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Standard-tract percutaneous nephrolithotomy for complicated calculi within horseshoe kidneys: A report of one case

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ABSTRACT

A 48-year-old man was presented in the local hospitalized where he lived because of lower back pain one month ago. Then he came to our hospital for kidney stones on the right side within horseshoe kidneys and hydronephrosis diagnosed by imaging and abdominal ultrasound. After we proceeded single standard percutaneous nephrolithotomy with holmium laser combined EMS, his stones were totally removed with little intraoperative bleeding. No eventful post-operative complications occurred and the curative effect was very satisfied by KUB after stay in bed for 3 days reviewed. And a long-term follow up showed his recovery was quite well.

Introduction

Horseshoe kidney (HSK) refers to that the distal polar of the kidney on both sides of the body fused at the mid-line of body, also known as the shoe with Iron kidney, is a kind of rare congenital renal dysplasia.[1] Among all the congenital fusion abnormalities of the kidneys, horseshoe kidney is the most common type with a prevalence of 0.25% of the population and ≥30% recurrence rate within 10 years.[2,3] Those patients with horseshoe kidney whose urine is drained poorly, get complicated calculus easily. PCNL is now recommended as first line of management in the treatment of horseshoe kidneys with large stone burden considering its higher clearance rate and minimal complications rate.[4] Our department admitted one patient with horseshoe kidney and multiple renal calculus. The report is as followed:

Case presentation

A 48-year-old man came to our hospital for kidney stones on the right side and hydronephrosis was confirmed by other hospital. The patient was presented in the local hospitalized where he lived because of lower back pain after lumbar sprain was confirmed to be with stones in the right kidney and severe hydronephrosis by colored ultrasound and IVP (Intravenous pyelography) a month ago. Then the patient came to our section. When he came, his BP(blood pressure) was 120/76 mmHg, body temperature was 36.5 °C and costovertebral angle percussion pain when the patient hospitalized. By abdominal ultrasound after hospitalized, the right collecting system of the patient was separated, and there were a number of anechoic areas which were indifferent sizes. The sections were linked to each other, one of the largest section was 6.4 cm × 3.5 cm, which we saw a number of strong lights with acoustic shadow behind them. Another section size was 2.0 cm × 1.5 cm in upper ureteral and its length of 4.2cm had strong light which the size was 1.6cm and with acoustic shadow behind it. The left renal collecting system had bright concentrations, ureter was not imaging. There were low echo which the anteroposterior diameter of 1.2cm in front of abdominal aorta and connected with the left and right lower pole of the kidney. Other organs like liver, cholecyst, spleen, pancreas, prostate were healthy. The filtration rate of 41.52 ml/min in right kidney and 35.76 ml/min in left were revealed by ECT. CT (Fig. 1) and KUB (Fig. 2) indicated: lower renal pole of both kidneys were mutual fusion across to abdominal aorta. The right renal pelvis showed image of multiple irregular mass and nodular higher density, the largest one was about 2.3 cm × 2.0 cm. The right renal pelvis and calices were irregularly expanded, part of renal parenchyma thinned. The renal parenchyma of left was normal. The results showed: horseshoe kidney, right kidney with multiple stones, hydronephrosis. Other laboratory examination no abnormalities. The right retrograde pyelography was examined and indwelling catheter the size of F5 before operation for Understanding of ureteral stenosis. The percutaneous nephrolithotomy (PCNL) was operated in spinal anesthesia combined with epidural anesthesia after all of the examination.

Abbreviations: ECT, Emission Computed Tomography; PNL/PCNL, percutaneous nephrolithotomy; HSK, horseshoe kidney.

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The patient lied prostrate after narcotized. Normally disinfecting operation field and operating drape. The costal margin between scapular line and the posterior axillary line on the right side for the puncture site, breakthrough was obvious when the percutaneous puncture of renal calyces under the guidance of ultrasound. The diluent Methylthionine Chloride was injected in the reserved ureteral catheter and there was pale blue liquid outflowed when needle core exited proved successfully puncture. The needle sheath is placed within the safety guide wire. After guide wire was inserted into the renal pelvic guided by ultrasound, establishing the standard channel expansion by F10, F12, F14, F16, F18, F20 fascia dilator successively. And then nephroscope was placed. There were multiple stones in the lower calyx of right kidney and obstructive cast stone in the ureteropelvic junction discovered by exploration. Then imbedding EMS system, if the stones were hard or some exposed not completely and holmium laser lithotripsy was not able to operate, use the EMS system. Operating renal pelvis, lower calyceal successively and to avoid damage the mucous membrane of renal pelvis during surgery. There are no significant residual stones in the renal pelvis and calyx only some stone powder confirmed by ultrasound. Nephroscope was placed in the ureteropelvic junction on the right side, then Zebra Urological Guidewire was placed into the bladder from ureter of right side and pull out the F5 ureteral catheter. Placing antegrade placement of F5 double-j catheter and right nephrostomy tube properly fixed, at the same time clipping half an hour. The operation was operated well and intra-operative bleeding was about 30ml. Little bloody fluid discharged from postoperative catheter, and when the color gets darker, proceeded bladder irrigation to prevent blood clot blocking catheter. Closely monitoring vital signs, gave the anti-infection and fluid replacement therapy. The curative effect was very satisfying by KUB after stay in bed for 3 days reviewed (Fig. 3). The double-j catheter was safely removed one month later and the patient urinated well by himself. Follow-up for 12 months, he was free of lower back pain and no stone recurrence found by ultrasound.

Conclusions

In this case, we chose costal margin between right scapular line and posterior axillary line as puncture site guided by ultrasound and into from upper renal calices. We used single standard channel (F20) percutaneous nephrolithotomy combined with holmium laser and EMS system to deal with multiple stones in middle and lower kidney and ureteropelvic junction stone. Percutaneous endoscopic combined with holmium laser and EMS system will sucking off by suction device directly after crushing stones, the clearance rate of stone is higher with less complications and light renal injury. Because of holmium laser with high efficiency of lithotripsy and the flexibility of the fiber, so if the stone is hard or not completely revealed, we first use holmium laser lithotripsy, then the EMS system to greatly increase stone clearance rate.

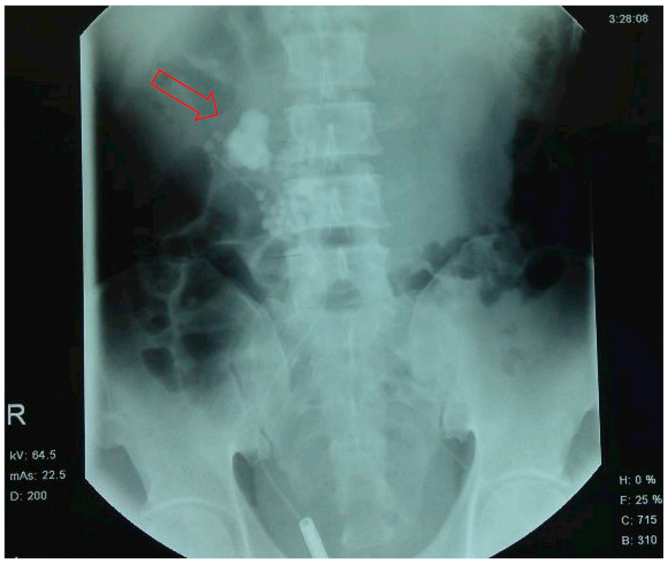

Fig. 2. Preoperative KUB, right kidney with multiple stones.

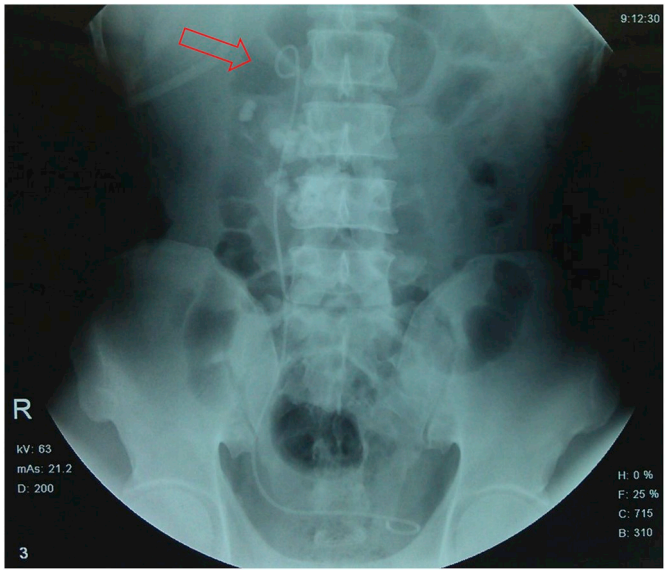

Fig. 3. KUB of 3 days after the operation, stones were totally cleared and double-J catheter was placed properly.

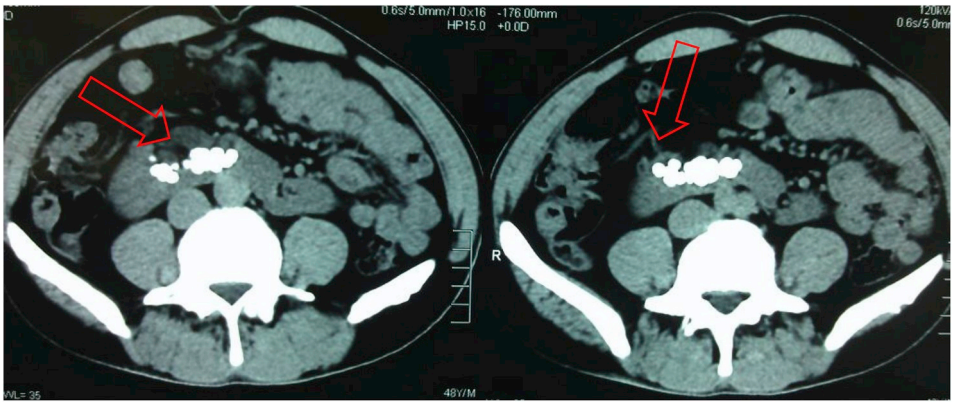

Fig. 1. CT for pre-operative examination, right kidney with multiple stones, hydronephrosis.

In addition, there were no obvious residual stones in the renal pelvis and calyces probed by ultrasound during operation. One-time treatment effect and the recovery of patient was satisfying.

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Availability of data and materials

The authors presented the essential data within the manuscript.

Authors' contributions

MTL drafted the manuscript and was responsible for critical revisions. MTL and FHZ performed the surgeries. CW made substantial contributions to patient management. FZ made substantial contributions to analysis and interpretation of data. CW analyzed the patient data. MTL was responsible for the conception and design of this study and interpretation of the data. All authors read and approved the final manuscript.

Ethics approval and consent for publication

Ethical approval was not applicable for this retrospective study. Written informed consent was obtained from the patient for publication of this manuscript.

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Declaration of competing interest

The authors declare that they have no competing interests.

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