

Endourology

Classical prone percutaneous nephrolithotomy in a solitary functioning kidney with severe kyphoscoliosis

Faraz Basharat Khan, Musab Umair^{*}, Muhammad Nawaz, Badar Murtaza, Omer Farooq Rehman

Armed Forces Institute of Urology, Rawalpindi Pakistan

ARTICLE INFO

Keywords:

Kyphoscoliosis
 Percutaneous nephrolithotomy
 Solitary functioning kidney
 Spinal deformity

ABSTRACT

Percutaneous nephrolithotomy (PCNL) is one of the important options in the management of large (>2 cms) and complex renal calculi. Traditionally the prone position has been used to access the pelvicaliceal system. It has its advantages and disadvantages as well. Several modifications to this position have been suggested and reported by several urologists. We had performed PCNL in an elderly female in classical prone position with severe kyphoscoliosis and solitary functioning kidney.

Introduction

Percutaneous nephrolithotomy (PCNL) is the treatment of choice for renal stones more than 2cm.¹ PCNL is primarily performed in prone position by the majority of urologists due to the familiarity with the procedure thus ensuring least complications. Prone position is less popular and less favorable in morbidly obese patients, patients with structural spinal deformities and with serious cardiopulmonary diseases.² Therefore, different positions are adopted by the urologists to minimize the complication rates, and among them are the supine, modified supine and Galdakao-modified supine Valdivia (GMSV) positions. We report a case of a 40-year-old female presenting to us with solitary functioning right kidney with a large renal calculus. As she was a case of severe kyphoscoliosis, we had to use classical prone position to access the pelvicaliceal system.

Case report

In February 2019, a 40-year-old married woman presented to our outpatient urology clinic and complained of paroxysmal dull pain in the right lower back for the last twelve days. The pain had been aggravated with exertion and fluid intake. Medical history revealed that she was suffering from potts disease for which she had taken anti-tuberculous medications. Surgical history was unremarkable. Physical examination revealed the abnormal curve of the spine on two planes: side to side (coronal plane) and back to front (sagittal plane). The patient was neither hypertensive and nor diabetic.

All the hematological investigations were within normal limits. Plain

CT revealed multiple right renal calculi (HU +1283) measuring (2.0 × 2.4 × 2.0 cm) in the right renal pelvis [Fig. 1(A)]. Left kidney was congenitally shrunken, relatively small in size with cortical thinning and irregular outline. Magnetic resonance imaging (MRI) of spine reveals degenerative and generalized osteopenia was noted in the entire spine with significantly reduced intervertebral spaces of the lower thoracic and lumbar vertebrae.

We reviewed treatment options in multidisciplinary team meetings (MDTM), most notably PCNL or extended pyelolithotomy. Neurosurgical reviews were obtained during MDTM. Open surgical approach was not possible as iliac crest and ribs were almost in close approximation. Given the solitary functioning kidney and severe kyphoscoliosis with her young age, we recommend PCNL in classical prone position.

PCNL was planned under general anesthesia. An initial right retrograde ureteropyelogram was done to delineate the pelvicaliceal system with the patient positioned in a lithotomy position. With proper care, the patient was put in prone position. The patient's head, thorax, and abdomen were positioned on the upper end of the operating table. In this position, the C-arm could be freely moved over the back [Fig. 1 (B)]. PCNL was performed using a bull's eye technique to puncture the pelvicaliceal system and track dilated using a combination of Teflon and metal dilators [Fig. 2]. The stone was fragmented using a pneumatic lithoclast. The stone was fragmented and extracted totally [Fig. 3]. An antegrade DJ stent was passed through guide wire for 2 weeks. Post-operative period was uneventful. The patient was discharged on the 3rd postoperative day with no complications.

^{*} Corresponding author.

E-mail address: musabumair923@gmail.com (M. Umair).

<https://doi.org/10.1016/j.eucr.2020.101417>

Received 6 September 2020; Received in revised form 13 September 2020; Accepted 15 September 2020

Available online 16 September 2020

2214-4420/© 2020 The Authors.

Published by Elsevier Inc.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

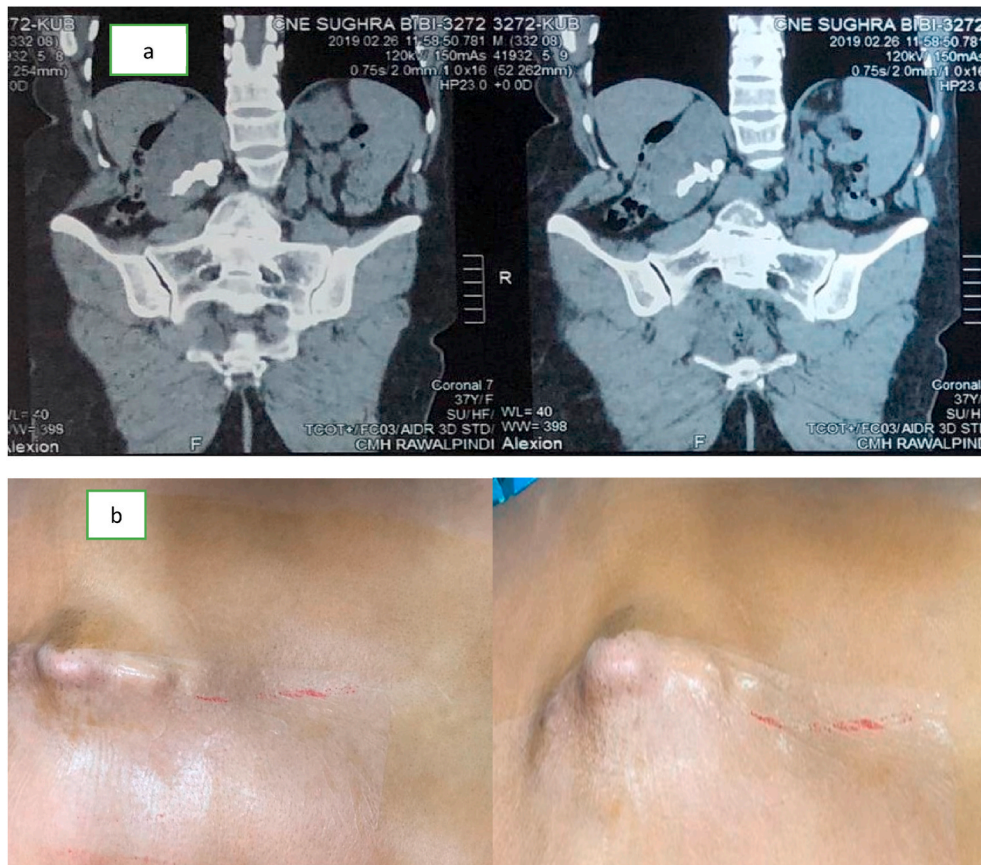


Fig. 1. Section “a & b” show original CT imaging showing the stone burden and severe kyphoscoliosis in classical prone position.

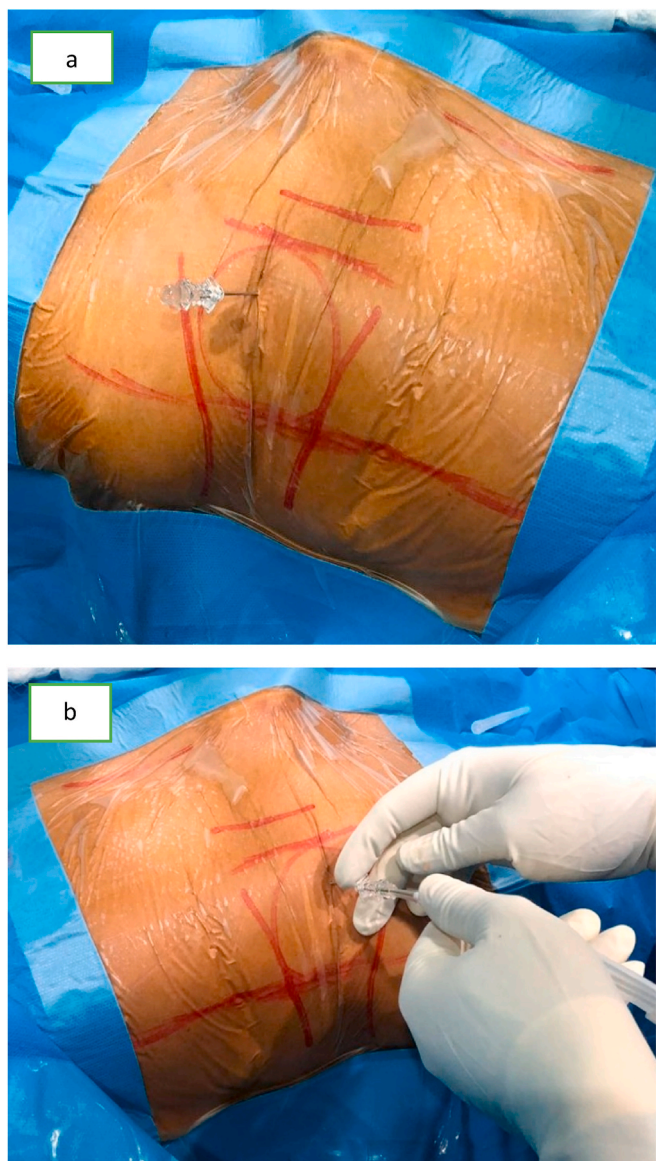


Fig. 2. Section “a & b” show puncture of the pelvicaliceal system and track dilatation.

Discussion

In spite of the disadvantages of performing PCNL in prone position like change in patient’s position, difficulty in keeping up an ideal access to the airway and risk of damage to nerves, limbs, and neck injuries it is still favored by majority of urologists because it provides a large surface area for renal access.² In kyphoscoliosis, it usually provides less surface area even in prone position therefore it is not only challenging but may require re-intervention to ensure complete stone clearance. PCNL in patients with spinal deformities is safe and effective as compared to open surgery. Kyphoscoliosis constitute a challenge during the surgical procedure and for anesthetic management. Right handling of urolithiasis in patients may be difficult because of anatomic variations and respiratory dysfunction, and stone size may not be the only factor in deciding the best treatment.³ In a study by Goumas-Kartalas et al⁴ 8 patients with spinal deformity underwent PCNL in supine and prone positions. No anesthesia-related or cardiopulmonary complications were observed, and they concluded that the supine position provides some advantages, including patient comfort, protection of cardiac function, better airway control, improved pulmonary ventilation and the ability to perform a

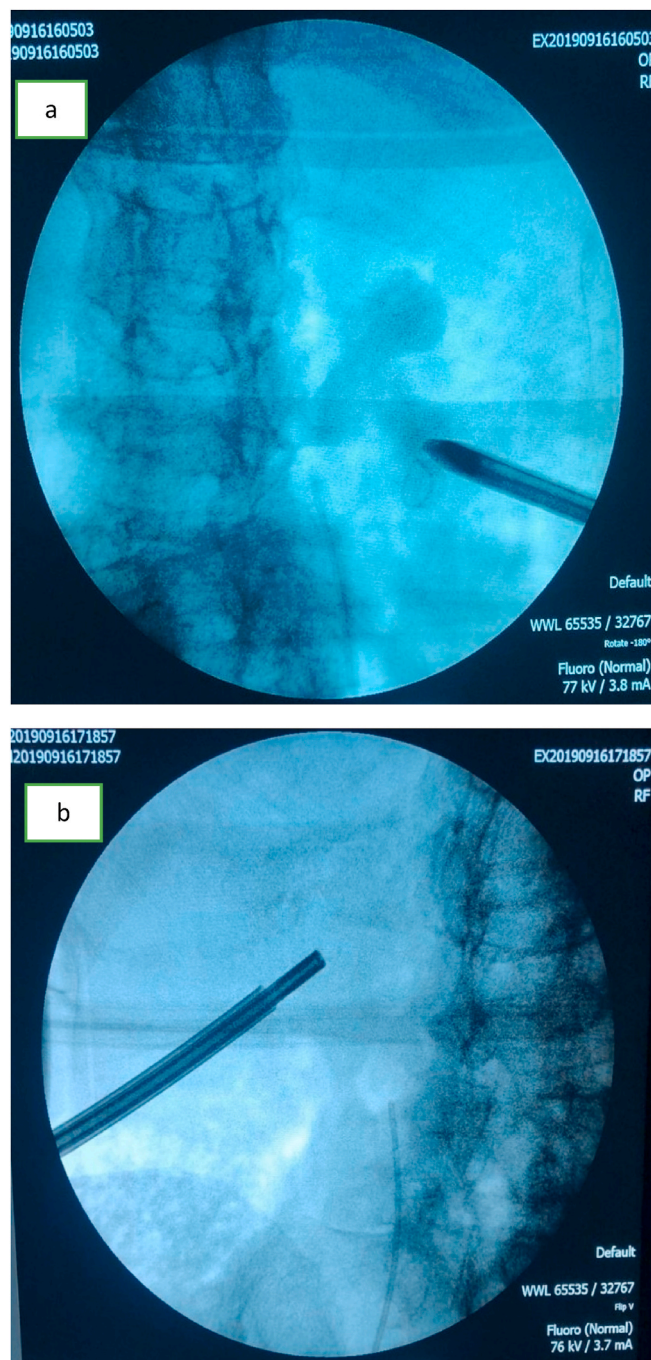


Fig. 3. Section “a” calculi identified “b” show complete clearance.

simultaneous combined procedure. However, they could not state that prone PCNL in patients with spinal deformities is contraindicated and that supine PCNL is always the best choice.

Conclusion

The treatment of nephrolithiasis in patients with solitary functioning kidney and spinal deformities is a complex situation, which may necessitate different approaches in planning and performing percutaneous procedures. The crux of the matter is to not only remove the renal calculus but save the solitary functioning kidney along with the care of spinal deformity. These cases represent a challenging situation. In this patient with severe kyphoscoliosis we have seen the feasibility and effectiveness of single stage prone PCNL to remove the renal calculi.

References

1. Turk C, Knoll T, Petrik A, et al. *Guidelines on Urolithiasis [Internet]*. Arnhem (NL): European Association of Urology; 2015 [cited 2015 May 23]. Available from: http://uroweb.org/wp-content/uploads/22-Urolithiasis_LR_full.pdf [Google Scholar].
2. Atkinson CJ, Turney BW, Noble JG, Reynard JM. Supine vs prone percutaneous nephrolithotomy: an anesthetist's view. *BJU Int*. 2011;108:306–308 ([PubMed] [Google Scholar]).
3. Silva ML, Sanguinetti H, Battiston S, Alvarez P, Bernardo N. Kidney stones in several spinal abnormalities: a challenging treatment. *J Endourol Case Rep*. 2016 Feb 1;2(1):8–10.
4. Goumas-Kartalas I, Montanari E. Percutaneous nephrolithotomy in patients with spinal deformities. *J Endourol*. 2010 Jul 1;24(7):1081–1089.