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Extending indications of micropercutaneous nephrolithotomy: It is not just about cracking stones



Arvind P. Ganpule, Jaspreet Singh Chhabra, S.B. Sudharsan, Ankush Jairath*, Mohankumar Vijaykumar, Ravindra Sabnis, Mahesh R. Desai

Department of Urology, Muljibhai Patel Urological Hospital, Nadiad, Gujarat, India

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KEYWORDS

Micropercutaneous nephrolithotomy (microperc); VUR; Posterior urethral valve (PUV); Calculi

ABBREVIATIONS

KUB, plain abdominal radiograph of the kidneys, ureters and bladder; PCNL, percutaneous nephrolithotomy; PUV, posterior urethral valve; MP, micropercuta-

Abstract Objective: To describe our experience and results of using the MicroPerc™ micropercutaneous nephrolithotomy armamentarium (PolyDiagnost, Germany) for unusual indications unexplored using this modality.

Patients and methods: We used the MicroPerc™ system for stone clearance in three ureteric calculi, two bladder calculi, one case of urethral calculus, for antegrade biopsy in a case of upper tract urothelial carcinoma, for Deflux® (dextranomer/hyaluronic copolymer, Salix Pharmaceuticals, Uppsala, Sweden) injection in three cases of vesico-ureteric reflux (VUR), and three cases of posterior urethral valve (PUV) fulgurations. A 4.85-F ‘All-Seeing Needle®’ (PolyDiagnost) was used in most of the cases. An 8-F mini-micro sheath was used where stability was deemed necessary. Clinical data were collected in a dedicated database. Intraoperative variables, post-operative complications, and outcomes were assessed.

Results: All patients were successfully treated with complete stone clearance at 1 month with no residual fragments. The antegrade biopsy confirmed a high-grade papillary neoplasm. There were no technical difficulties with injection of Deflux or PUV fulgurations. Follow-up at 1 year revealed no stone recurrence, resolved reflux in all three cases, and all the children that had had PUVs were voiding well. The small sample and retrospective nature of the analysis are the limitations of this study.

Conclusion: MicroPerc™, besides its usual use for minimally invasive percutaneous nephrolithotomy, can also be feasibly used for ureteric, bladder and urethral

* Corresponding author. Fax: +91 268 2520248/2520331.

E-mail address: ankushjairath@rediffmail.com (A. Jairath).

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neous nephrolithotomy/MicroPerc; URS, ureterorenoscopy; YAG, yttrium-aluminium-garnet; VCUG, voiding cystourethrography

stones, and for treating non-calculus diseases such as PUVs and VUR. True to its name, it may be an 'All-Seeing Needle' in reality with much more to offer and harvest from.

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Introduction

The past few decades have seen a paradigm shift in the management of renal stones, with percutaneous nephrolithotomy (PCNL) becoming the established 'gold standard' for the management of large renal calculi [1]. Although associated with high clearance rates, it carries with it a distinct set of morbidities. Ever since the latter were realised, efforts have been made to address these issues. This led to the notion of miniaturisation, with better optics and the development of flexible instruments. The modifications in PCNL range from the mini-PCNL (miniperc) to the ultra-microPCNL (ultra-miniperc) to the most miniaturised the microPCNL (microperc). The 'All-Seeing Needle®' (PolyDiagnost, Hallbergmoos, Germany) introduced by Bader et al. [2], has several unique properties, it is slender (4.85 F), relatively flexible, and has provision for connecting a three-way adapter. The latter can admit an irrigation source, energy source in the form of a laser fibre, and a flexible telescope. These very properties lend versatility to the microperc (MP) armamentarium.

Recently there has been an increase in publications on MP and its armamentarium, reporting the feasibility and safety of MP in managing renal calculi, both in adults and the paediatric population alike [3,4]. However, the data on the use of MP in other facets of urological surgery are scarce. In the present study, we present our experience and results of using the MicroPerc® micropercutaneous nephrolithotomy armamentarium (PolyDiagnost) for uncommon indications and indications unexplored to date using this technique.

Patients and methods

For application of MP in the clinical setting an Institutional Review Board approval was sought. We have been performing MP in our institute since 2011 [5]. The technique was initially applied to cases of renal calculi in orthotopically positioned kidneys bearing small calculi, i.e. primarily in management of stone disease. Thereafter, with increasing experience and promising outcomes, we decided to extend the scope of the technique to other clinical scenarios. We studied the use of the MP system in three cases of lower ureteric calculus, two cases of vesical calculi, one case of urethral calculus, three cases of Deflux® (dextranomer/hyaluronic copoly-

mer, Salix Pharmaceuticals, Uppsala, Sweden) injection for VUR, three cases of posterior urethral valve (PUV) fulguration, and for procuring a biopsy for a case of an upper tract mass lesion.

The preoperative evaluation included: history and a thorough clinical examination; renal function tests; urine routine examination; urine culture; plain abdominal radiograph of the kidneys, ureters and bladder (KUB); and a CT IVU for stone diseases. As per institutional policy, children presenting with recurrent UTIs and identified with Grade III–IV VUR on voiding cystourethrography (VCUG) were started on antimicrobial prophylaxis. Three children presenting with breakthrough infections despite prophylaxis were identified for Deflux injections. Three children identified with PUVs on VCUG were enrolled for fulguration using the MP setup. A case of haematuria upon evaluation with CT IVU was identified with a renal pelvic mass lesion. The patient required an antegrade biopsy that was attempted successfully using MP.

Surgical technique

The MP armamentarium (Fig. 1)

The workhorse of the MP setup comprises of the three part 4.85-F 'All-Seeing Needle', presented by Bader et al. [2]. After establishing the initial access the inner sharp bevelled needle housing the telescope is removed. A three-way connector is then attached to the proximal end. The three ends of the connector allow use of a 200 or 272 µm laser fibre, an irrigation connection, and a telescope through the other side port (Fig. 1). The highly flexible fibre-optic telescope contains 10,000 fibre-optic bundles and can be bent over itself without causing damage. Vision is controlled to the optimum level using an irrigation pump as required, which is controlled by a foot pedal by the operating surgeon. Although the telescope and irrigation sources, owing to their nature continued to be used, the laser fibre could be substituted for miniaturised accessories, depending upon the nature of procedure to be undertaken.

The other components comprise of 8-F mini-micro sheath (with obturator) that offers a more stable system, allowing easy manoeuvring from one calyx to other (as in mini-micro PCNL) and traversing the urethra for the transurethral procedures [Deflux injection, ureterorenoscopy (URS) and PUV fulguration]. Although not a

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