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CASE REPORT

Horseshoe kidney with a gigantic Calculus: A documented case report

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Abstract:

The most frequent genitourinary fusion abnormality described in literature is horseshoe kidney. Horseshoe kidney because of its abnormal anatomy is linked to malrotations, fluctuating blood flow, high insertion of the ureter, a tendency to develop ureteropelvic junction (PUJ) obstruction in up to one-third of patients, and these are all presentations of this condition. One-third of the patients with horseshoe kidney present with either stone disease or PUJ obstruction. In our case report, we discuss the treatment of a 38-year-old male patient who had been complaining of abdominal pain for the past few years, was found to have a horseshoe kidney and presented to us in urosepsis due to gigantic large calculus in right segment of horseshoe kidney and acute renal failure which was managed initially on emergent basis by insertion of percutaneous nephrostomy tube into the right segment followed by 2 months later by open right sided nephropyelolithotomy. The patient was relieved of all his symptoms at 3rd month follow-up and resumed his daily activities.

Keywords: Horseshoe kidney, urolithiasis, nephropyelolithotomy, renal calculi

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Introduction

The most common genitourinary fusion anomaly is horseshoe kidney, occurring 1/400-1/800 times per 100,000 people [1,2]. Up to one-third of patients had malrotation, variable blood flow, and a tendency for ureteropelvic junction obstruction (PUJ) [3]. The cause of PUJ obstruction is considered to be caused by congenital strictures, a high ureteric insertion, an irregular ureteral course, crossing vessels feeding the isthmus, or an aberrant motility of the PUJ segment [4]. The etiology of stone formation was formerly assumed to be caused by an elevated rate of infection, stasis, and PUJ obstruction. However, now it has been evaluated and found that these patients have metabolic causes [5]. Usually a horseshoe kidney has no symptoms. Whenever the urinary flow is obstructed, signs and symptoms of stone and obstruction become apparent. Here we describe the case of a 38-years-old male patient who presented with abdominal pain and was diagnosed with horseshoe kidney with gigantic calculi in the right segment of the horseshoe kidney.

Case presentation

A 38-year-old male had complaints of right sided lower abdominal pain over a period of last 2 years months on and off. He presented to the urology outpatient department with complaints of high-grade fever and right sided abdominal pain associated with dysuria. He was admitted and blood was drawn for complete blood count, renal function tests and urine and blood -culture and sensitivity. The lab results were raised wbc counts of 21000/mm3 and creatinine of 1.2. He was also advised a XRAY KUB (Kidney ureter and bladder) (Figure 1) and ultrasound of abdomen and pelvis (Figure 2) which revealed grossly dilated right kidney with gross hydronephrosis with features suggestive of pyonephrosis with pelvi-ureteric junction obstruction with a gigantic calculus of size 8.5 cm in the right renal pelvis of the right segment of the horseshoe kidney.

Figure 1. Xray KUB shows large gigantic staghorn stone in the right segment of the horseshoe kidney.

Figure 2. Ultrasound KUB shows right sided gigantic calculus with gross hydronephrosis in horseshoe kidney.

Then the patient underwent Computerised topography Urography which revealed horseshoe shaped kidney with fusion of lower poles at level of L3 vertebra. There was evidence of large staghorn calculus measuring 9.3 *8.3 cm in the right renal pelvis of the right segment of the horseshoe kidney associated with moderate to gross dilatation of the right pelvicalyceal system with significant thinning of the right renal cortex with average cortical thickness being 5 mm. On 10 minutes delayed films, the right kidney showed excretion of contrast. The left segment was normally functioning. (Figures 3-5).

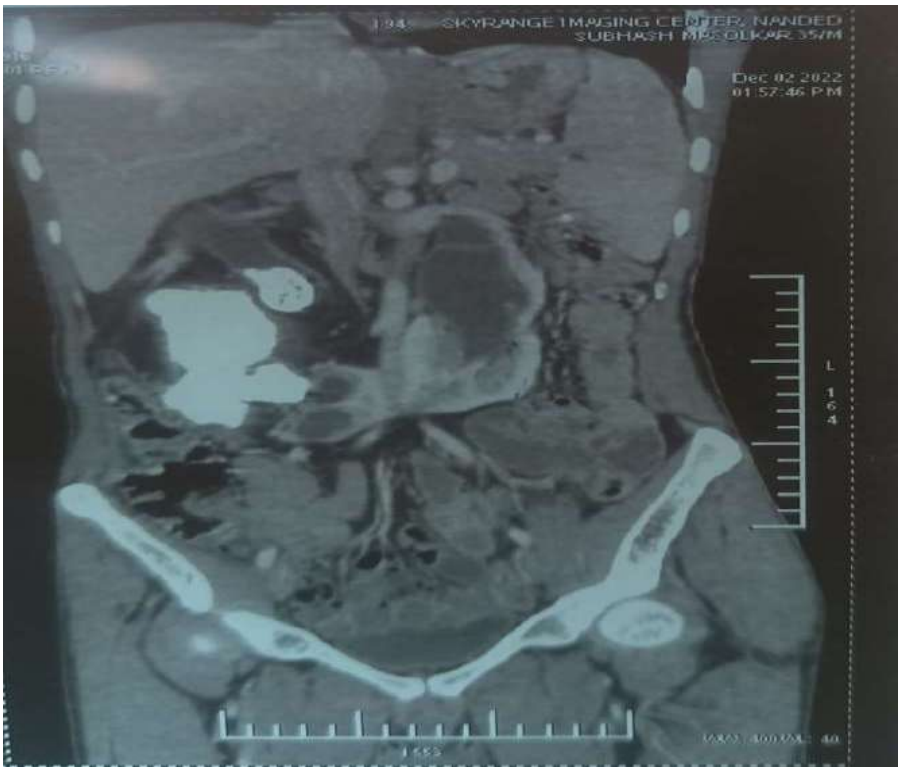

Figure 3. Coronal section film of CT urography showing horseshoe kidney with large gigantic right sided calculus.

Figure 4. Axial section film of CT urography shows large right sided calculus with hydronephrosis in horseshoe kidney.

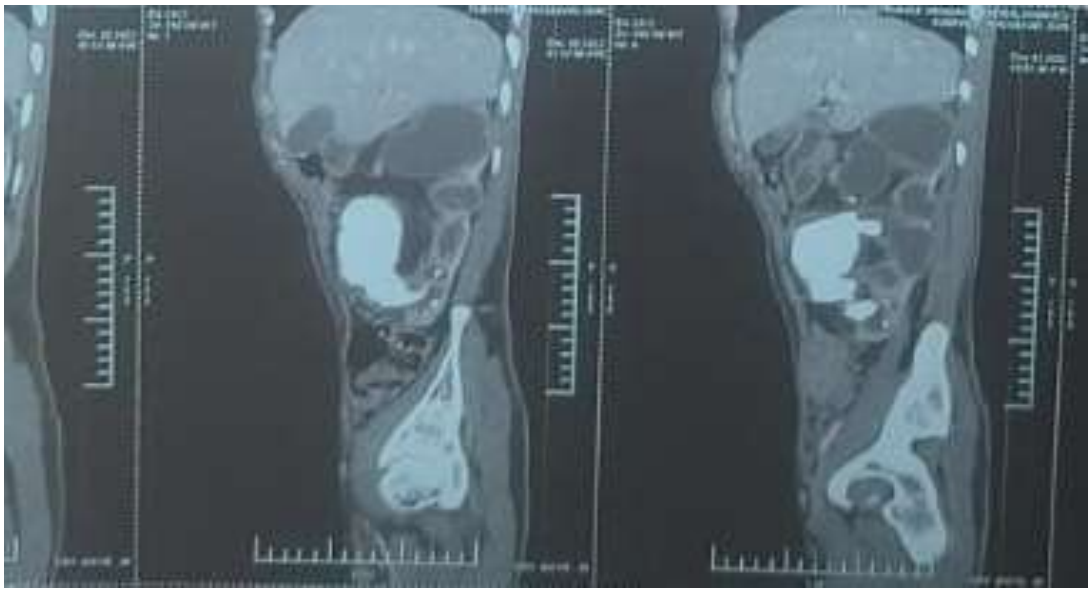

Figure 5. Sagittal section films of CT urography showing the Right aided gigantic calculus with gross hydronephrosis of the right kidney.

Hence, the patient underwent ultrasound guided percutaneous nephrostomy (PCN) insertion on the right side to drain the pus. He was managed with i.v. antibiotics and hydration. He was managed with PCN in situ to allow the infection to settle for a period of 2 months. Over the course of 2 months, the average daily PCN output was 200-250 ml. Patient then underwent nuclear study-DTPA scan to study the differential function. DTPA scan showed left kidney with delayed cortical uptake with normal excretory phase with GFR of 39.9 ml/min and a differential function of 62.7 %. Right kidney showed obstructive pattern with Type 2 O'Reilly curve pattern with GFR of 23.8 ml/min and differential function of 37.3% (Figure 6).

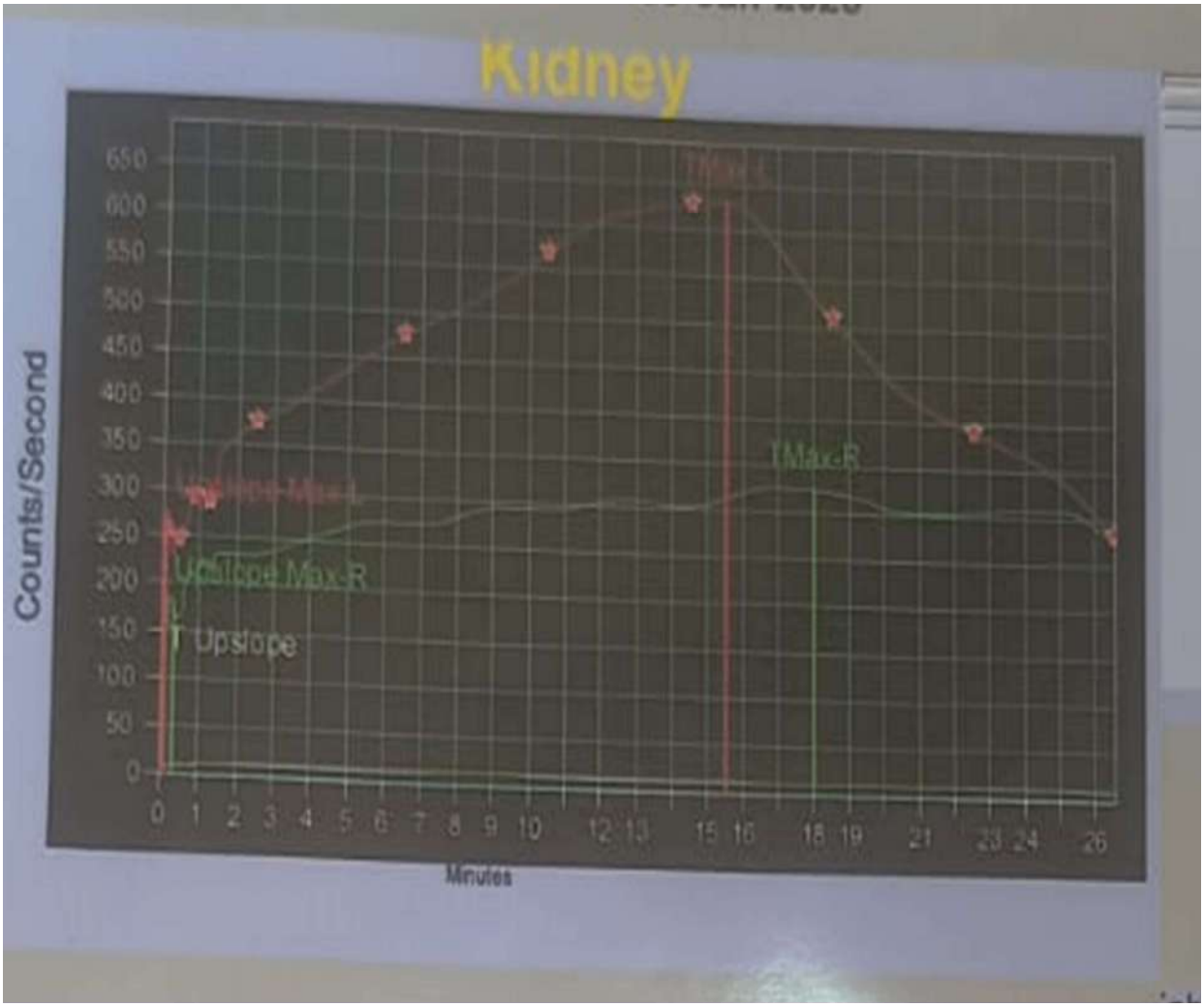

Figure 6. DTPA renogram showing type 2 O'Reilly curve pattern of obstruction of the right kidney with normal function of the left kidney.

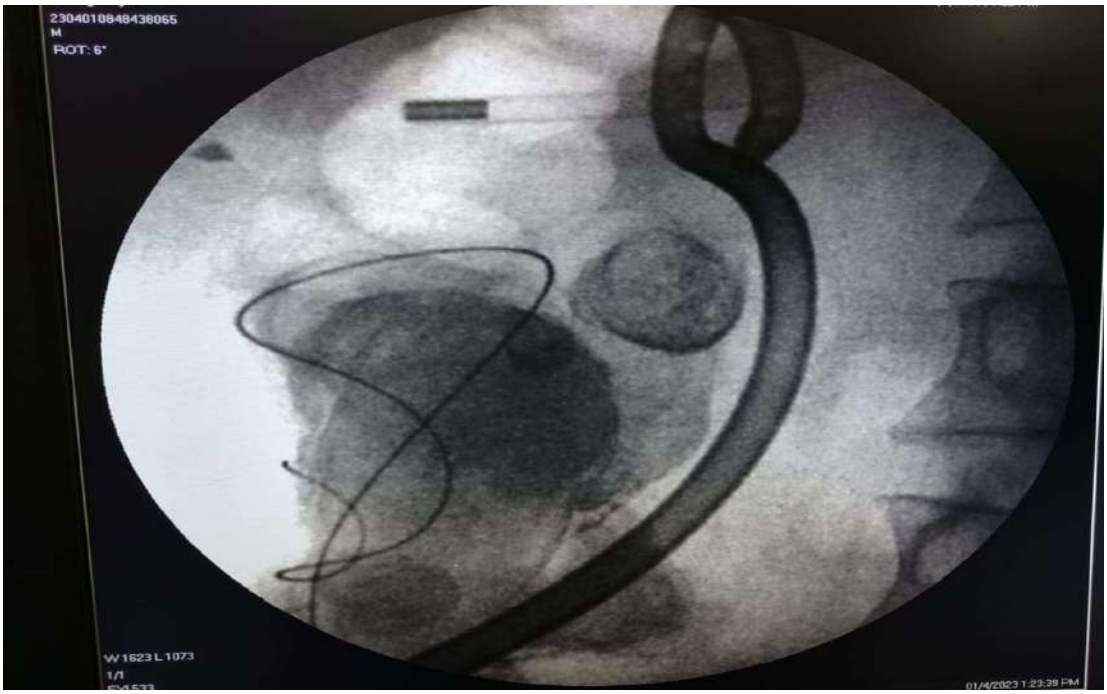

Figure 7. Scout film showing the large right sided gigantic calculus with PCN tube in situ. Preoperatively, right sided DJ stent was done to aid in identification of the right ureter during the surgery. In the image, we can see the placement of the terumo guidewire in the right sided pelvis over which the DJ stent was placed.

Figure 8. Intraoperative image showing the horseshoe kidney with the forceps pointed at the isthmus.

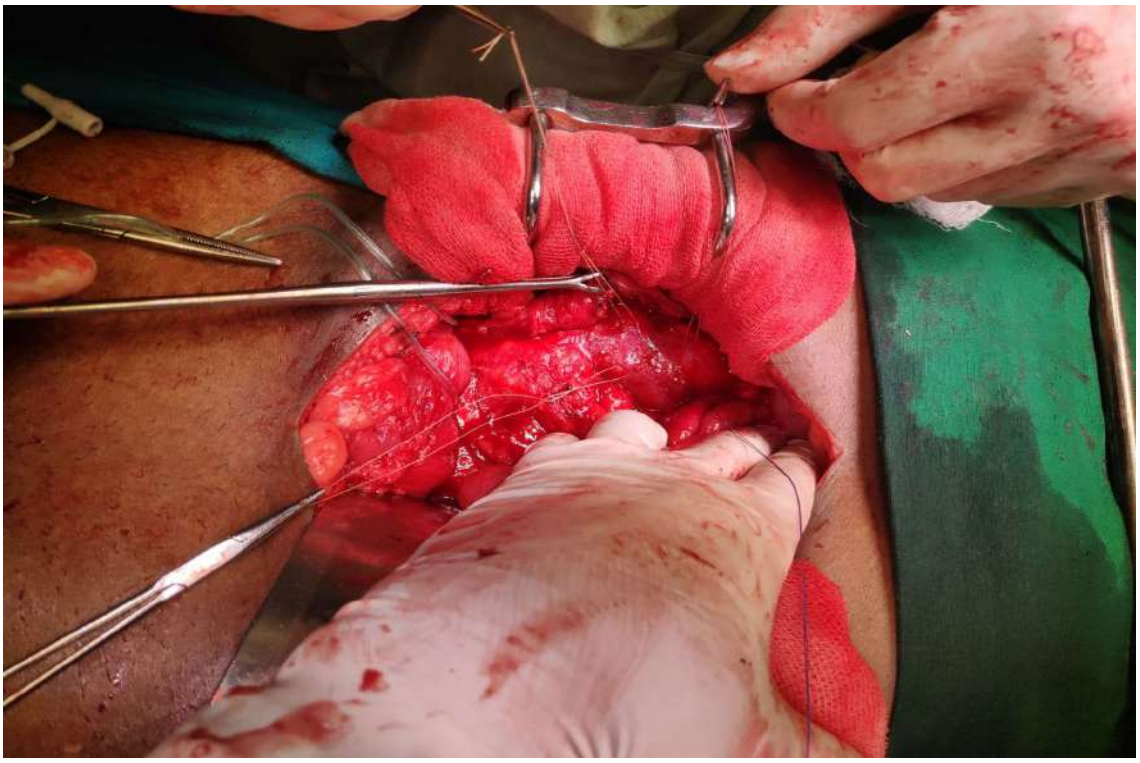

Figure 9. Intraoperative image showing the right sided renal pelvis with stay sutures taken on either side of the planned longitudinal pyelolithotomy incision.

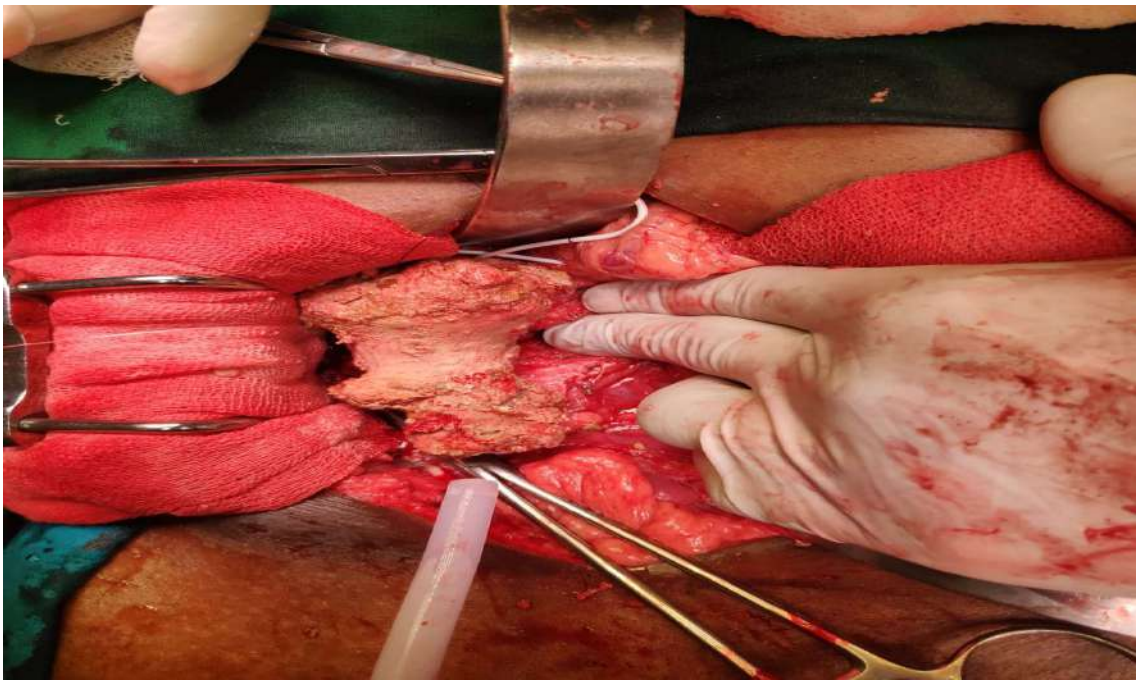

Figure 10. Intraoperative image showing the largest right sided calculus after pyelolithotomy incision.

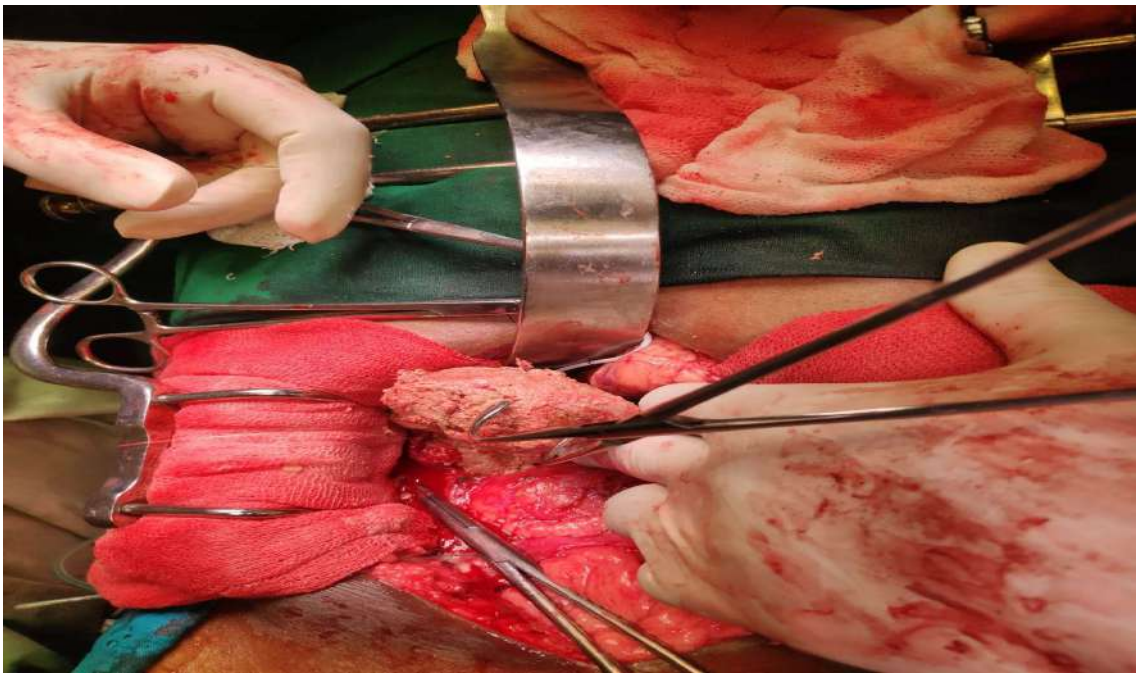

Figure 11. Intraoperative image showing the large calculus being extracted using Desjardin's pyelolithotomy forceps.

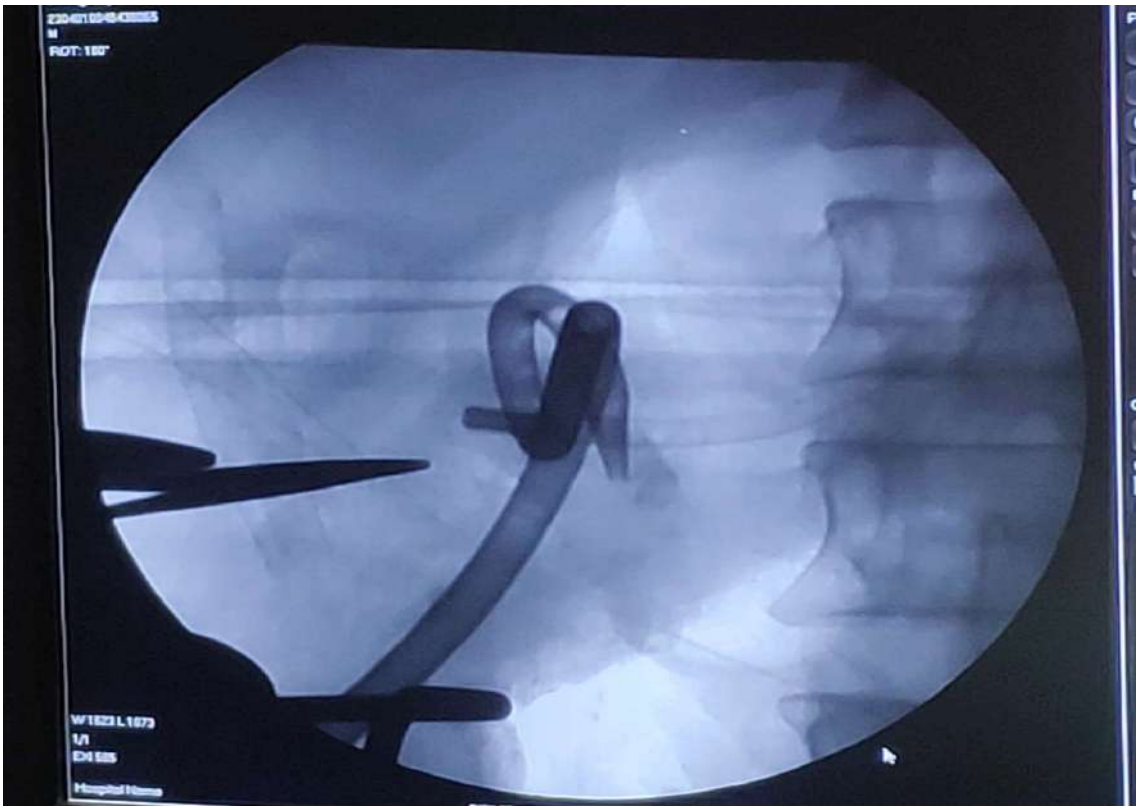

Figure 12. Intraoperative C-Arm Image showing complete stone clearance on the right side.

Figure 13. Postoperative image of the Large gigantic calculus along with other secondary calculi.

So, finally decision was made to go ahead with open right sided pyelolithotomy with pyeloplasty. Preoperatively, right sided 6/24 DJ stenting done to aid in identification of the right ureter during open surgery. (Figure 7). Open surgery was done using a midline vertical abdominal incision. The right segment of the horseshoe kidney was visualised after adequate mobilisation and reflection of the right sided colon. A longitudinal incision was made for the pyelolithotomy and the gigantic calculus was removed along with all other secondary calculi and then pyelolithotomy was closed using vicryl round bodies 3-0 with placement of 6/24 F DJ stent (Figures 8-13). An abdominal drain was placed and incision was closed. The patient underwent DJ stent removal after 6 weeks. A repeat DTPA scan after 3 months after surgery showed good excretion of the right segment of the horseshoe kidney.

Discussion

Horseshoe kidneys and its associated abnormalities present unique challenges to the urologist in their clinical practice. One-third of individuals with horseshoe kidney are aymptomatic, and it is only seldom found by incidental imaging findings. During the embryologic development, the inferior poles of the kidney fuse as it grows and hence, the kidney does not ascent as the inferior mesenteric artery obstructs. Infection, calculi, blockage or tumour owing to an abnormal pelvic posture, and ureters are all clinical findings. For a practising urologist, in terms of therapeutic decision-making and technical factors, horseshoe kidneys present a unique challenge. Retrograde intrarenal surgery (RIRS) could be employed as a option for small and medium sized calculi. In our case report, there was a gigantic calculus and multiple other large calculi so, open pyelolithotomy was chosen as the treatment plan. The patient was effectively managed with right-sided open pyelolithotomy. He had complete stone clearance in single surgery and is now on regular follow-up.

Conclusion

For a urologist, horseshoe kidney presents unique challenges in diagnosis and technical challenges in management. In

case of a horseshoe kidney with numerous renal calculi, consider and suspect PUJ obstruction and treat it to prevent recurrence of calculi. We believe that open surgery still has a place in the treatment of renal calculi in these patients inspite of availability of minimally invasive techniques due to the sheer complexity of the anomalies. Thus, to conclude it is important to understand that in those with abnormal anatomy, open surgery is a safe technique to deal with them.

Conflicts of interest

The authors declares that they do not have conflict of interest.

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