



## Ambulatory Percutaneous Nephrolithotomy—the Way of the Future?



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Percutaneous nephrolithotomy (PCNL) was first performed in 1976. In the 1980s the standard of care became for interventional radiologists to place a nephrostomy tube that the operative urologist would then dilate to enter the kidney

and remove the stone(s). A large bore nephrostomy tube would routinely be placed to conclude the procedure and the patient would be hospitalized. Much of this routine practice developed by convention and was not based on scientific data or clinical trials.

Regaining attention in the late 1990s, several peer reviewed publications supported the safety of tubeless PCNL. Additionally, urologist obtained renal access also became

more popular. It was Beiko et al who first demonstrated the feasibility of outpatient PCNL with the largest published series of 50 cases reported in 2015.<sup>1</sup>

In 2014 Chesapeake Urology and University of Maryland Baltimore Washington Medical Center partnered on a 6-month trial of outpatient PCNL, and began to develop a protocol for PCNL in an ambulatory setting (aPCNL). In April 2015 we performed our first aPCNL in a free-standing ambulatory surgery center (ASC) and to date have performed more than 150 cases.

Several procedural refinements were necessary to allow for aPCNL, most important being mastery of renal access by the operative urologist.

Nephrostomy tube placement by interventional radiologists is avoided. This practice not only adds to patient discomfort but can also limit the ability of the urologist to clear the stone when using an access point into the kidney that is not ideally located.

Access is obtained using simultaneous fluoroscopic and endoscopic guidance, which is thought to improve safety and precision. Precise renal access improves stone-free rates and minimizes renal trauma.

After stone clearance a ureteral stent is placed and a hemostatic plug is deployed into the tract before wound closure.<sup>2</sup> Every effort is made not to place a nephrostomy

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tube unless absolutely clinically indicated, such as with the presence of pyonephrosis or significant collecting system disruption.

Multilevel intercostal nerve blocks are performed using 0.5% bupivacaine. Acetaminophen and ketorolac are administered intravenously before concluding the procedure. These efforts lead to the patients' postoperative pain profile closely mimicking that experienced after ureteroscopy, with stent colic and catheter discomfort as the primary complaints. The Foley catheter is removed in the recovery room at 30 minutes. The average time in recovery is less than 90 minutes before discharge home. Compared to the traditional approach, patient satisfaction and experience are far superior.

Hospital readmissions and emergency room visits after the procedure have been minimal, and are comparable to data reported with ambulatory ureteroscopic procedures. To date we have encountered only 1 major complication. A pulmonary

embolism occurred and was managed by transfer to the hospital and routine management. After careful review of this adverse event the conclusion was that no change in outcome or clinical course was due to the site of service.

Patient selection is also a key factor for success in an ambulatory surgery center. An ideal candidate for aPCNL is a patient without significant comorbidities, with a lower body mass index and with a minimally complex stone burden (less than 30 mm). However, with greater experience treating patients in an ambulatory setting, these limitations can be challenged.

We have successfully treated several patients in the ASC with a stone burden in excess of 60 mm. Additionally, we have treated several patients with a body mass index approaching 50 kg/m<sup>2</sup> (pre-evaluated and cleared by the anesthesia provider) as well as patients with complex anatomy (diverticular stones).

Health care in America is undergoing a transition from volume based care to value based care. Greater scrutiny is being placed on enhancing care delivery with the most efficient and cost-effective model.

Renal access performed by the

operative urologist instead of an interventional radiologist has been shown to carry a cost savings of more than \$5,000 per case, a 17% advantage.<sup>3</sup> In addition, aPCNL in an ASC can provide savings greater than \$6,000 per case, or a minimum 30% cost advantage. In experienced hands and with a seasoned team the procedure can be performed safely in an ambulatory setting with optimization of the patient experience and with substantial savings to the health care system.

A regionalized high volume approach to providing this kind of specialized care would likely yield the best patient outcomes with the most cost-effective model. Chesapeake Urology has recently completed construction of the Advanced Kidney Stone Center of the Americas with the capacity to perform 500 aPCNLs per year. Plans involve continued expansion of this program with additional regional centers located around the country.

Paradigm shifts in care delivery are generally met with great resistance. In the early 1990s laparoscopic cholecystectomy was routinely performed in a hospital setting and with inpatient observation. Today it is rare

to see this procedure not performed in an ambulatory setting. The general surgery community was slow to adopt this new approach. Comparison of our hospital aPCNL database to published complications data on laparoscopic cholecystectomy demonstrates similar findings.<sup>4</sup>

Certainly a case can be made for the safety of performing PCNL in an ambulatory venue. Outcomes data thus far have demonstrated that with a veteran and expert team the procedure can be performed effectively and safely in this setting. ♦

1. Beiko D, Elkoushy MA, Kakarovic A et al: Ambulatory percutaneous nephrolithotomy: what is the rate of readmission? *J Endourol* 2015; **29**: 410.
2. Abbott JE, Cicic A, Jump RW 3rd et al: Hemostatic plug: novel technique for closure of percutaneous nephrostomy tract. *J Endourol* 2015; **29**: 263.
3. Patel R, Radlaka K, Olverny EO et al: Comparison of costs and outcomes of percutaneous nephrolithotomy based on percutaneous access. *J Endourol, suppl.*, 2016; **30**: A209, abstract MP24-11.
4. Abbott JE, Simpson E, Deem SG et al: Outpatient percutaneous nephrolithotomy: a comparative analysis with laparoscopic cholecystectomy. *Clin J Urol* 2012; **19**: 6525, abstract P14.