



Fig. 3: Sidewall retroperitoneal anatomy is shown after total lymphadenectomy.

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nodes, and bipolar and unipolar forceps are used to achieve hemostasis and to clear the lymphatic channels (Fig. 3).

This is the same process we follow during conventional laparoscopic lymphadenectomy, except that the conventional laparoscopic approach can be done using ultrasonic shears, which are multifunctional and may lower the risk for tissue damage. With the current da Vinci system, we are limited to using electrosurgery instrumentation for coagulation and cutting, but we have found that these instruments are more than adequate.

Para-Aortic Lymphadenectomy

For para-aortic lymphadenectomies in which node dissection will extend up to the inferior mesenteric artery, the trocar positioning is the same as for pelvic lymphadenectomy.

If node dissection above the inferior mesenteric artery is planned, however, trocar placement must be modified, with the camera port placed approximately 5-8 cm above the umbilicus and the other trocars adjusted accordingly, based on the different camera port placement (Fig. 4).

The peritoneum is incised over the right common iliac artery, and the incision is ex-



Fig. 5: The para-aortic node below the inferior mesenteric artery is removed.

tended cephalad over the inferior vena cava and lower abdominal aorta to the level of the duodenum, above the inferior mesenteric artery. The right ureter should be identified first, with the retroperitoneal space gradually developed toward the left side, and the left ureter then identified (Fig. 5).

The assistant port or the fourth arm of the robot is used to retract the ureter or the bowel laterally. The lymph adenectomy starts from below and gradually extends upward toward the insertion of the ovarian vein to the vena cava on the right side and the renal vein on the left side.

The nodes are removed using the same technique as for pelvic lymphadenectomy, with bipolar forceps used as a grasping forceps and for coagulation of the small



Fig. 6: Lymph nodes from the vena cava, and around the inferior mesenteric artery have been removed.

blood vessels and unipolar forceps used for cutting and achieving hemostasis for these vessels (Fig. 6).

Final Steps, Outcomes

In patients also undergoing a hysterectomy, lymphadenectomy can be performed before or after the hysterectomy, depending on the indication.

Lymph nodes dissected with the robotic approach can be stored and removed in a laparoscopic bag that is introduced through the assistant's port. In patients undergoing a hysterectomy, the bag can be stored in the abdomen during the procedure and then removed through the vagina afterward.

After we complete lymphadenectomy, the pelvic cavity is thoroughly irrigated, Sefrafilm slurry is applied to prevent adhesions, and all trocar sites are routinely closed. Closing all ports, even the 8-mm sites, is important since a small bowel trocar-site herniation has been reported. We also inject Marcaine in all trocar sites. Depending on the patient's condition, she can be discharged on the same day or after 1 or 2 days.

Gynecologic surgeons have developed various techniques for robotic-assisted laparoscopic lymphadenectomy that

include different placement of the trocar sites. We have been performing robotic lymphadenectomy and radical hysterectomy since 2003 and have modified our technique to be as feasible and reproducible as possible.

We recently compared the experiences of 43 women with early cervical cancer who were treated with either robotic radical hysterectomy with pelvic lymphadenectomy or laparoscopic radical hysterectomy with pelvic lymphadenectomy.

The treatments—using either conventional laparoscopy or robotic-assisted laparoscopy—were equivalent with respect to operative time, blood loss, hospital stay, and oncologic outcome. The mean pelvic lymph node count was similar in the two groups (JLS 2008;12:227-37).

While this analysis did not include cases involving open radical hysterectomy and lymphadenectomy, we know from other series and reports that the number of resected lymph nodes increases with a laparoscopic approach, whether or not it is robotically performed.

In studies in our fellowship training program, moreover, we have found that fellows who have less experience with laparoscopic surgery than attendings achieved the same number of lymph node retrievals as the attendings through either conventional laparoscopic or robotic lymphadenectomy. Such ease and reproducibility portends well for the future of robotic technology in gynecologic oncology.

Some of the major advantages of robotic-assisted surgery are that it provides 3-D views, allows intuitive motions, and involves less operator fatigue. In addition, tremor filtration facilitates more precise movements. It entails a shorter learning curve than does conventional laparoscopy. Robotic-assisted surgery has also paved a pathway to telesurgery and telementoring. This may expand the availability of advanced minimally invasive surgeries throughout the globe.

Dr. Nezhat had no financial conflicts of interest to disclose. ■

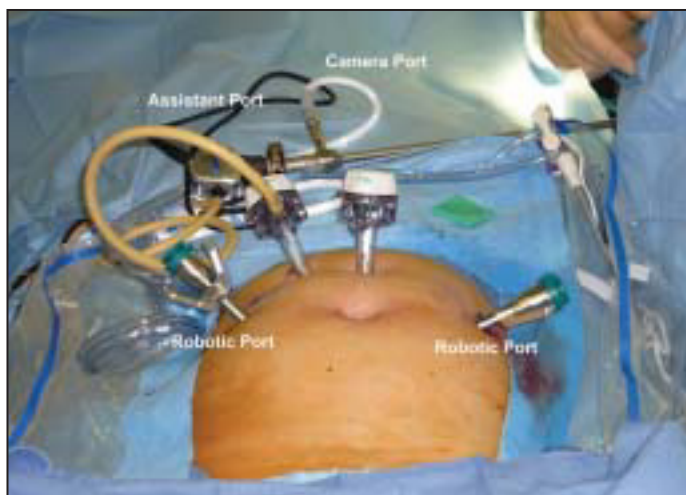


Fig. 4: Trocar sites for para-aortic lymphadenectomy up to renal vein: Camera port is about 5-8 cm above the umbilicus.

Laparoscopic Surgeons' Work-Related Symptoms on the Rise

BY ROBERT FINN
San Francisco Bureau

SAN FRANCISCO — Nearly 9 out of 10 laparoscopic surgeons said they experienced physical discomfort or symptoms related to performing surgery, according to the results of an online survey.

Feedback from 317 laparoscopic surgeons in North America and Europe who responded to the anonymous survey showed a marked increase in symptoms, compared with a 1999 study, Dr. Adrian Park said at the annual clinical congress of the American College of Surgeons.

According to that study, 8%-12% of laparoscopic surgeons reported pain or numbness and 9%-18% reported stiffness in the neck, shoulder, arm, or wrist (Surg. Endosc. 1999;13:466-8). In contrast, 42% of 2008 survey respondents reported neck stiffness. Other common complaints were numbness in the left and right hands (28% and 32%, respectively); stiffness and pain in the back (31% and 36%, respectively); and fatigue in the eyes (27%), neck (23%), left arm (24%), right arm (33%), and back (26%).

"If we were subjected to any of the kinds of worksite inspections that manufacturing facilities are ... the surgical work space would be shut down," said Dr. Park of the University of Maryland, Baltimore. "There's no question

that we need to study further the ergonomics of the perioperative environment, and we need absolutely to be [studying] the surgeon-patient and the surgeon-equipment interface. It's a bit of a conjecture, but I would suggest that no less than surgical career longevity may be at risk."

Dr. Park said the response rate was a bit under 30%; the respondents' average age was 44.3 years, and 83% were male. On average they had been in practice for 9.8 years and performed 212 laparoscopic procedures annually.

Surgeons with high caseloads were significantly more likely to report physical symptoms than those with low caseloads. Right-handed surgeons were significantly more likely to report right-hand symptoms than left-hand symptoms (54% vs. 40%). But left-handed and ambidextrous surgeons showed no significant differences in symptoms between hands.

More than 80% of the symptoms occurred during or immediately after a case, but about 15% of surgeons said that their symptoms were persistent. Unfortunately, little work has been done to identify which surgical movements are causing the problems. "Our base knowledge of sur-

gical movement is abysmal. You can have your backhand evaluated, you can have your golf swing evaluated, but we can't tell you what optimal surgical movement is," he said.

Dr. Park highlighted several areas that may be causing problems. Open surgery allows a surgeon to move with about 20 degrees of freedom, but in laparoscopic surgery

there are only 4-6 degrees of freedom. The surgeon has a three-dimensional view in open surgery, but only a two-dimensional view in laparoscopic surgery. Laparoscopic surgeons enjoy less tactile feedback than open surgeons, and laparoscopic instruments provide less force transmission than open instruments. And the "fulcrum effect," which requires the surgeon to

move the instrument handle in the direction opposite from the desired direction of the instrument tip, may play a role.

"I've practiced minimally invasive surgery my entire career. I've already had one wrist operated on, and I'm waiting for the next wrist to be operated on," said Dr. Park.

He disclosed that he has financial relationships with Stryker Endoscopy, Surgique Inc., Apollo Endosurgery Inc., and W.L. Gore & Associates. ■



'I've already had one wrist operated on, and I'm waiting for the next wrist [to be done].'

DR. PARK