Posterior retroperitoneal laparoscopic partial nephrectomy in pediatric patients

Camarena-Reynoso HR,1 Cantellano-Orozco M,1 Vázquez-Ortega L,1 Shuck-Bello C,1 Leos-Acosta C,1 Aguilar-Anzúrez Roberto,2 Olivera-Vázquez J,2 Cuevas-Alpuche JO.2

ABSTRACT

Introduction: The patient is a male child, 18 months of age. Disease onset began at 1 month of age with vomiting, fever of 39°C, irritability upon urinating, frequent urination and pyuria. Recurrent urinary tract infection was diagnosed and patient was referred to the Instituto Nacional de Pediatría at 1 year of age. Kidney and bladder ultrasound revealed left hydrenephrosis. Urologic multislice computed tomography (MSCT) showed a left double collector system with pelvic and superior caliceal system hydrenephrosis. The left superior pole of the kidney was poorly enhanced and there was probable left ureterocele. Double ureteral meatus and left ureterocele were confirmed by cystoscopy. Renal scintiscan with mercapto acetyl tri glycine (MAG 3) revealed left superior pole dysfunction. Posterior retroperitoneal laparoscopic partial nephrectomy was performed.

Discussion: Laparoscopic partial nephrectomy is currently performed only in specialized centers and the number of pediatric procedures is limited. Conversion rate during the learning curve of this procedure is high and technical difficulties continue to be a challenge, especially in infants and toddlers with dilated collector systems.

RESUMEN

Introducción: Paciente masculino de 18 meses. El pade- cimiento se reconoció al mes de vida, con vómito, fiebre de 39°C, irritabilidad durante la micción, polaquiuria y piuria. Se diagnosticó infección de vías urinarias de repetición y se le refirió al Instituto Nacional de Pediatría al año de edad; allí se sometió a ultrasonido renal y vesical, que reveló hidronefrosis izquierda. La prueba UROTAC identificó doble sistema colector izquierdo con hidronefrosis de la pelvis y cálices del sistema superior, hipocaptación del medio de contraste en el polo superior izquierdo y probable ureterocele izquierdo. En la cistoscopia se confirmó doble meato ureteral y ureterocele izquierdo. El gammagrama renal con MAG 3 confirmó la disfunción del polo superior izquierdo. Se programó al paciente para polecotomía renal laparoscópica con acceso retroperitoneal posterior.

Discusión: En la actualidad, la nefrectomía parcial laparo- scópica se practica sólo en centros con experiencia y el número de intervenciones en la población pediátrica es li- mitado. La tasa de conversión durante la curva de apren- dizaje de este procedimiento es elevada y las dificultades técnicas son todavía un reto, sobre todo en lactantes y pre- escolares con sistemas colectores dilatados.
Conclusions: Laparoscopic partial nephrectomy with a posterior retroperitoneal approach in children is a useful procedure with low morbidity and shorter hospital stay. It can be used in both benign and malignant pathologies with good results.

Keywords: partial nephrectomy, laparoscopy, retroperitoneal approach.

INTRODUCTION

Laparoscopy has been increasingly used in urological procedures over the last decades. Just two years after Clayman et al performed the first laparoscopic nephrectomy in 1990, Jordan described the first laparoscopic partial nephrectomy successfully performed on a child and Winfield on an adult. The benefits of laparoscopy in renal pathologies compared with traditional open surgery are widely accepted. They include the use of fewer analgesics, shorter hospital stay, better cosmetic results and a shorter period of convalescence for the patient. Simple and radical laparoscopic nephrectomy are widely used, but partial nephrectomy is not regularly performed. This is mainly due to the technical difficulties involved in renal parenchymal hemostasis and collector system repair. However, different partial nephrectomy series with transabdominal and retroperitoneal approaches have been published.

Initially indications for laparoscopic partial nephrectomy are similar to those for partial open surgery in which the patient is at high risk for developing renal insufficiency, has a solitary kidney (functional or anatomical) or has bilateral or familial kidney tumors. Relative indications include pathologies that could affect the contralateral kidney such as high blood pressure, diabetes mellitus and renal artery stenosis, among others. It is also performed on selected patients presenting with kidney tumor measuring less than 4 cm in which renal cell carcinoma is suspected and who at the same time have a healthy contralateral kidney. Laparoscopic partial nephrectomy is equivalent to radical open surgery in terms of disease-free period and perioperative efficacy in patients that have tumors with these characteristics. Laparoscopic partial nephrectomy can also be indicated in benign pathologies such as double collector systems with nonfunctional kidney segments, kidney cysts, benign tumors and stones associated with cortical atrophy. Currently there are different reports of laparoscopic retroperitoneal partial nephrectomy in adults, but information published in international journals is scarce and this procedure is not commonly performed on the Mexican pediatric population, especially on infants and toddlers.

OBJECTIVE

The objective of the present report is to demonstrate and describe the technique of posterior retroperitoneal laparoscopic partial nephrectomy.

CASE PRESENTATION

The patient is an 18-month old boy whose disease began at 1 month of age with vomiting, 39°C fever, irritability upon urinating, frequent urination and pyuria. Recurrent urinary tract infection was diagnosed. The child was sent to the Instituto Nacional de Pediatría at 1 year of age where he underwent kidney and bladder ultrasonogram that revealed left hydronephrosis (Image 1) and micturating cystourethrography that did not show vesicoureteral reflux (Image 2). Urological multislice computed tomography (MSCT) revealed a double collector system with hydronephrosis and low contrast medium uptake in the superior pole of the left kidney (Image 3). Double ureteral meatus and left ureterocele were corroborated by cystoscopy and so MAG 3 kidney scintiscan was done which revealed functional exclusion of the left superior pole (Image 4). Based on these findings, laparoscopic partial nephrectomy was performed at the superior pole. With the patient in the ventral decubitus posterior retroperitoneal approach was employed, placing two 5 mm and one 3 mm access ports. A 5 mm 30° lens was used (Image 5).
The procedure was carried out with no complications or incidences and lasted 120 minutes with an approximate 50 ml loss of blood. Progress was adequate and patient was released on the third postoperative day with good cosmetic results.

**DISCUSSION**

Retroperitoneal laparoscopic partial nephrectomy continues to be a complicated technique in children and therefore is not widely used. The largest published series of cases included 48 patients (36 partial nephrectomies of the superior pole and 12 of the inferior pole). Lateral retroperitoneal approach was used on 31 patients and posterior retroperitoneal approach on 17. Mean duration of surgery was 120 minutes (71-215 minute range). Ten procedures were converted (8 of which were among the first 20). Four of the patients whose surgery was converted presented with difficulties during parenchymal dissection. The other 6 converted procedures were in infants. The authors concluded that the conversion rate during the learning curve of this procedure is high and that technical difficulties continue to be a challenge for the pediatric urologist, especially in the case of infants and toddlers with dilated collector systems.

In 2006 Wallis et al published their experience with pediatric patients. From 2001 to 2004, 22 procedures...
were performed: 18 at the superior pole, 5 at the inferior pole, 12 for ureterocele, 9 for ectopic ureter and 5 for vesicoureteral reflux. Abdominal ultrasound was the routine postoperative imaging study. Four patients required conversion, 5 patients presented with urinary fistula and 2 presented with functional loss of the remaining kidney segment. One patient presented with high blood pressure 32 months after surgery. The authors concluded that laparoscopic partial nephrectomy is a safe procedure with low morbidity but that severe complications may occur during the learning curve.\textsuperscript{14}

In 2003 El-Ghoneimi compared retroperitoneal laparoscopic partial nephrectomy with open surgery and concluded that laparoscopic surgery is a safe and appropriate procedure in children. The duration of the two types of surgery is similar and the patient has a shorter hospital stay with laparoscopic partial nephrectomy.\textsuperscript{15} In 1998 a report from the Lenval du Nice Hospital in France was published describing 8 laparoscopic partial nephrectomies, two of which were converted because of inability to identify the polar veins and one due to perforation of the duodenum.\textsuperscript{16}

**CONCLUSIONS**

Laparoscopic partial nephrectomy via posterior retroperitoneal approach in children is a safe and useful procedure. However, this surgery is not widely used and has a steep learning curve. Once mastered, the procedure has a low morbidity rate, shortens the length of hospital stay and can be used in both benign and malignant conditions.

**BIBLIOGRAPHY**