

Case Report

Percutaneous nephrolithotomy in a case of retrorenal colon: A descriptive approach and literature review

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Abbreviations & Acronyms

CT = computed tomography
ESWL = extracorporeal shock wave lithotripsy
GI = gastrointestinal
KUB = kidney ureter bladder
PCNL = percutaneous nephrolithotomy
UPJ = ureteropelvic junction

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Received 7 November 2018; accepted 16 January 2019. Online publication 14 February 2019

Introduction: Percutaneous nephrolithotomy procedure is generally used to treat stones resistant to other treatment modalities. Colonic perforation even though rare, is a serious complication that increases patient's morbidity. This case report describes the case of a patient with retrorenal colon who underwent percutaneous nephrolithotomy for management of pelvis/lower calyceal staghorn stone.

Case presentation: A 63-year-old female patient presented for the management of a staghorn pelvis-lower calyceal stone. The patient had a preoperative computed tomography scan of the abdomen and pelvis that showed an incidental finding of left retrorenal colon. Under computed tomography scan guidance, a nephrostomy tube was successfully placed by an interventional radiologist, and then she underwent percutaneous nephrolithotomy.

Conclusion: This case report aims to stress on the importance of doing a computed tomography scan whenever a prior abdominal surgery is performed. We strongly believe that gastrointestinal injuries could be avoided by using computed tomography guided access in high risk patients.

Key words: CT guided percutaneous access, image guided, percutaneous nephrolithotomy, renal stone, retrorenal colon.

Keynote message

In addition to describing renal access in a retrorenal colon case, this case report aims to stress on the importance of doing a CT scan whenever a prior abdominal surgery is performed. We strongly believe that GI injuries could be avoided by using CT guided access in high risk patients. An adequate method is hereby described to avoid serious complications and to safely approach patients with retrorenal colon.

Introduction

PCNL procedure first described in 1976 by Fernstrom and Johansson is a minimally invasive technique for the management of stones resistant to ESWL, calyceal diverticulum stones, staghorn stones, stones with UPJ, and large stones with size varying in lower versus mid/upper poles.

The procedure is usually performed in the prone or supine position where a percutaneous access is placed whether by a radiologist or urologist, usually under fluoroscopic or ultrasound guidance. Bleeding and infection are the most common complications of PCNL. However, colonic perforation even though rare (<1%), is a serious complication that increases patient's morbidity and hospital stay.

Retrorenal positioning of the colon, as described by Prassopoulos *et al.*,¹ is determined by a line drawn from the anterolateral edge of the vertebral body through the middle of the renal hilum. The presence of colon posterior to this line is regarded as retrorenal colon. Retrorenal colon has a higher incidence in patients with history of abdominal surgery or spinal cord deformities.²

The following case report describes the case of a patient with retrorenal colon who underwent PCNL for management of pelvis/lower calyceal staghorn stone.

Case presentation

A 63-year-old female patient with a past surgical history of right partial colectomy and bilateral ureteroscopy for ureteral stones presented for the management of a staghorn pelvis-lower calyceal stone of $3 \times 2.2 \times 1.9$ cm.

The patient had a preoperative CT of the abdomen and pelvis and was referred to our center to undergo PCNL. Besides an accurate measurement of the stone dimensions, an incidental finding of left retrorenal colon was identified (Fig. 1). Spatial relationship of the kidney to retroperitoneal organs and colon was drawn, and a conventional intra-operative fluoroscopy guided percutaneous access was deemed to be at risk of colonic injury (Fig. 2).

Under CT scan guidance, an 8-Fr nephrostomy tube was successfully placed by an experienced interventional radiologist into the left middle renal calyceal group along with a 0.035 inch sensor PTFE-Nitinol with hydrophilic tip guide wire reaching the distal left ureter. Access was gained using a subcostal route. The patient was then transferred to the operating room, where general anesthesia and preoperative antibiotic prophylaxis were administered.

Procedure

The patient was placed in the prone position. Over the placed sensor guide wire, the percutaneous tract was dilated with nephromax balloon dilator up to 17 atmospheric pressure, and subsequent amplatz sheath was successfully inserted (30-Fr). Rigid nephroscopy was done, and the stone was identified and fragmented using ultrasonic lithotripter. Stone fragments were removed with suction and stone forceps. No evidence of remaining stones was detected, neither by direct vision, nor by fluoroscopy (Fig. 3). At the end of the procedure, an antegrade ureteral stent (JJ catheter 6-Fr–26 cm) was inserted and a 22-Fr nephrostomy tube was placed into the left kidney pelvis both under fluoroscopic guidance.



Fig. 1 CT-KUB showing large pelvic stone and the presence of a retrorenal colon.

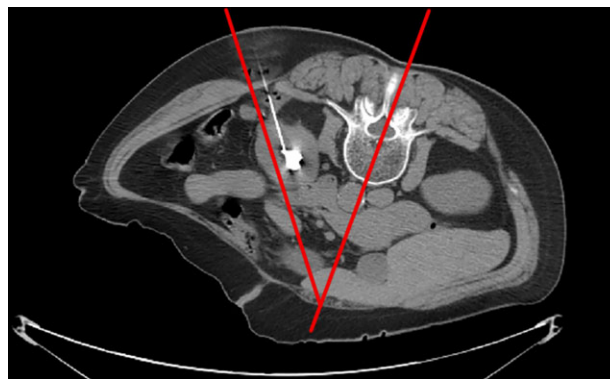


Fig. 2 A virtual 30 degrees angle drawn to outline the risk of injury during conventional fluoroscopy access-CT-guided 8-Fr nephrostomy in place.



Fig. 3 End of procedure, no identified remaining stones on fluoroscopy.

Outcome and follow-up

Postoperatively, the patient remained hemodynamically stable.

On the first postoperative day, a KUB X-ray was done confirming a stone free kidney with the double J stent in place and the nephrostomy tube was removed. The Foley catheter was removed on the second day postoperatively and patient was discharged with no complications. The double J catheter was removed 10 days after the procedure under local anesthesia in our endoscopy suite.

Discussion

PCNL has been repeatedly used by urologists to manage complicated cases of kidney stones. Complications of this procedure are well described in the literature among which,

one of the most devastating, is injury to the GI system. An unnoticed retrorenal colon is often the case behind GI injury, occurring in 1–2% of patients with higher prevalence at left lower poles. Although GI injury is not common, complications of unrecognized injury such as peritonitis, abscess formation, leakage, and fistulas can cause major morbidity.

In the presence of a retrorenal colon, evidence showed the need for access under CT or ultrasound. But, none, to our knowledge, described a detailed safe access to the kidney in the presence of retrorenal colon; hence, this case report describes the practical use of CT guidance to gain access to the kidney when a retrorenal colon is diagnosed preoperatively.³

In our center, usual access to the kidney is done under fluoroscopic assistance. Other centers gain access using ultrasound guidance. Multiple cases of colon injuries were reported after using the two modalities since both lack the precision to identify a retrorenal colon. Therefore, it is essential to assess renal anatomy and adjacent organs in order to gain access to the desired renal calyx with minimal complications. This would best be done using CT scan to assess surrounding organs and renal anatomy with precise marking of stone location.

If the technique described in this case report is well established and standardized in prospective studies, complications resulting from retrorenal colon could be reduced.

Studies showed that the prevalence of retrorenal colon in prone position is slightly higher than that in supine position. However, the rate of colonic injury is the same in both positions. In fact, colonic injury rate varies between 0.3% and 0.8%, with a non-remarkable difference in incidence between supine and prone PCNL procedures.⁴

Conclusion

To the best of our knowledge, such description of a safe access to a retrorenal colon is the first of its kind in the

Middle East region. In addition to describing renal access in a retrorenal case, this case report aims to stress on the importance of doing a CT scan whenever a prior abdominal surgery is performed. Meticulous reading of preoperative CT imaging is needed to identify a retrorenal colon when present to avoid any GI system injury.

Disclosure

The authors confirm that the paper has been read and approved by all named authors. The authors also confirm that they have given due consideration to the protection of intellectual property associated with this work and that there are no impediments to publication, including the timing of publication, with respect to intellectual property. In so doing the authors confirm that they have followed the regulations of their institutions concerning intellectual property.

Conflict of interest

The authors declare no conflict of interest.

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