

# Laparoscopic Pyelolithotomy in a Pelvic Kidney: A Case Report and Review of the Literature

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## ABSTRACT

**Background and Objectives:** Laparoscopic pyelolithotomy was performed in a pelvic kidney with a large renal pelvis calculus.

**Methods and Results:** Laparoscopic pyelolithotomy was successfully performed in a pelvic kidney with an operative time of 310 minutes. The use of intraoperative fluoroscopy and a semi-automatic suturing device greatly facilitated the procedure. The patient's operative pain was managed with 3 doses of ketorolac; she resumed a regular diet the day after surgery, and was discharged on the first postoperative day.

**Conclusions:** For patients with a large stone in the renal pelvis of an ectopic kidney, laparoscopic pyelolithotomy provides an effective approach.

**Key Words:** Laparoscopy, Pyelolithotomy, Ectopic kidney, Pelvic kidney, Shock wave lithotripsy, Percutaneous nephrolithotomy.

## INTRODUCTION

Pelvic kidneys are typically incidental findings, but may present due to underlying obstructive or calculous disease. The anatomical characteristics of the ectopic kidney can pose a significant challenge to the treatment of calculous disease. Treatment of larger renal calculi in these kidneys had been uniformly by open surgery until laparoscopically guided percutaneous nephrostolithotomy (PCNL) was described, initially, by Esghi, et al.,<sup>1</sup> and later by Toth, et al.<sup>2</sup>

Recently, 2 cases of laparoscopic pyelolithotomy have been reported in a pelvic kidney.<sup>3,4</sup> In one, the pyelolithotomy was completed but the pyelotomy was not closed.<sup>3</sup> Due to urine leakage, an indwelling stent and urethral catheter were maintained for 8 days. Hospitalization lasted 6 days.<sup>3</sup> In the second case report, intraoperative fluoroscopy and laparoscopic suturing were used to perform the procedure, but the pyelotomy closure was not tested for watertightness and the patient experienced peritoneal leakage of urine after the Foley catheter was removed.<sup>4</sup> This necessitated replacement of the Foley catheter for an unspecified length of time and the length of hospitalization was not reported.<sup>4</sup> Herein we report the third case of a laparoscopic pyelolithotomy in a pelvic kidney; in this case, use of the Carter-Thomason Needle-Point Suture Passer (Inlet Medical Inc., Eden Prairie, MN) and laparoscopic suturing of the pyelotomy with an Endostitch device (Auto Suture, Norwalk, CT) resulted in a waterproof closure.

## CASE REPORT

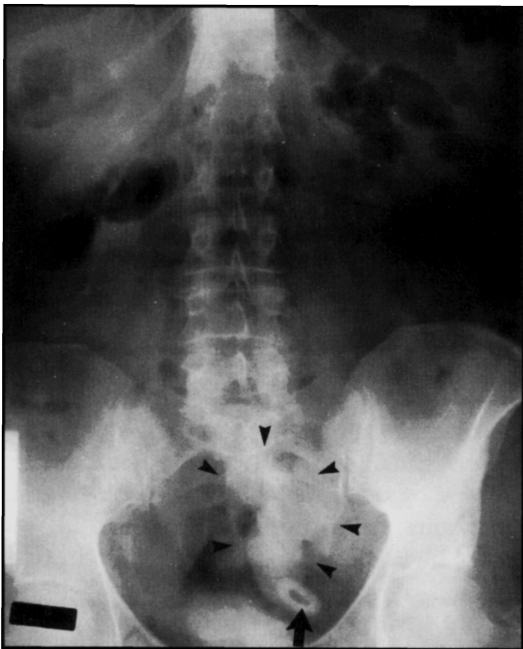
A 63-year old woman was referred for endourological treatment of a symptomatic 2.5-cm-x-1.5 cm renal pelvis stone in her left pelvic kidney. Intravenous urography (IVU) and abdominal/pelvic computed tomography defined the pelvic kidney's location relative to other structures; there was mild pyelocaliectasis noted (**Figures 1 & 2**).

After initiating general anesthesia, the patient was maintained in a supine position. Using flexible cystoscopy, a 0.038 in. guidewire was advanced to the renal pelvis. A 7 F/ 11.5 mm balloon occlusion catheter was then passed over the guidewire into the renal pelvis of the left pelvic kidney. The balloon was inflated with 1 cc of contrast mate-

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**Figure 1. IVU demonstrating ectopic right kidney and left pelvic kidney with laminated 2.5 cm stone at the ureteropelvic junction. (Left collecting system outlined by arrowheads, thick arrow on kidney stone.)**



**Figure 2. Abdominal/ Pelvic CT scan demonstrating left pelvic kidney with mild pyelocaliectasis and the stone at the ureteropelvic junction (arrow at stone).**

rial and was then snugged down at the ureteropelvic junction. A Foley catheter was placed for bladder drainage.

The patient was turned to a 30-degree lateral, left side up position and a 15 mm Hg CO<sub>2</sub> pneumoperitoneum was initiated with the Veress needle using a lateral inflation technique. Three 12 mm laparoscopic ports were placed: left lower quadrant in the midclavicular line, umbilicus, and right lower quadrant in the pararectus area.

The occlusion balloon catheter and intermittent fluoroscopy facilitated rapid identification of the renal pelvis. Holding sutures were placed inferiorly and superiorly on the anterior surface of the renal pelvis using intracorporeal suturing; suture delivery through the skin was accomplished via a Carter-Thomason Needle-Point Suture Passer (Inlet Medical Inc., Eden Prairie, MN). A 3 cm long pyelotomy was made and a 10 mm biopsy forceps was used to grasp the stone, which was removed intact after the 12 mm cannula was withdrawn from the port site. A running closure of the renal pelvis was accomplished using the Endostitch device with a 2-0 Polysorb suture (Auto Suture, Norwalk, CT). Retrograde instillation of indigo carmine confirmed a watertight closure of the renal pelvis. No drains were placed. The occlusion balloon catheter was changed to an indwelling 7 F double pigtail stent and a bladder catheter was left in place overnight. The total

operative time was 310 minutes (including pre- and postoperative stent placement).

Postoperatively, the patient's discomfort was managed by a total of 45 mg of intravenous ketorolac (3 doses) followed by 2 doses of an oral narcotic. She quickly resumed a regular diet and was discharged home on postoperative day 1.

A follow-up IVU, one week later, revealed the left pelvic kidney to be functional, stone-free, and without extravasation. The indwelling stent was removed in the office using the flexible cystoscope. All 3 port sites were healing well.

## DISCUSSION

Our experience (**Table 1**) is similar to the prior reports of successful laparoscopic pyelolithotomy for a large renal calculus in a pelvic kidney.<sup>3,4</sup> Placement of a retrograde ureteral catheter was instrumental in allowing expeditious localization of the renal pelvis at laparoscopy and for testing the closure of the pyelotomy. Closure of the renal pelvis was facilitated by the use of holding sutures and the Endostitch device.

The patient experienced minimal pain and a brief hospitalization, findings consistent with previous reports of laparoscopic pyelolithotomy for a normally positioned kidney.<sup>5,6</sup>

**Table 1.**

Comparison of laparoscopic pyelolithotomy and PCNL for renal pelvis stones &gt; 1.5-2 cm.

Procedure:	<u>Laparoscopic pyelolithotomy</u> <sup>3,4,5,6</sup>	<u>PCNL</u> <sup>7,8,9</sup>	<u>SWL</u> <sup>10,11,12</sup>
Anesthesia:	General	General	MAC/General
No. of access ports:	3-4	1	none
Approach:	Trans- or retroperitoneal	Retroperitoneal	Extracorporeal
Surgical time:	2 to 5 hours	1 to 3 hours	1 to 3 hours
Drains:	Stent (1 week)	PCNU (2 to 7 days)	stent (1 week)
Hospital stay:	1-2 days	3 to 5 days	0-2 days
Stone free rate:	100%	95%	52-78 %
# add. procedures (%):	27% convert to open	1-2 (12-90%)	1-2 (50-60%)
Blood Transfusion:	0%	2-10%	<1 %
# of patients:	11 (9 eutopic)	494	>2700

MAC= monitored anesthesia care, PCNU= percutaneous nephroureteral stent

In these reports, the operative time has averaged 2-5 hours using a 3- or 4-port approach. The renal pelvis was sutured closed in only one case and all patients had a surgical drain placed prior to fascial closure. While a stone-free rate of 100% was recorded among 9 patients, it is of note that 3 of those 9 patients required conversion to an open procedure.<sup>6</sup> While these reports concluded that laparoscopic pyelolithotomy in a eutopic kidney was of value in a situation where shock wave lithotripsy (SWL) or PCNL had failed or could not be done, we believe this represents a rare situation. Indeed, despite a vast experience at Washington University with laparoscopic renal surgery and a large surgical stone population (e.g. an approximate annual urolithiasis case load of 500 to 600 SWL, 100 to 150 ureteroscopies, and 50 to 100 PCNL) this is the singular case of a laparoscopic pyelolithotomy at our institution.

With regard to stone treatment in an ectopic or pelvic kidney, we believe the treatment strategy should be similar to that used for stones in a eutopic kidney. Hence, SWL or ureteroscopy remain first line therapy for smaller calculi (less than 2 cm), while laparoscopic-assisted percutaneous, pure laparoscopic, or open procedures are reserved for larger calculi.

From this standpoint, it is of note that 2 cases of laparoscopically guided PCNL have been reported in pelvic kidneys.<sup>1,2</sup> The operative time was not reported for these cases and the length of hospital stay was 6 days in one report.<sup>3</sup> We believe that given advances in laparoscopic equipment it may be just as simple to handle the stone removal entirely laparoscopically. The benefits of this approach would potentially include a shorter hospital stay

and less postoperative morbidity as occurred in the present case. For urologists interested in laparoscopic pyelolithotomy in this situation, the use of intraoperative fluoroscopy to identify the renal pelvis, the placement of holding sutures, the use of the Carter-Thomason Needle-Point Suture Passer, and intracorporeal suturing with the Endostitch device are recommended.

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