

A Cost-effective Way of Performing Laparoscopic Radical Nephrectomy in a Remote Health Facility in Nepal

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ABSTRACT

Laparoscopic radical nephrectomy (LRN) has been established as standard of care for T1 and T2 renal tumors. The aim of this article is to present our way of performing the surgery with an aim to reduce the overall cost of surgery.

Use of new improvised instruments makes surgery easy going. However, this additional comfort comes at a cost which is not always within the reach of common man. In order to give the advantage of minimal access surgery to patients coming to a remote health facility in the hilly areas of Nepal we adopt the following modifications describes in the article.

Keywords: Nephrectomy, Laparoscopy, Cancer, Kidney.

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INTRODUCTION

Laparoscopic radical nephrectomy (LRN) has been established as standard of care for T1 and T2 renal tumors.¹⁻³ The aim of this article is to present our way of performing the surgery with an aim to reduce the overall cost of surgery.

Use of new improvised laparoscopic instruments and accessories makes surgery easy going. However, this additional comfort comes at a cost which is not always within the reach of a common man. In order to give the advantage of minimal access surgery to patients coming to a remote health facility in the hilly areas of Nepal, we adopt the following modifications describes in the article.

PATIENT POSITION

Patient is placed in 45° lateral position with arms positioned appropriately. Kidney bridge is elevated with the table slightly flexed. Patient is securely strapped to the table. Pressure points including axilla, knees, elbows, and ankles should be padded to prevent neuromuscular injury. Urinary catheter and nasogastric tube is inserted. The sterile preparation and draping is done to whole of the abdomen in the front and back. The team position is shown in Figure 1 with surgeon standing on the contralateral side.

Peritoneal access is achieved by open technique through umbilical cicatrix. The 11 mm first port or optical port is

inserted in the umbilicus followed by two 5 mm ports, in epigastric region and the other in anterior axillary line an inch below the costal margin. An 11 mm lateral port is introduced laterally (Fig. 2). One of the purposes of 11 mm in this area is to accommodate the 10 mm clip applicator for the renal pedicles. 10 mm 30° camera is preferable.

OPERATIVE STEPS

Ten steps of LRN:

1. The line of Toldt is incised by harmonic scalpel a centimeter away from the colon, starting from iliac vessel to the hepatic/splenic flexure in vertical dimension and from hepatic flexure till inferior venacava horizontally.
2. The posterior parietal peritonium is gently lifted off the Gerota's fascia by blunt dissection. Ascending colon, hepatic flexure and duodenum is gradually mobilized till the anterior aspect of the venacava is visible.
3. Ureter and gonadal vessel identified at the pelvic brim. The area medial to the 2 structures cleared to identify the psoas muscle (Figs 3 for step 3 to 9).
4. The ureter is then traced upward and used as roadway to reach hilum. Once the hilum is reached the ureter should be divided keeping a long stalk to aid in retraction when necessary.

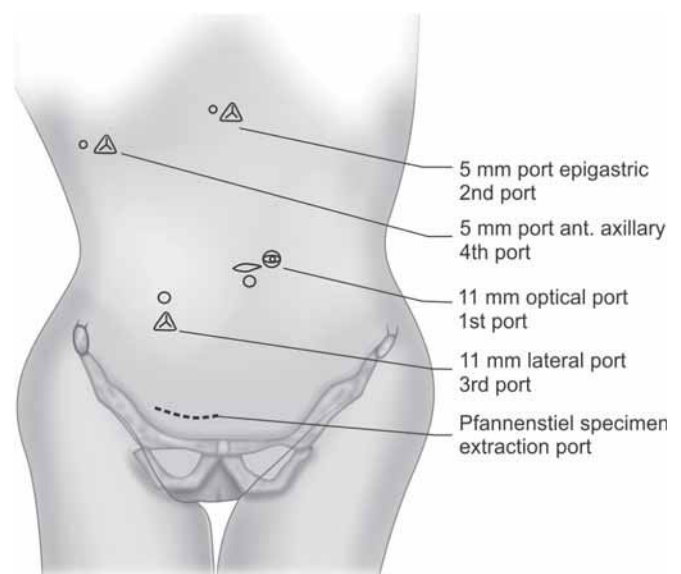


Fig. 1: Port positioning for a right sided nephrectomy

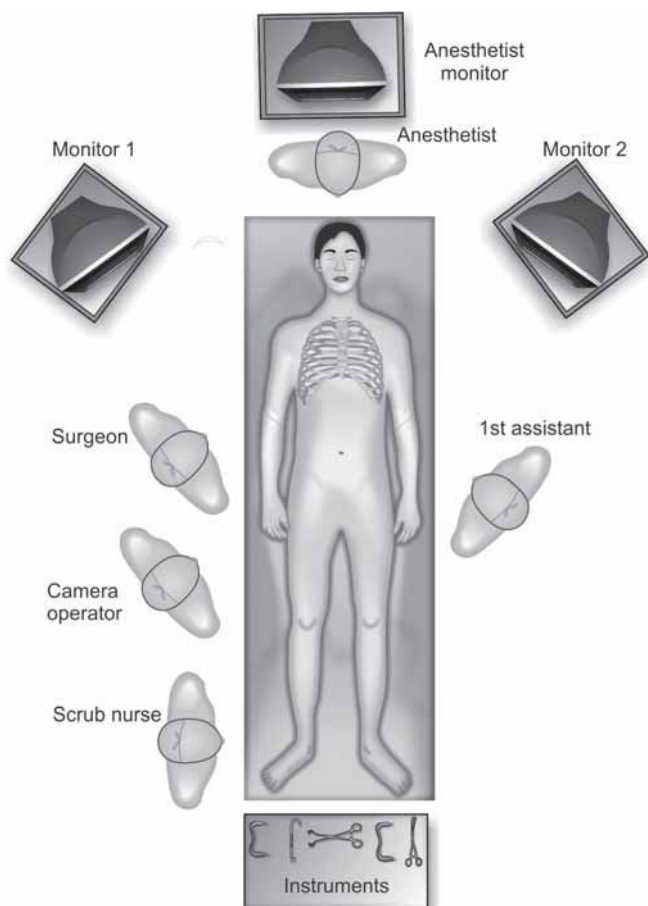


Fig. 2: Team position for a right sided nephrectomy

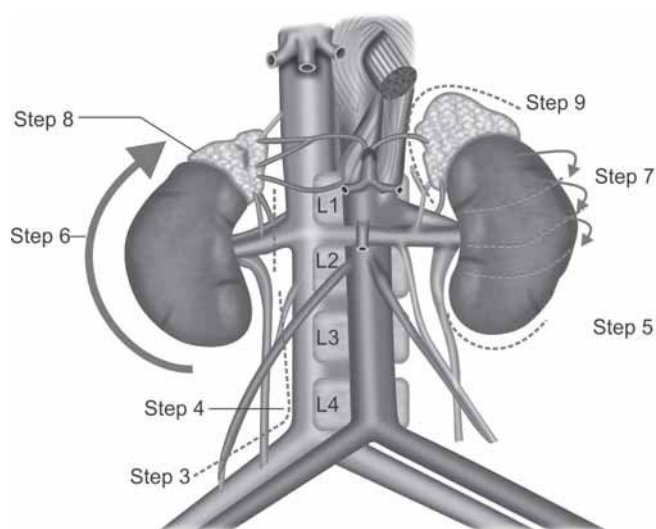


Fig. 3: Steps 3 to 9 of laparoscopic radical nephrectomy

5. Now is time for the posterior dissection. It is started with the lower pole mobilization followed by lateral border and upper pole.
6. With continued dissection, the kidney is flipped over in the anteromedial direction exposing the renal artery.
7. Renal artery is circumferentially mobilized. Two clips are applied to renal artery with a gap of 1 cm. In the mentioned gap a transfixation suture is applied to



Fig. 4: Postoperative wound appearance



Fig. 5: Laparoscopic radical nephrectomy specimen

add to the security of the clips. I usually tie another suture distal to the previous one. This obviates the need for any vascular stapler and there by minimizes the cost of surgery.

8. Same steps are repeated for the renal vein.
9. On the right side, if adrenalectomy is to be performed, dissection is continued upward along the side of venacava till adrenal vein is encountered which is then divided between clips. Afterward the superior border is dissected from the surrounding structure with the help of harmonic scalpel. On the left side the adrenal vein is clipped and cut. Then the rest of the dissection is carried out similar to right side.
10. The specimen is now put inside a retrieval bag. Using a Pfannenstiel incision the specimen is retrieved.

On the left side the Toldt line incision and dissection are far more extensive in comparison. The descending colon, pancreas and splenic flexure are mobilized medially severing the splenocolic, phrenico-colic and splenorenal ligaments. The spleen is allowed to gravitate medially aiding in the exposure and mobilization.

The specimen extraction is done with the help of a custom-made extraction bag tailored out of a urinary collection bag. A strong purse string is attached around the opening of the bag to aid in extraction. The extraction bag is introduced through the Pfannenstiel incision with the attached thread being securely caught outside the abdomen. A large wet mop is used on the incision to prevent air leak. Once the specimen is positioned in the bag, gentle traction is applied to the thread which brings the specimen to the extraction wound. Then the bag is then retrieved. The way of constructing the extraction bag is beyond the scope of this article. A drain is inserted if there is any concern about bleeding. Pneumoperitoneum is evacuated and the wounds are closed Figures 4 and 5.

The summary of this technique are:

1. Open technique of pneumoperitoneum even in obese patients.
2. No use of vascular stapler. Instead we would use laparoscopic intracorporeal knotting. A transfixation suture placed between 2 clips ensures complete vessel ligation without any compromise on pedicle security.
3. Use of Pfannenstiel incision of specimen retrieval avoiding any muscle cutting. This contributes to less postoperative pain, improved cosmesis, less chance of incisional hernia, enhanced recovery postoperatively and reduced analgesia requirement.
4. Custom home made extraction bag from urinary catheter bag. This adds to the cost cutting without increasing the complexity of specimen extraction.

POSTOPERATIVE CARE

Patient is allowed on fluid and diet as tolerated. Antibiotics are routinely prescribed. Patient is encouraged to mobilize and is discharged when improvement is satisfactory.

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