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Letter to the Editor

Large renal calculus and ipsilateral flank (incisional) hernia: Perhaps another indication for Mini PCNL? ☆



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Abstract

Introduction: The use of the Mini PCNL has been gaining momentum since its first description in 2001. The range of indications for this particular procedure may also be expanding. We describe a case of a large renal calculus in a renal collecting system, found in a patient who underwent an Anatomic Nephro-Lithotomy [ANL] procedure a few years back. He subsequently developed a flank (incisional) hernia after the ANL. Some, twenty years later he presented with another large (22 mm) stone in the same system.

Observation: Attempt at stone clearance was performed using the Mini PCNL. To avoid iatrogenic injury to the surrounding bowel loops in the hernia sac, a combined ultrasound and fluoroscopic technique was performed, with limited respiration and suspended abdominal fat at the time of renal access. The dilation was performed to accommodate the Mini PCNL sheath, thus minimizing the possibility of iatrogenic bowel injury. A serial balloon dilator was not used, in the presence of such severe fibrosis from the previous open surgery (ANL).

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Conclusion: The presence of a hernial sac within the ipsilateral flank may be amenable to Mini PCNL, provided the basic principles of puncture are maintained. This includes the use of adequate positioning, limited respiration and the use of ultra-sound identification of the bowel loops during access puncture and tract dilatation. A new indication for the use of Mini PCNL is thus reported.

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Introduction

The indication and role of minimally invasive surgery is evolving in today's modern era. The same is applicable to the management of upper tract calculi and the various forms of PCNL that are available. Herein, we describe the first report of the Mini PCNL used in a patient with an ipsilateral flank hernia.

Case report

A 49 year old man presented to our department with a large renal stone (22 mm) and an incisional (flank) hernia, from a previous ipsilateral, open surgical Anatomic Nephro-Lithotomy (ANL) procedure performed for a staghorn renal calculus, some 20 years ago. The current general surgical team had deferred treatment of his incisional hernia, to after his renal calculi was managed.

On examination the hernial (flank) scar and bulge was easily identified at rest, Fig. 1(A). His non contrast CT scan of the abdomen revealed the hernia in close approximation to the kidney, observed in Fig. 1(B).

A Mini PNCL was performed using the prone approach, with limited respiration. The renal puncture assess was performed using a combined fluoroscopic and ultrasound guided technique. The ultrasound also isolated the bowel segment from the renal access tract and facilitated a safe dilation and puncture tract, as seen in Fig. 2(A) and (B). Tract dilation was performed using a single access, graduated screw dilator, placed over the working guide-wire. The stone burden was resolved, via laser lithotripsy and basket extraction during

Mini PCNL, within 45 min of operative time, Fig. 2(C). He is now planned for laparoscopic repair of the ipsilateral incisional hernia.

Discussion

The main objectives of surgery for urinary tract calculi are to achieve a high stone free rate (SFR), maintain renal function and reduce complications from calculi and subsequent intervention [1].

ANL was a well described method for removal of staghorn calculi in previous years. Parenchymal damage due to needle puncture and tract dilatation and less commonly vessel injury are implicated in percutaneous nephrolithotomy (PCNL); whereas direct parenchymal injury with subsequent scar formation at the nephrotomy site is implicated in ANL [1].

As treatment alternatives, ureteroscopy and stone management or the use of ESWL in this situation may be considered to be safer options in some institutions.

However, the recent European Association of Urology (EAU) guideline recommends PCNL as first line in cases of renal calculi greater than 20 mm. In cases where multiple procedures with their resultant adverse effects are expected or numerous endourological approaches have been attempted unsuccessfully, open or laparoscopic procedures may be considered [2].

There is a paucity of direct comparative studies between ANL and PCNL. Considering the potential structural renal damage after ANL, renal dysfunction is often not clinically significant [1].

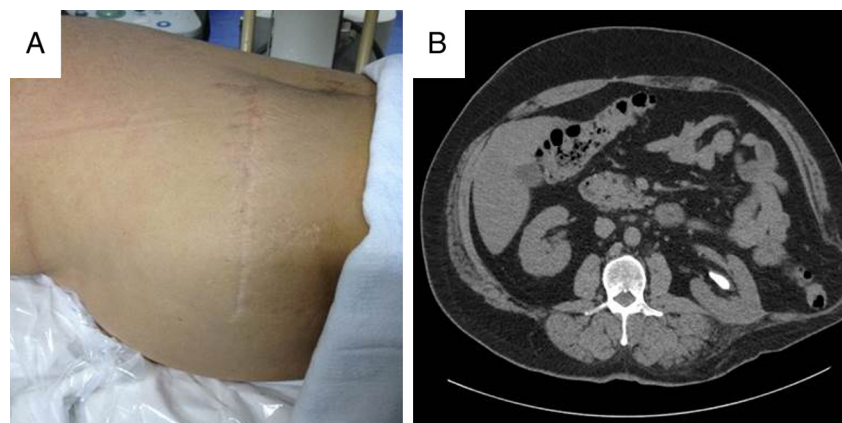


Figure 1 (A) Clinical picture of the flank incision and hernia bulge. (B) CT scan, showing the flank hernia, with bowel contents visualized within the sac, the 22 mm stone is visualized within the renal pelvis of the kidney.

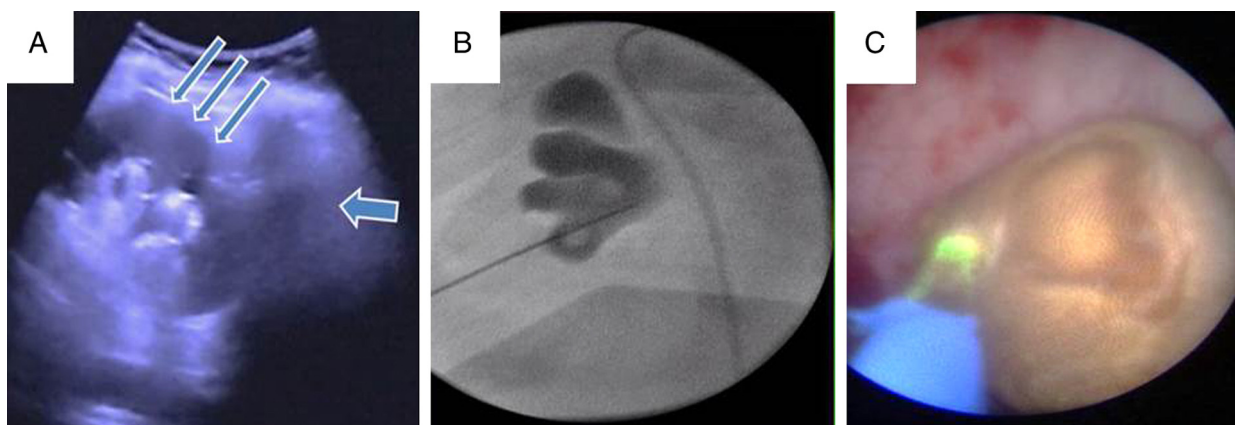


Figure 2 (A) Renal ultrasound image during puncture access (small arrows: renal cortex outline, large arrows: bowel loops in close proximity). (B) Fluoroscopic guided puncture. (C) Endoscopic view (Mini PCNL) during laser lithotripsy of the calculus.

Since the standard access tracts are 24–30 French (Fr), attempts were made to improve outcomes and minimize complications of the invasive nature of the procedure. Thus a minimally invasive percutaneous nephrolithotomy (Mini PCNL) was utilized. This per definition implies that a smaller scope is used through an 18 Fr or less tract [3].

Since its inception, there has been contentious debate and a plethora of research about the advantages and disadvantages of PCNL and Mini PCNL.

The SFR has been shown to be similar between the two procedures. Mini PCNL has the advantage of less blood loss, lower incidence of blood transfusion, less post-operative pain and a shorter hospital stay. Reduced morbidity has also been noted in patients undergoing Mini PCNL [4]. The technical benefit of Mini PCNL is that it does not always require a forceps for fragment extraction, since the so called ‘vacuum cleaner effect’ whereby fragments are irrigated out through the sheath is more prominent in Mini PCNL [4]. Complications such as pyelocaliceal perforation and post-operative pyrexia are similar between the two groups, however the operating time in standard PCNL is generally shorter [3].

Due to the presence of the hernia sac and the risk of resultant sheering due to serial dilation up to the standard PCNL sheath a Mini PCNL was performed. Since, intra-operative ultrasound access lowers the incidence of bowel injury [2], this modality was combined with fluoroscopic guidance. A balloon dilator was not utilized in the setting of such fibrosis and history of the previous ANL procedure.

In cases where multiple calculi are present, a newer innovation describes using ultrasound-guidance needle for manipulating stone fragments into a location accessible, thus decreasing the need for additional dilatation and subsequent complications [5].

Conclusion

Mini PCNL is an acceptable method for upper tract stone clearance in patients with an ipsilateral flank hernia, provided safe principles are applied along with an ultrasound guided access technique. The

first successful case of a Mini PCNL in a patient with an ipsilateral flank hernia is reported.

Consent and ethics

This study/report has been certified by the The Human Research Ethics Committee: (Medical) at the University of the Witwatersrand, Johannesburg, South Africa—Institutional Ethics Committee as per the principles of the Declaration of Helsinki.

Authors’ contributions

A. Adam [aadam81@gmail.com]: inception, write-up, structure, image collation, literature review, submission.

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Conflict of interest

None.

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