Technique and anatomic references in laparoscopic diagnostic pelvic lymphadenectomy


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**Abstract**

Background: Urologic neoplasias can be correctly staged through pelvic lymphadenectomy and this procedure is useful for making therapeutic decisions.

Aims: To describe and standardize the technique of laparoscopic pelvic lymphadenectomy.

Methods: A 73-year-old man presented with a stage T1b Nx M0 prostate tumor with a Gleason score of 6 (3+3) and a bladder tumor (urothelial neoplasia of potentially low malignancy). A contrast-enhanced computed tomography urography showed a 1 cm right internal iliac lymph node. Laparoscopic pelvic lymphadenectomy was performed to histopathologically determine the lymph node origin.

Results: Surgery lasted 129 minutes, 4 left and 7 right lymph nodes were resected, the drain was removed on the fourth day, and the patient was released on the fifth day. The histopathologic report was negative.

Discussion: The rate of positive lymph nodes reported for pelvic lymphadenectomy varies from 3.2 to 26.2%, depending on the population studied. The technique should be standardized in the uro-oncologic centers in order to have comparative and reliable results. It is a minimally invasive, safe, and effective treatment for tumor staging.

Conclusions: The description and standardization of the surgical technique makes it reproducible in the hospital environment for physicians that do not have enough experience, offering a step-by-step guide with anatomic references explained in this article.
Introduction

Prostate cancer has surpassed other malignant tumors as the main cancer in men. Since the advent of the era of prostate-specific antigen (PSA) the finding of lymph node metastases in surgical candidates with prostate cancer has diminished significantly. The majority of the data are reported in relation to a dissection template in the obturator fossa. The dissection of pelvic lymph nodes (lymphadenectomy) is the most precise staging procedure for lymph node invasion (LNI) in clinically localized prostate cancer. Since laparoscopic pelvic lymphadenectomy was established as a staging procedure in prostate cancer patients, its indications have been broadened to include staging of cancers of the bladder, penis, and urethra. Unfortunately, imaging studies such as computed tomography (CT) and standard magnetic resonance (MRI) have a very limited capacity for predicting tumor activity in lymph nodes. Laparoscopic pelvic lymphadenectomy has been thoroughly described in international journals. We will describe the laparoscopic technique used at the Hospital Central Militar for the purpose of standardizing it so that this approach can be conventionally adopted. This article offers a detailed step-by-step surgical approach for this procedure.

Methods

A 73-year-old man presented with the associated comorbidity of high blood pressure that was adequately controlled. He was studied due to lower urinary tract symptomatology and underwent transurethral resection of the prostate (TURP). The histopathologic study reported prostate adenocarcinoma with a Gleason score of 6 (3+3) in more than 5% of the resected tissue and the CaP was staged as T1bN0M0. During the resection, a monofocal bladder tumor of 1 cm was observed and separately resected. The histopathologic study reported a stage T1NxMx urothelial neoplasia with a low malignancy potential. Extension studies with CT-urography only revealed a contrast-enhanced 1 cm right internal iliac lymph node. A bone scintigram was negative for bone metastases and it was decided to carry out a diagnostic pelvic lymphadenectomy to determine the lymph node origin (secondary to prostate or bladder neoplasia) in order to provide definitive management of both known primary tumors.

Description of the technique

The abdominal wall was insufflated. The open or Hasson technique was used to place the initial trocar. The Hasson system consists of a trumpet valve with a conic sleeve and a blunt-tipped obturator. A 2 cm incision was made in the skin at the umbilical level, the pre-peritoneal fat was retracted and the fascia was incised. The peritoneum was lifted with a pair of Kelly forceps and incised with a cold knife. The peritoneal cavity was thus accessed and the trocar was inserted, attaching it to the fascia. Hemoperitoneum was established through the Hasson trocar and the complete abdominal cavity was visualized with the aid of a 30° laparoscopic lens.
Five trocars were placed under direct vision with the help of the laparoscopic video camera. A 10 mm trocar was placed at the umbilical level for laparoscopic camera access. A second trocar was placed on the left side and a third trocar on the right side at the umbilical level lateral to the inferior epigastric vessels, and aligned with the anterior superior iliac crest. Two additional trocars were placed laterally, midway between the umbilicus and the pubic symphysis. Dissection was begun on the side where there was greater suspicion of malignant lymph node disease.

The operating table was in the 25°-30° Trendelenburg position to allow the intestinal structures to descend in the direction of the diaphragm and distance them from the operating field.

The umbilical ligament, the iliac vessels, the internal inguinal ring, the vas deferens, and the spermatic cord structures were identified (fig. 1).

The incision line on the peritoneum was determined through these anatomic references. With the testis prepared inside the operating field, the surgeon could apply traction to the testis on the side of the dissection in order to identify the spermatic cord structures as they enter the internal inguinal ring.

Laparoscopic scissors were used to expose the external iliac artery and vein and a curved grasper was used to carry out traction and countertraction. The incision was made precisely medial to the umbilical ligament from the pubic bone toward the common iliac artery (fig. 2).

The vas deferens was exposed during the dissection of the peritoneum and was isolated, tied, and cut with laparoscopic clips. The external iliac vein and artery were carefully dissected; the dissection limits were the same as in open surgery. The artery was circumflexed inferiorly, the internal iliac artery superiorly, the internal iliac vein externally, and the obturator nerve medially. Lateral dissection was begun with the identification of the external iliac vein, recognized through the pulsation coming from the external iliac artery. The fatty tissue inferior to the arterial pulsation was lifted and the vein was exposed through gentle blunt dissection in a cephalad and caudal direction.

The lax connective tissue and the lymphatic tissue were lifted above the vein and dissection extended from the level of the common iliac vein bifurcation toward the pubic bone and then medially until the internal obturator muscle was seen.

The lymphatic tissue was dissected from the lateral surface of the pelvic wall with a combination of blunt and cutting dissection (fig. 3). The assisting surgeon medially lifted the lymph node package to facilitate the dissection of the pelvic wall. The accessory blood vessels were clipped and cut.

Once the lateral portion of the dissection was complete, attention was directed to the lymph node package near the umbilical ligament and the bladder wall. The assistant medially retracted the lymph node tissue in order to expose, through blunt dissection, the plane between the umbilical ligament and the nodular package. After isolating and defining the lateral and medial limits, the apex of the lymph node package near the pubic bone was clipped and divided. The cephalad retraction of the distal portion of the nodal package provided a clear view of the obturator nerve.

The remainder of the lymphadenectomy involved the cephalad retraction of the nodal package and blunt dissection of the deep portion, moving away from the pelvic wall. The obturator nerve should always be kept in sight to avoid injuring it.

The contralateral lymphadenectomy was performed with the same technique.

The resected tissue was extracted through a 10-12 mm port, preventing its loss by removing it through an extraction bag. A Blake drain was placed close to the surgical site.

**Results**

The total surgery duration of the laparoscopic bilateral pelvic lymphadenectomy was 129 minutes, having
The patient presented with a serosanguineous discharge through the drain that progressively diminished until the drain was removed on the fourth postoperative day. The patient was released with no drain on the fifth postoperative day. The histopathologic report was negative for malignancy and there was no evidence of tumor activity at the obturator fossa level. The patient was offered radical prostatectomy as cancer management, but he chose radiotherapy management instead. The bladder cancer is presently being managed with intravesical BCG and surveillance, with follow-up control cystoscopies.

**Discussion**

Pelvic lymphadenectomy continues to be a controversial theme for evaluating its indications, the extension of anatomic templates, and its possible therapeutic value. Some studies have demonstrated metastatic lymph node activity in prostate cancer in lymph nodes of the obturator fossa. Comparative studies between limited vs. extended pelvic dissection should be conducted to document the under or overstaging of prostate cancer.

The positive lymph node rate reported for open pelvic lymphadenectomy varies from 3.2% to 26.2%, depending on the population studied.

In the present case, laparoscopic pelvic lymphadenectomy had a negative histopathologic report in relation to neoplastic activity of known primary site origin. A study with a larger number of patients should be carried out in order to obtain results that are comparable to those reported in the international literature.

**Conclusions**

Standardization of the laparoscopic pelvic lymphadenectomy technique will facilitate this surgical approach in future patients, as well as have a beneficial effect on oncologic staging results for prostatic and/or vesical neoplasias, with better and more reliable histopathologic results.

The transperitoneal approach provides adequate exposure of the anatomic structures.

A standardized approach was described for performing laparoscopic pelvic lymphadenectomy for prostatic and/or vesical neoplasias.

The description and standardization of the surgical technique makes it reproducible in the hospital environment for physicians with insufficient experience, offering a step-by-step guide with anatomic references explained in this article.

**Conflict of interest**

The authors declare that there is no conflict of interest.

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**References**

