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Have patients with early squamous carcinoma of the vulva been overtreated in the past? The Norwegian experience 1977-1991

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Summary

Objective. To evaluate different surgical approaches in early squamous vulvar cancer.

Methods. Review of clinical and histopathologic data and follow-up information of 216 patients with clinical FIGO stage I-II disease, primarily treated by surgery from 1977-1991.

Results. Eighty-nine patients underwent radical vulvectomy with bilateral groin dissection by en bloc excision, 60 by the triple incision technique, 20 individualized vulvar surgery with uni-or bilateral groin dissection, and 47 vulvar surgery only. Groin metastases occurred in 9% stage I and 25 % stage II disease. Groin involvement was not seen in stage I tumors with invasion depth ≤ 1 mm. Bilateral metastases occurred in medially located tumors of both stages, and laterally located stage II. Metastases were ipsilateral in lateral stage I. Separate groin dissection significantly reduced morbidity. Sixty-six patients relapsed, 14 after more than 5 years. Vulvar recurrence was related to tumor diameter and the condition of the resection borders.

The single most important predictor of death from vulvar cancer was the presence of inguinal femoral lymph node metastases. Conservative and individualized surgery did not compromise 5-year survival.

Conclusions. A careful selection of patients fitted for less radical surgery is essential to avoid undertreatment. Groin dissection can be omitted in tumors with diameters ≤ 2 cm and invasion depth ≤ 1 mm. At least ipsilateral groin dissection is needed in all other cases. Groin dissection should be performed through separate incisions. Modified vulvectomy is appropriate provided radicality can be obtained. Long-time follow-up is important as recurrences can be seen many years after primary therapy.

Key words: Squamous carcinoma; vulva.

Introduction

In the early part of this century most patients with carcinoma of the vulva were treated by local excision only, and the overall survival rate was less than 20%. Historically Taussig [1] and Way [2] in the 1940s established the radical en bloc technique with removal of the primary tumor and the groin nodes in continuity. The 5-year survival improved to 60-70%, but the morbidity was high, and there was a serious impact on body image and sexual function [3]. Disaia *et al.* [4] in 1979 and Hacker *et al.* [5] in 1981 introduced the triple incision technique, which was demonstrated to be as effective as the *en bloc* procedure, and associated with less morbidity. During the last 15 years the management of vulvar cancer has evolved even further towards more conservative and individualized surgery in early disease. Different centers have reported modified vulvectomy with uni-or bilateral inguinal node dissection consistent with local control and cure in selected cases [6-11]. Recently the sentinel lymph node (SLN) procedure has been introduced in vulvar cancer surgery [12-15], and in the years to come, this technique may revolutionize the treatment of early vulvar cancer.

In 1989 the FIGO staging system of vulvar cancer was changed from a clinical to a surgical one in an effort to better predict patient prognosis according to stage of disease [16, 17].

We think it is important for every institution to evaluate the results of early vulvar cancer treatment in periods of changing treatment procedures and changing staging systems. In the following we present our results from the 15-year period 1977-91, with focus on the possible differences between the en bloc and the separate-incision surgery technique.

Material and Methods

From January 1, 1977 through 1991 a total of 331 patients with squamous cell carcinoma of the vulva were admitted to the Norwegian Radium Hospital for primary treatment. The hospital records were reviewed for clinical data. Information obtained included age at diagnosis, tumor diameter, site of primary lesion, clinical status of the inguinal lymph nodes and peri- and postoperative complications. Included in the present study were all patients with clinical FIGO stage I and II disease primarily treated by surgery, a total number of 216 patients.

Surgical procedure was divided into four groups: (1) radical vulvectomy with *en bloc* bilateral inguinal lymph node dissection, (2) radical vulvectomy with bilateral inguinal lymph node dissection through separate incisions, (3) individually modified vulvectomy with uni- or bilateral inguinal lymph node dissection, (4) modified or radical vulvectomy without groin dissection - named the local surgery group. The radical vulvectomy was done to the fascia lata. Modified vulvectomy included local excision or hemivulvectomy down to the fascia lata with surgical margins at least 2 cm from the clinically visible lesion. If resection borders were not free, a re-excision was performed, or local irradiation with electron beams was given.

The standard procedure for groin dissection was removal of both inguinal and femoral lymph nodes. After removing the subcutaneous tissue and the fatty tissue between the superficial fascia and the fascia lata, the fascia lata was split longitudinally over the proximal femoral vein and the fatty tissue medial to the vein containing the femoral lymph nodes was removed.

The treatment strategy for patients with lymph node metastases in spite of removal of the metastases was postoperative high-voltage irradiation against a low pelvic field including the groins when the wound had healed and the patient was in good condition after the operation.

Site of lesion was defined as medial when the tumor involved midline structures or was confined to the anterior part of the labia minora. All other tumor locations were defined as lateral.

Histologic specimens were reviewed by one of the authors (J.M.N) who had no access to clinical information. Depth of tumor invasion was measured by an ocular micrometer from the epithelial stromal junction of the adjacent most superficial dermal papilla to the deepest point of invasion.

Peri- and postoperative complications in the vulva and groins appearing during the first 30 postoperative days, which could be truly evaluated in this retrospective study, were infection, haematoma, and wound breakdown.

Wound breakdown was defined as major when the breakdown included the subcutaneous fat layer, and as minor in superficial skin breakdown. Infection was defined as erythematous changes associated with fever more than 38°C. Unfortunately long-term complications such as lymphedema of the lower extremities, vaginal wall relaxation and vaginal stenosis could not be evaluated in all patients and therefore not further mentioned.

Follow-up information was retrieved from the hospital records, from the Cancer Registry of Norway and from information given in the death certificates. Follow-up was closed January 1996. The follow-up time was defined as the interval from the date of diagnosis to the date of last observation, and disease-free survival as the interval from date of diagnosis to date of clinical manifest recurrence. No patient was lost in follow-up.

Differences in proportions were evaluated by the chi-square test or the Fisher test, whichever was appropriate. The Mann-Whitney test was used for evaluating differences in age and tumor size between the surgery groups. Survival was calculated by the method of Kaplan and Meier [18]. The log-rank test [19] was used to compare survival rates. Statistical significance was considered as $p < 0.05$.

Results

Mean age at diagnosis was 70 years, range 27-96 years. Ninety-five patients presented with clinical FIGO stage I and 121 patients with clinical FIGO stage II disease.

Surgery

The surgical procedure was radical vulvectomy with bilateral inguinal lymphadenectomy in 149 patients, of whom 89 underwent *en bloc* excision and 60 were operated on by the triple incision technique. In 20 patients the surgical procedure was individualized as follows: 12 patients underwent hemivulvectomy with

bilateral groin dissection, six hemivulvectomy with ipsilateral groin dissection and two patients vulvectomy with ipsilateral groin dissection. In all these 20 patients the groin dissection was performed through separate incisions. Groin dissection was not performed in 47 patients, of whom 25 underwent vulvectomy and 22 patients local excision. The reason why groin dissection was omitted was small-sized tumors in 27 cases, a compromised medical situation in 18 cases and patient refusal in two cases.

In the whole series 176 patients underwent radical vulvectomy and 40 patients local excision or hemivulvectomy.

There was a change from the en bloc excision to the triple-incision technique in 1985, and from the same year on significantly more patients were individually treated (Table 1).

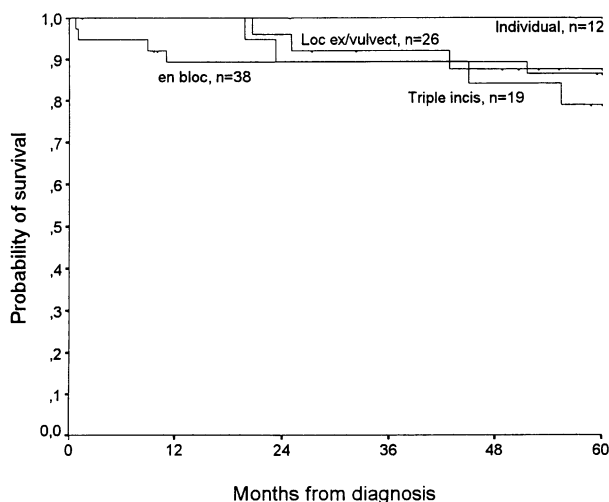


Figure 1. — Five-year corrected survival according to primary surgical procedure in 95 patients with clinical FIGO stage I squamous cell carcinoma of the vulva. Individual; local excision/vulvectomy with uni- or bilateral groin dissection, en bloc; radical vulvectomy with bilateral groin dissection by en bloc excision. Triple incision; radical vulvectomy with bilateral groin dissection by triple-incision technique.

Clinical and histopathologic features

Clinical and histopathologic features according to surgical procedure are presented in Table 2. No significant differences were found in age ($p = 0.062$), FIGO stage ($p = 0.174$), tumor diameter ($p = 0.224$), tumor location ($p = 0.348$), depth of invasion ($p = 0.502$), vessel invasion ($p = 0.214$) or grade of differentiation ($p = 0.072$) between the group treated by en bloc excision and the group who underwent the triple-incisions technique. The patients individually treated had smaller tumor diameter ($p = 0.015$) and smaller invasion depth ($p = 0.026$) than the triple incision group, and smaller invasion depth ($p = 0.045$) than the en bloc excision group. There were no significant differences in the other histopathologic parameters listed in Table 2 between these three surgery groups.

Groin dissection was omitted because of small-sized tumors in 27 patients. Eleven of these cases had tumor diameter ≤ 2 cm and invasion depth ≤ 1 mm, 12 tumor diameter ≤ 2 cm and invasion depth 2-6 mm and four cases had tumor diameter 3 cm and invasion depth 1-6 mm. In the 20 patients deemed too frail to undergo groin dissection, mean tumor diameter was 4 cm (range 1-7 cm) and mean invasion depth was 8.8 mm (range 1.5-16 mm).

Surgical radicality

Radicality in the vulvar specimen was obtained in 181 (84%) of the patients. In 15 more cases the whole cancerous lesion was resected, but vulvar intraepithelial disease (VIN) grade II-III was demonstrated in the margins. Resection borders were positive in 14 patients and inconclusive (probably positive) in six patients. The frequency of positive/inconclusive borders was related to tumor diameter ($p = 0.011$), and increased from 2% in diameter ≤ 1 cm to 6% in diameter 1-2 cm, 10% in diameter 2-3 cm and 16% in diameter > 3 cm. Surgical radicality was not related to depth of invasion ($p = 0.857$), tumor localization ($p = 0.1$) or to surgical modality ($p = 0.213$). The presence of VIN in the borders was not related to tumor diameter, depth of invasion, tumor localization or to surgical modality.

Lymph node metastases and surgical staging

Metastases to the inguinal lymph nodes occurred in 31/169 (18%) of the patients who underwent groin dissection; i.e. in 6/69 (9%) patients with clinical stage I and in 25/100 (25%) patients with clinical stage II disease ($p = 0.008$). Groin involvement was not seen in a subgroup of 11 patients with tumor diameter ≤ 2 cm and depth of invasion ≤ 1 mm. Groin metastases were unilateral in 23 and bilateral in eight of the cases. Bilaterally positive groins were seen in only one (2%) patient with clinical FIGO stage I disease. She had

a tumor with invasion depth 2 mm located in the clitoris. Seven (6%) patients with clinical stage II disease had bilateral groin metastases, of whom six had a medially-located tumor and one patient a laterally-located tumor. Unilateral positive nodes occurred in 11/67 (16%) patients with laterally-located tumors, and in all those cases metastases were ipsilateral. Fourteen patients had one positive node, eight had two positive and nine patients had three or more positive nodes. Three or more positive nodes were seen only in patients with clinical stage II disease. Bilateral groin dissection had been performed in all the node positive patients. Frequencies of groin metastases and frequencies and site of recurrences according to surgical modality are shown in Table 3.

Adjunctive treatment

Twenty-one patients received radiotherapy postoperatively.

Fifteen of the 31 patients with groin metastases received external irradiation, five with one positive node, four with two positive and six patients with three or more positive nodes. Radiotherapy was given in a total dose of 40-50 Gy to the pelvis and the groins in 11 of these patients. In one patient therapy was stopped after 34 Gy because of adverse effects. Four patients received external irradiation to both groins in a total dose of 30 Gy. One of the patients who refused groin dissection received 40 Gy to the groins. Five patients in the local surgery group with positive margins were given electron beam treatment to a vulvar field; doses 24-34 Gy.

Complications

Postoperative complications occurred in 85 (39%) of the patients. Complications according to surgical procedure are shown in Table 4. Four patients died postoperatively, two in the *en bloc* group and two in the local surgery group. The cause of death was myocardial infarction in two and pulmonary embolism in two of these patients.

The patients operated on by *en bloc* excision suffered postoperative complications more often than those operated on by the triple-incision technique, 51% versus 30% ($p = 0.018$) (Table 4). Mean stay in our hospital was 15 days for both groups, but more of the patients operated on by *en bloc* (66%) than by triple incisions (32%) needed referral to the local hospital for further care ($p = 0.001$). Postoperative complications occurred as often in the patients individually treated as in those who underwent the triple-incision technique (Table 4). The patients individually treated and those who underwent local surgery had a mean stay of 11 days, and 20% and 26%, respectively, were referred to the local hospital for further care. Because of referral to local hospitals, it was not possible to record with certainty the frequency of lymphocyst formation or late complications, e.g. the frequency of lymphoedema in the different surgery groups.

Recurrence

Four patients died of postoperative complications. Sixty-six (31%) of the the remaining 212 patients suffered recurrences. Fourteen patients relapsed after more than five years, three of whom after more than ten years. Frequencies and localizations of recurrent disease according to FIGO stage and surgical procedure are shown in Table 3.

Groin

Sixteen (7%) patients had recurrences to the groins (Table 3). Groin recurrences were seen in 8/167 (5%) patients where primary surgery had included groin dissection. In six of these patients the recurrence occur-

Table 1. — Clinical and surgical data according to period of primary treatment in 216 patients with squamous cell carcinoma of the vulva, clinical FIGO stage I-II

Factor	Period of treatment	
	1977-1984 n=110	1985-1991 n=106
FIGO stage		
I	54	41
Tumor invasion depth ≤ 1 mm	7	15
Tumor invasion depth > 1 mm	47	26
II	56	65
Surgery		
En bloc excision	80	9
Triple incisions technique	6	54
Individualized surgery	3	17
Local excision/vulvectomy	21	26
Groin node metastases at surgery		
Absent	76	62
Present	13	18
Not assessed	21	26

Table 2. — Clinical and histopathologic data according to primary surgery in 216 patients with squamous cell carcinoma of the vulva, FIGO stage I-II

Factor	Surgery			
	en bloc excision n (%)	triple-incision technique n (%)	individualized procedure n (%)	local excision/vulvectomy n (%)
Age (years)				
< 60	18 (20)	7 (12)	8 (40)	7 (15)
60-69	28 (32)	17 (28)	3 (15)	9 (19)
70-79	34 (38)	24 (40)	7 (35)	10 (21)
≥ 80	9 (10)	12 (20)	2 (10)	21 (45)
Patient delay (months)				
≤ 3	27 (31)	18 (30)	7 (35)	12 (25)
4-6	29 (33)	9 (15)	4 (20)	15 (32)
7-12	17 (19)	17 (28)	6 (30)	6 (13)
> 12	12 (13)	11 (19)	3 (15)	9 (19)
Not evaluable	4 (4)	5 (8)	0	5 (11)
FIGO stage				
I	38 (43)	19 (32)	12 (60)	26 (55)
II	51 (57)	41 (68)	8 (40)	21 (45)
Tumor diameter (cm)				
≤ 1	13 (15)	5 (9)	6 (30)	18 (39)
> 1 ≤ 2	25 (28)	11 (19)	6 (30)	7 (15)
> 2 ≤ 3	25 (28)	15 (26)	3 (15)	9 (19)
> 3 ≤ 4	8 (9)	18 (31)	4 (20)	2 (4)
> 4	18 (20)	8 (14)	1 (5)	10 (22)
Multifocal	0	1 (1)	0	3 (6)
Tumor location				
Medial	57 (64)	34 (57)	10 (50)	31 (66)
Lateral	32 (36)	25 (42)	10 (50)	13 (28)
Multifocal	0	1 (1)	0	3 (6)
Vessel invasion				
Absent	76 (85)	45 (75)	17 (85)	33 (70)
Present	11 (13)	11 (18)	1 (5)	5 (11)
Not evaluable	2 (2)	4 (7)	2 (10)	9 (19)
Differentiation grade				
Well	36 (40)	25 (41)	8 (40)	14 (30)
Moderate	44 (49)	21 (35)	10 (50)	16 (34)
Poorly	6 (7)	13 (22)	2 (10)	9 (19)
Not evaluable	3 (4)	1 (2)	0	8 (17)
Tumor thickness (mm)				
≤ 1	6 (7)	6 (10)	4 (20)	12 (26)
> 1 ≤ 2	11 (13)	5 (8)	2 (10)	6 (13)
> 2 ≤ 3	10 (11)	4 (7)	5 (25)	6 (13)
> 3 ≤ 4	10 (11)	7 (12)	1 (5)	3 (6)
> 4 ≤ 5	8 (9)	4 (7)	3 (15)	5 (11)
> 5 ≤ 6	9 (10)	5 (8)	2 (10)	2 (4)
> 6	32 (36)	29 (48)	3 (15)	11 (23)
Not evaluable	3 (3)	0	0	2 (4)

red in a primary node negative groin; two patients with surgical stage Ib disease and four patients with surgical stage II disease. In surgical stage Ib disease groin relapse occurred in 2/34 patients operated on by *en bloc*, and in 1/24 patients where groin dissection was performed through separate incisions; i.e. the triple-incision and the individually treated group ($p = ns$).

Corresponding values in stage II disease were 0/40 and 4/35 ($p = 0.04$).

Groin relapses did not occur in any of the 22 patients with surgical stage Ia disease (Table 3).

Except for the patients with surgical stage Ia disease, patients treated by vulvar surgery only had a high frequency of groin recurrences, and in these patients also simultaneous recurrences to the vulva and the groin occurred (Table 3). Groin recurrences were seen as often in patients treated by modified vulvectomy as in those with radical vulvectomy 3/40 (7%) versus 13/176 (7%). Eleven (23%) of the 47 patients where groin dissections were omitted suffered groin relapses.

Table 3. — Frequencies of groin metastases and frequencies and sites of recurrences according to primary surgery in 216 patients with squamous cell carcinoma of the vulva, clinical FIGO stage I-II.

FIGO stage	Surgery	No. of patients	Groin metastases	Recurrence		Site of recurrence			
				No	%	Vulva	Groin	Vulva+groin	Distant
I									
<i><=1mm*</i>									
	<i>en bloc</i>	4	0	2	(50)	2	—	—	—
	Triple incis	3	0	2	(67)	2	—	—	—
	Individual	4	0	0		—	—	—	—
	Vulvar surgery	11		2	(18)	2	—	—	—
<i>>1mm**</i>									
	<i>en bloc</i>	34	4	5	(15)	3	2	—	—
	Triple incis	16	2	4	(25)	3	1	—	—
	Individual	8	0	0		—	—	—	—
	Vulvar surgery	15		6	(40)	1	4	1	—
II									
	<i>en bloc</i>	51	11	20	(39)	15	1	—	4
	Triple incis	41	12	13	(32)	7	4	—	2
	Individual	8	2	3	(38)	3	—	—	—
	Vulvar surgery	21		9	(43)	—	4	2	3
Total		216	31	66	(31)	38	16	3	9

* tumor invasion depth ≤ 1 mm; **tumor invasion depth >1 mm; *en bloc*: Radical vulvectomy with *en bloc* bilateral inguinal lymph node dissection. Triple incis: Radical vulvectomy with bilateral inguinal lymph node dissection through separate incisions. Individual: Hemivulvectomy with uni- or bilateral inguinal lymph node dissection through separate incisions. Local excis: Local excision or hemivulvectomy.

Vulva

Thirty-eight (18%) patients had recurrences to the vulva (Table 3). Vulvar recurrences occurred in 20/89 (23%) patients treated by *en bloc* excision and in 12/60 (20%) patients treated by the triple-incision technique; not a significant difference ($p = 0.69$). Vulvar recurrence occurred in 4/40 (13%) of the patients who underwent local excision/hemivulvectomy and in 33/176 (19%) of the patients who underwent radical vulvectomy ($p = 0.49$). Although vulvar recurrences seemed to occur more frequently in the patients with VIN in the borders, 5/15 (33%), than in those with positive/inconclusive borders, 4/20 (20%), or in patients with free borders, 29/181 (16%), no significant differences existed between these three groups. Of the 20 patients with positive/inconclusive margins, vulvar recurrence was not seen in the five cases who received radiotherapy to the vulva postoperatively, but occurred in 4/15 (27%) of the patients in this group where radiotherapy was not given.

Treatment in the recurrent situation was surgery, external irradiation, chemotherapy or a combination of these three treatment modalities. Twelve of the relapsing patients received no therapy. At the end of the study 11 of 36 patients treated for vulvar relapses, and one of 11 patients treated for groin relapses showed no evidence of disease (NED) after a median follow-up time after recurrence of 44 months (range 14-86 months). Of the 11 patients with vulvar relapses alive with NED nine were treated by surgery and two with surgery and radiotherapy in the recurrent situation, and the one patient with groin relapse alive with NED was treated by radiotherapy.

Table 4. — Postoperative complications according to surgical procedure in 216 patients with squamous cell carcinoma of the vulva.

Complications	Surgery (Number of patients)			
	<i>en bloc</i> (89)	Triple incis (60)	Individ (20)	Local excis (47)
Wound breakdown				
<i>Major</i>	3	1	0	1
<i>Minor</i>	18	7	1	2
Wound infection	16	8	4	8
Haematoma	3	1	1	2
Systemic				
<i>Myocardial infarction</i>	1	0	0	1
<i>Pulmonary embolus</i>	1	0	0	1
<i>Deep venous thrombosis</i>	2	0	0	1
<i>Cerebral haemorrhage</i>	1	1	0	0
	45 (51%)	18 (30%)	6 (30%)	16 (34%)

en bloc: Radical vulvectomy with *en bloc* bilateral inguinal lymph node dissection.

Triple incis: Radical vulvectomy with bilateral inguinal lymph node dissection through separate incisions.

Individ: Hemivulvectomy with uni- or bilateral inguinal lymph node dissection through separate incisions.

Local excis: Local excision or hemivulvectomy.

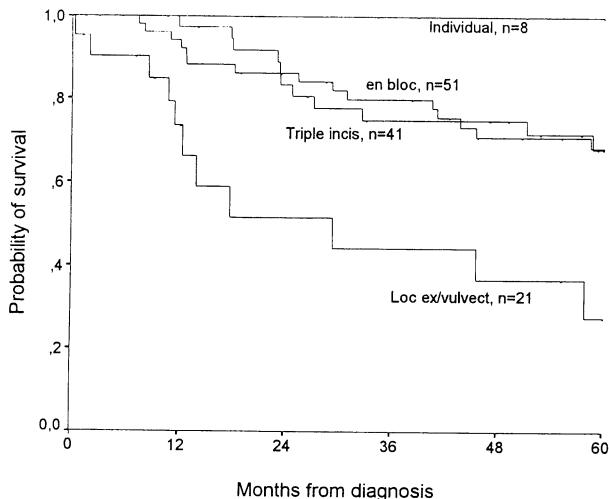


Figure 2. — Five-year corrected survival according to primary surgical procedure in 121 patients with clinical FIGO stage II squamous cell carcinoma of the vulva. Individual: local excision/vulvectomy with uni- or bilateral groin dissection; en bloc: radical vulvectomy with bilateral groin dissection by *en bloc* excision; Triple incis: radical vulvectomy with bilateral groin dissection by triple-incision technique.

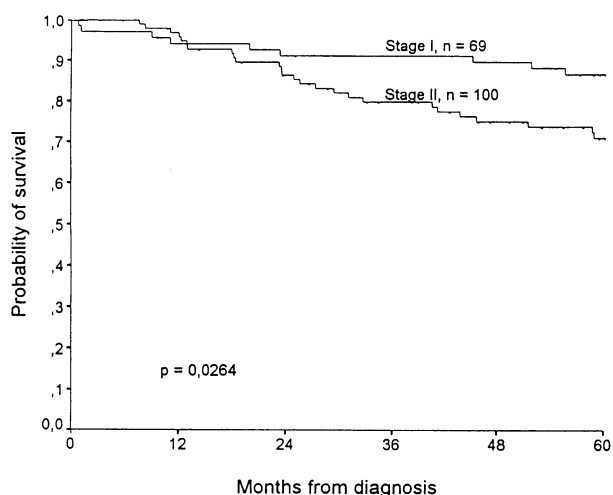


Figure 3. — Five-year corrected survival according to clinical FIGO stage in 169 patients with squamous cell carcinoma of the vulva where primary surgery included groin dissection

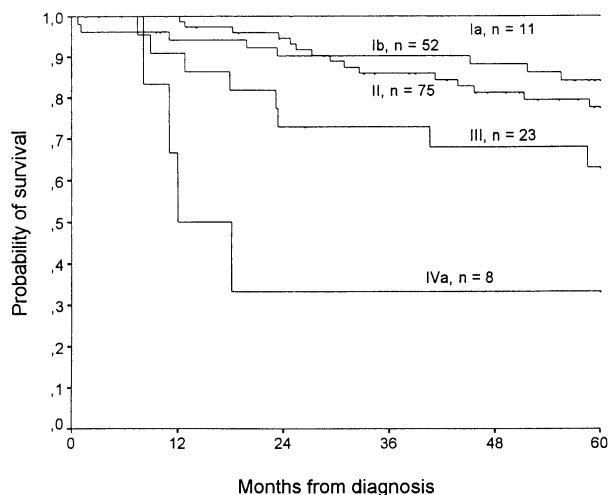


Figure 4. — Five-year corrected survival according to surgical FIGO stage in 169 patients with squamous cell carcinoma of the vulva where primary surgery included groin dissection.

Survival

At the end of the study 87 patients were alive with no evidence of disease. Seventy patients had died of unrelated causes, four of postoperative complications and 55 patients of vulvar cancer. For those patients who were alive, median observation time was 173 months (range 55-214 months) in the *en bloc* group, 85 months (range 53-201 months) in the triple-incision group, 85 months (range 62-211 months) in the individually treated group and 97 months (range 50-183 months) in the local surgery group. Overall five-year corrected survival was 76%. Survival curves according to surgical procedure for patients with clinical FIGO stage I disease are shown in Figure 1 and for patients with clinical FIGO stage II disease in Figure 2. There was no significant difference between the patients treated by *en bloc* dissection and those treated by the triple-incision technique in any of the clinical FIGO stages. All the patients individually treated survived five years.

Figure 3 shows survival curves according to clinical FIGO stage and Figure 4 survival curves according to surgical FIGO stage in the 169 patients who underwent groin dissection. No significant differences were seen between surgical stage Ib and surgical stage II ($p = 0.427$), or between surgical stages II and III ($p = 0.109$), while patients with stage Ib did better than those with stage III ($p = 0.045$). The groups of patients with stage Ia and stage IVa in our material are small for statistical considerations, but as can be seen in Figure 4 stage Ia seems to be associated with an excellent prognosis, and stage IVa with a poor outcome. Also patients with clinical stage II disease treated by vulvar surgery only had a bad prognosis (Figure 2).

Groin node metastases significantly worsened the prognosis with 5-year corrected survival 57% and 82%, respectively, in node positive versus node negative patients ($p < 0.001$).

Discussion

The change to more conservative surgical procedures in early vulvar cancer in the period of this study did not influence patient survival. The introduction of the triple-incision technique significantly reduced morbidity compared to the en bloc excision. Our results support the current opinion that the triple-incision technique should be the standard procedure whenever radical surgery is indicated in early vulvar squamous cancer [1, 2, 11, 20-22]. Previously a few cases of recurrences to the skin bridges between the vulvar and the inguinal incisions have been reported [21, 23]. No such event occurred in our series. Another modification also supported by our results has been the performance of a radical local excision rather than a radical vulvectomy for patients with primary tumors up to about 2 cm in diameter [5, 6, 24]. In these patients no difference in survival has been observed between those treated by radical wide local excision and those treated by radical vulvectomy [6-11, 24].

The main problem in the modern management of early vulvar cancer is the selection of patients suited for less radical surgery. As groin failure often is fatal, the exclusion of groin dissection should be carefully considered. Groin palpation is unreliable for the detection of lymph node metastases [25]. The presence of micrometastases to the groins in 9% of the patients with tumor diameter ≤ 2 cm and in 25% of those with tumor diameter > 2 cm in our study is in accordance with earlier reports [26-28]. The only group of patients without groin involvement at primary surgery or at follow-up were 22 cases with tumor diameter ≤ 2 cm and depth of invasion ≤ 1 mm, corresponding to surgical FIGO stage Ia disease. In the literature no groin metastases have been reported in this category of patients and according to the international opinion and our opinion they can be safely treated by vulvar surgery only [26, 29-32]. Studies have shown that increasing depth of stromal invasion and increasing tumor diameter are associated with increased risk of groin metastases [28-30]. In our study groin dissection was avoided because of small-sized tumors, even in patients with tumor volume greater than surgical FIGO stage Ia. These patients had a high frequency of groin relapses, and represent an undertreated group in our series. Even in elderly patients the temptation to avoid groin dissection, if indicated, should be resisted. If a patient's condition allows modern forms of anesthesia, she will probably also tolerate groin dissection which is an external procedure.

The decision whether to do uni- or bilateral groin dissection, should be based on size and localization of the primary tumor. As described by Iversen and Aas [33] the lymph drainage from the clitoris, from the perineum and also mainly from the anterior labium minus is bilateral. From the rest of the vulva lymph drainage is mainly ipsilateral, but a small contralateral lymph flow can be detected. The risk for contralateral positive groins only is minimal in laterally located tumors with a diameter ≤ 2 cm, as reported in the literature [10, 32]. In our study groin metastases were ipsilateral in all the patients with laterally located tumors. Provided ipsilateral nodes are negative, contralateral groin dissection can be omitted in these patients. Bilateral groin dissection is needed in all medially located tumors, and in laterally located tumors, clinical stage II.

Whether the nodes deep to the cribriform fascia require resection is debatable. Recent studies have better defined the anatomy of the groin lymph nodes. Borgno *et al.* demonstrated on cadavers that the femoral nodes were one to four in number, and always situated within the opening of the fossa ovalis, medial to the femoral vein [34]. Niclin *et al.* demonstrated on bipedal lymphangiograms that the inguinal nodes were situated within the femoral triangle, and that there were no nodes medial to the pubic tubercle or in the fibro fatty tissue overlying the outer 20% of the inguinal ligament [35]. However, some lymphatics from the leg traverse this tissue to anastomose with the axillary lymph nodes. DiSaia *et al.* [4] suggested that the superficial inguinal nodes could be regarded as sentinel nodes and femoral node dissection was needed only if inguinal nodes were positive. Hacker *et al.* [36] however reported positive femoral nodes when superficially nodes were negative and recommended inguino-femoral groin dissection. Levenback *et al.* [37, 38] and Terada *et al.* [13] identified the SIN ShN in various sites within the superficial compartment including lateral to the femoral artery and at the extreme medial border of the dissection. Terada *et al.* [13] postulated that this anatomic variability accounts for the risk of groin failure following a "negative" lymphadenectomy.

Stehman *et al.* reporting the GOG experience, noted a 7.4% groin failure rate in patients who underwent superficial inguinal lymphadenectomy [8]. Groin recurrences developed in 5% of our "groin-dissected"

patients. Groin recurrence in node negative groins was more often seen in patients operated on with the triple-incision technique than with en bloc excision in our series. This might be due to medially situated ShN's ShN not being included in the surgical specimen in the separate incision technique. The number of patients in our series is however too small to draw definite conclusions. Although the standard procedure for groin dissection in our institution included removal of superficial and deep nodes, it is not possible from a retrospective chart review to be sure that this procedure had been performed in all cases. There is a need for further studies to determine which surgical procedure for groin dissection provides the best combination of minimal morbidity and maximal survival. There is also a need for more detailed descriptions of the surgical groin procedure in publications, as Levenback *et al.* [37] in a questionnaire among gynecologic oncologists found variations in description of nodes removed and title of procedure, which makes comparison of results difficult and probably unreliable.

Groin irradiation has been tried instead of groin dissection, but according to results reported in the GOG study is inferior to surgery [39]. This has been attributed to inappropriate radiation planning [40], but may also relate to the fact that quite large positive nodes are not always palpable, and yet are unlikely to be sterilised by radiation therapy. If radiation is used, a CT scan should be used to plan treatment, and any bulky nodes on CT scan should be removed prior to radiation.

It is now generally accepted that when the inguinal nodes are free of metastatic disease the pelvic nodes are never involved and pelvic lymphadenectomy in patients without inguinal metastases is therefore considered unnecessary [6, 29, 41, 42]. When the pelvic nodes are involved the prognosis is relatively poor [41, 42]. In a Gynecologic Oncology Group (GOG) study, 28% of patients with groin node metastasis had positive pelvic lymph nodes and their estimated 2-year survival rate was only 23% [43]. The randomised GOG study [43] showed in patients with positive groin nodes after radical vulvectomy and bilateral groin node dissection that postoperative external groin and pelvic radiation therapy resulted in better survival and progression-free interval compared to pelvic lymphadenectomy [43].

Radical vulvectomy is a mutilating procedure with considerable impact on body image and sexual function. Especially in young women the resection of the primary vulvar tumor should be as conservative as possible [3, 44]. In our material, local recurrences were seen as often in patients treated by radical vulvectomy as in those who underwent modified local procedures.

However, tumor diameter was significantly greater in the first group, and we found frequency of positive/inconclusive borders related to tumor diameter. Like Magrina *et al* [24] we found that modified radical surgery is associated with decreased complications and 5-year overall and disease-free survival, and recurrence rates similar to those for radical vulvar surgery.

When deciding whether to do a modified or a radical vulvectomy, not only the diameter of the primary lesion, but also the condition of the rest of the vulva should be taken into consideration.

Patients with recurrence of squamous cell vulvar cancer have a poor prognosis. As shown in our study and reported in the literature [45-48], some patients with vulvar recurrences can be salvaged by secondary treatment, while groin recurrences are almost always fatal.

In 1988 FIGO revised the staging system for vulvar cancer from a clinical to a surgical one, and a subdivision of stage I was made in 1994 [17]. The surgical system incorporates the pathologic status of the lymph nodes, i.e. patients with positive nodes are upstaged. As groin node involvement, especially bilateral, considerably worsens prognosis, the surgical staging system will be more predictive for patient survival, as is also shown in our study. To compare the two different staging systems accurately, also patients with clinical stage III and IV must be included, as some of these patients probably will be downstaged due to perineal involvement, or to pathologic negative nodes.

In our material observation time was shorter in the patients treated by conservative and individualized surgery than in those treated by the *en bloc* procedure. In the literature so far most studies on conservative surgery of vulvar cancer, like ours, have reported survival results after five years of follow-up. As recurrences can occur many years after primary treatment, there is a need for further follow-up to evaluate the prognostic impact of the different surgical approaches on long-time survival.

Conclusions

The presence of inguinofemoral lymph node metastases is the single most important predictor of recurrences and death from vulvar cancer.

The introduction of more conservative surgery in early vulvar cancer has decreased morbidity without compromising patients' 5-year cancer-related survival. A careful selection of patients suited for less radical surgery is necessary to avoid undertreatment. Patients with surgical FIGO stage Ia disease can be safely treated with local vulvar surgery only. Ipsilateral groin dissection should be performed in patients with laterally located FIGO stage Ib tumors, and contralateral groin dissection could be omitted provided ipsilateral nodes are negative. Bilateral groin dissection should be performed in medially located FIGO stage Ib tumors and in all FIGO stage II tumors. The groin dissection should be performed through separate incisions. Randomized studies are desirable to determine the most appropriate surgical procedure for groin dissection. Modified vulvectomy is appropriate provided surgical radicality can be obtained, and the rest of the vulva is normal.

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