

Video Article

Inguinofemoral Lymphadenectomy and Femoral Dissection: Cadaveric Educational Video

Selçuk et al. Inguinofemoral Lymphadenectomy

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Abstract

Vulvar cancer is rarely seen. The complex inguinofemoral anatomy and the limited number of surgical procedures per year by per gynecologic oncologist decrease the competency level. This step by step cadaveric educational video was recorded to understand the anatomy and technique of inguinofemoral lymphadenectomy.

Key words: Inguinofemoral, lymphadenectomy, vulvar cancer, dissection, groin

Introduction

Since vulvar cancer is a rarely seen gynecological malignancy, every year a limited number of surgeries are performed by per gynecologic oncologist. Zee et al.(1) suggested that at least 5 to 10 patients should be managed per year by per surgeon to ensure the competency level. Additionally, sentinel lymph node approach is producing a less radical surgical concept that restricts the number of cases with full inguinofemoral lymphadenectomy. Current situation motivated gynecological oncology fellows and young surgeons to fulfill the learning curve or gain practice by cadaveric dissections. This cadaveric surgical education video demonstrates the technique of inguinofemoral lymph node dissection step by step.

Materials and methods

This cadaveric educational dissection video was recorded at Hacettepe University Faculty of Medicine, Department of Anatomy. One limitation of this study is that a fresh frozen cadaver has not been used. However, the video was recorded in a step by step technique and one strongest point this study proves is that whether the cadaver is fresh frozen or not, if they are used properly they can be very beneficial in medical and post-graduate education.

Inguinal anatomy

Groin is the anatomical region between the anterolateral abdominal wall and lower extremity. Inguinal ligament which is the cornerstone of Femoral (Scarpa's) triangle constitutes the base of it, and lies between the anterior superior iliac spine and pubic tubercle. Inguinal ligament is formed by the aponeurosis of the external iliac muscle. Under the skin the superficial fascia is noticed and it is composed of the fatty superficial layer (Camper's fascia) and the deeper membranous layer (Scarpa's fascia). Superficial vessels which supply the lateral, middle and medial site are superficial circumflex iliac, superficial epigastric and superficial external pudendal vessels, respectively. Scarpa's fascia fuses with the fascia lata which is the deep fascia of the thigh. Under the fascia lata the femoral vessels and nerve could be dissected. They lie as nerve-artery-vein-lymphatics (NAVL) from lateral to medial and the femoral vessels are covered by the femoral sheath which is the continuation of transversalis and iliac fascia below the inguinal ligament. Additionally, femoral triangle is detected under the fascia lata, lateral border is sartorius muscle and medial border is adductor longus muscle. Fossa ovalis is approximately 3cm inferolateral to the pubic tubercle and it is an opening area at the fascia lata where the great saphenous vein enters to the femoral vein. This part is covered by a thin, multi-perforated fascia called fascia cribrosa, many lymphatics and venous structures pass along there (Figure 1)(2, 3)

Inguinal lymph nodes

The inguinal lymph nodes are categorized into superficial and deep group which are separated by the fascia lata. The superficial lymph nodes are located under the Scarpa's fascia and divided into five groups depending on the termination point of great saphenous vein; superomedial, superolateral, inferomedial, inferolateral and central(4). Deep inguinal lymph nodes are located beneath the fascia lata medial to the femoral vein(5). The lymph node which is found at the femoral canal anterosuperior to femoral vein is Cloquet's node, the connection between the deep inguinal and iliac/obturator lymph nodes(6).

Surgical procedure

The surgical procedure is performed in low lithotomy position. Between the anterior superior iliac spine and pubic tubercle the skin incision is performed, 8cm in length, and 2cm below and parallel to the inguinal ligament. After the incision, dissection deepens to identify the Camper's fascia over the Scarpa's fascia. Identification and preservation of the Camper's fascia is critical in securing the skin flap and preventing skin necrosis. To dissect the fibrofatty tissue containing the superficial inguinal lymph nodes between the Camper's fascia and fascia lata; firstly, the fibrofatty tissue is mobilized under the Scarpa's fascia and dissected 2cm cephalad to the inguinal ligament where the aponeurosis of external iliac muscle is seen. Afterwards, excision of the lymphatic and fibrofatty tissue is performed from lateral (superficial circumflex iliac vein) to medial (superficial external pudendal vein) and superior to inferior (inferomedial end of inguinal ligament where it intersects with the adductor longus muscle).

The fossa ovalis is encountered after resection of superficial inguinal lymph nodes (Figure 2). Medial to the falciform edge of fossa ovalis, dissection of the cribriform fascia will lead to the deep inguinal lymph nodes which are located medial to the femoral vein. Great saphenous vein enters the femoral vein from the opening of fossa ovalis, so a careful dissection is needed while removing the cribriform fascia. Lymphadenectomy is performed towards the apex of femoral triangle, and there is no need to dissect the femoral sheath to excise the deep inguinal nodes

completely. Finally, Cloquet's lymph node which is the most superior of deep inguinal nodes could be resected from the femoral canal under the level of inguinal ligament(7).

Complications

Hematoma, seroma, wound breakdown, wound infection and lymphedema are the probable complications after inguinofemoral lymphadenectomy. The most serious complication is lymphedema and great saphenous vein should be secured during dissection to decrease the risk of lymphedema(8).

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H. Akdemir Aktas (HAA): Data collection, dissection
B. Ersak (BE): Data collection
I. Tatar (IT): manuscript writing
Mustafa F. Sargon (MFS): Dissection mentorship, anatomy mentorship
T. Gungor (TG): Manuscript mentorship

References

1. Van der Zee AG, Oonk MH, De Hullu JA, Ansink AC, Vergote I, Verheijen RH, et al. Sentinel node dissection is safe in the treatment of early-stage vulvar cancer. *J Clin Oncol.* 2008;26(6):884-9.
2. Detton AJ. *Grant's Dissector.* 16th ed. Philadelphia, United States: Lippincott Williams and Wilkins; 2016.
3. Netter F. Pelvis and Perineum. In: H. NF, editor. *Atlas of Human Anatomy.* 7th Edition. Philadelphia: Elsevier; 2019. p. Plate 389.
4. Rouviere H. *Anatomy of the Human Lymphatic System.* : Ann Arbor, MI: Edwards Brothers Inc; 1938.
5. Cesmebasi A, Baker A, Du Plessis M, Matusz P, Shane Tubbs R, Loukas M. The surgical anatomy of the inguinal lymphatics. *Am Surg.* 2015;81(4):365-9.
6. Selman TJ, Luesley DM, Acheson N, Khan KS, Mann CH. A systematic review of the accuracy of diagnostic tests for inguinal lymph node status in vulvar cancer. *Gynecol Oncol.* 2005;99(1):206-14.
7. Bristow RE. Inguinal lymphadenectomy. In: Geoffrey W. Cundiff RA, Robert E. Bristow, editor. *Te Linde's Atlas of Gynecologic Surgery.* 1st ed: Lippincott Williams & Wilkins; 2014. p. 125-33.
8. Zhang SH, Sood AK, Sorosky JI, Anderson B, Buller RE. Preservation of the saphenous vein during inguinal lymphadenectomy decreases morbidity in patients with carcinoma of the vulva. *Cancer.* 2000;89(7):1520-5.

Figure Legends

Figure 1: Inguinal anatomy with regard to superficial and deep inguinal lymph nodes (The figure was illustrated from the book ‘Atlas of Human Anatomy, Pelvis and Perineum, Plate 389, 7th Edition, 2019 Elsevier, Netter Frank H.’ by Sedef Yasin.

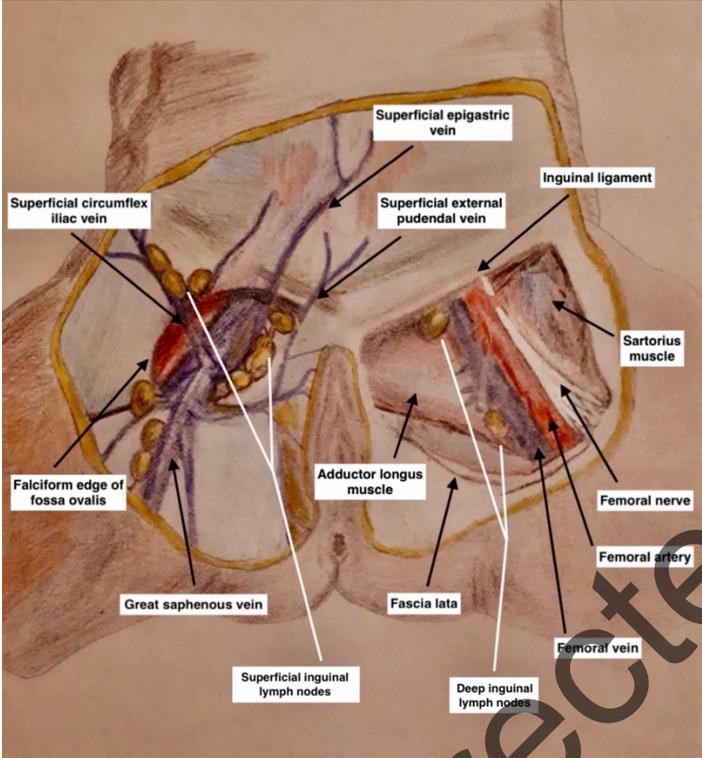


Figure 2: Cribriform fascia over the fossa ovalis, and fascia lata after superficial inguinal lymphadenectomy.

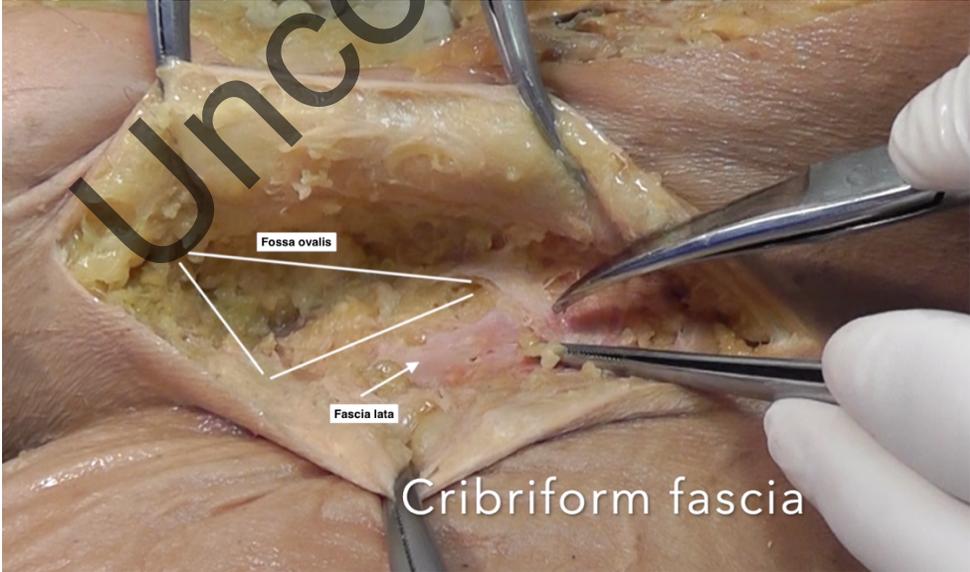
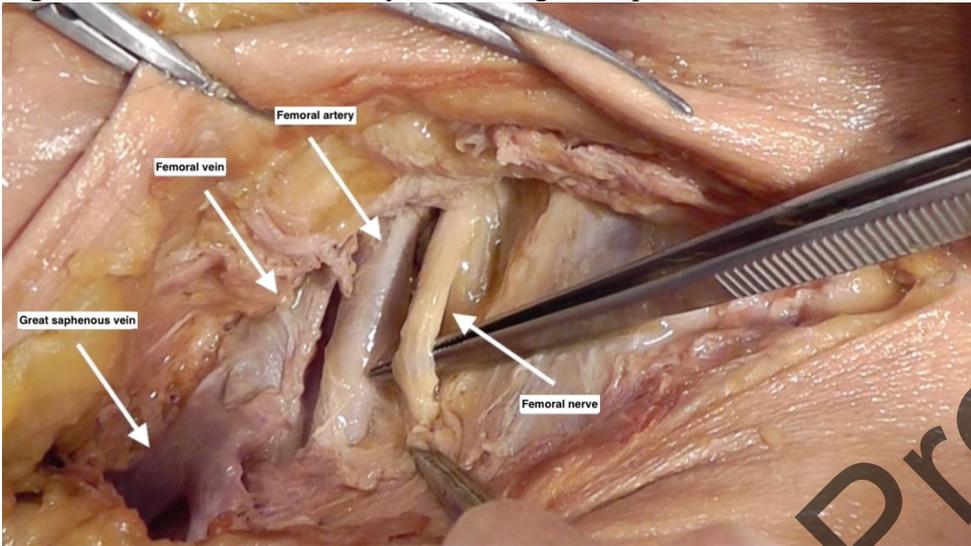


Figure 3: Femoral nerve, artery, vein and great saphenous vein after dissection of femoral sheath.



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