

Laparoscopic-Guided Percutaneous Nephrolithotomy in a Reoperated Pelvic Kidney

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ABSTRACT

The stone-retaining pelvic ectopic kidney of a 46-year-old female was treated with laparoscopically assisted complete supine percutaneous transperitoneal nephrolithotomy. She had a past history of previous open surgery for a left kidney stone about 7 years ago, left transurethral ureterolithotripsy (TUL) about 5 years ago, and an unsuccessful left extracorporeal shock wave lithotripsy (ESWL) recently. Ultrasound and intravenous pyelogram (IVP) imaging showed multiple calculi in a left ectopic pelvic kidney overlying on the sacrum. The burden of stone was 5 cm. With the patient in the supine position under laparoscopic control, the bowels were dislodged with forceps until the kidney became visible. Under laparoscopic control, the nephrostomy track was created on the antegrade route using a one shot dilator. Percutaneous nephrolithotomy was carried out in the usual manner with a rigid 26F nephroscope. Stones were fragmented and removed. No complications occurred. The operating time was 105 minutes; the hospital stay was 4 days. On the basis of the authors' experience, PNL with guided laparoscopy in pelvic kidneys is safe even in reoperative patients.

KEYWORDS: Reoperated pelvic kidney; Complete supine percutaneous transperitoneal nephrolithotomy (PNL); Urolithiasis; Laparoscopic guided PNL; Ectopic kidney

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INTRODUCTION

Percutaneous nephrolithotomy (PNL) is an effective procedure for the treatment of patients with large or otherwise complex stones. PNL is usually performed through a posterior flank approach, with fluoroscopy or ultrasonography used to monitor access into the renal collecting system [1-3]. A blind percutaneous transperitoneal approach to a pelvic kidney should be avoided, because the risk of injuring the overlying bowel is high. Because of this risk, several researchers have reported different techniques to facilitate laparoscopic PNL for patients with ectopic kidneys [4]. The present authors report their experiences in one laparoscopic-assisted transperitoneal supine position PNL in a reoperated ectopic kidney.

CASE REPORT

Patient Characteristics

The patient was a 46-year-old female with a chief complaint of left lower quadrant discomfort and a diagnosis of left pelvic kidney with stones. Her medical history revealed: (1) a previous open surgery with removal of stones in the left pelvic kidney approximately 7 years ago; (2) left transureteral lithotripsy (TUL) about 5 years ago; (3) an unsuccessful left extracorporeal shock wave lithotripsy (ESWL) done recently.

Ultrasound and intravenous pyelogram (IVP) imaging showed 5 stones in the left pelvic kidney. Kidney stones were not visible

Figure 1. Multiple Stones, Superimposed on the Sacral Density. doi: 10.3834/uij.1944-5784.2009.10.06f1



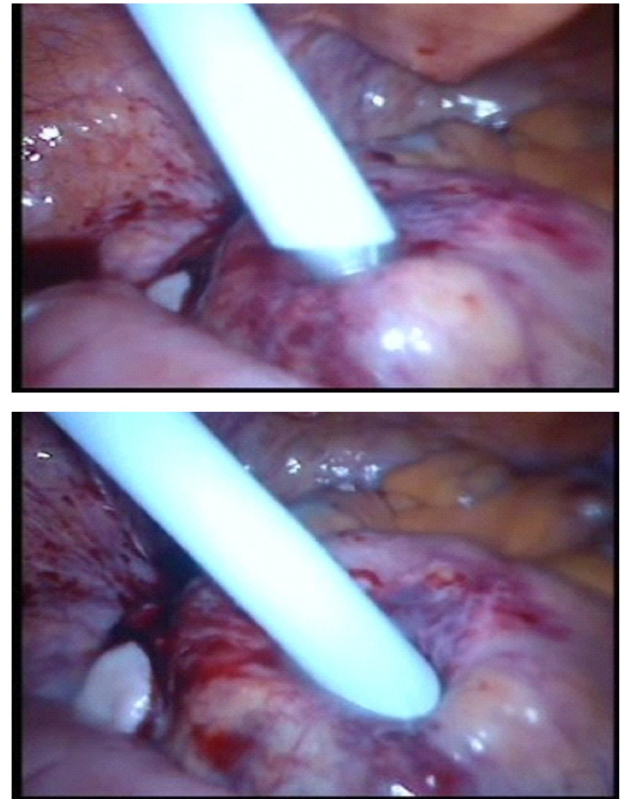
with fluoroscopy because they were located on the sacrum density. The diuretic renogram demonstrated poor functioning of the left kidney. The intravenous urogram also showed multiple stones in the kidney that were superimposed on the sacrum density (Figure 1).

Surgical Procedure

The patient was scheduled for laparoscopic-assisted supine left PNL. She received preoperative antibiotics and mechanical bowel preparation. General anesthesia was administered and the patient was placed in the lithotomy position. A left ureteral stent (5F) with cystoscopy was inserted. After CO₂ insufflation into the peritoneal cavity with a supraumbilical port (10 mm), the surgeons entered the peritoneal cavity and the pelvic kidney was visualized by a laparoscope. Under direct visualization, a 5 mm port entered the peritoneal cavity and rolled off the bowel loop. The surgeons elevated the foot of the bed to 20°. This position helped them to better visualize the kidney while separating it from the bowel loops.

The PNL was performed with the patient in a supine position and under general anesthesia. The renal access tract was obtained with an 18-gauge needle under laparoscopic guidance. The return of urine on removal of the stylet of the needle confirmed entrance into the collecting system. A 0.038 inch J-tipped wire was then inserted. Tract dilation was established by acute dilation [5]. The stone fragments were subsequently removed with grasping forceps.

Figure 2. Demonstration of the Ease With Which the Amplatz Sheath Can Be Replaced With Direct Visualization During Laparoscopy. doi: 10.3834/uij.1944-5784.2009.10.06f2



During insertion of the one shot dilatator, gas in the peritoneal cavity was released to decrease the distance for one shot access. Dilatation under direct visualization is an advantage of laparoscopic-assisted supine PNL that is not seen in other modalities of guidance. If the amplatz sheath is displaced during the procedure, it can be replaced under direct visualization with the laparoscope (Figure 2). This is another advantage of using this method.

A nephrostomy tube was inserted at the end of the procedure. A peritoneal drain was inserted from the port for draining the leakage of urine. Operation time was 105 minutes. The ureteral stent, nephrostomy tube, and peritoneal drain were removed the 2nd, 3rd, and 4th postoperative day, respectively. The patient was discharged on the 4th postoperative day. No complications occurred.

DISCUSSION

Treatment of nephrolithiasis in a pelvic kidney presents a technical challenge to endourologists [6]. Percutaneous nephrolithotomy is a good choice when the stone extends beyond the renal pelvis or lies in the calices. Ectopic pelvic kidneys require a different, more complicated and meticulous approach for PNL. The pelvic kidney is in the retroperitoneum and anterior to the sacrum. Interposing bowel loops between the kidney and the anterior abdominal wall prevent a direct puncture through the anterior abdominal wall. A blind percutaneous transperitoneal approach to a pelvic kidney should be avoided, because of the high risk of injuring the overlying bowel [2]. Researchers have reported different techniques and access points to facilitate laparoscopic PNL for patients with ectopic kidneys [7].

The present patient had left pelvic kidney stones with a history of stone surgery. While being careful to avoid intestinal damage, the surgeons elevated the foot of the patient's bed to 20° and also put a small pad under the left buttock in order to separate the intestine and kidneys.

Minimally invasive treatment of large stones in pelvic ectopic kidneys are attractive modalities because they have the advantages of reduced analgesic requirement, shorter hospital stay, early convalescence, better cosmesis, and excellent safety and efficacy profiles [8].

Eshghi et al [9] reported a laparoscopy-assisted PNL technique in a pelvic kidney for the first time in 1985. Toth et al [10] were the first to describe a transperitoneal laparoscopic assisted PNL in 1993. Zafar and Lingeman [11] could not remove the stones with laparoscopic equipment and used an 11.5F ureteroscope with a stone basket to extract the stone.

In the present case, the surgeons could remove the stones with nephroscopic equipment after pneumatic lithotripsy. Maheshwari et al [12] reported the same experience in a series of 3 patients. Desai and Jasani [13] performed PNL in 9 patients with ectopic kidneys under ultrasound guidance alone, without laparoscopic control. This may risk injury to the overlying bowel and the aberrant vascular structures [7]. In the opinion of the present authors, sometimes stones in ectopic kidneys overlap with pelvic bony density and the stones cannot be visualized by fluoroscopy during the PNL. Therefore, the authors start PNL with the guidance of laparoscopy in the posterior part of kidney.

Troxel et al [14] reported an extraperitoneal laparoscopy-assisted percutaneous approach to remove multiple stones

from the lower-pole calyx of a pelvic kidney. Watterson et al [15] reported on PNL of a pelvic kidney by way of the greater sciatic foramen. Matlaga et al [4] reported a series of 8 patients. In 6 cases, PNL was performed using a routine transperitoneal approach; in 1 patient, the surgeons created an iatrogenically induced defect in the iliac bone to access the pelvic kidney; in the final case they used a transhepatic track to perform PNL in a pelvic kidney [4]. The present authors used a transperitoneal approach to PNL using a laparoscope for visualization of the left pelvic kidney. They preferred the transperitoneal approach because they were more familiar with this access and the intraperitoneal viscera (colon and intestine) were visible. They think that this technique has better visualization potential and that the surgeon is better able to control the PNL procedure. They did not have any problems with this approach.

After exposing the surface of the ectopic kidney and mobilizing the colon, the nephrostomy needle is introduced safely through any part of the abdomen [7].

The authors used an inguinal approach to PNL in this case. The laparoscopic guide helped them to gain access to the posterior aspect of the kidney.

One important note is that before starting dilation of the nephrostomy tract, gas pressure should be decreased to reduce the distance between the skin and the renal system. This makes it possible to easily reach the whole system [7]. The authors released the gas of the peritoneal cavity to decrease the distance from the skin. This provided access to the kidney during insertion of the one shut dilatator.

Goel et al [16] reported that although patients with a previous pyelolithotomy may have dense adhesions, this should not be a problem for an experienced laparoscopist. The present case had previous open stone surgery. The authors showed that laparoscopic-assisted supine PNL is a safe, well-tolerated procedure. Laparoscopic guidance allows the transperitoneal route to be used safely for percutaneous nephrolithotomy in patients with calculi in pelvic ectopic kidneys. The authors believe that it is a feasible, safe, valid, and minimally invasive management option for this uncommon but challenging urological condition. Laparoscopy-guided PNL in pelvic kidneys is safe even in reoperative patients.

CONCLUSION

Laparoscopic-assisted PNL in an ectopic pelvic kidney represents a good alternative for open surgery. It is safe and had excellent results in this patient. Dilatation under direct visualization is an advantage of laparoscopic-assisted supine PNL that is not seen in other modalities of guidance. If the amplatz sheath is

displaced during the procedure it can be replaced under direct visualization with the laparoscope. This is an advantage to using this method.

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