BANGLADESH JOURNAL OF
UROLOGY
Bangladesh J. Urol. 2020; 23(1): 82-86
www.banglajol.info/index.php/BJU
DOI: https://doi.org/10.3329/bju.v23i1.50296

Original Article

ISSN : 2304 - 8514 (Print)
ISSN : 2304 - 8522 (Online)

Experience of Mini PCNL in Horseshoe Kidneys

Md. Abdur Rakib[1], Md Shahidul Islam[2], SM Shameem Waheed[3], Mohammad Harun-or-Rashid[4]

Received: 13 - 07 - 2020
Accepted: 02 - 09 - 2020
Conflicts of interest: None

Keywords: Mini PCNL, Horseshoe kidneys(HSK).

Abstract

Objective: *The objective of this article is to share our experience of Mini PCNL in horse shoe kidneys.*

Methods: *We performed Mini PCNL in 05 patients with Horse shoe kidneys in the urology centre of CMH Dhaka. Per cutaneous puncture was made with patient in prone position. Their ages ranged between 35-52 years with a mean age of 42.3 years. PCNL access tract was made in upper pole of the kidney in 03(60%) while 01(20%) through middle calyx, and 01(20%) had direct pelvic access. The stone size was 2.3-2.75cm with multiple calculi in two kidneys.*

Results: *Complete Stone clearance was achieved in all 05 cases .Mean hospital stay was 3.8 days (range 3-5 days).All cases were followed up at 4 weeks and after 3 months. No significant Complications were seen except one patient who developed transient post-operative pyrexia which subsided with antipyretics. None of our patients developed post PCNL bleeding or wound infection.*

Conclusion*: Mini PCNL in horse shoe kidneys are not too difficult than normal kidneys and does not carry significant risk than reported for normal kidneys. This effective modality resulted in almost100% stone clearance with minimal morbidity.*

Introduction

Horse shoe kidneys (HSK) are the most common congenital renal fusion anomalies with a prevalence of 1/400 to 1/800.[1] During embryogenesis fusion of the lower poles prevents normal ascent and causes malrotation with anterior displacement of the collecting system. Insertion of the ureter on the renal pelvis is displaced superior and later, probably as the result of incomplete renal rotation is associated with a significant rate of ureteropelvic obstruction. These factors contribute to impaired drainage of the collecting system, resulting in stasis. Patients with HSK have a higher incidence of urinary tract infections (24%), urinary calculi (20%) and hydronephrosis.[2,3] Mini PCNL is an effective and well established treatment for renal calculi in anatomically normal kidneys with success rates of up to 98% for simple stones[4,5] However the use of PCNL in congenitally anomalous kidneys particularly HSK has received little attention in literature. In view of the possibility that the abnormalities associated with a HSK may cause percutaneous access problems, a higher incidence of complications and a lower success rate. Most surgeons do not feel comfortable to subject HSK to any type of surgery and particularly to PCNL. There have been a few reports on the management of calculi in HSK using ESWL or PCNL. These reports suggest that although acceptable stone free rates can be achieved by ESWL but these appear to be much better following PCNL and it is no more difficult to perform PCNL in patients with HSK than those with normal renal anatomy.[6,7] In several small series PCNL has been shown to be highly successful in horse shoe kidneys with an overall stone-free rate of up to 89%.[6-9] Here we share our experience of 05 cases of Mini PCNL for stones in horse-shoe kidneys.

1. Col (Professor), Urology Centre, Combined Military Hospital, Dhaka Cantonment, Dhaka
2. Brig Gen (Professor), Urology Centre, Combined Military Hospital, Dhaka Cantonment, Dhaka
3. Brig Gen (Professor), Urology Centre, Combined Military Hospital, Dhaka Cantonment, Dhaka
4. Lt Col (Associate Professor), Urology Centre, Combined Military Hospital, Dhaka Cantonment, Dhaka

Correspondence: Col (Professor) Md Abdur Rakib, Urology Centre, Combined Military Hospital, Dhaka Cantonment, Dhaka
Email: rakiburo1970@gmail.com

Materials and Methods

Between January 2018 and December 2020 we performed Mini PCNL in 05 Horse shoe kidneys.

Patient's were assessed by medical history , physical examination, urine culture, renal functions tests, serum biochemical evaluation, ultrasonography and contrast CT scan of KUB.

All procedures were done under general anaesthesia with intravenous antibiotic cover. The procedure started with retrograde ureteric catheterization under fluoroscopic guidance while the patients were in lithotomy position. The patients were then placed in prone position for percutaneous renal access.

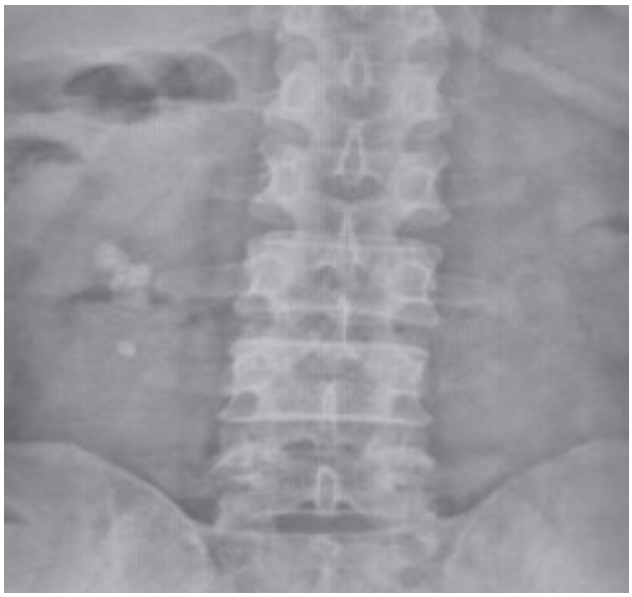

Fig.-1: *Shows Renal stone in Horseshoe kidney (RT)*

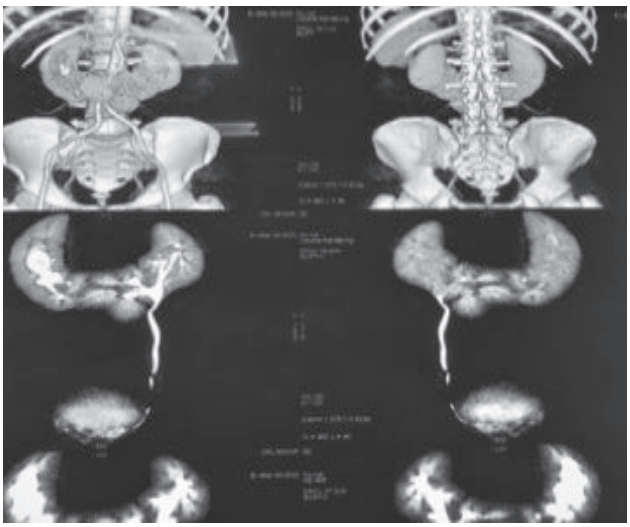

Fig.-2: *CT Urogram Shows Horseshoe Kidney with Rt Renal Stone*

Percutaneous renal access was established under fluoroscopic guidance. Then the tract was dilated by single step dilator and a 15 Fr sheath was placed. The nephroscope (Karl-storz) was introduced and stone visualized. Stone fragmented by Laser (Holmium-YAG) and extracted by whirlpool action and also by forcep. At the end of the procedure a 12 Fr nephrostomy tube and 6 Fr double J stent was placed. Post operatively plain X-Ray KUB was performed. The nephrostomy tubes were removed on 1st post operative day. Patients were followed up in out-patient department and check X-Ray KUB was done at 4 weeks after discharge and at 3 month intervals.

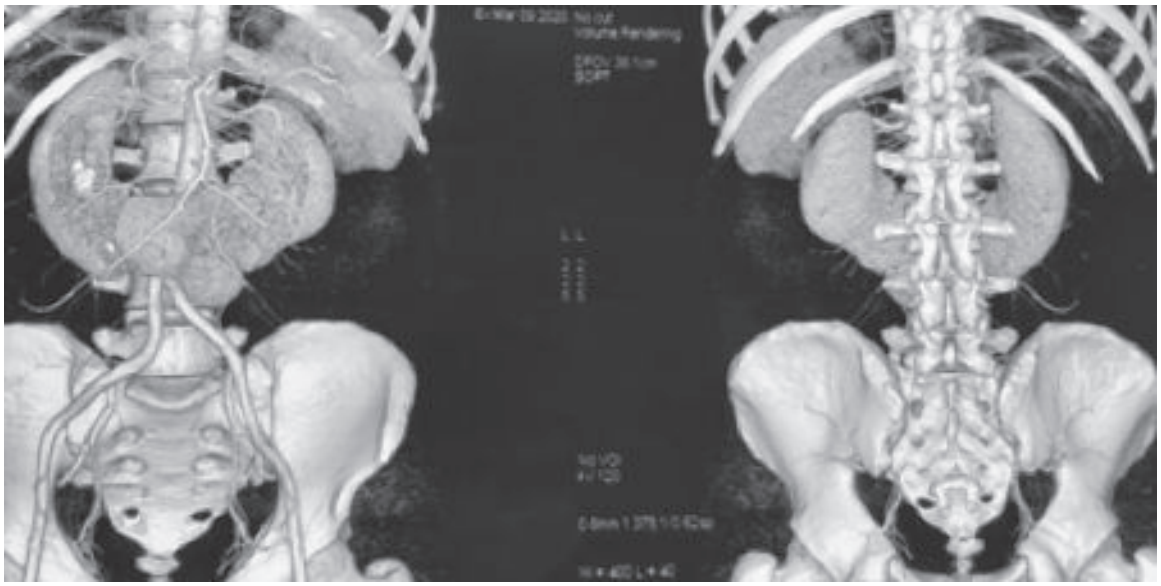

Fig-3: *CT Urogram Shows Horseshoe Kidney with Rt Renal Stone*

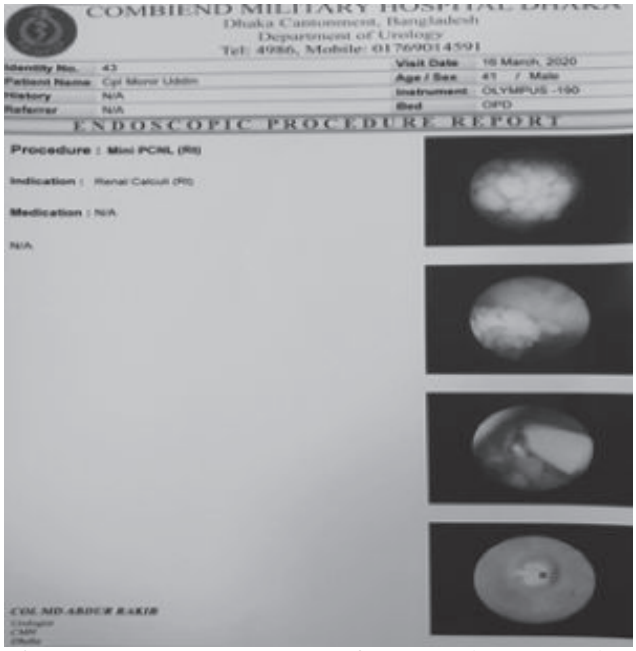

Fig.-4: *Per Operative Picture of Mini Park in Horseshoe kidney (RT)*

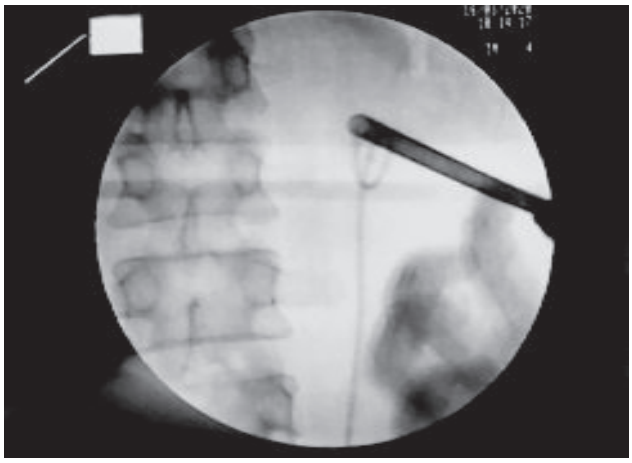

Fig.-5: *Post Operative Picture of Mini Park in Horseshoe kidney (RT) showing complete clearance of Stone with D-J Stent*

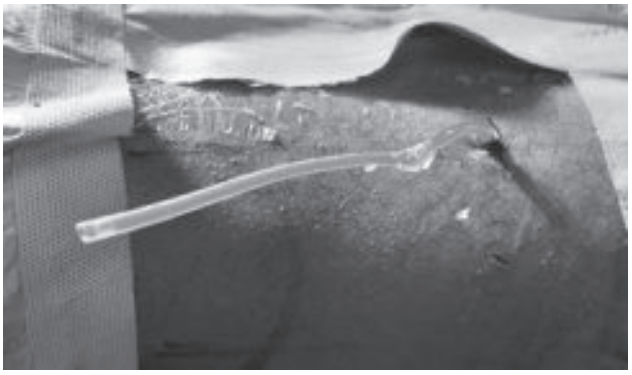

Fig.-6: *Post Operative Picture of Mini Park in Horseshoe kidney (RT)*

Results

Mini PCNL was performed in all 05 patients. There were 04 males and 01 female. Their ages ranged between 35 to 52 years with a mean age of 42.5 years. Three patients had stones in right kidney; two had stones in left kidney. Solitary stones were seen in three patients. Multiple stones were found in two cases. There were 2 pelvic stones, 1 lower calyceal while 2 kidneys had multiple stones in both pelvis and middle calyx. Four patients (80%) presented with loin pain, 1 (20%) diagnosed incidentally during investigations for other purpose. Pre-operative urine culture revealed no growth of organisms in all cases.

Table-I: *Age Distribution, (n=05)*

Age (yrs)	No of cases (n=05)	Percentage (%)
35-40	03	60
41-52	02	40
Total	05	100

Mean(42.5)

Table-II : *Sex Distribution (n=05)*

Sex	No of cases (n=05)	Percentage (%)
Male	04	80
Female	01	20
Total	05	100

PCNL access tract was made in upper pole in 3 kidneys (60%) while 2 kidneys (40%) through mid-pole access. Complete stone clearance was achieved in all 5 patients. Mean hospital stay for these patients was 3.8 days (range 3-5) days. Patients were followed up at 4 weeks and 3 months interval, No significant Complications were seen except in 1 patient (20%) who developed transient post operative pyrexia which subsided with anti pyretics. None of our patients developed post PCNL bleeding or wound infection. Stone analysis showed Calcium Oxalate stone in 04(80%)patients and rest one phosphate, magnesium, ammonium stone.

Table-III : *Laterality and Bilaterality (n=05)*

Site	No of cases(n=05)	Percentage(%)
Right kidney	03	60
Left kidney	02	40
Total	05	100

Table-IV : *Location (n=05)*

Location	No of cases(n=05)	Percentage(%)
Pelvis	02	40
Lower Calyx	01	20
Middle calyx	02	40
Total	05	100

Table-V : *Number of Stone (n=05)*

No of stone	No of cases(n=05)	Percentage(%)
Solitary	03	60
Multiple	02	40
Total	05	100

Table-VI : *Presentation (n=05)*

Presentation	No of cases(n=05)	Percentage(%)
Loin Pain	04	80
Incidental	01	20
Total	05	100

Table-VII : *Approach (n=05)*

Approach	No of cases(n=05)	Percentage(%)
Upper pole	03	60
Mid Pole	02	40
Total	05	100

Table-VIII : *Stone Clearance (n=05)*

Stone Clearance	No of cases(n=05)	Percentage(%)
Complete	05	100
Total	05	100

Table-IX : *Complication (n=05)*

Complication	No of cases(n=05)	Percentage(%)
No Complication	04	80
Fever	01	20
Total	05	100

Discussion

While performing percutaneous surgery in horseshoe kidneys, two main factors differ from the normal renal anatomy and have to be taken into account: blood supply and the orientation of the collecting system. An important observation is that all blood vessels except some to the isthmus enter the kidney from its ventro-medial aspect,[6] whereas percutaneous access is gained on the opposite side. The dorsal arteries to the isthmus are protected by the spine and are situated away from the nephrostomy tract. With PCNL access in prone position the risk of arterial bleeding is therefore not higher than in a normal kidney.

In the horseshoe kidney most of the calyces point either dorsomedially or dorsolaterally. Generally the orientation of the collecting system offers surprisingly good access to percutaneous nephrolithotomy.[6] The anomalous anatomy results in a lower and more medial position of the nephrostomy tract with a more or less dorsoventral orientation.In our series percutaneous access was attained after retrograde delineation of pelvicalyceal system, and then the kidneys were punctured with the patient in prone position. In these cases tract was made near or through the paraspinal muscles and was more medial than in an anatomically normal kidney. We found that the tract formed by this method allowed good manipulation of nephroscope. The pelvicalyceal system could easily be inspected for multiple calculi in different calyces. In contrast, in previous series it was found that rigidity of the nephroscope limited free inspection of pelvicalyceal system and they used flexible nephroscope in 80% of their cases to adequately access stones in various calyces.[9] All fragments were easily removed either by forceps or by flushing technique.

We found upper pole puncture to be much safer as this resulted in less bleeding and allowed good calyceal inspection. In patients with normal renal anatomy the upper pole calyx typically lies anterior to the posterior portion of the 11th and 12th rib, often requiring a supra-costal approach which may result in intra-thoracic complications[7]. In HSK upper pole percutaneous access is often essential and it is relatively safe due to the inferior displacement of the kidneys away from the pleura and since supra costal approach is not required, violation of the pleural cavity is rare. Because of the malrotation of the kidney, the pelvis may be deep in relation to the puncture site.

Al-Otaibi[9] recommends CT scan abdomen in every case before surgery because of the concern of abnormal relationship of the horseshoe kidneys with other viscera particularly the posterior position of bowel, which could result in nephrostomy tract puncturing the bowel. We did not find this to be of any problem while getting percutaneous access. The minimal complications which we encountered in our series included 1 case(20%) had post operative transient fever, This compares favorably with other reported series 25-42%.[7,9,10] Mini PCNL in horseshoe kidney require special attention both preoperative investigation to delineate the pelvicalyceal anatomy as anomalous kidneys and also intra operative care particularly during puncture to avoid complications.

There have been a few reports on management of calculi in HSK using ESWL. Stone free rates do not compare favorably with PCNL in HSK. Serra[11] showed stone clearance after ESWL in 16 out of 48 kidneys (33%). while Kirkali[12] reported a 28% stone free rate following ESWL in 18 HSK patients.. Clayman[13] demonstrated a 30% stone free rate after ESWL in 10 patients. Our small series showed 100 % stone clearance with Mini PCNL. This is far superior to clearance reported by ESWL and compares favorably with other reported series of 72%[7], 75%[9] and 87%.[10]

Conclusion

Mini PCNL in horseshoe kidneys is technically little difficult than in normal kidneys but does not have significant risk than reported for normal kidneys provided meticulous preoperative planning and utmost care taken specially during puncture. In our little experience with a few cases,Mini PCNL is safe and effective modality resulted in 100% stone clearance without any significant complications.

References

1. 1.Kaufman E. Lehrbuch der speziellen pathologisten anatomie 2 Berlin; de Gryter 1957; pp. 427-436
2. Evans WP, Resnik MI. Horseshoe kidney and urolithiasis. J Urol 1981;125:620-1.
3. Pitts WR, Muecke MI. Horseshoe kidney and urolithiasis. J Urol 1975; 113: 743-6.
4. Jones DJ, Russell GL, Kellett MJ , Wickham JEA. The changing practice of percutaneous stone surgery. Review of 1000 cases 1981-1988. BJU Int 1990;66:1-5.
5. Segura JW, Patterson DE, Le Roy AJ, William HJ Jr, Barrett DM, Benson RC Jr, et al. Percutaneous removal of kidney stones: review of 1000 cases. J Urol 1985; 134: 1077-81.
6. Janetschek G, Kunzel KH. Percutaneous nephrolithotomy in horseshoe kidneys. Applied anatomy and clinical experience. BJU Int 1988; 62:117-22.
7. Jones DJ, Wickcham JEA, Kellet MJ. Percutaneous nephrolithotomy for calculi in horseshoe kidneys. J Urol 1991;145:481-4.
8. Peartree RJ, Ruotolo RA, Khuri FJ, Valvo JR. Percutaneous stone removal in horseshoe kidney. Urology 1986;28:41-3.
9. AL-Otaibi K, Hosking DH. Percutaneous stone removal in horseshoe kidneys. J Urol 1999; 162:674-7.
10. Raj GV, Auge BK,Weizer AZ, Denstedt JD, Watterson JD, Beiko DT, et al. Percutaneous management of calculi within horseshoe kidneys. J Urol 2003;170:48-51.
11. Serra AC, Moreno RP, Baron FR, Vicunna FMG, Baron AR , Rodriguez VJ. Current management of calculi in horseshoe kidneys. Scand J Urol Nephrol 200;34:114-8.
12. Kirkali Z, Esen AA, Mungan MU. Effectiveness of extracorporeal shockwave lithotripsy in the management of stone-bearing horseshoe kidneys. J Endourol 1996;10:13-5.
13. Clayman RV. Effectiveness of extracorporeal shockwave lithotripsy in the management of stone-bearing horseshoe kidneys (editorial comment). J Urol 998;160:1949-2