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Surgery in Motion

Robotic and Laparoscopic High Extended Pelvic Lymph Node Dissection During Radical Cystectomy: Technique and Outcomes

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Please visit www.europeanurology.com and www.urosource.com to view the accompanying video.

Abstract

Background: With the increasing use of laparoscopic and robotic radical cystectomy (RC), there are perceived concerns about the adequacy of lymph node dissection (LND).
Objective: Describe the robotic and laparoscopic technique and the short-term outcomes of high extended pelvic LND (PLND) up to the inferior mesenteric artery (IMA) during RC.
Design, setting, and participants: From January 2007 through September 2009, we performed high extended PLND with proximal extent up to the IMA ($n = 10$) or aortic bifurcation ($n = 5$) in 15 patients undergoing robotic RC ($n = 4$) or laparoscopic RC ($n = 11$) at two institutions.
Surgical procedure: We performed robotic extended PLND with the proximal extent up to the IMA or aortic bifurcation. The LND was performed starting from the right external iliac, obturator, internal iliac, common iliac, preaortic and para-aortic, precaval, and presacral and then proceeding to the left side. The accompanying video highlights our detailed technique.
Measurements: Median age was 69 yr, body mass index was 26, and American Society of Anesthesiologists class ≥ 3 was present in 40% of patients. All urinary diversions, including orthotopic neobladder ($n = 5$) and ileal conduit ($n = 10$), were performed extracorporeally.
Results and limitations: All 15 procedures were technically successful without need for conversion to open surgery. Median operative time was 6.7 h, estimated blood loss was 500 ml, and three patients (21%) required blood transfusion. Median nodal yield in the entire cohort was 31 (range: 15–78). The IMA group had more nodes retrieved (median: 42.5) compared with the aortic bifurcation group (median: 20.5). Histopathology confirmed nodal metastases in four patients (27%), including three patients in the IMA group and one patient in the aortic bifurcation group. Perioperative complications were recorded in six cases (40%). During a median follow-up of 13 mo, no patient developed local or systemic recurrence. Limitations of the study include its retrospective design and small cohort of patients.
Conclusions: High extended PLND during laparoscopic or robotic RC is technically feasible. Longer survival data in a larger cohort of patients are necessary to determine the proper place for robotic and laparoscopic surgery in patients undergoing RC for high-risk bladder cancer.

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1. Introduction

Radical cystectomy (RC) with pelvic lymph node dissection (PLND) is the standard of care for patients with muscle-invasive bladder cancer (BCa) and noninvasive high-grade tumors and carcinoma in situ (CIS) who fail transurethral resection and appropriate intravesical therapy. There is a growing body of evidence from various retrospective series that lymph node clearance at the time of RC may have prognostic and therapeutic significance [1–8].

Recently, laparoscopic and robotic RC has been explored as a minimally invasive alternative to open surgery with the potential advantages of decreased blood loss, reduced morbidity, improved convalescence, and earlier initiation of adjuvant therapies [9–13]. A major perceived question is whether laparoscopic and robotic techniques can achieve an adequate lymph node clearance comparable to open surgery. We report our detailed technique of laparoscopic and robotic high extended lymph node dissection (LND) during RC for patients with BCa.

2. Methods and patients

Laparoscopic RC (LRC) ($n = 11$) or robot-assisted RC ($n = 4$) with high extended LND was performed for 15 patients with BCa at two institutions. All data were entered prospectively into an institutional review board–approved database and queried retrospectively.

All procedures were performed under general anesthesia with the patient in a steep Trendelenburg tilt. The procedures were performed using six trocars, as shown in Figure 1. The primary camera port was positioned at least 5 cm cephalad to the umbilicus, and the right and left working ports were positioned at the level of the umbilicus. This relatively slightly higher position of the camera and working trocars facilitates dissection of the proximal template of the high extended node, cephalad to the common iliac vessels.

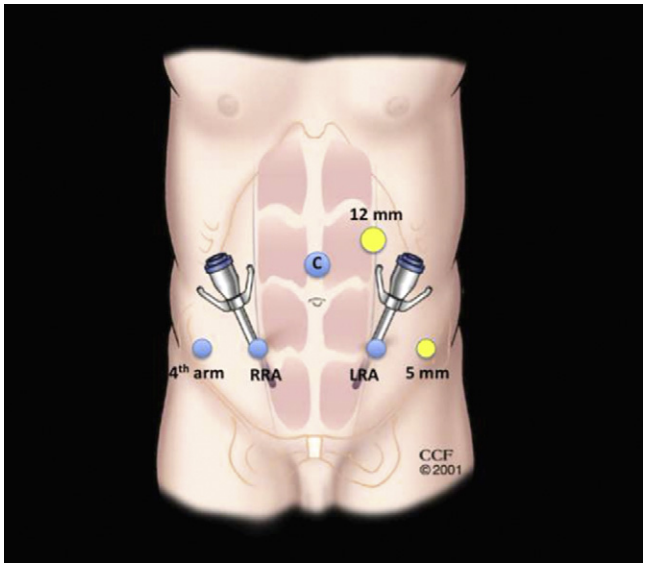

Fig. 1 – Port placement for robot-assisted radical cystectomy. Note that the camera port (C) and the robotic working ports (RRA and LRA) are positioned somewhat higher than usual. This placement facilitates the procedure as the dissection approaches the aortic bifurcation and higher.

The laparoscopic and robotic technique in radical cystoprostatectomy in the male and anterior exenteration in the female has been described [9,10,12]. We focus only on the lymphadenectomy (LND) technique. Although we have historically performed the RC first, followed by the LND, recently we have also carried out the LND first, followed by the cystectomy. In our opinion, there is no major advantage to performing the LND before or after the cystectomy.

For this study, we defined the high extended LND template as extending proximally up to the inferior mesenteric artery (IMA). We have modified the template of dissection during laparoscopic and robotic RC based on patient age, associated comorbidities, and clinical stage. In patients without significant comorbidity, especially with high clinical stage (T2 or greater), the extent of LND was either the aortic bifurcation or the IMA. However, our minimum proximal extent was the common iliac artery where the ureter crosses. In all 15 patients, the other boundaries of the extended template included the lymph node of Cloquet distally, the genitofemoral nerve laterally, and the perivesical tissue medially. Thus, the high extended pelvic template excised the external iliac, obturator, presciatic, hypogastric, common iliac, and presacral group of lymph nodes in all cases, with skeletonization of all of the previously mentioned anatomic structures bilaterally. In patients for whom the proximal template was extended up to the IMA, the preaortic, precaval, paracaval, and interaortocaval nodes distal to the IMA take-off were routinely included.

LND is initiated on the right distal external iliac vessels (Fig. 2). Using the right external iliac artery as a landmark, the lymphoareolar tissue lateral to it is dissected off the psoas muscle to identify the genitofemoral nerve that forms the lateral boundary of the template. The packet is longitudinally divided anterior to the artery using the split-and-roll technique. After delivering the packet posterior to the artery, a similar split-and-roll technique is done for the tissue surrounding the external iliac vein. Skeletonization of the entire length of the external iliac vessels up to the pubic bone completes this part of the LND, and the lymphatic packet is placed in an Endocatch I bag (Covidien, Mansfield, MA, USA).

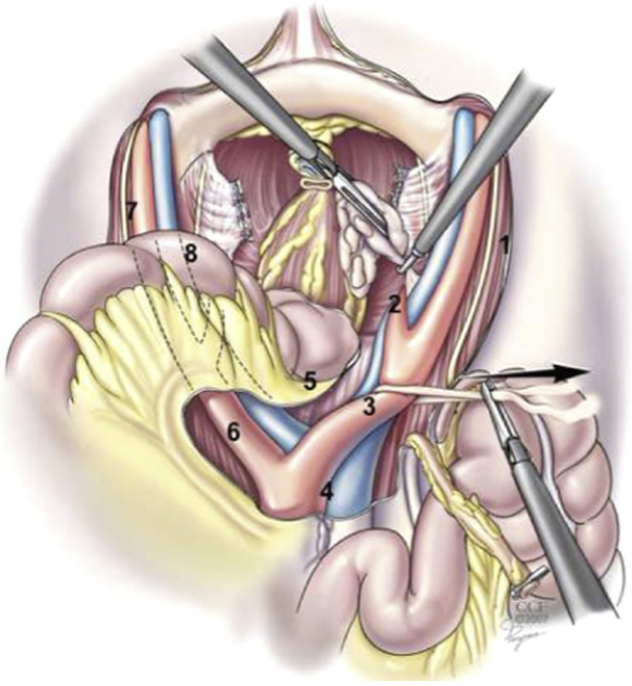

Fig. 2 – Order of high extended pelvic lymph node dissection up to the inferior mesenteric artery: (1) right external iliac, (2) right internal iliac/obturator, (3) right common iliac, (4) preparacaval and preparaaortic, (5) presacral (PS), (6) left common iliac, (7) left external iliac, and (8) left internal iliac/obturator.

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