VEIL Surgical Steps

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Abstract Inguinal lymphadenectomy remains the standard of care for metastatic nodal disease in cases of penile, urethral, vulval and vaginal cancers. Outcomes, including cure rates and overall and progression-free survivals, have progressively improved in these diseases with extending criteria to offer inguinal lymph node dissection for patients ‘at-risk’ for metastasis or loco-regional recurrence. Hence, despite declining incidence of advanced stages of these cancers, many patients will still need to undergo lymphadenectomy for optimal oncological outcomes. Inguinal node dissection is a morbid procedure with operative morbidity noted in almost two third of the patients. Video endoscopic inguinal lymphadenectomy (VEIL) was described and currently practiced with proven equivalent oncological outcomes. We describe our technique of VEIL using laparoscopic and robotic access as well as various new surgical strategies.

Keywords Videoendoscopic Inguinal Lymphadenectomy · VEIL · Penile Cancer · Inguinal Lymph node dissection in Penile Cancer · Endoscopic Inguinal Lymph node dissection · Minimal Access Inguinal Lymph node dissection

Anaesthesia

Video endoscopic inguinal lymphadenectomy (VEIL) can be done with spinal, epidural or general anaesthesia. If bilateral VEIL is being planned, then epidural and/or GA is a good

option as it takes more operative time compared to unilateral VEIL.

Position of the Patient, Surgeon and Monitor

Patient is placed in supine position with the thigh abducted and externally rotated for 30° at the hip joint. Sequential pneumatic compression device is applied to the legs to prevent deep-vein thrombosis. Surface marking of the femoral triangle is made for better orientation and to limit the dissection to the femoral triangle.

Port Placement

Camera port site—1- to 1.5-cm incision is made deep to the Scarpa’s fascia, 2 cm caudal to the apex of the femoral triangle. Subscarpa’s plane is created either by sharp dissection with scissors or bluntly by inserting the index finger, medially and laterally and towards the inguinal ligament to create adequate space for insertion of secondary ports at 5–6 cm medially and laterally at the level of the apex of the femoral triangle. Five and ten-millimeter ports are placed under the guidance of a finger placed inside the dissected plane for the use of grasper and clip applicator or harmonic scalpel, respectively; right-hand secondary port should be of 10 mm and left-hand port is of 5 mm for right-handed surgeon for the ease of applying clips. Ten-millimeter camera port is inserted at the end and fixed to the skin. Balloon port is preferred at camera port site as it will prevent leakage of carbon dioxide and can be pulled outside during early part of dissection for better visualization, as the space is less. All the ports are fixed to the skin to prevent from slipping out.

Surgeon stands lateral to the patient’s ipsilateral leg and monitor placed contralaterally at the level of the waist. Carbon dioxide pressure is kept initially to 15–16 cm of water to assist in

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dissection. Harmonic scalpel is useful in creating the subscarpa's plane by piercing the fat mechanically to create the right plane after identifying the glistening white Scarpa's fascia. Surface marking helps in identifying the boundaries of dissection and will give good orientation of site of dissection. Once the subscarpa's plane is dissected up to the level of the inguinal ligament, the external oblique aponeurosis is seen. Dissect laterally and medially to the boundaries of the femoral triangle that completes the dissection of skin flap. Carbon dioxide pressure has to be reduced to 5–6 cm of H₂O to prevent development of subcutaneous emphysema of the abdomen and sometimes chest, which is not of a concern, as it absorbs eventually in less than a day. The superficial nodes are seen towards the floor. Small venous tributaries encountered may be divided using harmonic scalpel using coagulation mode.

Dissection of deep fascia started at the apex of the femoral triangle. Carefully divide the fat and identify the deep fascia and cut using coagulation mode to effectively coagulate the maximum density of lymphatics which travel at this site. Identify the saphenous vein 2–3 cm medial to the apex of the femoral triangle and preserve it, if indicated. All the fibro fatty lympho areolar tissue with deep fascia is divided along the lateral and medial border of the triangle. Right direction of dissection is confirmed by palpating the harmonic scalpel tip corresponding to the surface marking over the skin. Laterally, sartorius muscle fibers and medially adductor longus muscle fibers will be seen. Divide the lympho areolar tissue and deep fascia from the underneath muscle fibers. The femoral artery is usually located 2–3 cm cephaloid to the apex of the femoral triangle. Deep fascia covering the femoral vessels is to be divided to see the lymphatics running parallel to the artery and vein. Dividing these lymphatics could increase the post-operative lymphorrhea and lymphedema. Femoral nerve seen lateral to the artery is identified and preserved. Once the sapheno-femoral junction is reached, the saphenous vein is dissected off the fibro fatty lympho areolar tissue to preserve the vein to reduce the risk of lymphedema. Multiple venous tributaries entering the saphenous vein at this junction are divided between clips. Small arterial branches arising from the femoral artery are divided between clips. Once we reach the inguinal ligament medially, the spermatic cord is visualised, which forms the limit of dissection, and specimen is freed now. Hemostasis is achieved and the specimen is removed through the camera port. Incision may be increased if the specimen is bulky, which is expected in obese patients.

Twelve- to fourteen-French sized suction drain is placed through the lateral port. Port sites are closed with subcuticular absorbable sutures. Drain is removed once the output in 24 h reduces to less than 10–20 ml.

Oral feeds are resumed in 6–12 h depending on the type of anaesthesia (Figs. 1 and 2).

Fig. 1 Surface marking of the femoral triangle with sites for port placement and site of the femoral artery

Modifications

Superficial VEIL

This is the first part of the conventional VEIL described above, where the subscarpa's plane is dissected all through the femoral triangle. Instead of cutting the deep fascia, the fibro fatty lympho areolar tissue anterior to the deep fascia is removed, including the lymph nodes at the fossa ovalis. The saphenous vein could be preserved to reduce the morbidity. Superficial VEIL procedure is simple, and the average operative time is 45 to 60 min. Specimen is subjected for frozen section. If the lymph nodes are positive for malignancy, then ileoinguinal lymphadenectomy is performed.

Excision of the Saphenous Vein

Excision of the saphenous vein is done when enlarged lymph nodes are found on clinical examination or on imaging or when the risk of involvement of inguinal nodes by malignancy is high. This is done by dividing the vein between clips at the initial part of dissection medial to the apex of the femoral

Fig. 2 Ports placed for right VEIL with pneumo lifting the dissected skin flap and transillumination of light through the flap

triangle and dividing the vein at its junction with the femoral vein by hemolock clips, so as to remove the segment of the vein traversing the femoral triangle. Occasionally encountered accessory saphenous vein is removed in the same way.

Bilateral VEIL

VEIL is done consecutively, one side after the other side. Technically, it is possible to do bilateral VEIL simultaneously when two complete sets of laparoendoscopic equipments and operating team are available. Simultaneous one side VEIL and contralateral open radical inguinal lymphadenectomy is possible to reduce the operative time and a good strategy when two operating teams are available.

Robotic VEIL

Josephson described the robot-assisted VEIL using the da Vinci system by three ports. There are no differences in the

technical steps. The lateral port is used by robot either for suction or retraction and by assistant for application of clips.

Very few authors have done this. Long-term outcome to claim oncological superiority is not available; however, all the advantages of robotic-assisted procedures like ergonomic position for surgeon, three-dimensional views with depth perception are the advantages. It adds to the cost of the procedure.

Laparoendoscopic Single-Site VEIL

Described by Tobias Machado, laparoendoscopic single-site (LESS) VEIL has the advantage of single incision to reduce the pain and improve the cosmesis. It is technically demanding and needs special instruments used for LESS surgery.