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Retroperitoneoscopic pyeloplasty with concomitant neophropexy for an  
ureteropelvic junction obstruction in combination with nephroptosis

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## **Abstract**

### **Introduction and Objectives**

We herein describe our technique for retroperitoneoscopic pyeloplasty with concomitant nephropexy in patients with a ureteropelvic junction (UPJ) obstruction in combination with nephroptosis.

### **Methods**

We performed this operation on three female patients with a right UPJ obstruction and nephroptosis diagnosed by intravenous urography, retrograde pyelography, computed tomography and an isotopic renogram. All patients underwent the insertion of a ureteral stent before laparoscopy, and they were placed in the flank position. A four-port, balloon-dissecting, retroperitoneal laparoscopic approach was used. Gerota's fascia was incised and the perirenal fat was completely dissected from the kidney. A UPJ obstruction was identified and pyeloplasty was performed using Anderson-Hynes dismembered anastomosis. Next, kidney fixation to the abdominal wall was performed by rows of renal capsular 2-0 nylon sutures

which were secured to the quadratus lumborum fascia. All procedures were performed retroperitoneoscopically.

## Results

The median operative time was 350 min with a range from 204 to 414. The median estimated blood loss was 50 ml with a range from 10 to 200. The postoperative hospital stay was 6 days. There were no postoperative complications. The ureteral stent was removed at 6 weeks after surgery. Postoperative urography revealed a complete resolution of hydronephrosis in all cases with one complete resolution and two cases with an improvement of nephroptosis. All patients had a complete resolution of their symptoms.

## Conclusions

Retroperitoneoscopic pyeloplasty with concomitant nephropexy seems to be a feasible, effective and minimally invasive procedure for treating UPJ obstruction in combination with nephroptosis.

## **Introduction**

Since it was first described as a minimally invasive treatment option for ureteropelvic junction (UPJ) obstruction by Schuessler and associates in 1993, laparoscopic pyeloplasty has emerged as a feasible and reliable treatment associated with minimal morbidity during the past decade[1]. The main reason for choosing the laparoscopic pyeloplasty is virtually identical with an open surgical reconstruction, while it shares the advantages of minimally invasive surgery.

As for nephroptosis, the clinical relevance remains a matter of controversy. However, symptomatic nephropexy is a bothersome disease requiring therapy. Nephropexy was first performed by Hahn in 1881. [2] Since then, more than 170 operative techniques have been described. However, postoperative morbidity and high failure rates have limited the use of open nephropexy. In 1993, Urban et al. first described laparoscopic nephropexy, a new and minimally invasive treatment modality for nephropexy. With this new technique, the operation again became a viable treatment option. Many

of the reported cases of endoscopic nephropexy were done via a transperitoneal approach. The retroperitoneal laparoscopic approach for nephropexy has the advantage of providing direct access to the kidney without bowel manipulation and so far various techniques for performing retroperitoneal laparoscopic nephropexy have been reported.

The rate of UPJ obstruction with nephroptosis is unclear. If both diseases occur concomitantly, then retroperitoneal pyeloplasty and nephropexy seem to be reasonable. We herein describe the technique and evaluate the efficacy of our method of retroperitoendoscopic pyeloplasty in combination with nephropexy.

## **Patients and Methods**

### *Patients*

From August 2001 to April 2006, we performed laparoscopic pyeloplasty on 13 patients with UPJ obstruction. Among them, three patients showed nephroptosis coincidentally and underwent retroperitoneoscopic pyeloplasty

and nephropexy concomitantly. All three females, ranging in age from 21 to 33 years old, were symptomatic (flank pain or lower abdominal pain). One patient was associated with a recurrent urinary tract infection. UPJ obstruction and nephroptosis was on the right side in all cases. At presentation all cases demonstrated UPJ obstruction and nephroptosis as confirmed by excretory urography, retrograde pyelography, computed tomography and an isotopic renogram. UPJ obstruction was primary in all cases and aberrant vessels were observed in one case. The grade of nephroptosis was over 2 vertebrae in all cases.

### *Surgical technique*

General anesthesia was administered by way of tracheal cannulation. We placed a double-J catheter at first. The patient was placed in the lateral decubitus position. One 1-cm incision was made at the midaxillary line halfway between the lower costal margin and the iliac crest. The retroperitoneal space was entered under direct vision and a balloon

dissection of the retroperitoneal working space was performed as previously described. [3] Next, an 11 mm working port and a 5 mm working port were created at the anterior and posterior axillary lines, respectively. Then a 4<sup>th</sup> port, measuring 5 mm in size, was placed just 2-3 cm medially from the spina iliaca anterior superior. The posterior Gerota's fascia was opened and the perirenal fat was dissected from around the kidney. The pelvis and the upper ureter were then fully mobilized using a blunt and sharp dissection, and the UPJ obstruction was evaluated.

The renal pelvis was divided while keeping the most lateral extent of the renal pelvis not dismembered. Thereafter, the ureter was spatulated on the lateral aspect extending inferiorly through the narrow portion of the ureter for about 2 cm using pivotal scissors. The most dependent part of the pyelotomy was sutured to the apex of the spatulated ureter using 4-0 polyglactin. After performing this stay suture, the stenotic segment of the UPJ and the redundant renal pelvis were removed and then the second stay suture was taken at the proximal end of ureter and renal pelvis. Two



separate anterior and posterior running sutures were placed using 5-0 polyglactin.

The perirenal fat was completely dissected from the kidney. Three or four 2-0 polypropylene sutures were placed on the posterior renal capsule to the fascia of the quadratus lumborum. All sutures were tied intracorporeally.

The kidney was monitored retroperitoneoscopically to ensure that the correct position was obtained. A closed suction drain was placed through the port incision into the perinephric space.

## **Results**

Retroperitoneoscopic pyeloplasty with nephropexy was successfully accomplished in all 3 cases (table). The median operative time was 350 minutes (range 204 to 414) with a learning curve. The median estimated blood loss was 50 ml (range 10 to 200). An aberrant artery vessel crossing on the dorsal side of UPJ was observed in 1 patient, and the dorsal vessel was transposed ventrally to the UPJ. No major or minor intraoperative

complications were noted.

The oral intake was resumed after a delay of 1 day after surgery. The Foley catheter was removed at 2 days postoperatively. The suction drain placed in the retroperitoneal space was removed at 3 days postoperatively. The double-pigtail ureteral stent was removed at 6 weeks postoperatively. The postoperative hospital stay was 6 days.

The median follow-up time was 3 years (range 0.7 to 3.8). All patients achieved a rapid and uneventful recovery. The symptoms were resolved in all patients. Postoperative intravenous urography after 10 weeks demonstrated a complete resolution of hydronephrosis in all patients and a complete resolution in 1 patient and an improvement in 2 patients with nephroptosis.

## **Discussion**

Advances in laparoscopic techniques and equipment have resulted in surgeons now being able to perform technically more complex types of reconstructive surgery. [4] For the last few decades, open pyeloplasty has

been the gold standard surgical treatment for a UPJ obstruction, with a long-term success rate exceeding 90%. However, this technique requires a lumbar incision with consequent morbidity. [5] There is growing evidence that minimally invasive techniques can show similar or even better functional results. [6] [7] In particular, laparoscopic dismembered pyeloplasty has emerged as a feasible and reliable treatment alternative to the open dismembered technique. [8] In addition, the patients benefit from the advantages of laparoscopy including a lower morbidity, better cosmetic results, less postoperative pain and a shorter convalescence period. [9]

In open pyeloplasty, the standard of care consists of a lumbotomy or a retroperitoneal approach rather than the transperitoneal approach. In our opinion, the use of laparoscopic techniques should not involve a change in the surgical approach. The retroperitoneal approach provides a shorter and more direct access to the UPJ, without any interference from the intraabdominal structures. Regarding the laparoscopic approach, the extraperitoneal route confers several advantages. Less dissection is required

to expose the UPJ, thereby reducing the risk of intraperitoneal organ injury and postoperative ileus. In addition, the potential deleterious effects of the peritoneal exposure to blood, urine, and carbonic acid are avoided. Although the surgical field is smaller, maneuvers such as suturing are still possible even during dismembered pyeloplasty. We have not found the smaller operating space to hamper the performance of either a dissection or anastomosis.

Nephroptosis is characterized by a descent of the kidney by more than 5 cm (or 2 vertebral bodies) during orthostasis. While it has been noted for some time that nephroptosis is a common finding in women, it is rarely a cause of any symptoms. A considerable amount of controversy remains concerning the treatment of nephroptosis with nephropexy. [10] Some surgeons consider nephroptosis to be an imaginary disease. However, others have successfully correlated the pain with an abdominal position of the kidney on dynamic ultrasonography and were thus able to identify patients whose symptoms could be relieved by nephropexy. [11]

The retroperitoneoscopic access is quick and easy. This method of fixing the kidney with three or four nonabsorbable sutures placed on the posterior renal capsule and the quadratus lumborum fascia is simple and effective.

[12] The knots can be tied intracorporeally and the retroperitoneoscopic access allows for the excellent visualization of the posterior aspect of the kidney and the quadratus lumborum fascia. Therefore, during suturing, the kidney can be accurately monitored to ensure the correct position.

UPJ obstruction and nephroptosis cause similar symptoms. We consider that UPJ obstruction and nephroptosis should be treated simultaneously. Both laparoscopic pyeloplasty and nephropexy can thus be done retroscopically in the flank position. No disadvantages have been observed while performing both procedures. There is a major advantage for patients in enabling patients to only undergo surgery once. Retroperitoneoscopic pyeloplasty with concomitant nephropexy has a high success rate while it is minimally invasive.

## **Conclusions**

Retroperitoneoscopic pyeloplasty with concomitant nephropexy is thus considered to be a feasible, effective and minimally invasive procedure for treating a UPJ obstruction in combination with nephroptosis.

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# table

Case	No. 1	No. 2	No. 3
Operative time (min.)	350	414	204
Blood loss (ml)	200	50	10
Post op. days to ambulation	2	1	2
Post op. days to oral feeding	1	1	1
Post op. days of hospital stay	6	6	6
Complication	None	None	None
Symptom	Complete resolution	Complete resolution	Complete resolution
Hydronephrosis	Complete resolution	Complete resolution	Complete resolution
Nephroptosis	Complete resolution	Improvement	Improvement