Experience in laparoscopic nephrectomy at the Hospital Central Militar


CAMBIARON LOS CARGOS Y AUTORES FAVOR DE TRADUCIR EN INGLES

a Jefatura de Sala de Urología, Hospital Central Militar, México D.F., México
b Residencia de la Especialidad de Urología, Escuela Militar de Graduados de Sanidad, México D.F., México
c Dirección Unidad de Especialidades Médicas, SEDENA, México D.F., México
d Docencia del Curso de la Especialidad de Urología, Escuela Militar de Graduados de Sanidad, México D.F., México
e Servicio de Urología, Hospital Central Militar, México D.F., México
f Jefatura del Servicio de Urología, Hospital Central Militar, México D.F., México

KEYWORDS

Laparoscopic nephrectomy; Radical laparoscopic nephrectomy; Simple laparoscopic nephrectomy; Mexico.

Abstract

Background: Laparoscopic renal surgery has become a practical and accepted alternative for treating complex surgical urologic diseases. The lumboscopic and transperitoneal approaches are used in confined renal tumor and hypofunctioning renal pathology as an alternative to open surgery, demonstrating lower morbidity and mortality and the same long-term oncologic result.

Aims: To describe our experience in simple, partial, and radical laparoscopic nephrectomy, commenting on the indications for surgical treatment and perioperative comorbidities, surgery duration, blood loss, and hospital stay.

Material and methods: This is a descriptive, retrospective study whose time frame was August 2009 to August 2011 and included a total of 43 patients (25 women and 18 men). Twenty-six simple nephrectomies, 15 radical nephrectomies, and 2 partial transperitoneal nephrectomies were carried out.

Results: There were few complications and they varied depending on the particular procedure performed. The most frequent complication was intraoperative bleeding and prolonged ileus.

Conclusions: Laparoscopic nephrectomy is the standard management in benign and malignant renal pathology. In our experience, as well as in other series, there was a low complication rate, showing that laparoscopic nephrectomy performed by an experienced surgeon is a safe procedure for the management of those pathologies.
Introduction

Since the year 1966, when the first articles on laparoscopy by Kurst Semms, a Russian gynecologist, were published, the feasibility and reproducibility of this procedure have been demonstrated; in addition Semms designed a laparoscopic instrument and thus is regarded as the father of laparoscopy. Many other specialties adopted its use, and authors like Reddick and Olsen showed excellent results in 200 laparoscopic cholecystectomies.

The success seen in the laparoscopic surgical results in other specialties motivated its use in urology, and it was Clayman, who in 1990, published the report on the first laparoscopic nephrectomy. From that moment on, reports on more urologic procedures in the kidney, ureter, bladder, and prostate were published.

Many advances have been made in laparoscopic renal surgery, resulting in different approaches and techniques. Among them are simple nephrectomy, radical nephrectomy, and partial nephrectomy; all of these with lumboscopic or transperitoneal approach. The latter has the advantage a bigger and more comfortable work space for managing the instrumentation and trocars, but it has the disadvantage of a reduced work space; the former has the advantage of not manipulating the intraperitoneal viscera and thus reducing the risk for complications such as bowel perforation or duodenal injury, but it has the disadvantage of a reduced work space; the latter has the advantage a bigger and more comfortable work space for managing the instrumentation and trocars, but there is always the latent risk for visceral injury.

There are new techniques, such as high definition laparoscopic ultrasound-guided cryoablation of renal tumors, through the laparoscopic approach. It has produced good results and lower morbidity and it is being used in localized renal tumors.

Laparoscopic renal surgery is now part of the treatment of choice in many renal diseases. It has shown lower morbidity and surgical trauma, shorter hospital stay, and better pain control. There is still no consensus as to whether the lumboscopic approach or the transperitoneal approach is better. The former has the advantage of not manipulating the intraperitoneal viscera and thus reducing the risk for complications such as bowel perforation or duodenal injury, but it has the disadvantage of a reduced work space; the latter has the advantage a bigger and more comfortable work space for managing the instrumentation and trocars, but there is always the latent risk for visceral injury.

This technique is challenging and requires the availability of the adequate material necessary for its performance, as well as a team of urologic laparoscopy surgeons that are up-to-date and constantly undergoing training in the new minimally invasive techniques.

In our Hospital, laparoscopic nephrectomy with the transperitoneal approach is the treatment of choice in benign and neoplastic renal pathology according to disease stage, and the aim of this article is to report on our experience in laparoscopic nephrectomy over a 3-year period.

Methods

A retrospective and descriptive study was conducted. Case records from the Hospital Central Militar archive were reviewed of patients that underwent laparoscopic simple nephrectomy, laparoscopic radical nephrectomy, and
laparoscopic partial nephrectomy, within the time frame of August 2009 to August 2012 at the Urology Service.

A total of 43 case records were reviewed, of which 25 were women and 18 were men; 15 patients were managed for stage T1 and T2 renal tumors, and 28 patients for benign pathology that conditioned renal dysfunction (non-visualized kidney). All patients had the following preoperative studies done: full blood count, blood chemistry, hemorrhagic tendency tests, urinalysis, and urine culture. They also had a uroterography scan, and the patients with non-visualized kidney had renal scintigraphy that confirmed the exclusion.

All patients were managed with 1 g of intravenous ceftriaxone preoperatively and compression stockings were applied both preoperatively and postoperatively. In addition, 40 mg of subcutaneous enoxaparin was applied every 24 hours for 5 postoperative days. All patients had Foley bladder catheter placement before initiating the surgery; the surgical team was composed of 2 urology surgeons that performed all the procedures.

**Surgical technique**

All the patients included in this case series were operated on using the transperitoneal approach and 4 to 5 access ports were utilized for the camera and surgical instruments. The patient was placed in the partial lateral decubitus position (fig. 1), exposing the side to be operated on and held in place by the jointed arms of the surgical table. Once the working space was installed, a 1 cm incision lateral to the umbilicus was made to introduce the blunt-tip port; once adequate pneumoperitoneum was reached (15 mmHg), the 30° camera was inserted. Then 3 or 4 ports were installed: at the subcostal arch midpoint, midway between the anterior superior iliac spine (ASIS) and the camera, and above the iliac crest. The number and diameter of the trocars depended on the lateral location of the kidney to be operated on (4 trocars right, 3 trocars left). A bipolar electrocautery and electrocoagulation through radiofrequency (Ligasure®) were used on all the patients. The procedure began with the dissection of the ipsilateral colon to expose the retroperitoneum. The kidney was dissected and freed en bloc, by the dissection of the contralateral colon to expose the retroperitoneum. The patient was placed in the partial lateral decubitus position (fig. 1), exposing the side to be operated on and held in place by the jointed arms of the surgical table. Once the working space was installed, a 1 cm incision lateral to the umbilicus was made to introduce the blunt-tip port; once adequate pneumoperitoneum was reached (15 mmHg), the 30° camera was inserted. Then 3 or 4 ports were installed: at the subcostal arch midpoint, midway between the anterior superior iliac spine (ASIS) and the camera, and above the iliac crest. The number and diameter of the trocars depended on the lateral location of the kidney to be operated on (4 trocars right, 3 trocars left). A bipolar electrocautery and electrocoagulation through radiofrequency (Ligasure®) were used on all the patients. The procedure began with the dissection of the ipsilateral colon to expose the retroperitoneum. The kidney was dissected and freed en bloc, by radical, simple, or partial nephrectomy, depending on the surgical indication motive. Hem-o-lok® and/or Endo GIA™ Universal Stapler were used for vascular ligation, according to preference.

In all cases the renal pedicle was ligated separately. The surgical specimen was extracted with no morcellation using a laparoscopic bag and enlarging one of the inferior ports. Drainage catheters were placed in all the patients and removed after approximately 5 days. The postoperative follow-up schedule was every 2 weeks for the following 2 months, after which follow-up control was extended to 3-month intervals.

All the patients were managed with the postoperative analgesic regimen of 30 mg of intravenous ketorolac every 6 hours and 1 g of intravenous paracetamol every 8 hours. If there was more pain, a rescue dose of 50 mg of tramadol was given, in addition to gastric protection with 40 mg of intravenous omeprazole every 24 hours and the anti-emetic ondansetron applied intravenously at a dose of 8 mg every 8 hours; progressive ambulation and a liquid diet were begun within the first 24 hours after surgery.

Hospital release was planned for 3 days after surgery, without the bladder catheter and abdominal drain. Sutures were to be removed 10 days after the procedure.

The complications related to the surgical procedure that were considered major were: vascular injury, visceral injury, thromboembolic events, and blood loss greater than 1,000 mL.

**Results**

Of all the patients reviewed, 43 were operated on. All procedures were transperitoneal and 26 were simple nephrectomies (8 right and 18 left), 2 right partial nephrectomies, 15 radical nephrectomies (7 right and 8 left); ages were from 23 to 83 years and the mean age was 56.64 years.

In relation to comorbidity, 39.53% (n=17) of the patients presented with some type of comorbidity; 7 patients had systemic arterial hypertension, one patient had type 2 diabetes mellitus, 5 patients had both of those diseases, 2 patients presented with T1c N0 M0 prostate adenocarcinoma managed with radical prostatectomy under adequate oncologic control, one patient had hypothyroidism, and one patient presented with systemic lupus erythematosus.

Of the 26 simple nephrectomies, all were due to non-visualized kidney, 10 were secondary to staghorn lithiasis (38.46%), 8 to obstructive ureteral lithiasis (30.76%), 5 to ureteral stricture (19.23%), 2 to ureteropelvic junction stricture (7.6%), and one was due to renal tuberculosis (3.8%).

The 15 radical nephrectomies were due to kidney tumors: 5 in stage T1a N0 M0 (33.33%), 5 in stage T1b N0 M0 (33.33%), 3 in stage T2a N0 M0 (20%), and 2 in stage T2b N0 M0 (13.33%).

The 2 partial nephrectomies of our case series were carried out because the kidney tumors were stage T1a N0 M0. Surgery duration was from 150 to 470 minutes, with a mean duration of 253 minutes.

Blood loss was quantified from 100 mL to 4,000 mL, with a mean blood loss of 450 mL.
Of the 43 procedures, 2 (4.6%) had to be converted to open surgeries; one right simple nephrectomy (2.3%) and one right radical nephrectomy (2.3%).

Hospital stay was from 2 to 29 days, with a mean hospital stay of 5.1 days.

Of the 43 patients, 10 presented with complications (23.25%); 6 had prolonged ileus (13.95%), one had complicated complete bowel obstruction that required resection and intestinal anastomosis (2.3%), one patient presented with a right pneumothorax that was resolved with a pneumokit (2.3%), one patient had a duodenal injury resulting in primary repair (2.3%), and one patient presented with pulmonary thromboembolism (2.3%).

Of the patient total, 5 (11.62%) needed a rescue dose of tramadol, 9 did not tolerate the diet (20.93%), and 4 did not ambulate (9.3%) within the first 24 hours after surgery.

Specific group results for laparoscopic simple nephrectomy are shown in table 1, laparoscopic radical nephrectomy in table 2, and laparoscopic partial nephrectomy in table 3.

In the 3 groups, only 3 patients presented with major complications, representing 6.9% of the patient total (fig. 2).

**Discussion**

Laparoscopic nephrectomy has become the treatment of choice for a large part of benign renal pathology and localized malignant pathology. This is why in 2009 we began to promote the development of different minimally invasive techniques for renal surgery in our Hospital, by forming a team of 2 laparoscopic urology surgeons and a protocol for the selection of patients that are candidates for laparoscopic renal surgery.

From August 2009 to August 2011, we performed a great number of laparoscopic simple nephrectomies due to non-visualized kidney, 15 laparoscopic nephrectomies, and 2 partial nephrectomies.

Surgery duration ranged from 150 to 470 minutes, with a mean 253 minutes per surgery. However, the procedure that took the longest was a simple nephrectomy that was converted due to a detected injury of the inferior cava that required primary repair; this same procedure was also the one that had the highest intraoperative blood loss. Another laparoscopic radical nephrectomy lasted 440 minutes, but in this procedure there was a detected duodenal injury that also needed primary repair. Consequently, these patients required an analgesic rescue dose and they could not walk or eat food by mouth within the first 24 hours of the surgery. Moreover, the hospital stay was extended to 20 days for this last patient.
that surpassed the mean, but did not reach 1,000 mL, and the patient that had the detected inferior cava lesion and 3 more under 500 mL, with a mean of 450 mL, except for the patient that had the most intraoperative blood loss; since then we have improved our technique and intraoperative blood loss and surgery duration have been significantly reduced. The cases in which there was inferior vena cava injury and duodenal injury were among the first cases operated on in our Service. They are the surgeries that lasted the longest and that had the most intraoperative blood loss; since then we have improved our technique and intraoperative blood loss and surgery duration have been significantly reduced. As has been documented in other studies, once the learning curve is reached, the number of procedure-related complications decreases, and so it is our opinion that continuous practice and a team that works well together is an independent aid to having better results.

Conclusions

We regard laparoscopic renal surgery as the first choice in benign renal pathology treatment, as well as in the case of localized renal tumors. It offers the same long-term results with a lower morbidity rate, which is why our Hospital continues to promote laparoscopic renal surgery so that we may increase our experience in the procedure and become a national referral Hospital.

Financial disclosure

No financial support was received in relation to this article.

Conflict of interest

The authors declare that there is no conflict of interest.

References


Figure 2 The overall major and minor complications that presented in our study.

The quantity of blood loss in the majority of patients was under 500 mL, with a mean of 450 mL, except for the patient that had the detected inferior cava lesion and 3 more that surpassed the mean, but did not reach 1,000 mL, probably attributable to a difficult approach and problems dissecting the hilum.

Hospital stay ranged from 2 to 29 days, with a mean of 5.1 days. The patient that had the longest hospital stay was one that underwent a right simple nephrectomy and presented with mechanical bowel obstruction secondary to adherences. Initially she was managed conservatively with no improvement and later had adhesiolysis. This patient finally underwent resection plus intestinal anastomosis, which extended her hospital stay to 29 days.

Prolonged ileus was the most frequent complication in our case series. It presented in a total of 6 patients and was resolved through intestinal rest and prokinetics. No additional intervention was required.

Another important point to mention is that the radical nephrectomies were only carried out in localized kidney tumors and the masses were under 7 cm in 66.66% of the cases. This could explain the lower quantity of blood loss observed in the radical nephrectomies, compared with the simple ones.

On the other hand, partial nephrectomy was only performed in 2 cases in masses under 4 cm. Both nephrectomies had a mean blood loss of 250 mL, an ischemia time less than 30 minutes, and rapid postoperative recovery; it should be pointed out that margins were negative for malignancy in the final histopathologic report, probably because they were carried out with intraoperative high definition laparoscopic ultrasound, that contributed to improving the resection margin, despite the difficulty of this technique in particular to achieve negative surgical margins.

The cases in which there was inferior vena cava injury and duodenal injury were among the first cases operated on in our Service. They are the surgeries that lasted the longest and that had the most intraoperative blood loss; since then we have improved our technique and intraoperative blood loss and surgery duration have been significantly reduced. As has been documented in other studies, once the learning curve is reached, the number of procedure-related complications decreases, and so it is our opinion that continuous practice and a team that works well together is an independent aid to having better results.

Conclusions

We regard laparoscopic renal surgery as the first choice in benign renal pathology treatment, as well as in the case of localized renal tumors. It offers the same long-term results with a lower morbidity rate, which is why our Hospital continues to promote laparoscopic renal surgery so that we may increase our experience in the procedure and become a national referral Hospital.

Financial disclosure

No financial support was received in relation to this article.

Conflict of interest

The authors declare that there is no conflict of interest.

References