

STONE DISEASE

Treatment of large impacted proximal ureteral stones: a prospective randomized comparison of percutaneous antegrade ureterolithotripsy versus retrograde ureterolithotripsy

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Purpose: We compared the safety and efficacy of percutaneous antegrade ureterolithotripsy with retrograde ureterolithotripsy for large impacted proximal ureter stones in a prospective randomized manner.

Materials and Methods: A total of 91 patients with large impacted proximal ureteral stones, defined as stones > 1 cm in size located between the ureteropelvic junction and the lower border of the fourth lumbar vertebra, were prospectively randomized for antegrade (44) or retrograde (47) ureterolithotripsy. Failure of the procedure (conversion to an open procedure), intraoperative and postoperative morbidity, operative time, hospital stay, stone clearance at discharge home, and follow-up were analyzed in each group.

Results: The main complications were bleeding (2.3%; 1 of 43) for the antegrade procedure and ureteral injury (2.3%; 1 of 44) for the retrograde procedure. Percutaneous antegrade ureterolithotripsy was associated with longer operative times (75.4 ± 11.8 v 30.6 ± 7.8 minutes; $P < 0.001$), longer hospital stay (6.3 ± 0.5 v 2.1 ± 0.4 days; $P < 0.001$), and a longer interval to return to normal activities (7.8 ± 0.7 v 2.7 ± 0.6 days; $P < 0.001$). Nevertheless, the percutaneous antegrade procedure had a higher stone-free rate both at discharge home (95.3% v 79.5% ; $P = 0.027$), and 1 month post-procedure (100% v 86.4% ; $P = 0.026$).

Conclusions: Percutaneous antegrade ureterolithotripsy is a valuable treatment modality for impacted proximal ureteral calculi larger than 1 cm, and achieves higher stone-free rates than those of retrograde ureteroscopy with holmium:YAG laser lithotripsy. The drawbacks of the antegrade procedure are longer operative time and hospital stay.

Editorial Comment

This study reported higher success with antegrade versus retrograde ureteroscopy for large proximal ureteral stones. The authors should be commended for a well-executed randomized clinical trial that addresses an important question. However, the addition of flexible ureteroscopy to their retrograde approach may have changed the outcome.

The authors did not utilize flexible ureteroscopy during their retrograde approach - this might impact the stone-free success rate. It would have been helpful to report the size and location of the residual stones - if indeed they were fragments that had migrated to the kidney, these would have been possible to address with the addition of flexible ureteroscopy and stone retrieval. Similarly, flexible ureteroscopy may have facilitated reaching the stone in the 6% of patients who failed the retrograde approach.

The authors did not utilize flexible nephroscopy for their antegrade approach. This might have allowed the use of a lower pole access, with subsequent lower morbidity (pain, hospital stay, return to normal activities). It would be useful to try to establish predictive factors for failure of the retrograde approach - one might hypothesize that male gender, more proximal location, and high grade obstruction would predispose to either stone migration or difficulty accessing the stone. Lastly, one might consider the use of devices to prevent stone migration, such as the Boston Scientific Stone Cone, Cook N-Trap or PercSys Accordion in the setting of large proximal ureteral stones.

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Impact of percutaneous nephrolithotomy on estimated glomerular filtration rate in patients with chronic kidney disease

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Background and Purpose: We investigated the impact of percutaneous renal procedures on estimated glomerular filtration rate (GFR) of patients with chronic kidney disease (CKD). **Patients and Methods:** The GFRs of adult patients were calculated using the Modification of Diet in Renal Disease formula, and the patients were staged according to the Kidney Disease Outcome Quality Initiative CKD classification system. The study included 185 patients with preoperative GFR values less than 60 mL/min/1.73 m². The impact of percutaneous nephrolithotomy (PCNL) on GFR was analyzed by comparing the preoperative GFR with the GFR before discharge and at postoperative month 3.

Results: Patients with CKD had a significant increase in the GFR after the procedure. In postoperative month 3, the mean GFR was more than 60 mL/min/1.73 m² in 25% of the patients with CKD and less than 60 mL/min/1.73 m² in 75%. While all patients with stage 5 CKD improved to better stages, some other patients' conditions declined to stage 5 from better stages at the end of postoperative month 3. No patient needed dialysis. The presence of urinary tract infections tended to affect GFR negatively. **Conclusion:** Estimated GFR, as a better indicator of renal function, is significantly affected by the PCNL procedure. While significant improvement was observed in late-stage patients with CKD, unexpected deterioration could occur in patients at earlier stages.

Editorial Comment

The investigators studied a challenging patient population - the high rate of staghorn calculi and high rate of multiple accesses suggest a complex stone burden. This certainly may account for the high complication rates, specifically related to transfusion, sepsis and death. Alternatively, it is possible that the CKD could impact platelet function, baseline hemoglobin, cell-mediated immunity and humoral defenses. It is possible that the higher rate of urinary leak could be related to the thinned renal parenchyma in CKD. Interestingly, number of renal accesses or presence of a solitary kidney did not predict a negative outcome on GFR. Intuition would suggest that in these high risk patients, a greater reliance on flexible ureteroscopy and nephroscopy to decrease the need for multiple accesses might be warranted. One can conclude that GFR often improves after PCNL, however occasionally renal function will worsen. Patients should be counseled on the 25% chance of improvement and 4% risk of deterioration.

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