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Video Article

Pelvic Lymphadenectomy; Step-By-Step Surgical Education Video

İlker et al. Pelvic Lymphadenectomy

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Abstract

Pelvic lymph node dissection is one of the leading surgical procedures in gynecologic oncology practice. Learning the proper technique with anatomical landmarks will improve the surgical skills and confidence. This video demonstrates a right side systematic pelvic lymphadenectomy in a cadaveric model.

Keywords: lymph node, anatomy, gynecologic oncology, lymphadenectomy, surgery

Introduction

Pelvic lymphadenectomy is a supplementary part of staging and treatment in gynecologic oncology. Additionally, it influences the prognosis and guides the adjuvant treatment. The role of lymphadenectomy in ovarian cancer is controversial, in endometrial cancer high risk patient groups deserve lymphadenectomy and in cervical cancer lymphadenectomy is a complementary part of surgical treatment. Lymphadenectomy could be performed in a selective or systematic approach. This video demonstrates a right side systematic pelvic lymphadenectomy in a cadaveric model.

Pelvic lymphatic drainage

Drainage from the lymphatics of perineum, lower extremity, lower abdominal wall and pelvic viscera (except sigmoid colon) is to the pelvic wall lymph chain. Upper paracervical (supraureteral paracervical) and lower paracervical (infraureteral paracervical) pathways are the basic routes of pelvic lymphatic drainage(1). Additionally, a lymphatic branch from the ovary runs downward from the utero-ovarian ligament and follows ovarian-uterine artery branch, consequently drained via the upper paracervical pathway(2).

Pelvic lymph nodes mainly include the external iliac, internal iliac and obturator lymph nodes which are below the bifurcation of common iliac artery. The lymphatic tissues lay on the external iliac vessels anteriorly and medially, over the internal iliac vessels, at the interiliac junction, and over the obturator nerve; by the way to achieve a complete (systematic) pelvic lymphadenectomy these lymph nodes should be removed(3). The borders of pelvic lymph nodes are genitofemoral nerve laterally, bifurcation of common iliac artery cranially, deep circumflex iliac vein caudally, obturator nerve inferiorly and obliterated umbilical artery medially(4).

Sacral lymph nodes are generally not encountered in pelvic lymph node group and dissection of it is not a routine part of pelvic lymphadenectomy. Sentinel lymph node mapping studies also showed that sentinel lymph nodes are rarely detected in the presacral area(5), however if there is a bulky lymph node it should be dissected.

Surgical technique

In order to achieve a successful pelvic lymphadenectomy; firstly a good anatomic exposure should be maintained to visualize all the surgical field (Figure 1), secondly lymph nodes over the external and internal iliac vessels are dissected then obturator lymph nodes are removed.

After exploring the abdomino-pelvic cavity, uterus is drawn over to the contralateral pelvic side wall, caudo-medially. The lateral parietal peritoneum is incised between the round ligament and infundibulopelvic ligament, so the retroperitoneal space is accessed (transection of the round ligament to access the retroperitoneal area is optional). The incision is enlarged and the peritoneum is cut parallel to the infundibulopelvic ligament. The ureter is identified at the base of the posterior sheet of broad ligament. Pararectal space is developed between the internal iliac artery (lateral) and ureter (medial). Paravesical space is developed between the bladder (medial) and pelvic side wall

(lateral); obliterated umbilical artery divides the paravesical space into two parts and the lateral part points out the obturator fossa. The peritoneal tissue of round ligament where it enters the inguinal canal under the inguinal ligament is pulled upward. The ureter is retracted medially, and the pelvic lymphadenectomy starts over the external iliac artery, below the bifurcation of common iliac artery.

The fibroadipose lymphatic tissue over the external iliac artery is gently elevated and mobilized medially, a tiny dissection is applied to separate the lymphatic tissue from the fibrous sheath. While dissection is carried out longitudinally over the external iliac artery; at the mid-level a cleavage is opened to clear the lymphatic tissue over the external iliac vein until the level of deep circumflex iliac vein which is the caudal border. Therefore, internal iliac lymph nodes are also removed over the anterior part of internal iliac artery. Afterwards, lymph node dissection turns around the superior pubic ramus of pubic bone which forms a part of obturator foramen and pubic vein the connection between the external iliac and obturator vein (corona mortis) is identified. By the way, dissection of obturator lymph nodes starts from this point after retraction of external iliac vessels laterally to the psoas muscle and maintaining a medial retraction on the paravesical space (that retracts the obliterated umbilical artery medially) (Figure 2). All the lymphatic tissue over the obturator nerve medial to the obliterated umbilical artery is stripped from the attachments and finally the lymphatic tissue is removed.

Additionally, if there is a bulky or huge lymph node over the external iliac vessels and extending to the psoas muscle; the external iliac vessels are separated from the psoas muscle by sharp and blunt dissection so the medial part of psoas muscle and obturator internus muscle could be exposed (Figure 3). This maneuver also provides an access to the obturator fossa and obturator nerve could easily be noticed by applying a gentle traction on the obturator lymph nodes. (3, 4, 6).

Probable surgical complications

- Bleeding
External iliac vessels, internal iliac vessels, obturator vessels, or pubic vein or artery (corona mortis)
- Nerve injury
Genitofemoral nerve, obturator nerve
- Ureter injury
- Lymphorrhea
- Lymphoedema

Tips and tricks for pelvic lymphadenectomy

- Starting lymph node dissection over the anterior surface of external iliac artery is a safe method in creating the right cleavage.
- If there is a bulky lymph node at the obturator fossa and lying under the obturator nerve, care should be taken during stripping the attachments under the obturator nerve. There is an extensive venous vascular bed and collateral circulation of internal iliac vein that make the control of bleeding difficult(7).
- If corona mortis is formed by a pubic vein (most frequent type), the bleeding could easily be controlled(8).
- Obturator nerve injuries are rare, however end-to-end anastomosis could be performed or nerve grafts may be applied(9).
- The ureter injuries will be managed due to the region of injury; double-J-stent or end-to-end anastomosis are the options.
- Distal part of external iliac or obturator lymph nodes over the deep circumflex iliac and pubic vein could be clipped or sutured to prevent lymphorrhea(4).
- Any self-retaining retractor may provide an adequate gross exposure, however caudomedial retraction from the paravesical space by a deaver retractor and lateral retraction of external iliac vessels by a vessel retractor are critical points.
- Monopolar or bipolar cautery or a Metzenbaum scissor will be used in dissection. Additionally, any other vessel sealing device could be used according to the preferences of the surgeon.

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Figure 1: Pelvic anatomy for proper pelvic lymphadenectomy (right pelvic side wall)

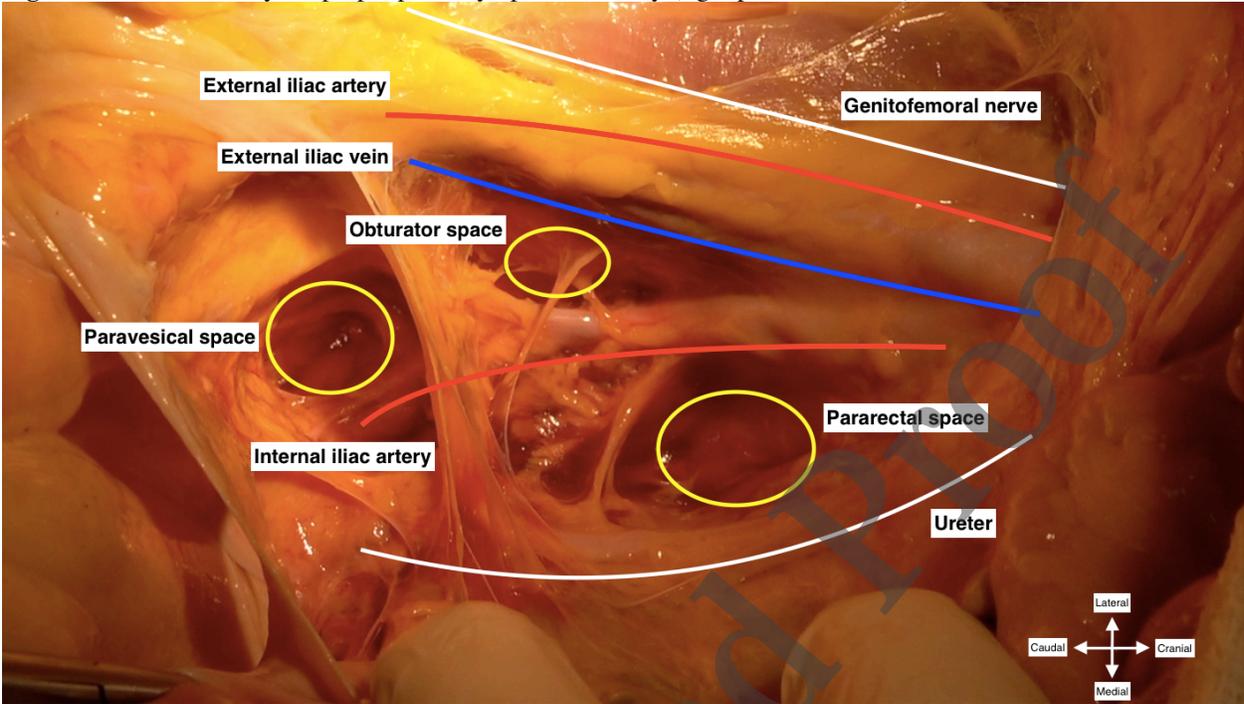


Figure 2: Pubic vein and obturator lymph nodes (right pelvic side wall)

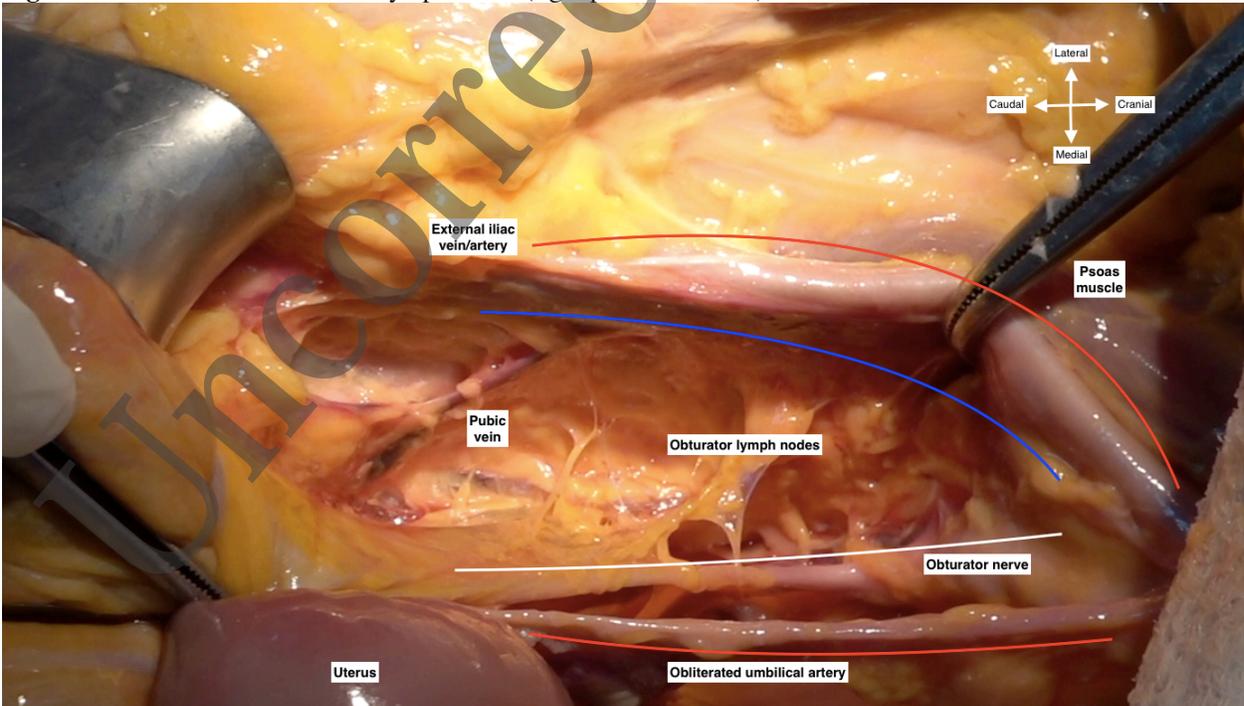
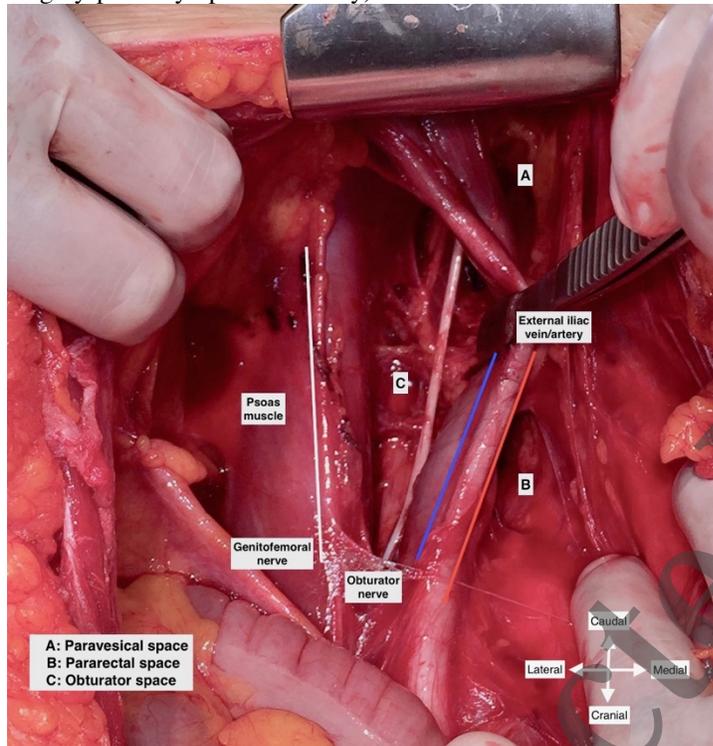


Figure 3: Exposure of obturator space after medial retraction of external iliac vessels (left pelvic side wall/live surgery-pelvic lymphadenectomy)



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