

**Editorial Comment: Bilateral Single-Session PCNL in Pediatric Patients; the Devil is in the Details**

Wang X. et al have shared their commendable experience on 45 cases of bilateral same-stage PCNL in young patients including 12 infants.

In keeping with contemporary 2023 EAU Guidelines for pediatric urology, urinary stones < 3mm at any location deserve primary observation, those below 10mm in the pelvis and lower pole alike are recommended for primary SWL, and those between 10 and 20mm in the pelvis are assignable to SWL/PCNL and RIRS. Recommendation for percutaneous lithotripsy supersedes in lower pole calculi over 10mm and pelvic stones above 20mm.<sup>1</sup> Based on these criteria, with reference to the provided average unilateral stone burden (16mm, range 3-40 per Table 1), one is tempted to believe that some patients may also have been amenable to alternative treatment at least on one side, which could entail less morbidity, reduce the duration of anesthesia in prone position and pose less risk for bleeding.

The choice of irrigant is of utmost consequence in infant PCNL and exponentially more critical when single-session bilateral PCNL is being contemplated. Adhering to isotonic crystalloid (saline) warmed to body temperature cannot be overemphasized. We are unaware of the type of fluid, elevation if gravity dependent, or pressure settings if pressurized, but Table 2 confirms that up to 11 liters of irrigant was required to accomplish bilateral miniPCNL in some of these children. The low body mass of pediatric patients renders them more vulnerable to volume overload by absorption of this fluid, and smaller instrumentation in microperc entails not just 20 times less inflow, but also less effective egress through the access sheath. Moreover, even limited bleeding can further impede outflow through such a small caliber route, and even downstream along catheterized ureters. In bilateral surgery this can easily translate into resurgence of anuria [notably mentioned in 8.9% of the patients in this series].

The threshold for tolerable bleeding to continue elective bilateral PCNL ought to be very low, as duly stated in this paper (<1g/dL). Kandemir et al. recorded 0.79 (0.2–2.4) g/dL drop in 85 unilateral pediatric PCNL cases including multi-tract procedures.<sup>2</sup> As is predictably unavoidable, bleeding in the present bilateral PCNL series of children exceeded the 1g/dL threshold, at times by thirty percent in both mini and microperc groups, although none required transfusion.

PCNL involves renal instrumentation, ureteral catheterization, hemodynamic stresses of general anesthesia, prone positioning and perioperative medical perturbations that all contribute to predictable changes in GFR, previously shown in adults to decrease over in the initial 48 hours by 13% on average, and gradually recover thereon.<sup>3</sup> Conceivably, the same is much more profound in simultaneous bilateral procedures of the present report, where initial preoperative creatinine levels are stated to have been normal in all (see Results). Compared to common normal range for age, the magnitude of post procedural "serum creatinine elevation" (Table 2) borders 50-100%, and is no different in mini and microperc.

All children in this series were scheduled based on non-contrast CT scan (NCCT) and again followed one month post-op by a second NCCT. While no alternative imaging modality can offer the sensitivity of this rigorous approach, adherence to the ALARA principle and post procedural follow-up of children by ultrasound, with only selective NCCT is the message to be promoted.

Last but not least, seeking the likely underlying metabolic, infectious or iatrogenic culprit for such bilateral large renal stones at young age is of utmost importance. The high propensity for recurrent stone disease in their long years ahead deserves judicious case by case selection of the least morbid and most nephron-preserving strategy to treat each stone, every time. Sometimes, although admittedly seldom, this will be bilateral simultaneous PCNL as presented in this series.

Pejman Shadpour MD  
 Professor of Pediatric Urology  
 Founder, departments of pediatric urology and laparoscopic surgery  
 Hasheminejad Kidney Center (HKC),  
 Iran University of Medical Sciences (IUMS)  
 ORCID 0000-0003-4171-4168

**REFERENCES**

1. Radmayr C, Bogaert G, Burgu B, Castagnetti MS, Dogan HS, O'Kelly F. Uroweb-European Association of Urology [Internet]. EAU Guidelines on Pediatric Urology-Uroweb. [(accessed on 28 February 2024)]. Available online: <https://uroweb.org/guidelines/paediatric-urology>
2. Kandemir A, Balasar M, Pişkin MM, Öztürk A. Outcomes of mini-percutaneous nephrolithotomies in children: a single centre experience. *Cent European J Urol.* 2019;72(2):174-177. doi: 10.5173/ceju.2019.1672
3. Nouralizadeh A, Sichani MM, Kashi AH. Impacts of percutaneous nephrolithotomy on the estimated glomerular filtration rate during the first few days after surgery. *Urol Res.* 2011 Apr;39(2):129-33. doi: 10.1007/s00240-010-0310-5