Invited Commentary

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Endoscopic combined intrarenal surgery in prone split-leg and inclined supine positions to treat renal cast and multiple calyx stones: An invited commentary

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This Invited Commentary discusses the following article: Mulay A, Mane D, Mhaske S, Shah AS, Krishnappa D, Sabale V. Supine versus prone percutaneous nephrolithotomy for renal calculi: Our experience. *Curr Urol* 2022;16(1):25–29. doi: 10.1097/CU9.0000000000000076.

Urolithiasis is a common disease encountered in urology. Its incidence is 0.1%–14.8% in Western countries and 5.94%–9.15% in China, with a significantly higher incidence in South China than in North China. In some areas of South China, the incidence of calculi exceeds 20%.[1] Currently, percutaneous nephrolithotomy (PCNL) is the preferred treatment option for patients with multiple complex, renal cast, and multiple calyx stones.[2] Complex multiple stones are associated with a lower stone clearance rate and a higher complication rate.[3] Multichannel lithotripsy and endoscopic combined intrarenal surgery (ECIRS) in prone split-leg and inclined supine positions can improve the stone clearance rate.[4] The 2016 American Urological Association guidelines established multi-channel PCNL as a safe and effective treatment for complex stones. In a previous study, the stone-free rate in a single operation was 79%, but the size and number of channels increased, followed by an increased risk of bleeding.[5]

In the article "Supine versus prone percutaneous nephrolithotomy for renal calculi—Our experience," Mulay et al. evaluated the efficacy and safety of PCNL in modified supine and prone positions and showed that PCNL and ECIRS can be performed simultaneously in the supine position. In 1992, Ibarluzea et al. introduced ECIRS in the modified supine position.[6] With the improvement and development of various urological surgical techniques and instruments, retrograde intrarenal surgery (RIRS) is no longer just an adjunctive or alternative surgery but an important part of clinical treatment. Better clinical outcomes and minimization of surgery-related complications can be achieved by combining RIRS with PCNL. A systematic review of 14 ECIRS cases showed that ECIRS had a stone-free rate of 61%–97%, a complication rate of 5.8%–42%, and a reduced risk of bleeding. Moreover, the bleeding risk was not correlated with the PCNL puncture channel size.[7] Modified supine ECIRS has the following advantages over multichannel PCNL:

a. No position adjustment is required after anesthesia.
b. Direct vision puncture can be performed, and the puncture needle and dilator can enter the collecting system without being too deep under the direct vision of the transurethral ureteroscope, ensuring the safety and effectiveness of the puncture and reducing the incidence of complications when the channel is established.
c. The first choice for percutaneous renal puncture in ECIRS is the inferior calyx approach, and flexible ureteroscopy is performed to treat stones in the middle and upper calyces, which are relatively easy to access. Simultaneously, the advantages of flexible ureteroscopy for exploration include treating parallel calyx stones. For lower parallel calyx stones, the stone basket under the flexible scope can be used to move the stone to a position that can be treated with nephroscopy, after which the stone can be crushed and extracted.
d. Stone fragments entering the ureter can be treated without position adjustment, thereby reducing the rate of reoperation.
e. Combined PCNL and RIRS can treat ureteral and kidney stones simultaneously.
f. The stone clearance rate improves without increasing the risk of bleeding.
g. Combined with ureteral twisting and stenosis, it is difficult to insert the double J stent tube from the PCNL channel after lithotripsy. The double J stent tube can be placed retrogradely through the urethra using the ECIRS without position adjustment.

ECIRS can also be performed in the prone split-leg position, which has several advantages compared to the modified supine position as follows:

a. The prone split-leg position fully exposes the percutaneous renal puncture area of the affected kidney at the waist.

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b. This position is simpler than the modified supine position and effectively reduces the workload of medical staff.
c. The peripheral organs, such as the intestines, are lowered by gravity, reducing the risk of organ damage.
d. The intrarenal perfusion effect is better in the prone position; therefore, the operative field of view is unaffected.
e. The modified supine position typically has a longer PCNL tract, particularly in patients with obesity, with decreased nephroscopic mobility and greater renal parenchymal mobility; thus, the bleeding risk is high, and extra-long devices should be provided.

However, the prone split-leg or inclined supine position is not significantly superior in terms of urological parameters, such as the stone clearance or complication rate.[8]

PCNL technology has evolved mainly owing to improvements in puncture technology, endoscopic instruments, lithotripsy devices, and drainage management. The introduction of the split-leg prone and improved supine positions is also part of the development. The development of ECIRS reflects the individualized management of patients with stones. ECIRS in split prone and modified supine positions is associated with a higher stone clearance rate, less blood loss, shorter operative time, and reduced perioperative complications when treating renal cast and multiple calyx stones. This is a new, safe, and effective procedure for PCNL.

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Statement of ethics

Not applicable.

Conflict of interest statement

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Author contributions

QC, CC, and FL conceived the study. FL wrote the original draft of this manuscript. FL and CC reviewed and edited the manuscript. QC supervised this study. All authors have read and approved the final manuscript.

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