

# The rarest phenomenon of flexible ureterolithotripsy: Kidney stone in supernumerary type combination with a horseshoe kidney

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## Abstract

The horseshoe kidney (HSK) is common and supernumerary kidney is the rarest developmental anomaly of the urogenital system. The supernumerary kidney in a HSK conjunction is extremely rare, and prevalence of it is unknown. A review of literature, there have been a few case reports about the supernumerary and HSK combination, however, none of which also had a concomitant kidney stone and obstructive pathology. Our case indicated that patient referred to flank pain and visible hematuria to our clinic, and further investigations demonstrate supernumerary kidney in a horseshoe configuration and kidney stone. Kidney stone could not be found at the first attempt because of the anatomical malformation. Retrograde pyelography showed ureteral branching and helps to define the placement of stone. This stone was fragmented with flexible ureteroscopy in the lower pole of the middle kidney in the second session. There was no stone fragments absence at the 1<sup>st</sup>-month control. This exceedingly rare type case should be evaluated meticulously on preoperative duration otherwise can be a challenge for surgeons. Visualize pelvicalyceal system under the fluoroscope is a vital step in this regard to being guidance during the procedure.

**Keywords:** Flexible ureteroscopy, horseshoe kidney, renal malformations, supernumerary kidney

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## INTRODUCTION

The supernumerary kidney is among the rare developmental urogenital anomalies. The horseshoe kidney (HSK) is the most common renal anomaly, but supernumerary kidney in a horseshoe conjunction is a very rare event. Renal abnormalities are prone to affect by urolithiasis because of the high insertion of the ureter; there is a relative impairment of renal drainage.<sup>[1]</sup> The literature has not reported these same possible risks of having a

supernumerary kidney in a horseshoe combination due to the rarity of the cases. There have only been a few case reports of the supernumerary kidney in a horseshoe configuration, none of which also demonstrated renal stone and laser stone fragmentation by flexible ureteroscopy (FURS). Herein, we present the FURS of the middle kidney stone fragmentation as well as the preoperative and perioperative challenges.

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## CASE REPORT

A 49-year-old man referred to our department with bilateral flank pain associated with macroscopic hematuria. Ultrasonographic examination demonstrated an HSK concomitant renal stone. Due to altered anatomy, computed tomography (CT) urography was planned and it revealed the triple system, bilateral kidney stones. After the anesthesia preparation, we performed FURS. First, semirigid ureteroscopy was used. Seven millimeter-sized fallen ureteral stone had been seen in the bladder. After that, 3 f hydrophilic guide wire inserted into the right ureter. A 9.5 f access (Plasti-med, Istanbul, Turkey) was introduced then passed the FURS (Flex X2, Karl Storz, Tuttlingen, Germany). We could not locate the stones in the renal calyces. Retrograde contrast fluid injected and then it revealed the branching part of the ureter which way to the third kidney [Figure 1]. We pushed forward the device gently, under the vision of retrograde pyelography (RPG). Kidney stone had been found in the lower part of the third kidney on the middle line. It was fragmented by the Holmium laser, and 4.8 f 26 cm pigtail stent (Plasti-med, Istanbul, Turkey) was inserted. First-month control with the kidney, ureter, and bladder film was stone free.

## DISCUSSION

One of the rarest urogenital anomalies is the supernumerary kidney with fewer than one hundred cases reported so far. Numerous size and locations can be grown-up on the left side of the abdomen; smaller dimensions and caudal settlement type are common.<sup>[1]</sup> The supernumerary kidney in a horseshoe combination is the rarest type of renal abnormalities; a few cases are reported in the literature. Abnormal division of the nephrogenic cord into the

two metanephric blastema with branching two part of a single bud in the embryological time. The prevalence of developmental anomalies is still unknown, mostly unilateral and on the left side.<sup>[2]</sup>

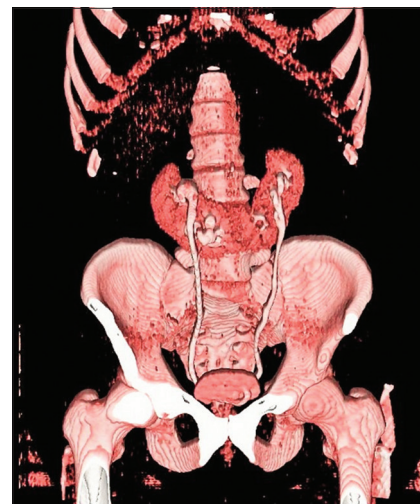
Modern radiological images such as intravenous urography and CT are presented as an enough for the definition of the vast majority part of the cases. According to complaints of the patient, further investigations could be necessary. These techniques demonstrate separated arterial, venous supply, and pelvicalyceal system with the distinct encapsulated parenchyma should be evaluated at the differential diagnosis. Differently associated anomalies such as atresia, duplication, and ectopic opening and HSK configuration like our cases can combine with the supernumerary kidneys.<sup>[3]</sup>

Congenital renal anomalies are susceptible to urinary tract infection, stone and malignant changes, and hydronephrosis. Besides of that, patients mostly apply to urology clinics with various symptoms such as fever, abdominal, or flank pain; suspicious mass is seen in these cases. Particularly, these pathologies are common associations with HSK. Due to the rarity of this anomaly, there is no evidence-based approach for the treatment of supernumerary and horseshoe combination anomaly patients. However, previous studies reported that increased risk of malignancy and fusion anomalies such as vaginal and urethral atresia accompanied with other systems' malformations.<sup>[4]</sup>

Perioperative fluoroscopic images are valuable guides to find the track of the aberrant kidney. In our case, the right inferior (middle) supernumerary kidney has a separated



**Figure 1:** Retrograde pyelography image during the flexible ureteroscopy



**Figure 2:** Conformational image which shows separated pelvicalyceal system with adjacent parenchyma



**Figure 3:** Computed tomography urography image of supernumerary in a horseshoe kidney combination at the coronal plane

arterial, venous supply and collecting system with the adjacent parenchyma. It is overlying aorta and median columnar line [Figures 2 and 3]. Ureteral branch of the middle kidney arise from the proximal part of the right ureter was determined by RPG. Kidney stone located to the inferior part of the middle kidney. Our case is unique in the literature as a view of this aspect. Laser stone fragmentation has not been reported in the supernumerary HSK with FURS till date.

## CONCLUSION

The extremely unusual anomalies of the supernumerary kidney in a horseshoe conjunction are such a rare event, especially concomitant kidney stone, and FURS procedure is incredibly challenging. Therefore, contrast-enhanced imagines and perioperative retrograde ureteropyelography can simply our process, increase the success rates, and reduce additional interventions.

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## Conflicts of interest

There are no conflicts of interest.

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