



Does plastic surgical consultation improve the outcome of patients undergoing radical vulvectomy for squamous cell carcinoma of the vulva?



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HIGHLIGHTS

- Plastics-assisted vulvectomy closure significantly improves margin outcomes in tumors ≥ 3 cm.
- Plastics-assisted closure does not independently impact complications.
- History of radiation therapy significantly increases complications.

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ABSTRACT

Objectives. To analyze margin status and prognostic factors for complications in patients undergoing vulvectomy for invasive squamous cell cancer (iSCC) with and without plastic-assisted closure.

Methods. Demographic and clinical data were collected on 94 patients with iSCC who underwent vulvectomy between 2004 and 2013. All pathology slides were re-reviewed by two gynecologic pathologists. Data were analyzed using XLSTAT-Pro v2014.2.02.

Results. Of 88 eligible patients, 15 (17%) had plastic-assisted vulvar closure and 73 (83%) did not. There were significantly more patients in the plastics group with recurrent disease (53% v 10%) and history radiation therapy prior to surgery (40% versus 5%). Plastic-assisted closure was associated with larger tumors (3.73 cm versus 2.03 cm, $p < 0.01$) and a higher frequency of adequate margins (53% versus 29%, $p = 0.06$). For tumors ≥ 3.0 cm, plastic-assisted closure was significantly associated with adequate margins (44% versus 6%, $p = 0.03$). Prior radiation use was associated with plastic-assisted closure, larger tumors, older age, and recurrent disease. Complications occurred in 36 patients (41%) and significantly more occurred in those with plastic-assisted closure (67% versus 36%, $p = 0.04$). On multivariate analysis including age, tumor size, recurrent disease, plastic-assisted closure, and history of radiation, only history of radiation therapy was a significant predictor of complications (OR = 17, 95%CI 2.05–141.35; $p = 0.01$).

Conclusions. Plastic-assisted vulvectomy closure was more often utilized in cases involving past radiation therapy and larger tumors. Plastic-assisted closure significantly increased the frequency of adequate margins in tumors ≥ 3 cm and did not impact complications.

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Introduction

Vulvar cancer is a rare malignancy in US women, which accounts for 3–5% of all female genital cancers [1]. Over the last few decades, the

incidence of invasive vulvar cancer has continued to increase, while mortality has gradually decreased for all age groups [2].

Primary surgical resection remains the standard of care for patients diagnosed with invasive squamous cell cancer (iSCC) of the vulva. The high morbidity of radical vulvar surgery has resulted in a shift toward techniques that aim to minimize morbidity without compromising cancer-specific outcomes [3]. Modern evidence suggests that a post-fixation margin of 8 mm is an independent predictor of local recurrence

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Table 1
Baseline data on all patients.

	All (n = 88)	Plastics (n = 15)	No plastics (n = 73)	p-Value
<i>Patient demographics</i>				
Age (years)				0.23*
Mean (range)	67 (32–92)	71 (32–86)	66 (39–92)	
BMI (kg/m ²)				0.64*
Mean (range)	30 (20–50)	30 (22–39)	29 (20–50)	
Tobacco use				0.16 [□]
Non-smoker	56% (49)	33% (5)	60% (44)	
Former smoker	30% (26)	47% (7)	26% (19)	
Current smoker	15% (13)	20% (3)	14% (10)	
Comorbidities				
DM, type II	22% (19)	47% (7)	16% (12)	0.01 [□]
Hypertension	58% (51)	87% (13)	52% (38)	0.01 [□]
Immune suppression	10% (9)	0% (0)	12% (9)	–
<i>Disease history</i>				
Disease status				<0.01 [□]
Primary disease	83% (73)	47% (7)	90% (66)	
Recurrent disease	17% (15)	53% (8)	10% (7)	
FIGO stage				0.53 [□]
I	72% (63)	80% (12)	70% (51)	
II	10% (9)	13% (2)	10% (7)	
III	18% (16)	7% (1)	21% (15)	
<i>Treatment history</i>				
History of prior vulvectomy				<0.01 [□]
Yes	14% (12)	27% (4)	11% (8)	
No	86% (76)	73% (11)	89% (65)	
History of radiation therapy				<0.01 [□]
Yes	11% (10)	40% (6)	5% (4)	
No	89% (78)	60% (9)	95% (69)	
<i>Surgery performed</i>				
Vulvectomy location				
Lateral hemivulvectomy	47% (41)	53% (8)	45% (33)	0.57 [□]
Anterior vulvectomy	27% (24)	0% (0)	33% (24)	–
Posterior vulvectomy	11% (10)	20% (3)	10% (7)	0.37 [□]
Complete vulvectomy	15% (13)	27% (4)	12% (9)	0.22 [□]
Plastic-assisted closure				
VY fasciocutaneous flap	–	14	–	–
Rectus abdominus flap	–	1	–	–

BMI, body mass index; DM, diabetes mellitus; FIGO, International Federation of Gynecology and Obstetrics.

[□] Fisher's exact or chi-square test.

* T-test.

and disease specific survival [4–7]. Despite a shift in the treatment paradigm toward less radical surgery, rates of post-operative complications following radical vulvectomy remain high. Recent studies report complication rates as high as 40–45% with wound breakdown cited as the most common cause of post-operative morbidity [8,9]. Thus, the primary goals of contemporary surgery are to achieve an 8 mm post-fixation margin and to minimize post-operative morbidity.

Vulvar closure performed by a plastic surgeon following radical vulvectomy represents a potential strategy to improve both margin and complication-specific outcomes. The role of plastic-assisted vulvar closure on post-operative complications has been established in the literature [10–13]. The reported rates of post-operative wound dehiscence with plastic-assisted vulvar closure have ranged from 10 to 20% [10–12]. A recent study performed by Panici et al. reported lower rates of wound dehiscence in larger tumors with plastic-assisted closure compared to closure performed by a gynecologic oncologist alone [10].

Studies conducted on the role of plastic-assisted vulvar closure have exclusively reported on feasibility and complications. To date, there are no studies that report on margin status associated with a plastic-assisted closure. In this retrospective review, we explore the impact of plastic-assisted vulvar closure on both margin status and rates of post-operative complications.

Materials and methods

We retrospectively reviewed the records of 283 consecutive patients who underwent vulvectomy at Brigham and Women's Hospital between 2004 and 2013 following Institutional Review Board approval. Pathology reports were reviewed and 94 patients with a diagnosis of iSCC were found. Exclusions included 80 cases of vulvar intraepithelial neoplasia, 19 cases of malignant melanoma, 14 cases of Paget's disease, 11 cases of basal cell carcinoma, 7 cases of other rare tumors, 30 cases with no residual tumor, and 28 cases with benign pathology. Histologic preparations were requested for the 94 radical vulvectomy specimens (partial or complete) and 6 were not available for review and thus were excluded from the study. Medical records for the 88 remaining patients were reviewed and information on patient demographics, clinical history, cancer history, treatment history, and procedure performed was collected.

Cancer free margins were defined as the distance from the end of the tumor to the tissue edge. Margin status was defined as “adequate” if the tumor was ≥ 8 mm from the tissue edge, “close” if < 8 mm, and “positive” if the tumor was present at the tissue edge. Two gynecologic pathologists reviewed all specimen slides and determined tumor size, cancer free margins, and margin status. Tumor size was defined as the largest radial diameter of the tumor.

For the margin analysis, patients were stratified into 2 groups based on the surgical procedure performed: radical vulvectomy with plastic-assisted vulvar closure (plastics, n = 15) and radical vulvectomy without plastic-assisted vulvar closure (no plastics, n = 73). Tumor size and cancer free margins were compared between groups using linear regression and margin status was compared using a chi-square test. A sub-analysis of margin status was performed for tumor size groups: ≥ 1 cm, ≥ 2 cm, and ≥ 3 cm. The frequency distribution of adequate margins between groups was compared for each tumor size stratum using Fisher's exact test.

The frequencies of post-operative complications were determined using perioperative hospitalization records and post-operative clinic notes, reviewed for the following post-operative complications: wound breakdown, cellulitis, abscess, hematoma, and deep venous thrombosis. The following potential factors associated with post-operative complications were evaluated: age, body mass index (BMI), tobacco use, hypertension, type 2 diabetes mellitus (DM), immune suppression, history of radiation therapy, location of vulvectomy, tumor size, and plastic-assisted closure. Univariate analysis was performed to determine the factors associated with a patient having any post-operative complication. Univariate analysis was also performed to determine the factors associated with prior radiation use. Logistic regression analysis was performed using backwards step-wise selection ($p > 0.15$) to identify factors independently associated with the occurrence of any complication. Logistic regression results were reported using odds ratios (OR) with 95% confidence intervals (CI). All statistical analyses were performed using XLSTAT-Pro v2014.2.02.

Results

Baseline characteristics on the 88 patients are described in Table 1. The median patient age was 69 (range, 32–92) with no significant difference in mean age between groups (71 versus 66 years, $p = 0.23$). The median follow-up time was 25.5 months (range, 0–107). There was no significant difference in BMI, tobacco use, and immune suppression between groups. Significantly more patients in the plastics group had DM (47% versus 16%, $p = 0.01$) and hypertension (87% versus 52%, $p = 0.01$). There was no significant difference in FIGO stage between groups. At the time of radical vulvectomy, significantly more patients in the plastics group had recurrent disease (53% versus 10%, $p < 0.01$), history of prior vulvectomy (27% versus 11%, $p < 0.01$) and history of pelvic radiation therapy (40% versus 5%, $p < 0.01$). There was a notable absence of anterior vulvectomies performed in the

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