Laparoscopic Radical Nephrectomy in Renal Cell Carcinoma

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Renal cell adenocarcinoma is a collection of abnormal cells within the kidney. A malignant renal mass is an abnormal growth of cells that have the potential to spread throughout the body. Cancerous cells often continue to grow unless they are destroyed surgically or by medications. There is a decreased likelihood of metastasis (spreading of cancerous cells to other parts of the body) when cancerous cells are treated early. CT scans, MRIs, plain X-rays, and bone scans can determine metastasis. Historically, the only surgical option for removal of a renal mass was through a large incision in the abdomen. Recently, many urologists have adopted new innovations in the removal of renal masses including laparoscopic radical nephrectomy. The laparoscopic approach to radical nephrectomy has been associated with improved patient outcomes including decreased pain, shorter hospital stay, rapid recovery, and improved aesthetic cosmetic appearance. Laparoscopic radical nephrectomy may be performed in three different types of surgical procedures including laparoscopic hand-assisted radical nephrectomy, transperitoneal radical nephrectomy, and retroperitoneal radical nephrectomy. Understanding the procedure, preoperative instructions, and recovery will assist nurses in counseling patients considering laparoscopic radical nephrectomy.

Historically, the only surgical option for removal of a renal mass was through a large incision in the abdomen. Recently, many urologists have adopted new innovations in the removal of renal masses including laparoscopic radical nephrectomy. The laparoscopic approach to radical nephrectomy has been associated with improved patient outcomes including decreased pain, shorter hospital stay, rapid recovery, and improved aesthetic cosmetic appearance. Laparoscopic radical nephrectomy may be performed in three different types of surgical procedures including laparoscopic hand-assisted radical nephrectomy, transperitoneal radical nephrectomy, and retroperitoneal radical nephrectomy. Understanding the procedure, preoperative instructions, and recovery will assist nurses in counseling patients considering laparoscopic radical nephrectomy.

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Note: CE Objectives and Evaluation Form appear on page 87.
Laparoscopic radical nephrectomy may be performed via conventional or hand-assisted techniques. The decision for which type of surgery that is best for each patient depends on the size and location of the tumor, co-morbid conditions, prior abdominal surgeries, and the experience and preference of the surgeon with the various surgical techniques.

**Hand-Assisted Laparoscopic Radical Nephrectomy**

Hand-assisted laparoscopic radical nephrectomy (HALN) was developed by urologists to combine the benefits of open surgery with minimally invasive surgery. Hand-assisted surgery provides many advantages for both the surgeon and the patient. It overcomes the limitations of laparoscopy, such as lack of ergonomic instruments, lack of tactile sensation, and two-dimensional endoscopic view within a three-dimensional field (Fox, 2000). Actual operative time is shorter than pure laparoscopic procedures. Recovery time and length of hospital stay are similar. It allows for intact specimen removal, more rapid control of bleeding, and a more rapid path to surgical proficiency with laparoscopic equipment (Quallich, 2002). Hand-assisted radical nephrectomy allows the surgeon to use the hand to assist in the surgery by placing it through a hand-access device in the lower abdomen. The use of the hand within the abdomen enables the surgeon to have an increased sense of tactile sensation which helps to dissect and manipulate tissues within the abdomen. This approach provides increased hand mobility and ease in identifying anatomical landmarks. At
to the limited space and more anatomical landmarks. Retroperitoneal radical nephrectomy may be preferred for patients who have abdominal adhesions. Adhesions are fibrous bands of muscle tissue that are often present following abdominal surgery and where the kidney is removed during the surgery. Two smaller incisions that are less than one-half inch each are made for the camera and the surgical instruments. An additional incision may be necessary for the purpose of retracting tissues or organs such as the liver or the spleen (see Figure 2). Prior to the removal of the kidney, the abdominal cavity, surgical site, and instrument position are all inspected.

Transperitoneal and Retroperitoneal Laparoscopic Radical Nephrectomy

Conventional laparoscopic surgery is completed by a transperitional or retroperitoneal approach. The transperitoneal procedure is the more common approach between these two techniques. Transperitoneal radical nephrectomy involves making an initial one-half inch incision in the abdomen through which a laparoscope is placed. This approach provides the surgeon with a greater working area and easier accessibility to anatomical landmarks. The retroperitoneal approach is a more challenging procedure due to the limited space and more anatomical landmarks. Retroperitoneal radical nephrectomy may be preferred for patients who have abdominal adhesions. Adhesions are fibrous bands of muscle tissue that are often present following abdominal surgery. Fewer port sites are needed for the retroperitoneal approach, as retraction can be done from one trocar only, since bowel retraction is not required. However, there is less working space available for dissection and therefore more difficulty in dissecting large hydronephrotic kidneys and large renal tumors. There are a total of four to five half inch incisions with a transperitoneal or retroperitoneal approach. The first incision is for the camera, the next two incisions are for the surgical instruments, and an additional incision in the lower abdomen through which the kidney is removed. Removal of the tumor intact rather than morcellation better facilitates pathological evaluation. Patients with right renal masses may require an additional incision to retract the liver during the procedure. The trocar incisions are less than one-half inch and the incision for the kidney removal is approximately three inches (see Figure 3).

Intra-Operative Risk and Conversion to Open Surgery

Laparoscopic radical nephrectomy is not without its unique risks. Every trocar and instrument introduction into the abdominal cavity presents an important risk of vascular injury or visceral perforation. Risk increases with the number of trocars introduced. Injury can potentially damage every intra or retroperitoneal organ. The major-

Table 1.
Instructions for Surgery – Department of Urology – HUMC

<table>
<thead>
<tr>
<th>Surgery Date: ___________</th>
<th>Day: ___________</th>
<th>Time to Report: ___________</th>
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Three Weeks Prior to Surgery
- You are required to complete pre-admission testing (PATS) prior to surgery
- You are required to complete medical clearance. You must make an appointment with you internist or cardiologist prior to surgery.

One Week Prior to Surgery
- Very important! You must stop taking aspirin, vitamin E, Plavix®, Ticlid®, Coumadin®, ibuprofen, or any aspirin-like products 7 days prior to surgery.

Three Days Prior to Surgery
- You should start increase of fluids 3 days prior to surgery.

Day Before Surgery
- Drink 8 oz glasses of fluids every 2 hours starting in the am.
- No solid foods after 12 noon.
- Clear liquids including cranberry juice, water, broth, Jell-O® till midnight.
- Drink 12 ounces of magnesium citrate at 6 pm.

Day of Surgery
- If you take high blood pressure or heart medication, you can take it with a small sip of water the morning of surgery.
- Do not take diabetic medication the morning of surgery.
- You must report to the hospital 2 hours prior to surgery.
ity of these types of laparoscopic injuries will require immediate or delayed open surgery, due to hematoma, postoperative bleeding, abscess, or peritonitis (Miura et al., 2002). Occasionally, the surgeon may need to convert to an open radical nephrectomy due to excessive operative time or intraoperative bleeding, and injury to the arteries, veins, and surrounding structures in the abdomen. Moreover, as with any surgical procedure, anesthetic problems may also occur.

**Preparing for Surgery**

It is medically necessary for all patients to have blood testing, urinalysis, radiologic examinations (including a CT scan or MRI), chest x-ray, electrocardiogram, and medical clearance from their internist or cardiologist prior to surgery. The day before laparoscopic surgery, it is necessary for patients to begin a clear liquid diet and fast for a minimum of 8 hours prior to the surgery. Patients are instructed to perform a mild laxative regimen to cleanse the bowel. This may be taken from mid afternoon to early evening. Patients are advised to arrive at the hospital 2 hours prior to surgery at which time they will meet with the anesthesiologist. Patients are also required to bring their radiology films with them on the day of surgery so that the urologist can delineate the kidney’s anatomy (see Table 1).

**Postoperative Recovery**

The average hospital stay after a laparoscopic nephrectomy is 2 to 4 days. After surgery, patients are monitored closely in the recovery area. From the recovery area, patients are transferred to a surgical floor. Patients will have an intravenous catheter in their arm so that fluids can be administered in order to prevent dehydration. Additionally, patients have a catheter in the bladder which drains urine. A sequential compression device (SCD) may be placed on the legs to prevent inflammation (phlebitis) and the formation of blood clots (thrombus) in the legs while confined to bed. The Foley catheter will typically be removed the day after surgery. For pain management, patients will usually have a patient-controlled analgesia pump.

The day after surgery, the SCD boots are discontinued, patients are assisted out of bed at least three times daily for ambulation, allowed sips of water, and the Foley catheter is removed. With active bowel sounds and flatus, fluids are increased, and the diet is advanced to regular food. All patients are recommended to use an incentive spirometer ten times per hour, and complete coughing and deep breathing exercises every 2 hours to prevent pneumonia. Patients are changed to oral pain medication once they are tolerating food and fluids.

The most common complaints after laparoscopic nephrectomy surgery are shoulder pain and abdominal bloating for a few days after surgery. This is due to the gas that is used to inflate the abdominal cavity during the procedure to aid in visualization and provide operative space. Pain medication is ordered to help relieve any discomfort. Additionally, walking helps to aid in relieving bloating and discomfort caused by the gas infused during surgery.

Every patient recovers at a different rate after surgery. Patients should note that it is important to gradually build strength after surgery. Patients should start with short walks and simple exercises. Patients should not push, pull, or lift heavy objects over ten pounds for 1 month following surgery.

**Followup**

Patients are seen in the office 1 to 2 weeks after surgery to evaluate recovery. At this time, the surgeon will discuss the pathology report. Surgical skin staples are removed from the abdomen. Most patients are able to return to work 2 to 6 weeks after surgery. Lifting is restricted for 2 to 4 weeks based on postoperative evaluation. Monitoring postoperatively for renal cell carcinoma is the same for laparoscopic nephrectomy and open nephrectomy. Patients are recommended to have blood testing, an abdominal CT scan, and a chest x-ray every 6 months for 5 years to monitor for any cancer reoccurrence.

**Conclusion**

When deciding to have a laparoscopic nephrectomy, it is essential to choose a surgeon that has been adequately trained in laparoscopic surgery or is a fellowship-trained endourologist. Laparoscopic radical nephrectomy is an excellent surgical option for patients diagnosed with a renal mass. Research has shown many advantages to this approach, including minimal blood loss, decreased postoperative pain, more rapid convalescence, and improved cosmetic appearance. As endoscopic instruments improve, and become more ergonomic in their use, this procedure will become more common in the urologic armamentarium.

**References**


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Additional Reading