World J Urol (2011) 29:703–704
DOI 10.1007/s00345-011-0787-8

EDITORIAL

Beyond ESWL: new concepts for definitive stone removal

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Received: 8 October 2011 / Accepted: 12 October 2011 / Published online: 12 November 2011

Every 10th German will form upper urinary tract calculi during live time ad every fourth of them will suffer from a recurrence [1]. It is therefore not surprising that urinary stones account for up to 20% of all urological cases. Therefore, every urologist has to be familiar with urinary stone disease.

During the last three decades, interventional stone treatment made an enormous shift from open surgery to today's minimal-invasive procedures. Extracorporal shock wave lithotripsy (SWL) virtually stopped all other techniques only shortly after percutaneous nephrolithotomy (PNL) has been introduced. However, the limitations of SWL such as large stones, hard stone compositions and the lower renal pole became evident over the years. Improvements in endoscopic techniques and skills let to preferential use of ureteroscopy (URS) and, again, percutaneous techniques.

This topic of the *World Journal of Urology* collects interesting articles on currents trends in interventional stone removal. Since the frequency of SWL treatments is decreasing, it is remarkable that PNL seems to be benefited most from the trend to a more invasive approach to renal calculi. Mini-PNL, although having been introduced for pediatric patients, seems to be on the rise. Our own series compared mini-PNL with flexible URS for large renal stones [2]. We could demonstrate that the efficacy of mini-PNL is comparable to conventional PNL. Flexible URS could achieve excellent stone-free rates; however, the price to pay is a staged procedure in many patients. A major concern to PNL is the potential of life-threatening complications. The report of Schilling et al. is therefore of interest, as he compared the mini-PNL results of a novice to an expert [3]. As one could expect, the stone-free rate (SFR) was lower and OR time was higher for the novice. However, with an expert on call, the complication rate did not differ. While several authors have reported tubeless PNL to be safe after uncomplicated procedures, there might be reasons to place a nephrostomy tube. De Sio et al. reported a series comparing placement of standard 22F to small-bore 12F nephrostomies [4]. They could show a significant lower VAS pain score in the immediate postoperative period. Başeskioğlu et al. evaluated a large series of rigid URS with and without ureteral stenting after balloon dilation to 18F of the ureteral orifice [5]. It is surprising that they could only find a higher rate of irritative symptoms in the stented group. However, there was some tendency to more unexpected hospital visits for the non-stented group, but no difference in follow-up. It is worth to mention that the authors used 9.8F ureteroscope that are no longer considered to be the standard for rigid URS. In our own experience, balloon dilation is barely required when having access to small-diameter scopes. A very interesting development is the combination of endoscopic procedures, mainly driven by the trend to supine PNL [6]. Simultaneous antegrade–retrograde approaches avoid the need of multitract percutaneous accesses and increase the chance to render even patients with complex stone burden stone free in a single session.

Even though ESWL seems to have left its climax behind, there can be no doubt that it remains standard of care for most pediatric stones. This is confirmed by Lu et al. reporting their experience with shock wave

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treatments of ureteral and renal stones in children [7]. Excellent efficacy with stone-free rates of >90% after 3 months are results all other approaches have to compete with. Yucel et al. report comparable SFR of 84% for small ureteral stones in children [8]. However, using standard sized rigid endoscopes with the risk of perforation and postoperative stenting, we feel that SWL should keep its status as the first-line treatment option. In contrast, for large renal stones, PNL can safely be applied as demonstrated by Dogan et al. who achieved stone-free rates of almost 90% [9]. Nevertheless, the occurrence of significant complications such as colonic perforations and blood transfusions supports the plea of Desai et al. to perform ultrasound-guided puncture and to use miniaturized instruments [10].

Another important aspect is the question whether all stones have to be removed. There is some evidence that asymptomatic lower pole calculi do not require treatment [11]. While preventive stone treatment in risk patients such as pilots or professional drivers is usually recommended, the study of Rosenberg et al. is noteworthy [12]. By analyzing a large number of childbirths, they could identify pregnant women with urolithiasis. The observation of an increased rate of pregnancy complications—though perinatal outcome was not negatively influenced—may support the concept of preventive removal even of asymptomatic stones in woman aiming to become pregnant.

Apart from the enthusiasm of interventional treatments, the pathogenesis and pathophysiology of urinary stone formation have to be considered. Probably, urinary outflow obstruction, such as UPJ stenosis, is probably easiest to identify. When attempting to limit X-ray exposure to children, MRI became the recommended diagnostic tool. But as the false rate of MRI depends on the grade of renal pelvic dilation, the old-fashioned Whitaker test might be worth reconsidering [13].

However, in most patients, the underlying causes of urinary stone formation are less evident. Metabolic evaluation, stone analysis and preventive measures of recurrent stone formers are frequently performed and even less often reported. Furthermore, more high-quality trials are required for further improvement in stone management. Only few RCTs are available, and the reported data are regularly inconsistent, starting from the definition of stone sizes and ending with variable definitions of stone-free rate. These limitations hinder the development of evidence-based recommendations. It is therefore necessary to improve the quality of stone research by reporting stone-free data without inclusion of residual fragments, using consistent nomenclature to report stone size, stone location, stone-free rates, time point when stone-free rate is determined and imaging modalities. Apart from technical and pure outcome aspects, future studies should address social aspects as patient preferences, quality of life and time until treatment completion.

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