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# Transpsoas cystolitholapaxy in a pediatric patient with myelomeningocele, augmented neobladder, and Mitrofanoff appendicovesicostomy

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ABSTRACT

Recurrent urolithiasis is a common and potentially morbid complication of spina bifida. Although the size, the location, and the composition of these stones often necessitates percutaneous intervention, access is often complicated by body habitus and spinal deformity. There is little consensus regarding the approach to percutaneous lithotripsy when a clear path to the collecting system is unavailable, particularly in the setting of surgically augmented urological anatomy. Here we present the first known case in which a pediatric patient with spina bifida underwent percutaneous lithotripsy of bladder stones via a transpsoas approach.



## Introduction

Recurrent urolithiasis is a common complication of spina bifida and may result in chronic pyelonephritis and compromised renal function [1,2]. The hazards of renal calculi are often greater in patients with myelomeningocele who lack sufficient sensory function to recognize stone impaction [3,4]. Further, spinal deformity in these patients often makes percutaneous nephrostomy technically challenging [1,3,4]. In such cases,

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retrograde flexible ureteroscopy may facilitate stone removal in the absence of prior surgical urinary diversion [4]. In patients who have undergone urinary diversion surgery, percutaneous nephrolithotomy remains the mainstay of treatment [1,4]. However, in the uncommon situation of a patient with severe spinal deformity and prior urinary diversion surgery, an alternative route for stone removal must be sought. This report describes a percutaneous transpsoas approach to facilitate lithotripsy of large calculi within a bladder pouch.

## Case report

Institutional review board approval was not required for preparation of this case report. Informed consent was obtained. A 16-year-old adolescent girl with a history of myelomeningocele and complex lower urinary tract reconstruction, including augmented neobladder (constructed from ileum and cecum), Mitrofanoff appendicovesicostomy, and left-to-right transureterostomy with ureteral reimplantation, presented for management of a 2-cm staghorn calculus of the right kidney, as well as multiple stones within the neobladder (Fig. 1A). The genitourinary anatomy was surgically altered such that urine flows from the left ureter to the right ureter and through the common ureteric channel into the augmented neobladder and out the appendicovesicostomy.

Initially, the patient was placed prone under general anesthesia. The right renal collecting system was accessed via a percutaneous intercostal upper pole approach; however, because of the patient's severe spinal deformity and narrowed intercostal spaces, the larger sheath required for rigid endoscopy could not be placed. A 20-Fr Peel-Away Sheath (Cook Medical, Bloomington, IN) was instead placed and a 16.5-Fr flexible cystoscope and an 8-Fr flexible ureteroscope were used to perform laser fragmentation and basket removal of stones. Because of the technically challenging nature of this procedure caused by the severe spinal deformity with a suboptimal

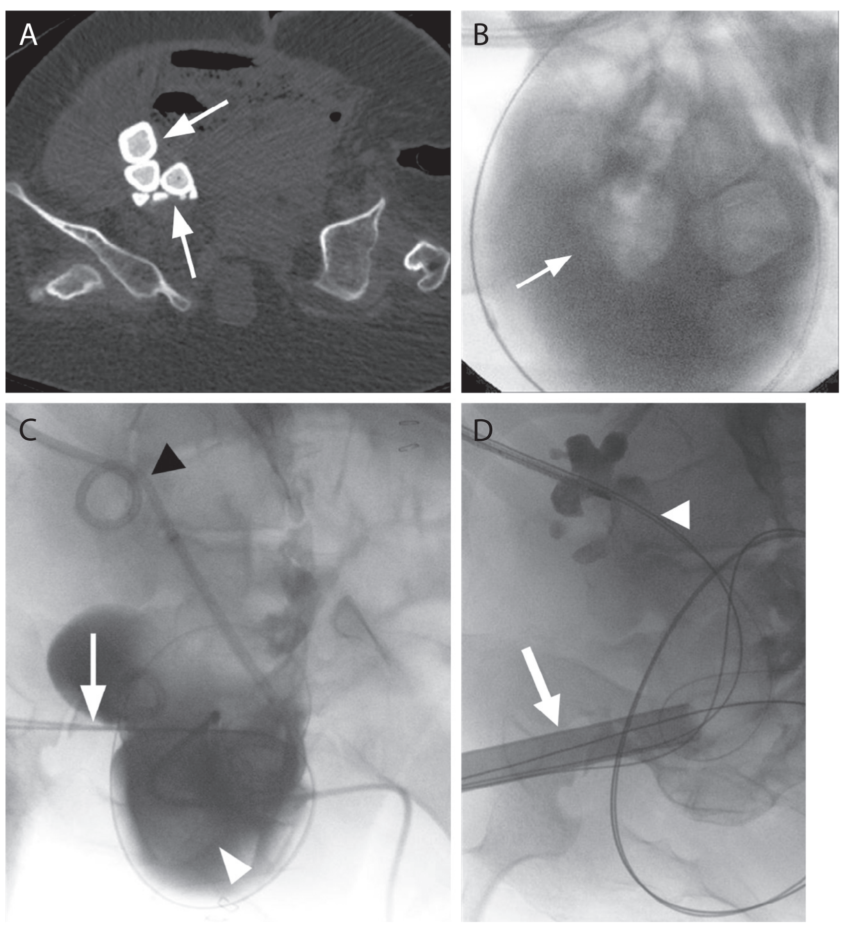


**Fig. 1 – (A) Noncontrast axial pelvic computed tomography showing large calcium-containing stones in the patient's neobladder (arrows). (B) Fluoroscopy demonstrating large calculi within the neobladder (arrow). (C) Fluoroscopy demonstrating successful percutaneous guidewire passage into the neobladder (arrow), as well as filling defect from bladder calculus (white arrowhead). A nephoureteral stent is also partially visualized (black arrowhead). (D) Fluoroscopy demonstrating successful passage of Amplatz guidewires (Boston Scientific, Marlborough, MA) retrograde from the neobladder, up the ureteric anastomosis, and out through the previously placed percutaneous nephroureteral access tract. Filling defects in the collecting system represent renal calculi (white arrowhead). A 30-Fr Teflon cannula (Bard X-Force, Covington, GA) is seen positioned (white arrow) within the neobladder before the insertion of a rigid nephroscope.**

sheath size, some small stone fragments remained in the kidney and larger stones remained in the neobladder. The patient was allowed to recover and returned to the angiography suite 6 weeks later for extraction of the remaining urinary calculi.

Upon return, the patient was placed supine and prepped and draped in the usual fashion. A 12-Fr straight catheter was used to catheterize the neobladder through the appendicovesicostomy. The neobladder was then filled with 60 mL of diluted Isovue contrast (Bracco Diagnostics, Monroe Township, NJ). Under fluoroscopy, an 18-gauge Chiba needle (Cook Medical) was used to access the neobladder from a percutaneous transpsoas approach, followed by guidewire passage. The needle traversed through the skin and subcutaneous tissues, through the right psoas muscle and overlying fascia, and entered the neobladder. The needle was removed, the tract was dilated, and 2 wires were coiled within the neobladder, one acting as a safety wire (Fig. 1B). The transpsoas tract was then balloon dilated to 30-Fr, and a 24-Fr sheath was placed for cystoscopy. A 22.5-Fr rigid nephroscope was passed though the sheath (Fig. 1C) and bladder stone lithotripsy was performed using an ultrasonic lithotripter (Olympus Medical, Center Valley, PA) (Fig. 1D).

A 12-Fr open-ended Foley catheter was then inserted over one of the guidewires to serve as a transpsoas neobladder drain. An additional 12-Fr Foley catheter was then placed in the neobladder through the appendicovesicostomy. The patient had an uneventful postoperative clinical course and was discharged the following day.

## Discussion

Percutaneous access to the renal collecting system may be technically difficult in patients with spina bifida with severe spinal deformity, who often present with both complex urological anatomy and large urinary calculi. Both supine and supracostal access techniques have been described to facilitate nephrolithotomy in patients with challenging anatomy [5,6]. However, depending upon the extent of kyphoscoliosis, supine positioning may not be feasible and supracostal access may result in a higher rate of intrathoracic complications [6].

In this case, the patient's spinal deformity rendered direct access to the neobladder impossible. Although access to the renal collecting system was accomplished via a supracostal approach, this access was inadequate for removing all calculi. The transpsoas approach allowed adequate access to be obtained into the neobladder and facilitated satisfactory removal of all remaining calculi without any complications. Although further investigation will be necessary to elucidate the indications and the long-term efficacy of this technique, the transpsoas approach represents a simple alternative route for retrograde cannulation of a reconstructed bladder pouch.

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