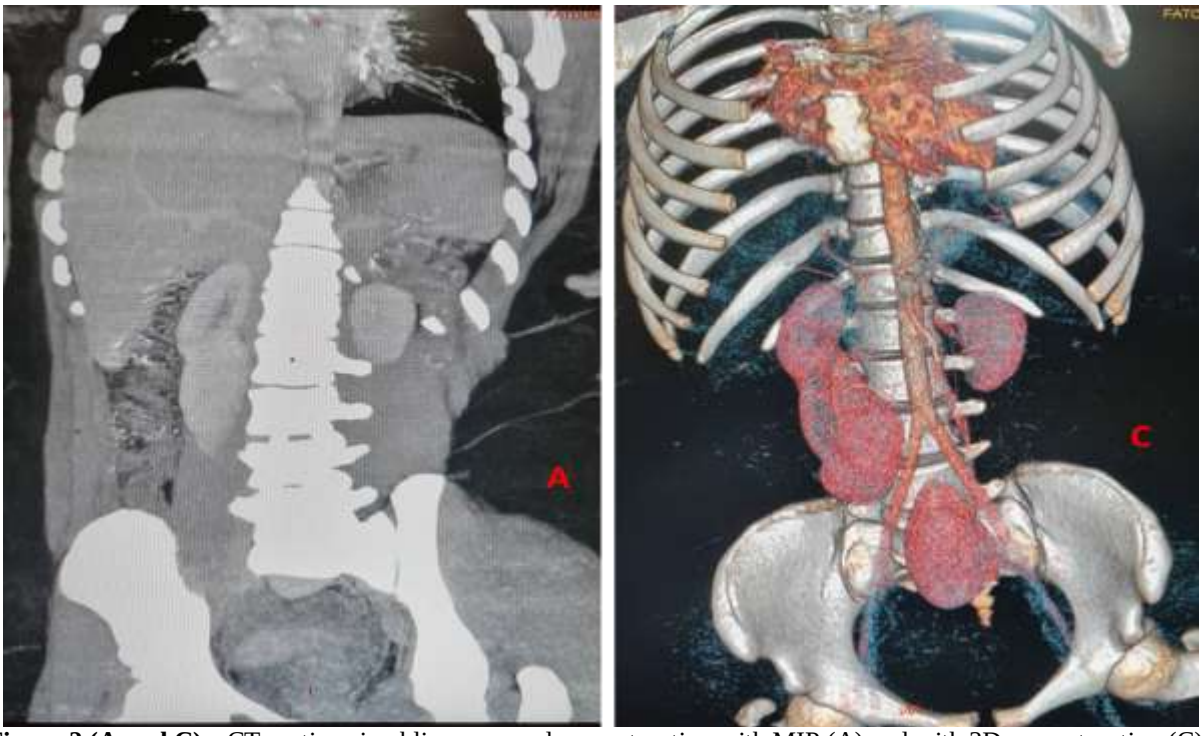

Figure 2 (A and C):- CT sections in oblique coronal reconstruction with MIP (A) and with 3D reconstruction (C) showing the sigmoid kidney on the right and the hypogastric supernumerary kidney between the iliac arteries and its left ipsilateral kidney in a normal situation.

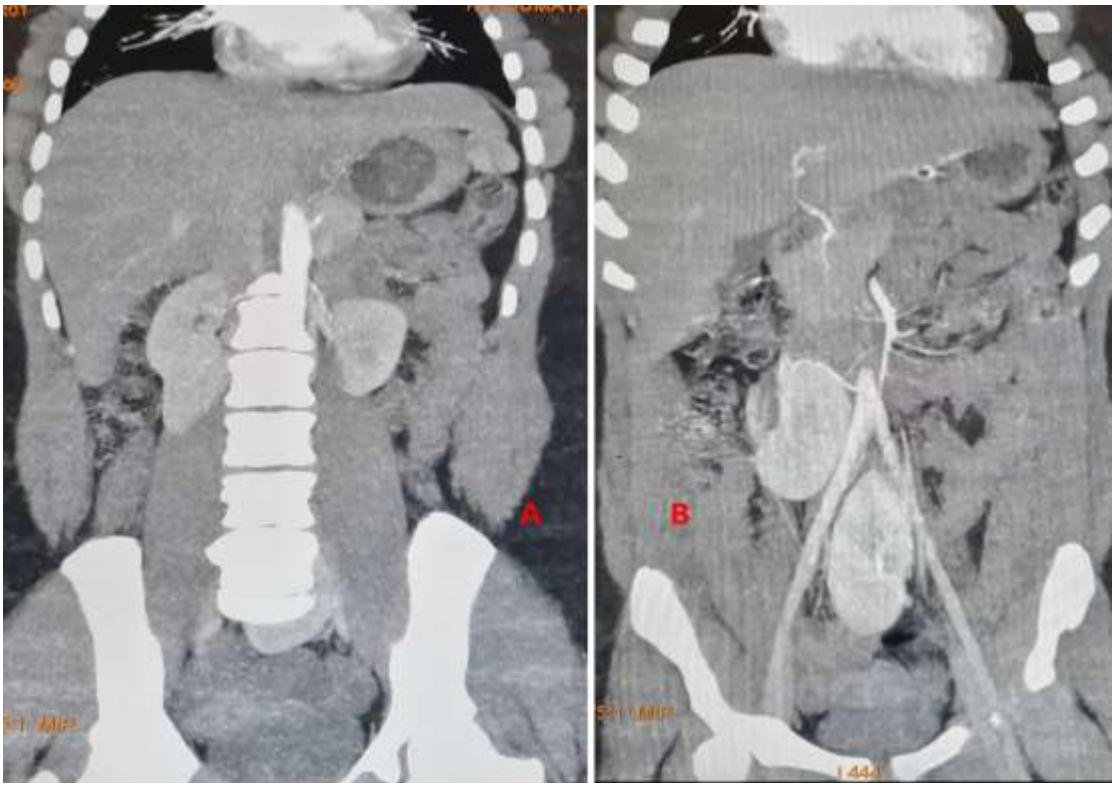

Figure 3 (A and B):- CT scans in coronal reconstruction with MIP (A and B) showing normal kidneys (A) and supernumerary kidneys (B) hypogastric between the iliac arteries and in the right iliac fossa with arterial pedicles protruding of the abdominal aorta.

The latter had its own ureter communicating with the left ureter which empties into the bladder (ureteral bifidity**) (figure 4).**

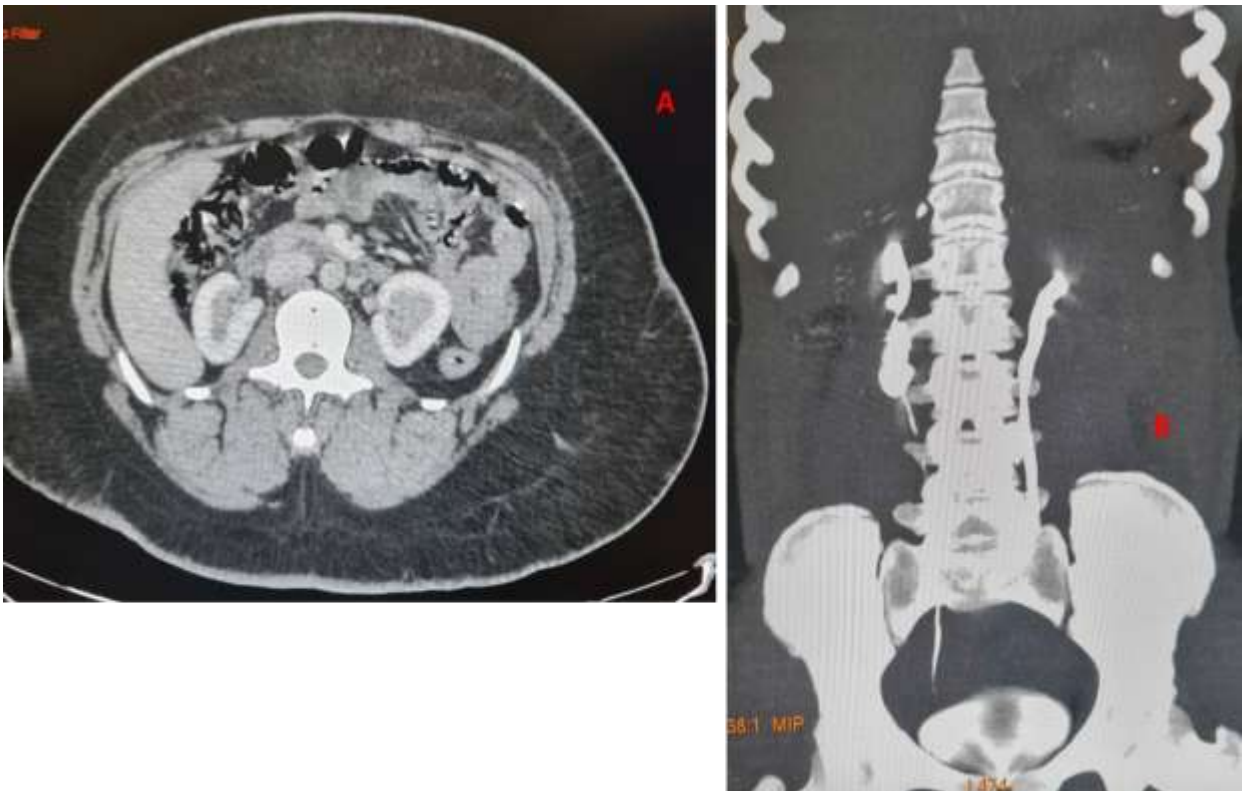

Figure 4 (A and B):- CT scans in axial reconstruction (A) and coronal reconstruction with late stage MIP (B) showing normal kidneys (A) and bilateral bifidity (B).

The arterial vascularization of the kidneys was ensured by four renal arteries, the first two of which (right and left) leaving the abdominal aorta located at the height of L1 and the last two (right and left) leaving the abdominal aorta at the height of L3-L4 just before the bifurcation of the iliac arteries **(see figure 3).** A urological and renal opinion was requested and they opted for close monitoring given the absence of visible complications on the supernumerary kidneys.

Discussion:-

Our observation corresponds to a double supernumerary kidney which is defined in the literature as being a structure which resembles a normal kidney in its different aspects, with its own pedicle and excretory pathway distinct from those of the ipsilateral kidney **[1,5].** The supernumerary kidney can be discovered on the occasion of lumbar pain, hematuria, urinary incontinence, arterial hypertension or trauma **[5, 6,7].** In our patient there was intermittent abdomino-pelvic pain for 2 days. It may be responsible for a pelvic mass or simulate an adrenal tumor **[1,5,8].** We had clinically found a hypogastric mass. The preoperative diagnosis of the supernumerary kidney is difficult despite the various radiological examinations including ultrasound, intravenous urography and computed tomography **[1,4,9].** In our patient, who was slightly obese, ultrasound suspected multiple kidneys and computed tomography with injection of contrast product made it possible to evoke the diagnosis of two ectopic supernumerary kidneys with sigmoid kidney on the right. Embryologically, supernumerary kidneys are formed from a single nephrogenic blastema. When two ureters, partially or totally separated, penetrate this blastema, there is formation of two kidneys by secondary fragmentation of the metanephros**[1,2].** It is an extremely rare malformative and congenital renal anomaly **[4, 5, 6**], since until 1992, only 72 cases were reported in the literature **[6].** Our case is the first in Bamako if not in Mali properly documented. The left side is the site of this anomaly in approximately 63.3% of cases **[2].** The supernumerary kidney is in more than half of the cases caudal compared to the ipsilateral kidney **[1, 2, 4].** In our observation the malformation was on both sides (right and left). It can be cranial or posterior or be associated with a true horseshoe kidney **[2, 6, 8].** In our case, it was associated with an anomaly of rotation and fusion of the crossed

ectopia type commonly called sigmoid kidney. The lower pole of the right kidney with normal topography and orientation was fused to the upper pole of the poorly rotated right supernumerary kidney. When the ureter is bifid, the confluence takes different forms (Y-shaped, inverted-Y-shaped) **[1].** Bifidity was present in our observation and bilaterally in a Y-shape. There may be duplicity, and in this case the mode of bladder accumulation is not well established **[1,2].** The supernumerary kidney and supernumerary the ipsilateral kidney can be the site of complications such as stone formation, hydronephrosis, pyonephrosis or neoplasia. These complications occur variably depending on whether the ureter is double or bifid **[1,2].** In our observation, there was no notable complication, the four kidneys retained good corticosinusal differentiation without hydronephrosis, without lithiasis, but there was a difference in volumebetween the kidneys in a normal anatomical situation (36 mm on the right and 77 ml on the left) and ectopic kidneys and (85 ml on the right and 119 ml on the left).Those in normal position were smaller compared to supernumerary kidneys. Therapeutic conduct in front of a supernumerary kidney varies according to the circumstances of discovery, the associated pathology and the state of the ipsilateral kidney and the contralateral kidney [**1,2].** If the supernumerary kidney is associated with urinary incontinence due to an ectopic or symptomatic ureteral orifice due to stasis, infection or stone formation; nephro-ureterectomy is necessary **[1].** In our observation there was no complication and it was a fortuitous discovery. When the supernumerary kidney is discovered fortuitously or intraoperatively, nephro-ureterectomy will be performed if it is small, abnormal in appearance with satisfactory renal function of the ipsilateral and contralateral kidneys **[1].** The supernumerary kidneys were two in number, one in the right iliac fossa and the other in the laterovesical hypogastric with larger volumes than the ipsilateral kidneys and normal renal function. The opinion of urologists and nephrologists were the continuous monitoring of the patient. Because long-term monitoring is essential when the supernumerary kidney appears normal, given the risk of neoplastic transformation, infection and stone formation **[1].**

Conclusion:-

The supernumerary kidney is an extremely rare congenital renal malformation. Its diagnosis remains difficult. Cross-sectional imaging, ultrasound and computed tomography made it possible to suspect and confirm the presence of two supernumerary kidneys. Computed tomography remains the gold standard in the diagnosis and treatment of supernumerary kidneys.

Conflict of interest:

The authors all participated in the writing of the manuscript directly or indirectly and declare that they had no conflict of interest

Informed consent:

The patient and his parents gave their informed consent for the publication of the case.

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