Gynecol Surg (2012) 9:175–178
DOI 10.1007/s10397-011-0704-6

TECHNIQUES AND INSTRUMENTATION

Video endoscopic-assisted inguino-femoral lymphadenectomy (VEIL) in squamous cell invasive vulvar carcinoma: our initial experience

Daniela Huber · Damien Robyr · Nicolas Schneider

Received: 7 July 2011 / Accepted: 16 September 2011 / Published online: 14 October 2011

Abstract Inguinal lymphadenectomy is a part of the surgical treatment of invasive perineal cancers and lower extremities and inferior trunk melanomas. Inguinal node metastasis represents a major prognostic factor; therefore, inguinal lymphadenectomy has a central role in oncological patient management. Nevertheless, inguinal node dissection is associated with significant morbidity such as lymphedema, wound dehiscence, flap necrosis, infection, seroma, femoral hernia, and deep venous thromboembolism. Recently, several publications have reported experiences with video endoscopic-assisted techniques attempting to reduce the high morbidity related to open inguinal lymphadenectomy. The primary results are promising in terms of feasibility, oncological survey and goals, postoperative complications, and esthetic results. We discuss here our initial experience with video endoscopic inguino-femoral lymphadenectomy (VEIL) in a patient with invasive vulvar carcinoma. To our knowledge, this is the first report of a bilateral VEIL in vulvar carcinoma.

Keywords Invasive vulvar carcinoma · Inguinal lymph node dissection · Inguinal lymphadenectomy · Video-assisted surgery · Video-assisted inguino-femoral lymphadenectomy (VEIL) · Minimal invasive surgery

Background

Vulvar carcinomas represent the fourth most common gynecological malignancy, accounting for 4% of all female genital tract cancers [1]. Inguinal nodal metastasis is the essential independent prognostic factor. Predictors of metastasis in inguinal lymph nodes are: histological grade, extent of tumor stromal invasion, capillary-like space involvement with the tumor, clinically suspect regional nodes, and clitoral or perineal location. In pT1 vulvar tumors, the survival rate is reduced from 90% to 55% in cases of nodal metastasis [1]; therefore, the lymphadenectomy has a major role in surgical management with prognostic and potentially therapeutic implications [2, 3]. Traditional single extended incision for bilateral inguinal node dissection and radical vulvectomy has a reported morbidity of up to 76% [4, 5] including infections, flap necrosis, wound dehiscence, chronic lymphedema, lymphocyst formation, femoral hernia, and deep venous thromboembolism [4–9]. The mortality related to classical lymphadenectomy is as much as 3%.

In response to this morbidity, several less invasive surgical techniques were developed: separate incisions for inguinal lymphadenectomy, unilateral inguinal node dissection for lateralized lesions, saphenous vein preservation [9], and sartorius muscle transposition. Superficial lymphadenectomy was also proposed as a less invasive alternative to complete inguinal node dissection in order to diminish local complications. This procedure excludes the inguinal deep nodes located beneath the cribriform fascia and medial to femoral vein (including the Cloquet node). However, excessive nodal recurrences were reported in the literature [10, 11] with this technique.

One of the most interesting approaches to reduce the morbidity of extensive inguinal lymphadenectomy in vulvar cancer is the sentinel lymph node biopsy. This minimally invasive procedure allows selective ablation of the first draining tumor node, thereby permitting a less aggressive inguinal surgery. Published results are promising [12–15].

D. Huber (✉) · D. Robyr · N. Schneider
Obstetrics and Gynecology, CHCV Sion Hospital,
Rue Champsec 80,
Sion 1950, Switzerland
e-mail: ghetudana@gmail.com

In 2008, the GROINSS-V study concluded that the sentinel lymph node procedure in early stage unifocal vulvar cancer reduces morbidity without increasing groin recurrence or compromising overall survival.

The newest minimal invasive procedure—video endoscopic inguino-femoral lymphadenectomy (VEIL)—was developed by Bishoff [16], an oncological urologist who demonstrated its feasibility by dissecting two cadaveric models in 2003. In 2006, Tobias-Machado et al. [17] published an initial case report of video endoscopic inguinal lymphadenectomy compared with a controlateral open radical procedure. VEIL continues to evolve: single site and robotic variants were recently presented [18–20].

Material and method

A 55-year-old postmenopausal female presented with an exophytic and ulcerated mass in both the minor labia and clitoris. A preoperative biopsy suspected a VIN III lesion. The superficial anterior vulvectomy established the diagnosis of invasive vulvar carcinoma, pathological stage pT1b with no carcinomatous lymphangitis. A CT scan infirmed pelvic and inguinal nodes involvement. Video-assisted inguino-femoral lymphadenectomy was scheduled 5 weeks after the vulvectomy.

Preoperative vascular Doppler ultrasound mapping was performed to identify the internal saphenous vein, its accessory vein, and the femoral vessels projection on the femoral triangle. The landmarks of the femoral triangle, the course of femoral vessels, and the saphenous veins were traced with indelible ink before prepping and draping (Fig. 1). This allows the correct placement of trocars outside the perimeter of the femoral triangle and permits the constant survey of the extent of subcutaneous dissection by transillumination during the endoscopic procedure.

The patient was placed in a supine position on a regular table with split movable footrests, which allowed abduction and external rotation of the thighs. The surgeon was positioned between the legs of the patient and the assistant was positioned lateral to the operated groin. The monitor was opposite the patient's shoulder. A Foley catheter was placed in the bladder.

A 15-mm incision was made 2 cm below the vertex of the femoral triangle. After the incision of Camper's fascia, scissors and digital blunt dissection were used to develop a space beneath it. The second and the third 10-mm incisions were placed at 6 cm external and 6 cm internal to the vertex of the femoral triangle. Three 10-mm Hasson trocars were placed in these incisions and fixed to the skin with nonresorbable sutures. A zero-degree laparoscope was inserted through the first trocar. CO_2 insufflation pressure was started at 15 mmHg for 15 min to help the dissection and was subsequently reduced to 5 mmHg during the rest of the procedure.

Fig. 1 The landmarks of the femoral triangle, the course of the femoral vessels and saphenous veins traced with indelible ink before prepping and draping

The retrograde dissection beneath the Camper fascia was continued until clear identification of the inguinal ligament (Fig. 2). Selective electrocoagulations or clip ligations were necessary before division of several saphenous veins and femoral artery branches. Early identification of the internal saphenous vein is needed for a precise and bloodless technique.

The distal lymphatic tissue and saphenous veins were divided at the vertex of the femoral triangle with the Endo GIA Roticulator™ 45-2.5-mm endovascular stapler and a harmonic scalpel. The lymphatic tissue was lifted from the

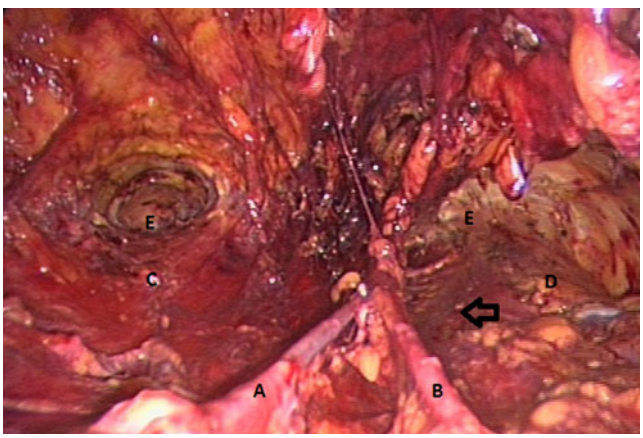

Fig. 2 Retrograde dissection with development of anterior space beneath the Camper fascia. *A* and *B* saphenous veins and their respective accessories; *C* sartorius muscle; *D* adductor longus muscle; *E* inguinal ligament

fascia lata by a combination of blunt and sharp dissection up to the fossa ovalis. The femoral sheet was carefully dissected and opened at the inferior limit of the fossa ovalis. The femoral vessels and the saphenofemoral junction were identified and skeletonized up to the femoral channel. The same Endo GIA endovascular stapler was used to transect the saphenous arch. Inguinal lymphadenectomy was continued medially to the femoral vein to harvest the deep inguinal nodes up to the Cloquet node. At the level of the inguinal ligament, the lymphatic tissue was divided with the harmonic scalpel and completely liberated. The nodal tissue was removed through the lateral 10-mm incision using an endobag. A suction drainage was placed and exteriorized at the lateral port incision.

Findings

The total operative time for the bilateral inguinal lymphadenectomy was 260 min. The estimated blood loss was less than 50 ml on each side. No subcutaneous CO_2 emphysema was observed beyond the upper thighs. Prophylactic 1.5 g intravenous cefuroxime was administered at the anesthetic induction and a second equivalent dose after 180 min. An adapted compression stocking was applied immediately post-intervention. Postoperative pain control was achieved with oral nonsteroidal anti-inflammatory drugs. Early ambulation was encouraged. The inguinal drainage was maintained until the 24-h output was less than 50 ml (seventh postoperative day for both sides). On the right side, acute lymphangitis occurred on the fifth postoperative day and successfully managed by oral antibiotics for 1 week (Fig. 3). The definitive pathological stage was pT1bN0M0 (eight negative nodes on each side).

An external vulvar radiation therapy and a close clinical follow-up were recommended to the patient. The patient was satisfied with both the functional and esthetic results 4 months after the procedure.

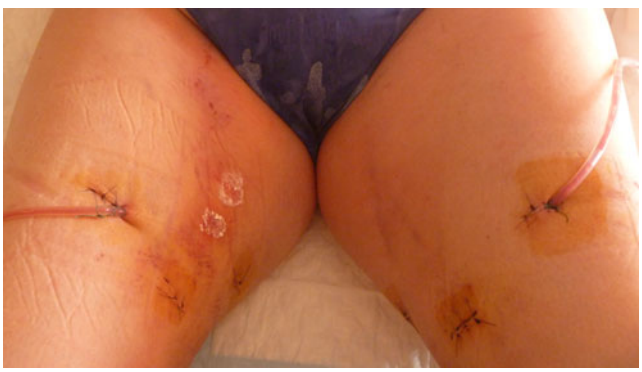

Fig. 3 Postoperative aspect on the fifth day after surgery

Conclusion

The video-assisted approach follows the same main steps as those for the open technique but in a reverse manner as lymphadenectomy is started caudally and continued up to the saphenous arch and the inguinal ligament. Inguinal lymphadenectomy is a challenging surgical procedure with a high complication rate even for skilled surgeons and in the most recent series [9, 21, 22]. This can be related to the devascularization of skin flaps, the disruption of lymphatic afferents, concomitant medical conditions that predispose to poor wound healing, and simultaneous septic operative steps as ablation of a potential necrotic and infected primary tumor. Since the first description of an endoscopic approach by Bishoff in 2003 [16], Tobias-Machado et al. have published a consistent comparison with the open procedure on the same patient [17, 23–26] demonstrating a significant reduced morbidity for the video-assisted approach (70% versus 20%) [23–25]. Other published series have consistently reported fewer skin postoperative events and lymphatic morbidity [27–29].

VEIL appears attractive in current oncological practice. The number of lymph nodes harvested is comparable with open inguinal lymphadenectomy [18, 23, 26, 29, 30] and with the advantage of less subcutaneous flap injuries and attendant complications, shorter hospitalization, and early patient ambulation and recovery [17, 23–26, 29–31]. Our operating time was significantly longer compared to classical surgery, but we believe that standardized surgical procedures, improvements of endoscopic instrumentation, and a dedicated trained surgical team could considerably improve this aspect. Reports indicate that operating time significantly decrease with the learning curve [32]. Our feeling is that the learning curve is not steep for a trained oncologist surgeon with experience in laparoscopic techniques as the main principles of endoscopic surgery apply. In addition there are the advantages of enhanced visualization of anatomical structures and optical magnification.

In 2009, Master et al. developed a modified endoscopic approach permitting completion of a lymphadenectomy even for large or adherent inguinal adenopathy, in cases of previous groin surgery and for obese patients expanding the indications for this minimally invasive technique. Thus, VEIL has the potential to replace open inguinal surgery for a large panel of patients. The middle-term outcome of the initial series seems to fulfill the oncological objectives [25], but extended follow-up is needed for more definitive conclusions and a better patient selection. To our knowledge, this is the first report of a video endoscopic bilateral inguinal lymphadenectomy in a patient with low genital tract malignancy.

Acknowledgments Many thanks go to M.E. Visher for her essential and gracious support in revising the manuscript's English.

Conflicts of interests The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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