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Percutaneous Nephrolithotomy in the supine flank free modified position for the removal of a 3 year Double-J ureteral stent in a horseshoe kidney

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ABSTRACT

Horseshoe kidney is one of the most common congenital renal abnormalities with increased incidence of stone formation. We present a case of an HIV seropositive patient with a both-ends encrusted 3 year forgotten DJ stent and a staghorn stone in the left moiety of a horseshoe kidney. He was treated with percutaneous nephrolithotomy in the supine flank free modified position and simultaneous cystolitholapaxy. Supine percutaneous nephrolithotomy is safe and feasible in horseshoe kidney and facilitates simultaneous transurethral access for cystolitholapaxy.

Keywords: Percutaneous Nephrolithotomy; supine flank free modified position; 3 year Double-J ureteral stent; horseshoe kidney

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Introduction and Background

Horseshoe kidney is found to be one of the most common congenital renal abnormalities. It has a prevalence of 1 in 400 persons and a male-to-female ratio of 2:1. As the lower poles of kidneys are fused during embryogenesis, the inferior mesenteric artery interferes with the ascent of the kidney to its normal position. Therefore, the horseshoe kidney remains located in a position more inferior and medial to its normal position, resulting in an anterior location of the renal

collecting system, thus permitting safe and easier usually subcostal upper calyceal percutaneous access, as it is gained on the opposite side to where renal blood supply enters the kidney (1).

We present a case of an HIV seropositive patient with a both-ends encrusted 3 year forgotten D-J stent and a staghorn stone in the left moiety of a horseshoe kidney that was treated successfully with PCNL in the supine flank free position with simultaneous cystolitholapaxy.



Figure 1. A plain KUB film showing a D-J stent with a staghorn stone in the left kidney. Encrustation is also noticed.



Figure 2. A CT KUB showing a horseshoe kidney with a left staghorn stone

Case presentation

A 50-year-old Caucasian man presented to the outpatient department with a 1-year history of increased frequency and mild dysuria. He reported a left renal colic 3 years ago that was treated with a D-J ureteral stent placement. Physical examination and laboratory profile were unremarkable. Urine culture was positive for *Escherichia Coli* sensitive to all antibiotics. He had a history of hypertension, diabetes mellitus treated with metformin, hypercholesterolemia

and HIV seropositivity treated with abacavir, darunavir and ritonavir. His viral load was undetectable at the time of presentation and CD4 count was normal.

The plain and the CT KUB revealed a horseshoe kidney, left pelvicalyceal dilatation with a left staghorn renal calculi (3.9cm in maximal diameter) and 2 lower pole calculi (0.9cm and 0.7cm). He had a both ends encrusted D-J stent (figure 1,2).



Figure 3. The modified supine flank free position of the patient. The posterior axillary line, the iliac crest and the 12th rib are marked. The flank is free of any support

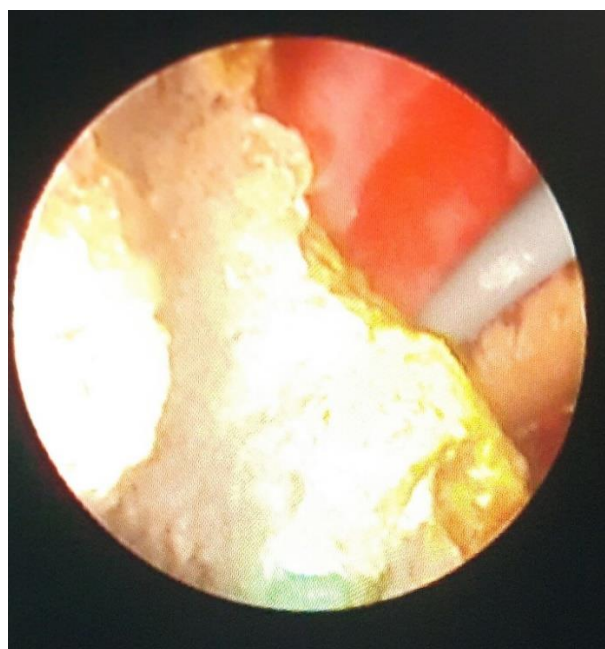


Figure 4. An endoscopic view showing the pelvic part of the staghorn stone and the encrusted stent

The patient was placed in a modified Barts flank free supine position, with the ipsilateral with the nephrolithotomy leg being completely extended and the contralateral leg slightly abducted (figure 3). An encrusted distal end of the D-J stent was noticed during cystoscopy. A 6F ureteral catheter was introduced and retrograde ureteropyelography was performed. The ureteral part of the stent seemed unaffected from encrustation. After thorough ultrasound examination of the left kidney, an upper and a middle calyx were punctured under fluoroscopy. Renal access was carried out through the upper calyx, with serial dilatation up to 24Fr by using single use Amplatz dilators. Nephroscopy was performed with a 18Fr nephroscope (Karl Storz) and stones were disintegrated by using Holmium laser (Sphinx Lisa Laser 30Watt) (figure 4). A 550µm laser fiber was used at 1,2-1.5J energy and 10-15Hz frequency.. Stone fragments were washed out by using the “vacuum cleaner” effect or retrieved with the 3-prong grasping forceps. The flexible nephroscope (16Fr Karl Storz) was used for laser disintegration of the lower calyceal stones and to look for any residual fragments at the end of the procedure.

Cystolitholapaxy at the encrusted distal end of the stent with a 24 Fr sheath (Wolf) mechanical lithotripter was performed at the completion of renal stone disintegration. The old DJ stent was removed from the percutaneous tract under fluoroscopic guidance. At the end of the procedure a 6Fr ureteral catheter and a 16F nephrostomy tube were inserted. The total operating time was 86min and fluoroscopy time was 88 seconds.

The patient had an unremarkable recovery. The ureteral catheter and the nephrostomy tube were removed on the 2nd postop day and the patient was discharged the 3rd postoperative day. A new CT scan was performed one month post-operatively, confirming the patient's stone free status. The stone analysis reported calcium oxalate dihydrate.

Discussion

Prone PCNL has been established the

procedure of choice for the management of large renal stones in horseshoe kidneys with high stone free and low complication rates (2,3).

In 1998, Valdivia Uria et.al., reported on the first series of patients who were undergoing PCNL in the supine position (4). A further development has been the Galdakao variant developed in 2006, which introduces some medial rotation to the supine position by positioning the contralateral leg in flexion and the ipsilateral leg in extension favouring an easier subcostal access to the posteriorly located upper pole calyces of the horseshoe kidney (5). Further evolution of the supine position was the development of Barts flank free modified supine position with a pad under the ipsilateral rib cage and pelvis leaving the loin completely free thus allowing more space for renal access and easier instrumentation (6). We developed a further modification of the Barts flank free position by placing the ipsilateral with the nephrolithotomy leg in complete extension resulting in broader access to the flank of the patient compared to the standard supine position, thus allowing more medial punctures if needed, like in a horseshoe kidney.

Unlike in prone position, where the patient has to be kept initially in lithotomy position for insertion of a ureteric catheter, in supine PCNL patients remain in same position throughout the procedure. This facilitates simultaneous transurethral access during nephrolithotomy, thus permitting endourological procedures and reducing operating time and increasing safety, as happened in our case where cystolitholapaxy was performed at the completion of PCNL, without changing patient's position.

To the best of our knowledge, this is the first report in the literature of treating a staghorn stone in a HIV patient with an encrusted 3 year ureteral stent in the supine flank free modified position with simultaneous cystolitholapaxy.

Immunocompromised patients are at higher risk for postoperative complications after PCNL, such as bleeding and infections, In our case, the patient had an uneventful recovery, further

supporting our choice regarding supine flank free positioning during PCNL. A thorough preoperative evaluation and a careful selection of patients along with a detailed perioperative planning is of outmost importance for a good surgical result in experienced hands, when performing PCNL in high risk patients with complex stone burden (7).

Conclusion

Given the flexibility it provides, supine flank free modified position is a safe and feasible alternative option for the treatment of complex stone cases in horseshoe kidneys.

Abbreviations:

CT: Computed Tomograph

CRP: C-Reactive Protein

PCNL: Percutaneous Nephrolithotomy

ECIRS: Endoscopically Combined IntraRenal Surgery

DJ: Double-J

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