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## Open to Debate For

# Percutaneous Nephrolithotomy for Stone Disease: Which Position? Prone Position!

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### Article info

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Percutaneous nephrolithotomy (PCNL) remains the first-line treatment of choice for large renal stones >2 cm. The evolution of PCNL surgical instruments and approaches over time has improved the stone-free rate (SFR) and decreased the rate of complications, making it more appealing for specialists [1]. The initial description of PCNL refers to the prone position and has been described as an effective and safe approach. The supine position was first proposed as an alternative approach in 1987 with the aim of overcoming the limitations of the prone position [2]. However, the supine position is associated with its own disadvantages. Patient positioning has been and continues to be a matter of debate. A balanced evaluation of all the pros and cons of both techniques is essential to make proper recommendations. Here we outline and discuss the benefits and limitations of the prone position for performing PCNL.

Prone PCNL remains the technique most often used, and is preferred by 77% of endourologists [3]. The question thus arises as to whether there is an objective indication to

recommend a change in surgical practice from the prone to the supine position.

During the past two decades many authors have investigated the effect of patient positioning on perioperative outcomes following PCNL. A recent meta-analysis including 1474 patients revealed similar SFRs for patients undergoing supine and prone PCNL. Moreover, no significant differences were observed between the two groups for overall complication rates and length of hospital stay. The supine position was only superior in terms of overall operative time compared to prone PCNL [4].

With the absence of significant clinical benefits of the supine position over the prone position, the latter approach ensures treatment of all renal stones regardless of size and location in the pelvicalyceal system. The prone position is ideal for kidneys with a large stone burden, such as semi-staghorn and complete staghorn stones, for which multiple PCNL access points can be required to treat the stone [5]. The broader surface area of the prone position allows puncture and establishment of PCNL tracts at every site (upper, middle, and lower portion of the kidney). In addition, the prone position provides the surgeon with a wider working space for intrarenal instrument manipulation [6].

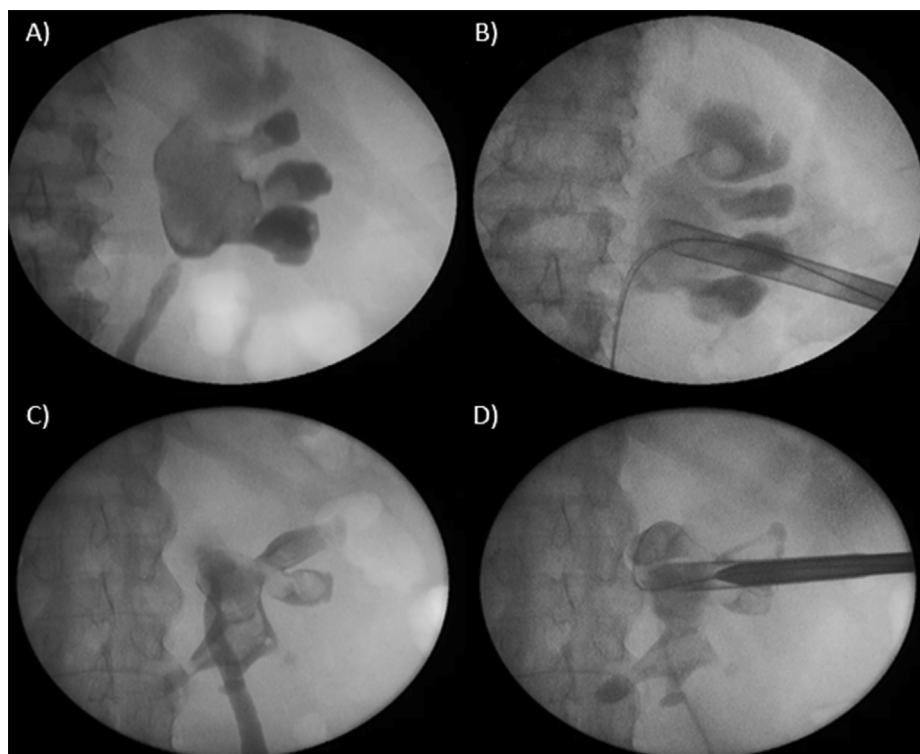
An important benefit is the possibility to perform prone PCNL in patients with kidney anomalies, such as horseshoe kidney (Fig. 1). The shorter length of the PCNL tract and the limited kidney mobility are additional advantages associated with prone PCNL. Similarly, the prone position can facilitate access in obese patients [6]. It has been advocated that pronation would jeopardize anesthesia for obese patients and increase the intra-abdominal and intra-thoracic pressure. However, better pulmonary func-

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**Fig. 1 – (A) Complete staghorn stone. (B) The stone was managed using a single nonpapillary prone percutaneous nephrolithotomy (PCNL) tract. (C) Staghorn stone located in the left compartment of a horseshoe kidney. (D) Successful management with nonpapillary prone PCNL.**

tion, an increase in functional residual capacity, and better lung compliance and oxygenation were observed in obese patients in the prone position when adequate padding was applied [7].

It can be claimed by specialists performing supine PCNL that their approach is associated with a lower anesthesiologic risk for patients, lower intrarenal pressure (IRP), easier performance of endoscopic combined intrarenal surgery (ECIRS), and better ergonomics and radiation exposure [8]. It is worth mentioning that anesthesiologic risks and nerve injuries mainly accompany longer procedures. In the current era of endourology with the latest commercial lithotripters, even treatment of complete staghorn stones can be limited to 1 h.

Is the decrease in IRP a real benefit favoring supine PCNL? Low IRP means a less distended pelvicalyceal system and worse visualization with difficult lithotripsy, which is more pronounced with lithotripters that incorporate suction devices. In addition, although the IRP is higher in the prone position than in the supine position, it mostly remains in the safe range for standard and mini-PCNL procedures [9].

Performing ECIRS in the prone position is not more challenging than in the supine position [10]. In fact, this is a matter of surgeon expertise. In our hands, ECIRS can be safely performed in the prone position without posing any additional threat to patient safety. Similarly, we think that operating in a sitting position (during supine PCNL) or standing position (prone PCNL) depends exclusively on personal preference and can vary from surgeon to surgeon. Nevertheless, our experience in training fellows and

residents has revealed that the prone position represents a more optimal approach for a young specialist with limited expertise.

Both prone and supine PCNL have similar safety and effectiveness. With all the pros and cons of the approaches, the surgeon's expertise and preference remain the main factors for decision-making.

**Conflicts of interest:** The authors have nothing to disclose.

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