

# Supernumerary kidney forming isthmus of horseshoe kidney: A rare presentation

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## ABSTRACT

Supernumerary kidney is one of the rarest congenital anomalies of the genito-urinary tract. Around 100 cases have been reported in the literature so far. Even rare is the fusion of a supernumerary kidney. The supernumerary kidney has its own blood supply, collecting system and a capsule. We report the case of a 33 year old male with vague pain in the pelvis who was found to have a horseshoe kidney with a fused supernumerary kidney as the isthmus.

## INTRODUCTION

Since its portrayal more than 350 years ago<sup>[1]</sup>, around 100 cases have been described in the literature. The incidence of the anomaly remains obscure and is believed to occur in equal frequency in both genders.<sup>[2]</sup> Embryological basis of supernumerary kidney can be explained by abnormal division of nephrogenic cord into two metanephric blastemas during the 5<sup>th</sup>-7<sup>th</sup> week of gestation which eventually form two kidneys with partially or completely duplicated ureteric buds<sup>[3]</sup>. Horseshoe kidney is a relatively common fusion anomaly with an incidence of around 0.25% of the general population and is seen more commonly in males than females<sup>[4]</sup>. The combination of a fused supernumerary kidney forming isthmus of a horseshoe kidney is rarer. The exact incidence of this anomaly is not known due to the rarity of this presentation.

## CASE REPORT

A 33-year-old male presented to the emergency with acute onset of non-radiating lower abdominal, colicky pain associated with nausea and vomiting. There was no constitutional derangement, hematuria, or flank

pain at presentation. Abdominal examination failed to disclose any mass or organomegaly. All traditional laboratory evaluations were unremarkable except for increased yield of RBCs (10–15/HPF) in routine urine analysis. Ultrasound scan of the abdomen was subsequently performed, which delineated a well-defined, solid, and solitary suprapubic intra-abdominal mass measuring 3 cm × 4 cm × 6 cm in the anteroposterior, transverse, and longitudinal profile and overlying the inferior vena cava and abdominal aorta at L4–L5 level. A triple phase-contrast computed tomography of the abdomen was performed to further characterize the sonological finding. The investigation confirmed the horseshoe configuration of the right and left kidneys, along with the disposition of the supernumerary kidney as its isthmus [Figure 1]. The study also provided details of the cortical contours, vascularity, and drainage apparatus (including calyceal cluster and ureters) of all the three kidneys, individually; ruling out categorically bifid systems or partial duplications [Figures 1 and 2]. The patient was managed conservatively and discharged the next day after symptomatic relief.

## DISCUSSION

The combination of a fused supernumerary kidney with horseshoe kidney is very rare and has been

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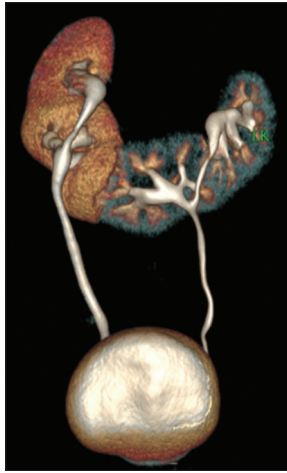
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**Figure 1:** Three-dimensional-reconstructed computed tomography urography image with calyces from left renal moiety and isthmus seen draining into left renal pelvis and ureter



**Figure 2:** Three-dimensional computed tomography reconstruction showing an aberrant renal artery (blue arrow) supplying the isthmus and lower pole of right renal moiety. Two renal arteries seen on the right side and single renal artery on the left side supplying the renal hilum

sporadically reported; the exact incidence of this anomaly cannot be comprehended due to the rarity of this presentation. Customarily, a bridge of parenchyma fuses the lower poles of both kidneys in a horseshoe configuration and constitutes the isthmus. When the isthmus of a horseshoe kidney reaches the inferior mesenteric artery at the aorta, further ascent of the configuration ceases. Histological structure of the isthmus is rather varied and has been evaluated by many authors.<sup>[5]</sup> In a horseshoe kidney, the isthmus consists of either functional parenchyma or fibrous tissue. Microscopic studies of the isthmus have revealed the presence of connective tissue and few glomeruli. Interestingly, the interposition of a supernumerary kidney and performing the role of an isthmus in a horseshoe configuration, as in our case, has been rarely reported. A literature survey has disclosed around five cases, to date to the best of our knowledge.

## CONCLUSION

Horseshoe kidney, alone or in combination with supernumerary kidney, is prone to pathological situations and emanating from stone disease, drainage impediments, and tumors. The precise anatomical details reconstructed through appropriate imaging as done in our case prerequisite for managing these clinical situations.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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