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# Outpatient ‘mini’ percutaneous cystolithotomy following complex lower urinary tract reconstruction

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## KEYWORDS

Cystolithotomy;  
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**Abstract Purpose:** To present our initial experience with “mini” percutaneous cystolithotomy performed as an outpatient procedure in patients with neurogenic bladders.

**Materials & methods:** Over the last 6 years, patients with neurogenic bladders and bladder calculi were managed with outpatient percutaneous cystolithotomy. All but 1 had previously undergone appendicovesicostomy (APV) creation. The procedure was performed by first passing a pediatric cystoscope per APV. Once the calculi were visualized, and following bladder distention, additional bladder access was obtained by passage of either a 16F Peel-Away introducer using the Seldinger technique or a 5 mm laparoscopic trocar under direct vision. An ultrasonic lithotripter was then advanced through the percutaneous access site and stone fragmentation completed. Following procedure completion, a catheter was placed for 24 h for bladder decompression. All procedures were performed on an outpatient basis.

**Results:** 12 patients underwent 18 successful operations. In 1 patient, percutaneous access was unsuccessful. Mean age at surgery was 12.3 years. Mean operative time was 72 min 8 patients had undergone previous ileocystoplasty. The remainder was rendered stone free at the completion of surgery. One patient had persistent bleeding from the intravesical trocar site necessitating fulguration and an overnight stay for observation. The remainder were sent home the same day. There were no cases of urine extravasation.

**Conclusions:** “Mini” percutaneous cystolithotomy is a safe, effective technique for the outpatient management of bladder calculi.

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## Introduction

Bladder calculi are a significant source of morbidity for the neurogenic bladder patient, occurring in 10–50% of patients who have previously undergone augmentation cystoplasty [1,2]. Urinary stasis, mucous production, and chronic bacteriuria all increase the risk of calculus formation. Available treatment options include: open cystolithotomy, endoscopic fragmentation, extracorporeal lithotripsy, and percutaneous lithotripsy. Given the often complex surgical histories of these patients, as well as the likely need for additional surgeries, the role of minimally invasive surgical approaches to bladder calculi gains further significance. Our current approach to the management of bladder calculi in the neurogenic bladder is percutaneous, via a single 5 mm port and performed on an outpatient basis.

## Methods

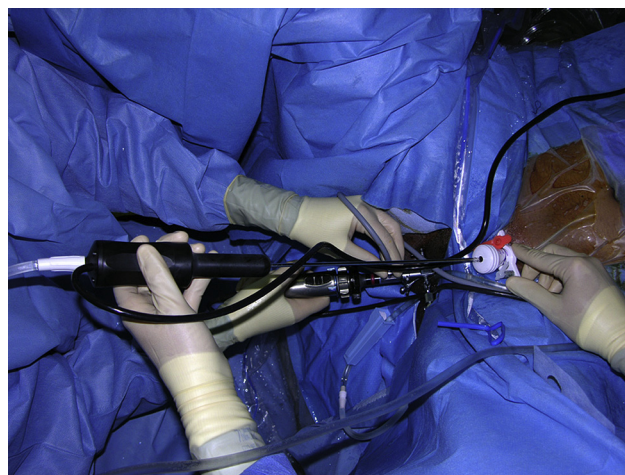
### Data collection

After obtaining Institutional Review Board approval, all patients undergoing percutaneous cystolithotomy at the Children's Medical Center were prospectively accrued. Data recorded for each patient included: age at surgery, sex, number of calculi, duration of hospitalization, augmentation status, and postoperative complications.

### Procedure

Patients with bladder calculi were identified via either ultrasound or KUB. In all patients a preoperative urine culture was obtained and perioperative antibiotics started per the culture and sensitivity. For patients with negative preoperative urine cultures, perioperative antibiotics were started 1 day preoperatively and continued through postoperative day #1. Following initiation of general anesthesia patients were placed either supine or, if urethral access was attempted, in lithotomy position. As most patients had undergone bladder neck reconstruction, routine cystourethroscopy was not performed. Inspection of the bladder was performed by passing a 12F cystoscope through the appendicovesicostomy (APV), or native urethra if bladder neck reconstruction had not been performed.

With the bladder distended, either a spinal or Veress needle with Step™ radial dilator (Covidien Surgical, Mansfield, MA, USA) was passed into the bladder under direct vision (Fig. 1). When choosing the site for percutaneous access, the native bladder was preferred. However if access into the native bladder was not possible, it was obtained via the augment. For those patients who had undergone reconstruction at our institution, the bladder was hitched to the anterior abdominal wall at the time of their initial surgery in order to prevent the interposition of bowel between the bladder and abdominal wall, and ease percutaneous access for future bladder surgery. In those patients who had undergone reconstruction elsewhere, to avoid bowel injury, access was performed via the previous suprapubic tube tract. In those cases in which a Veress needle was used, a 5 mm port was placed through the dilator. When a spinal



**Figure 1** Trocar and cystoscope positioning (cystoscope in urethra).

needle was used to achieve bladder access, a 16F Peel-Away® introducer (Cook Medical, Bloomington, IN, USA) was placed using the Seldinger technique.

With bladder access achieved, a dual ultrasonic lithotripter was placed through the percutaneous access site and stone fragmentation completed under direct vision. At the completion of the procedure, if necessary, the cystoscope was passed via the suprapubic access site to confirm removal of all large fragments. The percutaneous access device was then removed, the skin incision closed, and a catheter left in either the APV or urethra overnight, to be removed by the patient 24 h postoperatively.

## Results

Over a 6-year period, a total of 19 procedures were attempted in 13 patients (4M; 9F). In a single case in a female patient who had previously undergone bladder neck reconstruction without augmentation, due to difficulty visualizing the percutaneous access sheath via the APV, the procedure was aborted. Subsequent imaging revealed no calculi, and no additional surgical intervention was performed. Thus, 18 procedures in 12 patients (4M; 8F) were included in the final analysis; 3 patients required additional procedures for recurrent/residual calculi, with 2 undergoing a second, successful percutaneous cystolithotomy at 7 and 36 months post initial endoscopic stone removal, and 1 requiring 4 additional percutaneous procedures over a follow-up of 5 years. Mean patient age at surgery was 12.3 years (range 6–17 years). 8 patients (67%) had undergone previous ileocystoplasty. All but one patient had an appendicovesicostomy. Mean operative time was 70 min (range 15–160), and an average of 2.5 calculi were removed (range 1–6, Table 1).

Following procedure completion, patients were discharged home in 17 of the 18 cases (94%). In a single case, following discharge, worsening hematuria resulted in repeat cystoscopy. The patient had no history of bleeding diatheses, access was uncomplicated, and there was noted to be no immediate bleeding from the trocar site upon removal. Cystoscopy revealed bleeding from the trocar

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