Extra-large renal calculi removal using single puncture percutaneous nephrolithotomy

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Abstract

With the ever-increasing use of ultrasonography and X rays, renal calculi are being detected while still small thus large renal calculi are becoming less common. Percutaneous nephrolithotomy (PCNL) is a gold standard for the treatment of renal calculi >2 cm in size and being widely used worldwide. Here, we present a case of an extra-large kidney stone (10 cm × 7.5 cm and 2.7 cm × 2.3 cm) in a 45-year-old male patient which was removed through a single puncture PCNL.

Keywords: Percutaneous nephrolithotomy, renal calculus, staghorn calculus

INTRODUCTION

Since its initial introduction in the 1970s, percutaneous nephrolithotomy (PCNL) has become the gold standard for the treatment of renal calculi >2 cm in size and being widely used worldwide. PCNL is a minimally invasive procedure that allows removal of large or complicated stones and has several advantages, including decreased operative time and hospitalization, lower complication rates, and stone clearance >90%.1 The complications with PCNL include disruption of the pelvicalyceal system, bowel perforation, and hemorrhaging requiring transfusion or angioembolization.2,3 Here, we present a case of a 45-year-old male with an extra-large staghorn calculus managed successfully with a single puncture PCNL.

CASE REPORT

A 45-year-old male patient presented with intermittent dull aching left loin pain. He had these complaints off and on for the past several years. The patient was nondiabetic, nonhypertensive and had no other clinically significant history. On examination, he had tenderness on deep palpation of his right renal angle. The hemoglobin was 11.8 g/dL, total leukocyte count of 6600/µL, and serum creatine 0.9 m/dL. Routine urine examination showed 8–10 pus cells per high powered field.

An X-ray of the abdomen (kidney, ureters, and bladder [KUB]) showed extra-large right renal calculus occupying the right renal pelvis and upper middle calyces (10 cm × 7.5 cm) [Figure 1] and in addition, there was a 3 cm (2.7 cm × 2.3 cm) large lower calyceal calculus [Figure 1]. Ultrasonography showed the right hydronephrotic and enlarged kidney with large staghorn calculus.

The patient was started on intravenous antibiotics a day before the surgery and underwent PCNL the next day under...
spinal anesthesia. A single middle calyceal puncture was made. The calculus was fragmented with Swiss LithoClast. The total intraoperative time was 3 h. An antegrade 6/Z6 double J Stent was inserted to provide postoperative drainage, and a 20 French nephrostomy tube was also kept. Post evacuation plate showed complete drainage of the right pelvicalyceal system. The postoperative course was uneventful. An X-ray KUB on day 1 of the procedure was taken [Figure 2] and the nephrostomy tube was removed. The perirethral catheter was also removed on the second day after the PCNL site wound soakage was zero. The patient was discharged a day later.

DISCUSSION

Here, we present a case of large staghorn calculi which was successfully managed by single puncture PCNL. There is a lot of literature available on the use of PCNL in patients with renal calculi size 2–3 cm. However, limited data are available for calculi which have diameters >3 cm. In the present case, there were two large calculi (10 cm × 7.5 cm and 2.7 cm × 2.3 cm) were removed using minimally invasive single puncture PCNL.

To the best of our knowledge, this is the first case of the largest renal calculi which was removed by single puncture PCNL. The largest renal calculi were reported by Hemendra Shah (India) in 2004 which measured 13 cm at its widest point and was removed from the left kidney of the patient.[4] However, the heaviest renal calculi were reported by Ghulam Shabir Imran Akbar Arbani and Malik Hussain (Pakistan) in 2008 which measured 620 g and was removed from the right kidney of the patient.[5]

In a recent meta-analysis that included five randomized and nine nonrandomized studies involving 901 patients compared laparoscopic pyelolithotomy and PCNL and found that though laparoscopic pyelolithotomy is a safe and effective in the treatment of large renal calculi, PCNL is still suitable for most cases and laparoscopic pyelolithotomy can be used as an alternative management procedure with good selection of cases.[6]

The size of the renal calculi is directly correlated with the overall incidence of complications after PCNL and hence, treatment of large renal calculi is still considered challenging in the majority of the cases.[6] An ideal procedure for the treatment of large or complex renal stones would be the one that helps achieve complete stone-free status and with minimal morbidity and is cost-effective. PCNL is generally considered as a safe procedure, and there is a lot of literature available supporting its usefulness and cost-effectiveness. However, PCNL has some known complications, and the most common one is hemorrhage, which can occur during the passage of the needle, tract dilatation, or during nephrostomy. Lungs and pleura are commonly injured during PCNL.

In a previous report by Ciccone et al., a 68-year-old female had a 5-cm staghorn renal calculus and was treated with the staged ureteroscopic approach.[7] In this case, the prone or semi-prone positions were difficult and hence, staged ureteroscopy and lithotripsy were chosen. Although, this was in contrast to our report, Ciccone et al. concludes that treatment of choice for large staghorn renal calculi remains PCNL; however, in selected patients, other options can also be helpful.[7]

Although, extra-large renal calculi are rare the present case demonstrates the usefulness of PCNL in the management of large complex multiple renal calculi with a single puncture and adds data to the literature.
Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

REFERENCES
1. Desai M, Jain P, Ganpule A, Sabnis R, Patel S, Shrivastav P. Developments in technique and technology: The effect on the results of percutaneous nephrolithotomy for staghorn calculi. BJU Int 2009;104:542-8.
2. El-Assmy A, El-Nahas AR, Madbouly K, Abdel-Khalek M, Abo-Elghar ME, Sheir KZ. Extracorporeal shock-wave lithotripsy monotherapy of partial staghorn calculi. Prognostic factors and long-term results. Scand J Urol Nephrol 2006;40:320-5.
3. Prabhakar M. Retrograde ureteroscopic intrarenal surgery for large (1.6-3.5 cm) upper ureteric/renal calculus. Indian J Urol 2010;26:46-9.
4. Guinness World Records. Largest Kidney Stone. Available from: http://www.guinnessworldrecords.com/world-records/largest-kidney-stone. [Last accessed on 2018 Jul 26].
5. Guinness World Records. Heaviest Kidney Stone. Available from: http://www.guinnessworldrecords.com/world-records/heaviest-kidney-stone. [Last accessed on 2018 Jul 26].
6. Bai Y, Tang Y, Deng L, Wang X, Yang Y, Wang J, et al. Management of large renal stones: Laparoscopic pyelolithotomy versus percutaneous nephrolithotomy. BMC Urol 2017;17:75.
7. Ciccone JM, McCabe JC, Eyre RC. Case report: Successful staged ureteroscopic treatment of a 5 cm staghorn renal calculus. Case Rep Urol 2012;2012:873069.