Sparing Saphenous Vein During Inguinal Lymphadenectomy in Patients with Vulvar Cancer: A Single Center Experience of 10 Years

Mustafa ÖZAT, Mine KANAT-PEKTAŞ, Tayfun GÜNGÖR, Leyla MOLLAMAHMUTOĞLU

Ankara, TURKEY

OBJECTIVE: The present study aims to investigate the short-and long-term morbidity associated with the preservation of saphenous vein during inguinal lymphadenectomy in patients with vulvar cancer.

STUDY DESIGN: A retrospective analysis was conducted in a total of 108 women who were diagnosed with vulvar cancer. The women undergoing preservation versus ligation of saphenous vein during inguinal lymphadenectomy were compared with respect to recurrence, disease-free survival, short and long term complications.

RESULTS: Saphenous vein was spared in 88 inguinal incisions made in 51 women while saphenous vein was ligated in 101 inguinal incisions made in 57 women. When compared with those undergoing saphenous vein ligation, the short-term and long-term complications were significantly less frequent in women whose saphenous veins were spared (22.5% vs 42.4%, 12.7% vs 35.0% respectively; $p<0.05$). However local and lymphatic recurrence rates were comparable in women undergoing either preservation or ligation of saphenous vein during inguinal lymphadenectomy (19.3% vs 22.2%, 9.8% vs 10.5% respectively; $p>0.05$). The incidence of wound breakdown, local infection and chronic lymphedema were significantly lower in women undergoing saphenous vein preservation (0% vs 25.0%, 1.2% vs 38.3%, 11.6% vs 44.4% respectively; $p<0.05$). The existence of lymphatic involvement was found to be unassociated with the risk of acute or chronic lymphedema.

CONCLUSIONS: The preservation of saphenous vein during inguinal lymphadenectomy reduces the incidence of short-term and long-term complications without affecting the risk of local recurrence. Depending on the experience of the surgeon, the surgical strategy should be individualized and optimized for each patient with vulvar cancer.

Key Words: Complication, Inguinal iymphadenectomy, Saphenous vein, Surgery, Vulvar cancer

Gynecol Obstet Reprod Med;2011;17:160-165

Introduction

Vulvar cancer accounts for approximately 4% of all cancers occurring within the female genital tract.[1] Radical vulvectomy and bilateral inguinal and pelvic lymph node dissection have been standardized as the surgical treatment for vulvar cancer.[2] Yet the original single extended inguinal incision was found to be associated with considerable morbidity due to the devacularization of skin flaps and the interruption of regional lymphatic and vascular systems. Therefore, a number of therapeutic measures have been developed to reduce the operative morbidity. These measures include using separate inguinal incisions, limiting the surgical field, administering preoperative antibiotics and using closed suction drains which result in optimization of the management for patients with vulvar cancer.[2,3]

Despite the remarkable advance in the surgical techniques, wound breakdown, local infection and chronic leg edema remained as a significant postoperative challenge for women with vulvar cancer. Since these women are relatively old, they are more likely to have the co-existing medical conditions which may further exacerbate operative morbidity.[4]

Inguinal lymphadenectomy classically refers to the resection of saphenous vein with the aim of facilitating the procedure.[5] Catalona et al. were the first to propose the preservation of saphenous vein during inguinal lymphadenectomy in order to diminish the postoperative morbidity in patients with penile carcinoma.[6] Although this technique was later adapted for women with vulvar cancer, it has not become a standard and has been replaced by a newer method, namely sentinel lymph node biopsy.[7,8] As expected, many studies have been con-

Department of Gynecologic Oncology Dr. Zekai Tahir Burak Women Health Research and Education Hospital, Ankara

Address of Correspondence: *Mine Kanat Pektas*
Ertugrul Gazi Mah. Kutlugun Sok. No: 37/14 Iccebeci, Ankara
minekanat@hotmail.com

Submitted for Publication: *04. 03. 2011*
Accepted for Publication: *20. 06. 2011*

ducted to determine the efficiency and safety of saphenous vein sparing.[3,4] However direct comparative data are limited and certain studies failed to show any decrease in operative morbidity in relation with the preservation of saphenous vein.[9,10] Therefore the present study aims to report the ten-year-long experience of a single gynecologic oncology cancer with sparing saphenous vein in patients with vulvar cancer.

Material and Method

The present retrospective study was approved by the Institutional Review Board of Dr Zekai Tahir Burak Women Health Research and Education Hospital where the study was conducted. Patients who underwent inguinal lymphadenectomy for vulvar cancer between January 1, 1998 and December 31, 2008 were identified through the database of the gynecological oncology department at the study center. However patients with vulvar adenocarcinoma and sarcoma were excluded as these histological subtypes had different tumor behavior and lymphatic spread than those of vulvar squamous cell carcinoma and melanoma. Thus a total of 108 patients were eligible.

Vulvar cancer was histologically diagnosed in all of the reviewed patients in whom radical resection of vulvar tumor was made at the time of the inguinal lymphadenectomy. Since the study center lacks a nuclear medicine department, complete inguinofemoral lymph node dissection had to be performed instead of sentinel lymph node biopsy. The staging system of the International Federation of Gynecology and Obstetrics (FIGO) was used to specify the spread of the vulvar tumor in each patient. Clinicopathologic information was obtained from both hospital records and outpatient files.

The primary consequence of the present study was determined as the presence or absence of the related complications that consisted of cellulitis, seoma, phlebitis, lymphedema, deep venous thrombosis, pulmonary embolus, hematoma and wound breakdown. These complications were categorized into short-term and long-term groups. Any complication occurring within the first six months of surgery was defined to be short-term while long-term complications referred to any occurrence after six months. No objective criteria were used to describe the severity of lymphedema.

Lymphadenectomy was done as described by Morrow and Curtin.[11] The incisions for the inguinal dissections were always performed separately from those made for the resection of vulvar tumors. No matter saphenous vein was spared or ligated, inguinal dissection was carried out meticulously beneath the level of the superficial inferior epigastric vessels. The boundaries of the inguinal dissection were determined as the aponeurosis of the external oblique muscle superiorly, the adductor longus muscle medially, and the anterior superior iliac spine laterally. In every reviewed patient, hemoclips were used to maintain hemostasis and lymphostasis. The sartorius muscle was not routinely transposed in either study group.

In case of saphenous vein sparing, a 10-12-cm long skin incision was usually made transversely just 2 cm below the inguinal ligament. Unless macroscopically enlarged lymph nodes were fixed to the saphenous vein, the vein was recognized and dissected out. Afterwards both the accessory saphenous and the great saphenous veins were preserved. When the saphenous vein interfered with the dissection of the deep inguinal lymph nodes, it was gently pulled aside by means of a vein retractor.

On the other hand, a longitudinal incision was performed in the inguinal region of women who underwent saphenous vein ligation. Antibiotics were administered preoperatively in all patients who also customarily received closed suction drains postoperatively. The presence of morbidity was based on the documentation of complications which had been noted in the medical records. Objective measurements were not used to define any related complications.

Edema of the lower extremity was distinguished by visualization and palpation. Given the variation in unilateral versus bilateral inguinal dissections, each inguinal region and the ipsilateral leg was considered as a separate entity for evaluating the outcomes of interest.

After being transferred into computerized media, the collected data was evaluated by the Statistical Package for Social Sciences (SPSS version 11.5, SPSS Inc, IL, USA). Statistical analysis was performed by using the Fisher exact test, Pearson chi-square test, and Student t test. A p value of less than 0.05 was accepted to be statistically significant. Confidence intervals for differences in proportions were calculated using asymptotic and exact formulas.

Results

A total of 189 inguinal dissections were performed in 108 women with vulvar cancer. Saphenous vein was spared in 88 inguinal incisions made in 51 women while saphenous vein was ligated in 101 inguinal incisions made in 57 women. The average duration of postoperative follow-up was 66.1±19.4 months (range: 8-120). As shown in table 1, both the saphenous vein-ligated and spared groups had statistically similar demographic features.

Meanwhile no statistically significant difference was detected between the saphenous vein spared and ligated groups with respect to the average number of dissected lymph nodes on the left inguinal region (11.5±2.0 vs 11.8±2.1 respectively, p=0.053). Also the median number of dissected lymph nodes on the right inguinal region were statistically indifferent be-

tween both study groups (10.2±1.6 vs 10.8±1.8, respectively, p=0.505).

Table 2 compares the saphenous vein-ligated and saphenous vein-spared groups with respect to short-term postoperative complications. Hence wound breakdown, acute cellulitis and lymphedema were less likely to occur in the saphenous vein-ligated group. As indicated by table 3, the incidences of chronic cellulitis, lymphedema and leg pain were significantly less in the saphenous vein spared group.

Acute lymphedema occurred in 12 inguinal incisions performed in six patients with lymphatic involvement who had had their saphenous veins spared while it was detected in 20 inguinal incisions made in ten women with lymphatic metastasis who had undergone saphenous vein ligation (p=0.088). Acute lymphedema became chronic in ten inguinal incisions performed in six patients with lymphatic involvement whose saphenous veins had been spared. On the other hand, chronic lymphedema developed in 20 inguinal incisions made in ten women with lymphatic metastasis who had undergone saphenous vein ligation (p=0.054).

Enlisted in table 4 are the operative and postoperative characteristics as were the data related with long term postoperative follow-up period of the reviewed patients in table 5.

Discussion

Vulvar tumors are primarily treated by surgical methods which are closely associated with the size, location and stage of the lesion as well as the age and health status of the patient. The standard surgical approach has been defined as radical vulvectomy with bilateral dissection of inguinal nodes. Since saphenous vein is routinely ligated and resected during inguinal lymphadenectomy, lymphovascular circulation of the leg is interrupted which in turn induces infection and causes problems in wound healing. This may also enhance the development of chronic complications which subsequently influence the life quality of patients.[2,5,12]

In spite of the progressive improvement in surgical techniques, the morbidity associated with inguinal dissection still constitutes a significant problem. Although preoperative administration of antibiotics, operative management of separate groin incisions and postoperative utilization of closed suction drains have provided some benefit, cellulitis, wound breakdown and lymphedema still appear as the related debilitating morbidities. Prior series have reported wound breakdown occurring in 15-25% of patients, cellulitis in 7-28% and chronic lymphedema in 6-65%.[13,14]

Several previous studies investigated the efficiency and safety of saphenous vein sparing in women with vulvar cancer.[3,4,15,16] Zhang et al. were able to show a decrease in the overall complication rate of 83 women with vulvar cancer by means of sparing the saphenous vein (56% vs 23%). The rate of wound breakdown was decreased by 66% from 38% to 13% and there was a 54% reduction in the rate of cellulitis from 39% to 18%. Moreover the risk of lower extremity edema was decreased from 39% to 11%.[3]

Accordingly, Dardarian et el. evaluated a total of 29 patients and observed a statistically significant decrease in wound breakdown incidence (25% vs 0%), long-term lym-

Table 1: Demographic and Clinical Features of the Patients

	Saphenous vein spared (n=51)	Saphenous vein ligated (n=57)	p
Age (years)	58.3±5.0	56.5±4.7	0.056
Body mass index (kg/m^2)	26.6±6.2	28.1±6.7	0.249
Co-existing medical conditions			
Obesity	19 (37.3%)	21 (36.8%)	0.965
Smoking	14 (27.5%)	16 (28.1%)	0.943
Hypertension	10 (19.6%)	13 (22.8%)	0.687
Diabetes mellitus	3 (5.9%)	5 (8.8%)	0.569
Tumor histology			
Squamous cell carcinoma	48 (94.1%)	52 (91.2%)	0.986
Malignant melanoma	3 (5.9%)	5 (8.8%)	0.866
Tumor stage			
Stage I	15 (29.4%)	13 (22.8%)	0.555
Stage II	30 (58.8%)	34 (59.6%)	0.972
Stage III	6 (11.8%)	8 (14.1%)	0.440
Stage IV	0 (0.0%)	2 (3.5%)	0.071

**p<0.05 was accepted to be statistically significant.*

Table 2: Short Term Postoperative Complications

	Saphenous vein spared (n=51)	Saphenous vein ligated (n=57)	χ2	p
Acute cellulitis	**18.3% (16/88)**	**26.7% (27/101)**	**5.942**	**0.033***
Acute seroma	4.5% (4/88)	3.0% (3/101)	0.5257	0.077
Acute lymphedema	**19.3% (17/88)**	**30.7% (31/101)**	**7.1881**	**0.001***
Wound breakdown	**11.4% (10/88)**	**22.7% (23/101)**	**5.654**	**0.030***
Acute phlebitis	4.5% (4/88)	3.0% (3/101)	0.4649	0.077
Lymphocyst	3.4% (3/88)	2.0% (2/101)	0.4533	0.088
Deep vein thrombosis	1.1% (1/88)	1.0% (1/101)	0.3331	0.099
Pulmonary embolism	0.0% (0/88)	0.0% (0/101)	0.2222	0.199
Hematoma	1.1% (1/88)	0.0% (0/101)	0.2134	0.099
None	**36.4% (32/88)**	**10.9% (11/101)**	**6.7889**	**0.001***

**p<0.05 was accepted to be statistically significant.*

Table 3: Long Term Postoperative Complications

	Saphenous vein spared (n=51)	Saphenous vein ligated (n=57)	χ2	p
Chronic cellulitis	**11.4% (10/88)**	**20.9% (21/101)**	**4.735**	**0.042***
Chronic seroma	3.4% (3/88)	2.0% (2/101)	0.6175	0.069
Chronic lymphedema	**11.4% (10/88)**	**29.2% (29/101)**	**7.764**	**0.028***
Chronic phlebitis	4.5% (4/88)	3.0% (3/101)	0.4649	0.077
Chronic leg pain	**23.9% (21/88)**	**32.9% (33/101)**	**2.356**	**0.048***
Sense abnormality	6.8% (7/88)	5.0% (5/101)	0.5032	0.089
Deep venous thrombosis	3.4% (3/88)	3.0% (3/101)	0.3682	0.199
Pulmonary edema	0.0% (0/88)	1.0% (1/101)	0.2177	0.096
None	**35.2% (31/88)**	**3.0% (3/101)**	**8.098**	**0.001***

**p<0.05 was accepted to be statistically significant.*

Table 4: Operative and Postoperative Characteristics of the Patients

	Saphenous vein spared (n=51)	Saphenous vein ligated (n=57)	p
Amount of operative blood loss (mL)	225.5±75.1	203.5±71.3	0.122
Duration of surgical operation (minutes)	155.3±15.5	152.2±18.9	0.356
Duration of wound healing (days)	29.5±2.7	37.1±3.3	0.001*
Postoperative hospital stay (days)	6.5±1.3	10.7±2.8	0.001*
Postoperative adjuvant treatment			
Chemotherapy	0 (0.0%)	2 (3.5%)	0.187
Radiotherapy	6 (11.8%)	8 (14.0%)	0.294

**p<0.05 was accepted to be statistically significant.*

Table 5: Long Term Follow Up of the Patients

	Saphenous vein spared (n=51)	Saphenous vein ligated (n=57)	p
Local recurrence	10.3% (9/88)†	13.9% (14/101)	0.014
Lymphatic recurrence	5 (9.8%)	6 (10.5%)	0.088
Distant metastasis	1 (2.0%)	1 (1.8%)	0.177
Disease free survival (months)	56.7±18.9	54.5±20.1	0.733
Overall survival (months)	62.5±23.4	60.7±21.8	0.568

†Denoted within the parentheses, the fractional number refers to the ratio of affected incisions over the total number of inguinal incisions.

**p<0.05 was accepted to be statistically significant.*

phedema (38% vs 11%) and cellulitis formation (45% vs 0%) without recognizing any change in the recurrence rate (19.3% vs 22.2%). However no considerable decrease was detected in the incidence of short term lymphedema (67% vs 72%) even if saphenous vein was spared.[4] Later Zhang et al. assessed 64 patients with vulvar tumors and confirmed the efficiency and safety of saphenous vein sparing within short and long periods of postoperative follow-up. Much more expressed than postoperative fever, cellulitis, seroma or lymphocyst formation, the incidence of short term lower extremity lymphedema decreased by 23% and phlebitis by 15% approximately after the preservation of saphenous vein. Meanwhile long term complications were tapered by 50% nearly while both recurrence and five year survival rates did not significantly change.[15]

The findings of the present study are in parallel with those specified earlier, indicating significant reduction in cellulitis (in short and long term), lymphedema, wound breakdown and chronic leg pain. Another point to be emphasized is that women who had their saphenous veins spared were more likely to be asymptomatic.

However there are two studies in literature which have failed to demonstrate any benefit of saphenous vein preservation in the development of operative complications.[9,10] Despite the fact that the findings of Lin et al. and Hopkins et al. claim no advantage with the preservation of saphenous vein, they do not emphasize any association with poor survival.

It should be noted that all of the formerly cited studies were conducted as retrospective chart reviews, thus their power might have been limited.[3,4,15] Another point is the lack of standardization in the clinical and operative management of the patients who had been reviewed in these studies. The adoption of different diagnostic criteria, implementation of distinct surgical techniques and application of various clinical equipment might have led to the signified discrepancies. Although the present study evaluated a relatively larger group of patients (n=108) and inguinal incisions, its retrospective design might have caused a bias as well. Though the detailed description of acute and chronic complications may present a superiority for this study.

To our knowledge, the research made by Kehoe et al. is the only exception to the aforementioned retrospective reviews. Despite offering interesting and valuable data, this prospective study enrolled only ten patients. However the incidences of minor wound breakdown, lower extremity edema and lymphocyst were found to be significantly lower on the inguinal side in which the saphenous vein was preserved.[17]

When all of the published data are assessed together with the presented results here, arose the question about the usefulness of preserving the saphenous vein during inguinal lymphadenectomy. The present study has reported that the number of lymph nodes dissected is comparable with no particular increase in recurrence rate after applying the preservation procedure. Additionally operative times and blood loss have been shown in previous studies and in our review to be equal.[3,4,15] Therefore it may be strongly suggested that sparing the saphenous vein has substantial benefit and that it is unlikely to exert any important clinical hazard. In other words, sacrifice of the saphenous vein should not be considered unless there is a prominent lymphatic involvement in the groin or a macroscopically enlarged lymph node is fixed to the saphenous vein.[18]

In conclusion, saphenous vein sparing is an adjusted form of inguinal lymphadenectomy which can be performed by taking the severity of the lesion and health status of the patient into account. This surgical procedure does not seem to exert detrimental effects on survival in contrast with some potential benefits it may have for women with vulvar tumors. Since it is relatively easier to preserve saphenous vein, it should be performed when feasible. As described in previous studies along with ours, the sparing procedure seems to diminish the operative morbidity associated with inguinal lymphadenectomy without increasing the duration of surgery, the amount of blood lost or the risk of local recurrence. However further prospective studies conducted within large patient groups are needed to document the efficacy and safety of the sparing procedure for the saphenous vein.

Vulva Kanserli Kadınlarda Safenöz Venin Korunduğu Inguinal Lenfadenektomi: Tek Merkezde 10 Yıllık Deneyim

AMAÇ: Bu çalışma, vulva kanserli kadınlarda uygulanan inguinal lenfadenektomi sırasında gerçekleştirilen safenöz ven korumasının ilişkili olduğu kısa ve uzun vadeli morbiditeyi belirlemeyi amaçlamaktadır.

GEREÇ VE YÖNTEM: Çalışma merkezinde, on yıllık bir dönem boyunca, vulva kanser nedeniyle inguinal lenfadenektomi uygulanan 108 kadın geriye dönük olarak incelenmiştir. Safenöz ven ligasyonu yapılan ve safenöz veni korunan olgular; nüks, ve hastalıksız sağkalım ile kısa ve uzun vadeli komplikasyonlar yönünden karşılaştırılmıştır.

BULGULAR: Vulva kanseri nedeniyle 88 inguinal insizyon yapılan 51 kadında safenöz ven korunurken aynı nedenle 101 inguinal insizyon yapılan 57 kadında safenöz ven ligasyonu gerçekleştirilmiştir. Safenöz ven ligasyonu yapılan olgularla karşılaştırıldığında, safenöz veni korunan olgulardaki kısa ve uzun vadeli komplikasyon riski anlamlı olarak düşük bulunmuştur (sırasıyla %22,5 vs %42,4 ve %12,7 vs %35,0; p<0,05). her iki olgu grubundaki lokal ve lenfatik nüks oranları ise istatistiksel olarak benzerdir (sırasıyla %19,3 vs %22,2 ve %9,8 vs %10,5; p>0,05). Bundan başka, safenöz veni korunan olgulardaki yara ayrılması, lokal enfeksiyon ve kronik lenfödem riski anlmalı olarak düşüktür (sırasıyla %0 vs %25,0, %1,2 vs %38,3 ve %11,6 vs %44,4; p<0,05). Lenfatik tutulum ile akut veya kronik lenfödem riski arasında anlamlı bir ilişki gösterilememiştir.

SONUÇ: İnguinal lenafdenektomi sırasında gerçekleştirilen safenöz ven koruması, lokal nüks riskini arttırmaksızın cerrahiyle ilişkili olarak ortaya çıkan kısa ve uzun vadeli komplikasyonları azaltmaktadır. Vulva kanseri tanısı konulan bir olgu için cerrahi yaklaşımda bulunulmadan önce cerrahın kişisel deneyimi de göz önüne alınmalı ve olguya özgü bir strateji planlanmalıdır.

Anahtar Kelimeler: Cerrahi, İnguinal lenfadenektomi, Safenöz ven, Komplikasyon, Vulva kanseri

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