

# Horseshoe Kidney with Bilateral Ureteropelvic Junction Obstruction with Multiple Renal Calculi: A Case Report

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## Abstract

Horseshoe kidney is the commonest fusion anomaly of the genitourinary tract with a prevalence of 1/400-1/800. It is characterized by renal malrotation, variable blood supply, high insertion of the ureter, and a propensity to form an ureteropelvic junction (UPJ) obstruction in up to one-third of cases. The most common complication of horseshoe kidney is kidney calculus. The management of a young patient who presented with horseshoe kidney with recurrent multiple renal calculi due to bilateral UPJ obstruction with recurrent urinary tract infection is described. During follow-up after 3 months, the patient was symptomatically relieved, there were no complaints of pain or fullness in the abdomen and the patient has started doing daily regular activities and work.

**Key words:** Horseshoe kidney, Percutaneous nephrolithotomy, Pyeloplasty, Ureteropelvic junction obstruction, Urolithiasis

## INTRODUCTION

Horseshoe kidney is the commonest fusion anomaly of the genitourinary tract with a prevalence of 1/400-1/800.<sup>1</sup> It is characterized by renal malrotation, variable blood supply, and a propensity to form ureteropelvic junction (UPJ) obstruction in up to one-third of cases.<sup>2</sup> UPJ obstruction is postulated to develop secondary to congenital stricture, high ureteral insertion, an abnormal ureteral course over the isthmus, crossing vessels supplying the isthmus, or abnormal motility of the UPJ segment.<sup>3</sup>

The most common complication of horseshoe kidney is kidney calculus. It was previously believed that such a high frequency of calculus formation in these patients was due to the higher rate of infection, stasis, and obstruction. However, the last reviews are suggestive for metabolic causes in most of the patients.<sup>4</sup>

The management of a young patient who presented with horseshoe kidney with recurrent multiple renal calculi due to bilateral pediatric ureteropelvic junction (PUJ) obstruction is described.

## CASE REPORT

A 24-year-old male patient presented with complaints of intermittency, burning micturation, pain lower abdomen, fullness in both flanks, increased frequency of micturation, and dysuria off and on for 3 years. The patient gave a history of left-sided open pyelolithotomy 3 years back. The operation was uneventful, but there was no total stone clearance. The patient was evaluated and investigated. Complete blood count, liver function tests, and renal function test were normal. Urine routine microscopy was showing signs of infection. Ultrasound (USG) abdomen showed the findings suggestive of horseshoe kidney with bilateral multiple renal calculi with gross hydronephrosis. Intravenous pyelogram (Figure 1) was suggestive of multiple bilateral renal calculi with bilateral hydronephrosis with horseshoe kidney. Nuclear renogram (Figure 2) was showing horseshoe kidney with bilateral impaired parenchymal function and obstructed drainage pattern on the left side and sluggish partially obstructed drainage pattern on the right side.

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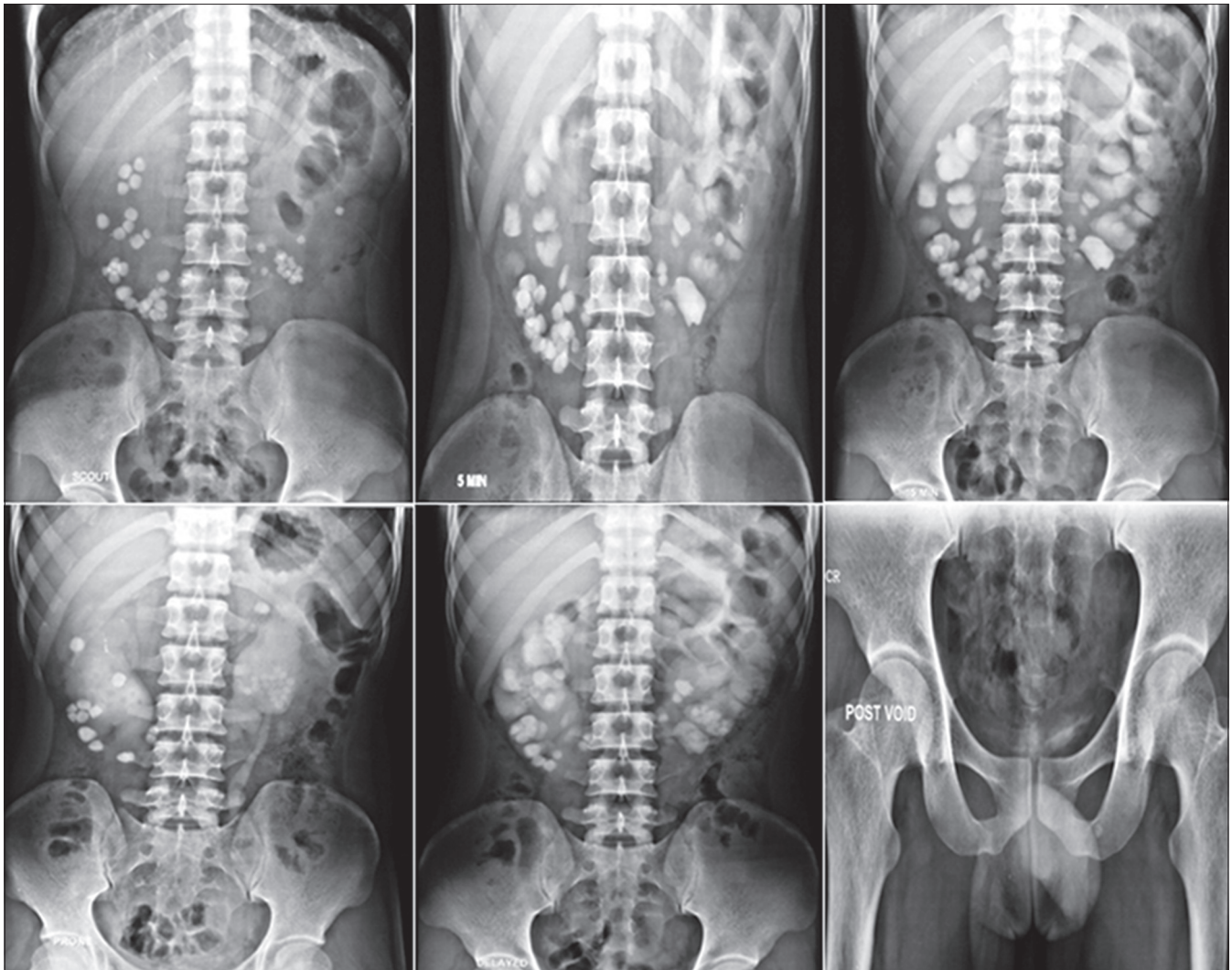


Figure 1: Intravenous pyelogram suggestive of multiple bilateral renal calculi with bilateral hydronephrosis with horseshoe kidney

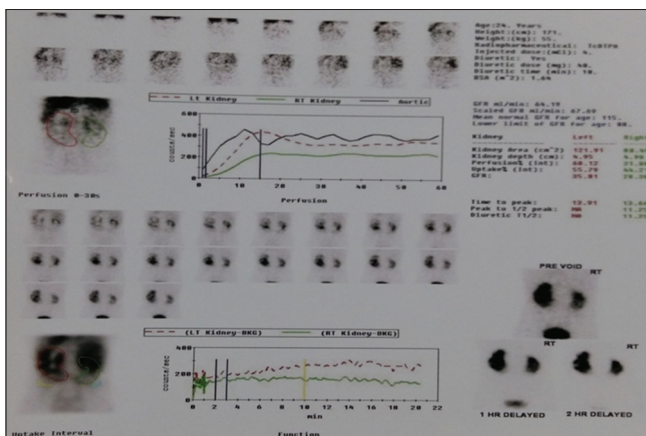


Figure 2: Nuclear renogram showing horseshoe kidney with bilateral impaired parenchymal function and obstructed drainage pattern on the left side and sluggish partially obstructed drainage pattern on the right side. Differential renal function of left moiety - 55.79% and right moiety - 44.21%

The patient was subjected to bilateral retrograde pyelogram which showed bilateral UPJ obstruction with high insertion of the ureter. Bilateral open pyelolithotomy with pyeloplasty with double-J (DJ) stenting was done through a lower midline incision. Post-operative hospital stay was uneventful. Follow-up USG and X-ray kidneys-ureters-bladder (KUB) after 2 weeks showed residual calculi, 4 on right and 3 on the left side. Urine culture was positive for *Escherichia coli*  $>10^5$  which was managed conservatively with injectable cefotaxime for 7 days. X-ray KUB 3 weeks later showed right renal calculi with left lower ureteric calculi. The right side percutaneous nephrolithotomy (PCNL) with left sided ureterorenoscopy lithotripsy (URSL) was done, complete stone clearance (Figure 3) was achieved and bilateral DJ stenting was done. During follow-up, the patient was symptomatically relieved; there were no complaints of pain or fullness in the abdomen.



**Figure 3: Post-operative X-ray kidneys-ureters-bladder showing complete stone clearance**

## DISCUSSION

Horseshoe kidney is the result of a developmental defect occurring between 4<sup>th</sup> and 8<sup>th</sup> weeks of embryogenesis. As the kidney develops, the inferior poles fuse and its ascent is arrested by the inferior mesenteric artery. The kidneys are fused by an isthmus, which can be a band of fibrous tissue or a thick rim of functional renal tissue. Clinical findings are those of infection, calculi, obstruction or tumor due to anomalous position of pelvis, and ureters. As the most common complication of the horseshoe kidney necessitating surgical intervention, urolithiasis has an incidence of 20-60%, and UPJ obstruction occurs at an incidence of 15-33%.<sup>5</sup>

The primary technical challenges of pyeloplasty in this population relate to aberrant lower pole vessels, the unfamiliar caudal position of the kidney, and renal isthmus. Conventionally, the management of UPJ obstruction in horseshoe kidney has been open dismembered pyeloplasty with isthmusectomy and nephropexy of the ipsilateral kidney.<sup>3</sup> Simple Anderson–Hynes pyeloplasty via a flank incision without additional division of the isthmus and lateropexy of the kidney is also a highly effective and safe procedure for treating UPJ obstruction in horseshoe kidney.<sup>6</sup>

The calculi in a horseshoe and ectopic kidneys present unique challenges in decision-making and technical

aspects of treatment. PCNL has been shown to be highly successful with an overall stone-free rate of 75-100% in a few series.<sup>7</sup>

In the case of this patient who presented with horseshoe kidney with recurrent multiple renal calculi due to bilateral UPJ obstruction with recurrent UTI. The patient was managed successfully with bilateral open pyelolithotomy with pyeloplasty in a single setting. The patient developed UTI during follow-up period, which related to bilateral DJ stent *in situ*, and managed conservatively with antibiotics. In view of residual calculi, the right PCNL and left URSL was done, and complete stone clearance was achieved. After 3 weeks, bilateral DJ stent was removed. During follow-up after 3 months, the patient was symptomatically relieved, there were no complaints of pain or fullness in the abdomen and the patient has started doing daily regular activities and work.

## CONCLUSION

There should be a high index of suspicion for UPJ obstruction in a patient presenting with horseshoe kidney with recurrent multiple renal calculi. Its management requires multimodal approach with the judicious use of endoscopic and open surgical intervention. Correction of UPJ obstruction is recommended to treat the symptoms and prevent the recurrence of calculi in these patients.

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