

Treatment of pediatric urolithiasis: how small is “small enough”?

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“Big” scars for stone removal are only needed in unusual circumstances. This is true given the fact that technology is fast evolving and instruments becoming smaller and smaller. The management of urolithiasis in children has undergone a paradigm shift in the past decade. Management of pediatric urolithiasis necessitates a balance between stone clearance and morbidity related to the procedure. A variety of treatment options are available, which include shock wave lithotripsy (SWL), percutaneous Nephrolithotomy (PCNL), and retrograde intra renal surgery (RIRS) and open surgery. Concerns regarding endourologic treatment include effect on the renal development and function, the side effects of radiation, and the implications of residual stones. Children with pediatric urolithiasis need to be worked up metabolically to prevent recurrence.

The treatment options should be chosen with prudence, as each of the treatment options has its share of problems. SWL has been the treatment of choice for renal calculi less than 15 mm in size. The stone-free rates range from 68 to 84% [1]. In our study, ESWL was found to be safe and effective in children as was in adults for solitary renal and upper ureteric stones less than 2 cm in size. We found that children required fewer and lower energy shock waves to achieve equivalent results. Considering that long-term data are awaited regarding functional consequences of shock waves on pediatric kidneys, it would be prudent to shock these kidneys as little as possible. In this context, we feel to minimize the “shock loss,” and optimizing the number and

energy of shock waves, the patient should be given optimum anaesthesia with the use of ultrasound and fluoroscopy for localizing and monitoring of stone fragmentation [2].

PCNL remains the most effective option for treating large stones in this age group. The obvious downside of this approach is the potential for life-threatening complications such as bleeding; hence, surgeon experience is paramount in deciding the number and site of access. Stone-free rates of more than 90% have been shown in pediatric age group [3]. Percutaneous Nephrolithotomy has been described even in children as small as 11 months, having complex calyceal stones and/or staghorn calculi. The method to gain access, ultrasound or fluoroscopy, is a matter of experience and personal preference. Ultrasound offers the advantage of visualization of spleen and liver and avoids injury. It also minimizes radiation to these kids. The key to success in PCNL in these small patients is staging the procedure if required, miniaturization of instruments, and using ultrasound as the method of achieving access. PCNL offers a good clearance rates with acceptable morbidity. Miniaturization of instruments particularly smaller nephroscopes and newer energy sources will decrease the morbidity of PCNL. The question is how small is small enough! In this regard, in our opinion, microperc is the “new kid on the block.” It has a role to play in percutaneous management of these small patients. Essentially, “microperc” involves performing the procedure through the eye of the needle. The microoptics of 0.9 mm diameter are used. The assembly has an integrated light head inserted through the working sheath of the needle, and PCNL can be done through the same needle sheath with a 3-way needle allowing irrigation, passage of flexible telescope and a laser fibre [4]. Although investigational, larger multicentre trials that are already underway will prove its utility.

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Lower ureteric stones can be managed with semirigid ureteroscope, and access to the upper tract may be difficult due to narrow delicate ureters. The newer sleek flexible ureteroscopes with improved deflection mechanism will change the way we manage these stones.

Surgeon experience and instrumentation are “key” to complete stone clearance with minimal morbidity. The future lies with newer generation SWL machines, smaller flexible ureteroscopes, “all see needles,” and nephroscopes. We believe that “Small” is the next “Big” thing in managing pediatric stones.

References

1. Myers DA, Mobley TB, Jenkins JM et al (1995) Pediatric low energy lithotripsy with the litho star. *J Urol* 153(2):453–457
2. Kurien A, Symons S, Thimmegouda M, Desai M (2008) Extracorporeal shock wave lithotripsy in children: equivalent clearance rates to adults achieved with fewer and lower energy shock waves. *BJUI* 103:81–84
3. Manohar T, Ganpule AP, Shrivastav P, Desai M (2006) Percutaneous nephrolithotomy for complex calyceal calculi and staghorn stones in children less than 5 years of age. *J Endourol* 20(8):547–551
4. Desai MR, Sharma R, Mishra S, Sabnis RB, Stief C, Bader M (2011) Single step percutaneous nephrolithotomy (Microperc): the initial clinical report. *J Urol* 186(1):140–145