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Horseshoe Kidney

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Clinical Image

Horseshoe kidney is the most frequent congenital fusion abnormality of the urinary system. It associates malrotation, ectopia, and vascular changes. It's usually the lower pole of both kidneys that are merged by a parenchymal or fibrous isthmus. An inverted horseshoe kidney is called when the isthmus connects the superior pole [1].

The classic theory implies that during the 4th week of gestation, while the kidneys are still in the pelvis, their lower poles are connected and fuse in the midline leading to a horseshoe kidney with fibrous isthmus [1]. Normally around the 7th and 8th week of gestation both kidneys ascent at the level of the L2 vertebral body and rotate 90° permitting hilar turning from anterior to medial. Nevertheless, ascension and rotation are prevented by the inferior mesenteric artery. And thus, the lower poles point toward each other, and the hilar remains anteriorly directed [2].

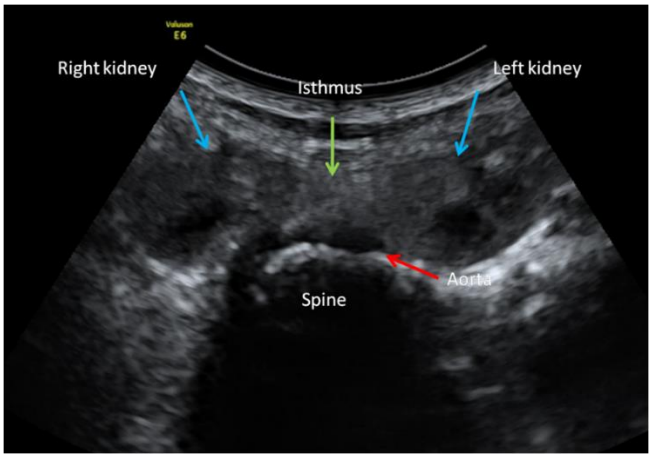

***Figure:** Transverse sonogram showing renal fusion by a connecting isthmus.*

A second theory implies an abnormal migration of the posterior nephrogenic cells that forms a parenchymal isthmus [1]. Median fusion of the kidneys in a symmetrical position on either side of the spine forms a U-shaped horseshoe kidney. On the other hand, a lateral fusion between vertical and horizontal kidneys with an isthmus laterally to the midline forms an L-shaped horseshoe kidney.

This condition is usually asymptomatic, but in case of hydro nephrosis, lithiasis, or infection the most common symptom is intense abdominal pain radiating to a low lumbar position. Gastrointestinal manifestations such as nausea and vomiting may also be associated [1].

HSK may be complicated by ureteropelvic junction obstruction, lithiasis especially large staghorn stones, infection secondary to urine stasis, and renal tumours secondary to chronic infection.

On ultrasound, detecting the isthmus is the finding making the diagnosis. It can be complicated in the case of a fibrous isthmus or a large body habitus, and it should not be mistaken for a retroperitoneal mass. On CT, the imaging of enhancing tissue distinguishes functional from the fibrous isthmus.

Both CT and MRI provide useful information on the kidney anatomy and vascular supply that is commonly abnormal with multiple accessory vessels. It also allows detailed information about the relationship with other structures, and the associated pathological conditions [1,2].

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

Author Contributions

All authors contributed equally to this work

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