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Laparoscopic Extraperitoneal Cystolithotomy (Single-Incision Laparoscopic Surgery): A Sutureless, Tubeless Technique

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ABSTRACT

Three bladder calculi were removed from an 73-year-old adult male by laparoscopic extraperitoneal cystolithotomy (single-incision laparoscopic surgery), a sutureless and tubeless procedure. Surgery was performed without difficulty. No problems of stone fragmentation, prostatic bleeding, or sepsis were encountered. The entire procedure lasted only a few minutes, thereby minimizing the patient's time under anesthesia. Laparoscopic extraperitoneal cystolithotomy is safe and easy to learn. It should be part of all urologists' armamentarium against bladder calculi. Similar procedures have been reported in children for removal of calculi after bladder augmentation.

INTRODUCTION

Pediatric urologists have pioneered minimally invasive surgery and were the sole urologists to perform laparoscopy until Clayman revolutionized urologic laparoscopy for adults in 1991 [1]. The paradigm shift in treating a variety of urologic diseases must continue. A Medline (U.S. National Library of Medicine) search to date revealed reports of laparoscopic bladder stone surgery only in children, especially following bladder augmentation [2-4]. I have yet to see an analogous adult report. I certainly have not seen it reported as a single-incision laparoscopic surgery (SILS) procedure.

CASE REPORT

This case is a 73-year-old male who presented with gross hematuria secondary to 3 classic bladder calculi. The largest calculus measured approximately 2 cm x 1.5 cm in diameter on a computed tomography scan. We reviewed his treatment options, including classic cystolithotomy. He made it clear that he did not wish to have transurethral resection of the prostate (TURP) because he had minimal lower urinary tract symptoms (LUTS). He did not wish any type of transurethral surgery because he was fearful of sexual side effects and retaining residual fragments. He decided that he wanted a laparoscopic approach.

Surgical Procedure

The patient was brought to the operating room and given intravenous ceftriaxone sodium (Rocephin; Genentech Inc, South San Francisco, CA, USA) and general laryngeal mask anesthesia. He was prepped, draped, and placed in a modified dorsal lithotomy position. The flexible cystoscope was placed to evaluate the prostatic urethra and bladder. The bladder was filled to capacity with sterile water mixed with gentamicin. One large and 2 smaller stones could easily be seen. I used the lighted flexible scope (retroverted and placed near the dome of the bladder) to illuminate the skin over the space of Retzius, 2 cm cephalad to the symphysis pubis. The area was marked with the marking pen. A 1.5 cm incision was made transversely in the midline on the mark.

Laparoscopy. A 12 mm direct-vision laparoscopic trochar was placed through the incision via the space of Retzius and directly into the bladder. The smaller stones were easily

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Abbreviations and Acronyms
LUTS = lower urinary tract symptoms
SILS = single-incision laparoscopic surgery
TURP = transurethral resection of the prostate

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extracted through the port under direct visualization, using a modified coaxial system (placing the nephroscope and grasper through the port). The larger stone was more challenging.

Using the flexible cystoscope as the camera port, a gallstone grasper was placed through the suprapubic port under direct visualization. The calculus was grasped (Figure 1). The stone was extracted in much the same manner as a gallstone. The stone was retracted in the grasper until the stone and grasper could be extracted with the stone intact (Figure 2). The procedure was similar to removing a laparoscopy retrieval sac through a port site.

The bladder was reexamined via the flexible cystoscope; it was cleared of all stones. There was no evidence of any bladder injury. The trigone was not involved in any way with the procedure, except to admit the flexible cystoscope. There was perfect hemostasis; the cystostomy site appeared to retract to a closed position immediately. No bladder sutures or suprapubic drains were deemed necessary.

Postsurgical care. An 18-Fr Foley catheter was placed per the urethra without difficulty and remained in place for 4 days to facilitate rapid healing of the suprapubic cystostomy site. Postoperative analgesia was achieved with ketorolac (Torradol; Cerner Multum Inc, Denver, CO, USA) for 24 hours, followed by ibuprofen and benzoic acid/hyoscyamine/methenamine/menthylene blue/phenyl salicylate (Prosed; Thomson Reuters, New York, NY, USA) for 3 days. His only scar was a 1.5 cm suprapubic transverse incision. His urine was immediately clear and remained clear on follow-up. He voided easily following catheter removal.

Subsequent TURP and follow-up. The patient was voiding quite well in the short-term to medium-term period, especially after he no longer had bladder spasms from the surgery. Approximately 3 months later, his benign prostatic hyperplasia symptoms were significant enough (on maximal medical management) for him to request a TURP. This procedure was then conducted. The results were uneventful and he was voiding within 24 hours. He never reaccumulated any stones in his bladder. He reported no change in potency when he was asked after both surgeries. Overall, he was quite satisfied.

DISCUSSION

There are several advantages of laparoscopic extraperitoneal cystolithotomy over standard transurethral techniques. First, I was able to access the stone directly without going past (and traumatizing) the urethra and prostate by using a larger, more precise instrument than could have been used transurethrally. Second, there was no tiny bladder fragments waiting to pass, as would happen with transurethral techniques. Finally, an enlarged prostate can create a visual obstruction to easy treatment transurethrally, and recent literature supports a trial of stone removal without TURP.

Figure 1. The Intact Bladder Calculus Held Within the Grasper, as Seen Through a Flexible Cystoscope.
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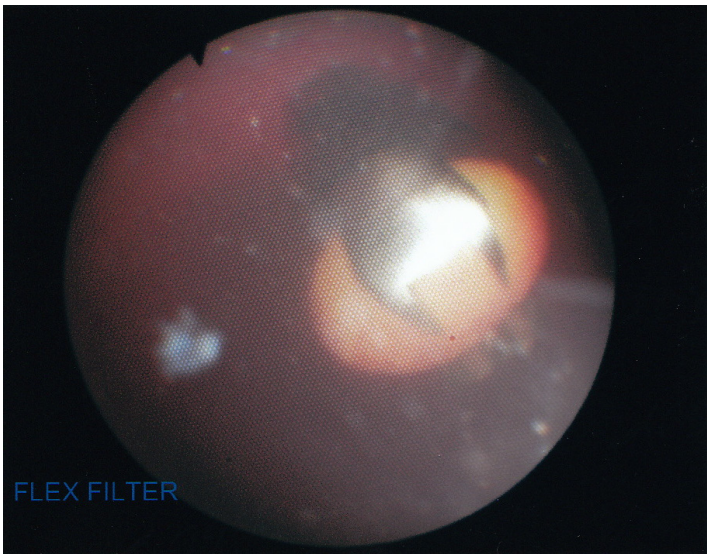

Figure 2. Measurements of the Calculus and Incision.
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If I would have been certain that this patient needed the TURP because of severe retention or intractable LUTS, I would have considered a combined laparoscopic approach with a temporary suprapubic tube and simultaneous TURP to be the least comorbid option. However, he was very happy not to have a suprapubic tube. His stones were removed with minimal access benefits. He did not need any transfusions or have any complications. He was given the opportunity to see if TURP was necessary. Eventually, his TURP was completed without the associated pain, spasms, or associated minor problems of concurrent transurethral cystolithotomy (eg, bleeding, bladder pain, long catheter time).

The laparoscopy and TURP procedures together were much less comorbid than a suprapubic cystolithotomy and prostatectomy and also less comorbid than a transurethral cytolithotomy and simultaneous TURP, which were the 2 other main options for this patient. When the TURP was needed, it was a simple, well-tolerated procedure without the added discomfort of concurrent bladder stone surgery.

CONCLUSIONS

This is the first known report of a laparoscopic extraperitoneal cystolithotomy in an adult; I found no other cases in a literature search to date. The literature contains reports of similar procedures performed in children with augmentation cystoplasty. The present report is also another example of SILS. It is demonstrative of the paradigm shift toward minimally invasive treatments that were once the realm of open surgery. It has all the benefits ascribed to SILS and minimally invasive surgery. The technique described is safe, simple, time-saving, and requires the usual equipment and skill set available to most urologists. The morbidity appears to be less than that associated with classic open cystolithotomy, and it is a much more precise, delicate, and complete procedure than transurethral cystolitholapaxy. It should be part of every urologist's armamentarium.

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