VULVAR CANCER SURGERY: WHY, WHEN AND HOW

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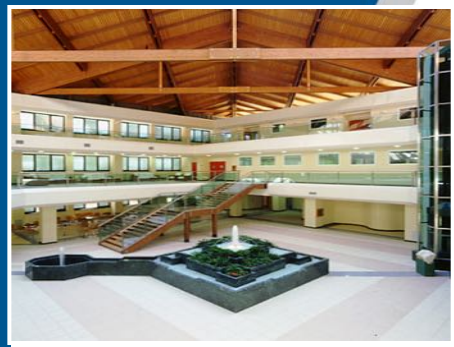

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VULVAR CANCER SURGERY: WHY, WHEN AND HOW

- **5% of all female genital tract malignancies**
- 92% squamous cell carcinoma (SCC)
  - Melanoma
  - Adenocarcinoma
  - Basal cell carcinoma
  - Sarcoma
- In the United States in 2012
  - New cases: 4,490
  - Deaths: 950.

  [Cancer facts and figures, ACS 2012]
- Highest estimated incidence in Malta: 3.5/100.000
- Increasing among young women

Age-standardised (World) incidence of vulval cancer by world region, 2002 estimates (CR-UK)

VULVAR CANCER SURGERY: WHY, WHEN AND HOW

- An updated standard of care hasn't yet been defined
- Most approaches to treatment are mainly based on the experience of small series

In the open scene of vulvar cancer treatments
surgery plays a ***central role***
currently being the ***first choice***
and exerting a ***great impact on prognosis.***

VULVAR CANCER SURGERY: **WHY**, WHEN AND HOW

MAIN GOALS OF SURGERY

- **STAGING**
- **TREATMENT**

VULVAR CANCER SURGERY: **WHY**, WHEN AND HOW

STAGING

In 1988 (1) vulvar cancer staging system ***switched from clinical to surgical***

In 2009 FIGO staging system (2) was revised on the base of the main emerging features affecting prognosis:

- tumor size
- number and size of groin lymphnode metastasis
- surrounding tissues involvement

(1) Meeting Report 1988
(2) FIGO 2009 Meeting Report, Pecorelli 2009

VULVAR CANCER SURGERY: **WHY**, WHEN AND HOW

TREATMENT

Improvement in OS:

- Radical vulvectomy with en bloc bilateral inguinofemoral and pelvic lymphadenectomy - 5 year survival rate improved from 20-25% to 60-70%
- Removal of > 10 IFL for each side in patients with positive nodes (2)
- Removal of deep and superficial IFL (3)

Reduction of local relapse:

- Extent of surgical margins (4). Surgical margin is the most powerful predictor of local vulvar recurrence. Accounting for specimen preparation and fixation, a 1-cm tumor-free surgical margin on the vulva results in a high rate of local control

(1) FJ Taussig 1940
(2) Courtney-Brooks 2010
(3) Stehman 1992, Burke 1995
(4) JM Heaps 1990

VULVAR CANCER SURGERY: WHY, **WHEN** AND HOW

In case of resectable disease, radical surgery should **always** be performed in early and locally advanced stages of disease

In case of unresectable local advanced disease, surgery should be attempted **after a neoadjuvant treatment**

In metastatic disease with local severe symptoms, surgery retains a **palliative role**

to summarize… "always if possible!"

VULVAR CANCER SURGERY: WHY, WHEN AND HOW

SURGICAL BURDEN

- Local and systemic morbidity
- Prolonged hospitalization
- Mortality

- type of affected patients: advanced age and related systemic diseases
- specific issues related to the anatomical area in question: contamination of wounds and humidity
- frequent need for massive demolition
- delayed feeding and consequential development of intestinal bacterial flora, potentially reaching a septic status

VULVAR CANCER SURGERY: WHY, WHEN AND HOW

SURGICAL BURDEN

Short and long-term post-operative complications are frequent and sometimes severe

- wound breakdown
- infection
- lymphocele
- lymphedema cellulitis
- erysipelas
- deep venous thrombosis

Possible delay on the start of adjuvant therapies sometimes up to lose the correct indication

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

CRITERIA FOR SURGERY

I. Restricted more than possible

II. Radical and oncologically safe

III. Supported by plastic surgical techniques

IV. Peri-operative management protocols

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

Minimizing demolition up to minimum required is mandatory, especially for early disease.

Over the years, many acquisitions allowed to resize the extent of surgery towards a more sparing vulvar and nodal surgery

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

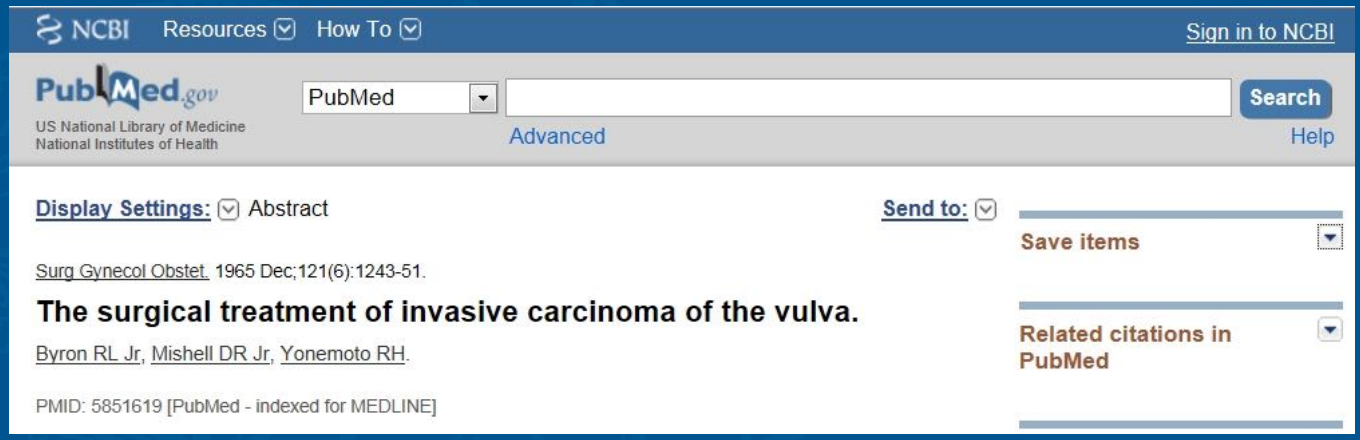
MAJOR STEPS IN THE HISTORY OF VULVAR SPARING SURGERY

- BUTTERFLY INCISION
- TRIPLE INCISION
  - NO NODAL STAGING IN MICRO-INVASIVE CANCER
  - SAPHENOUS VEIN SPARING
  - MONOLATERAL LYMPHADENECTOMY
  - SENTINEL NODE BIOPSY
  - CONSERVATIVE VULVAR SURGERY
    - WLE - EV
    - CLITORAL SPARING SURGERY

CRITERIA FOR SURGERY

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

BUTTERLFLY INCISION



Radical vulvectomy with en bloc inguinofemoral lymphadenectomy through butterfly incision (1)

(1) Taussig FJ. Cancer of the vulva: an analysis of 155 cases. American Journal of Obstetrics and Gynecology. 1940;40:764–779.

CRITERIA FOR SURGERY

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

TRIPLE INCISION

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Obstet Gynecol. 1981 Nov;58(5):574-9.

Radical vulvectomy and bilateral inguinal lymphadenectomy through separate groin incisions.

Hacker NF, Leuchter RS, Berek JS, Castaldo TW, Lagasse LD.

Abstract

One hundred patients underwent radical vulvectomy and bilateral inguinal lymphadenectomy using separate groin incisions. Forty-nine had stage I disease, 37 stage II, and 14 stage III. Corrected actuarial 5-year survival for each stage was 97.4, 86, and 49.2%, respectively. Inguinal lymph nodes were positive in 25% of cases: 10.2% of stage I, 27% of stage II, and 71.4% of stage III cases. Major complications occurred in 21 patients, including major groin breakdown in 14. Thirty patients experienced no acute postoperative morbidity. The mean postoperative hospital stay was 19 days, and mean operative blood loss was 620 ml. No patients developed isolated metastases in either the groin or the inguinal skin bridge, but 2 stage III patients developed simultaneous metastases in the skin bridge and elsewhere. For appropriately selected patients, separate groin incisions for inguinal lymphadenectomy appear to result in lower morbidity than traditional methods, without compromising survival.

PMID: 7301232 [PubMed - indexed for MEDLINE]

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Separate triple incisions
sparing the inguino-crural skin bridge

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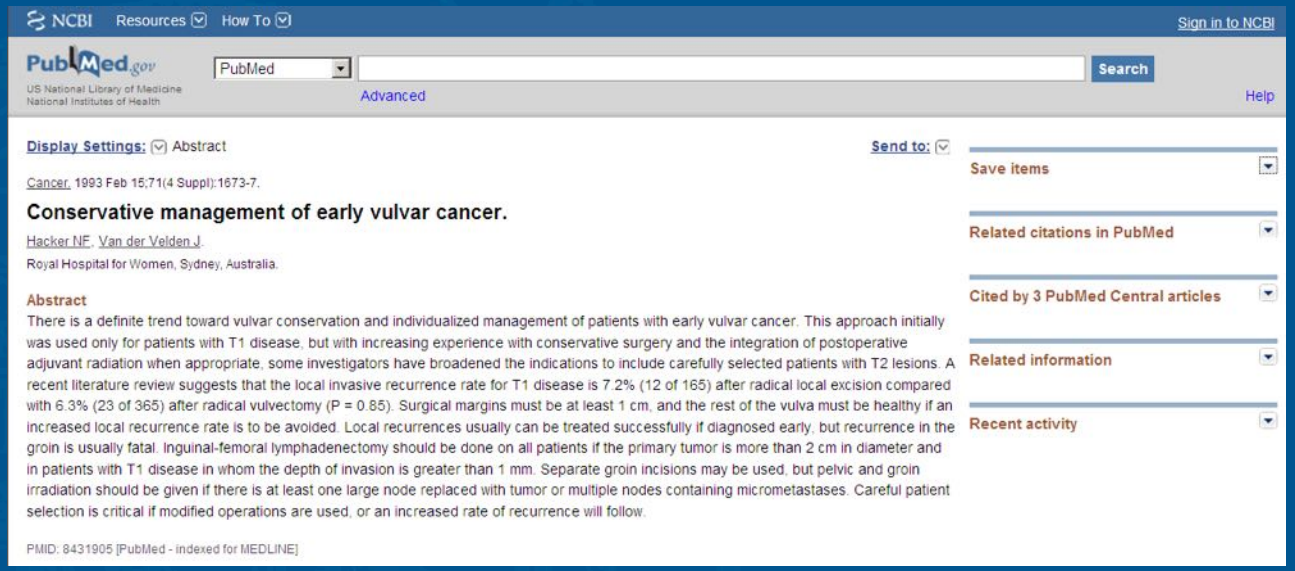
VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

CONSERVATIVE VULVAR SURGERY



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Cancer. 1993 Feb 15;71(4 Suppl):1673-7.

Conservative management of early vulvar cancer.

Hacker NF, Van der Velden J.

Royal Hospital for Women, Sydney, Australia.

Abstract

There is a definite trend toward vulvar conservation and individualized management of patients with early vulvar cancer. This approach initially was used only for patients with T1 disease, but with increasing experience with conservative surgery and the integration of postoperative adjuvant radiation when appropriate, some investigators have broadened the indications to include carefully selected patients with T2 lesions. A recent literature review suggests that the local invasive recurrence rate for T1 disease is 7.2% (12 of 165) after radical local excision compared with 6.3% (23 of 365) after radical vulvectomy (P = 0.85). Surgical margins must be at least 1 cm, and the rest of the vulva must be healthy if an increased local recurrence rate is to be avoided. Local recurrences usually can be treated successfully if diagnosed early, but recurrence in the groin is usually fatal. Inguinal-femoral lymphadenectomy should be done on all patients if the primary tumor is more than 2 cm in diameter and in patients with T1 disease in whom the depth of invasion is greater than 1 mm. Separate groin incisions may be used, but pelvic and groin irradiation should be given if there is at least one large node replaced with tumor or multiple nodes containing micrometastases. Careful patient selection is critical if modified operations are used, or an increased rate of recurrence will follow.

PMID: 8431905 [PubMed - indexed for MEDLINE]

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Radical wide local excision instead of radical vulvectomy

- small lesions (< 2cm)
- tumor/vulvar size ratio is favorable

CRITERIA FOR SURGERY

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

CLITORAL SPARING SURGERY

Available online at www.sciencedirect.com
SCIENCE DIRECT
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Gynecologic Oncology 95 (2004) 152–156
Gynecologic Oncology
www.elsevier.com/locate/ygyno

Conservative clitoral preservation surgery in the treatment of vulvar squamous cell carcinoma☆

John K. Chan[a], Valerie Sugiyama[b], Tania R. Tajalli[b], Huyen Pham[b], Mai Gu[b], Joanne Rutgers[c], Bradley J. Monk[b,*]

[a]Division of Gynecologic Oncology, Department of Obstetrics and Gynecology, Stanford University School of Medicine, Stanford, CA 94305-5317, United States
[b]Division of Gynecologic Oncology, Department of Obstetrics and Gynecology, Chao Family Comprehensive Cancer Center, University of California, Irvine-Medical Center, Orange, CA 92868, United States
[c]Department of Pathology, Long Beach Memorial Medical Center, Long Beach, CA 90806, United States

Received 19 February 2004
Available online 28 August 2004

Safety and efficacy of clitoral-sparing surgery when tumor doesn't involve the very anterior vulva

CRITERIA FOR SURGERY

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

NO NODAL STAGING IN µ-INVASIVE CANCER

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PubMed | Wilkinson EJ, Microinvasive carcinoma of the vulva. | Search

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Int J Gynecol Pathol. 1982;1(1):29-39.

Microinvasive carcinoma of the vulva.

Wilkinson EJ, Rico MJ, Pierson KK.

Abstract

Thirty cases of microinvasive squamous cell carcinoma of the vulva were seen from 1972 to 1978 inclusive. They comprised 37.7% of 77 c squamous carcinoma of the vulva seen during this period of time. The results of analysis of multiple factors, including tumor depth and pat invasion, nuclear and histologic grade, volume, inflammatory response, presence of vascular invasion, and depth of invasion as compared of adjacent skin appendages and rete ridges are presented. Two patients were found to have inguinal lymph node metastasis: in one of th the tumor was deeper than the adjacent deepest skin appendages while in the second patient skin appendages were not adjacent to the t These tumors measured 2.25 and 1.8 mm in depth, respectively. In both patients the tumor was of high nuclear grade and had a diffuse pa infiltration. No nodal metastases were found in patients whose tumors did not invade deeper than 1.5 mm or deeper than the adjacent dee appendage. Tumors measuring 1.5 mm in depth had tumor volumes under 1,000 mm3. The only death from tumor that occurred in this se occurred in a woman who had a second primary tumor of the vulva following a local excision for her microinvasive carcinoma. The definitio measurements of microinvasive carcinoma of the vulva are discussed and an improved method of measurement is proposed.

PMID: 7184888 [PubMed - indexed for MEDLINE]

Int J Gynecol Cancer 2006, **16**, 963–971

REVIEW PAPERS

Prediction of lymph node metastases in vulvar cancer: a review

M.H.M. OONK*, H. HOLLEMA†, J.A. DE HULLU‡ & A.G.J. VAN DER ZEE*
Department of Gynaecologic Oncology; †Department of Pathology, University Medical Center Groningen, Groningen, The Netherlands; ‡Department of Gynaecologic Oncology, University Medical Center Nymegen, Nymegen, The Netherlands

Abstract. Oonk MHM, Hollema H, de Hullu JA, van der Zee AGJ. Prediction of lymph node metastases in vulvar cancer: a review. *Int J Gynecol Cancer* 2006;**16**:963–971.

The aim of this study was to review the literature on currently available non- and minimally-invasive diagnostic methods and analysis of primary tumor characteristics for prediction of inguinofemoral lymph node metastases in patients with primary squamous cell carcinoma of the vulva. We used the English language literature in Pubmed and reference lists from selected articles. Search terms included vulvar carcinoma, prognosis, lymph node metastases, ultrasound, computer tomography, magnetic resonance imaging, positron emission tomography, and sentinel lymph node. No study type restrictions were imposed. Currently no noninvasive imaging techniques exist that are able to predict lymph node metastases with a high enough negative predictive value. A depth of invasion ≤1 mm is the only histopathologic parameter that can exclude patients for complete inguinofemoral lymphadenectomy. No other clinicopathologic parameter allows exclusion of lymph node metastases with a high enough negative predictive value. The minimally invasive sentinel node procedure is a promising technique for selecting patients for complete lymphadenectomy, but its safety has not been proven yet.

KEYWORDS: diagnostic tests, lymph node metastases, vulvar carcinoma.

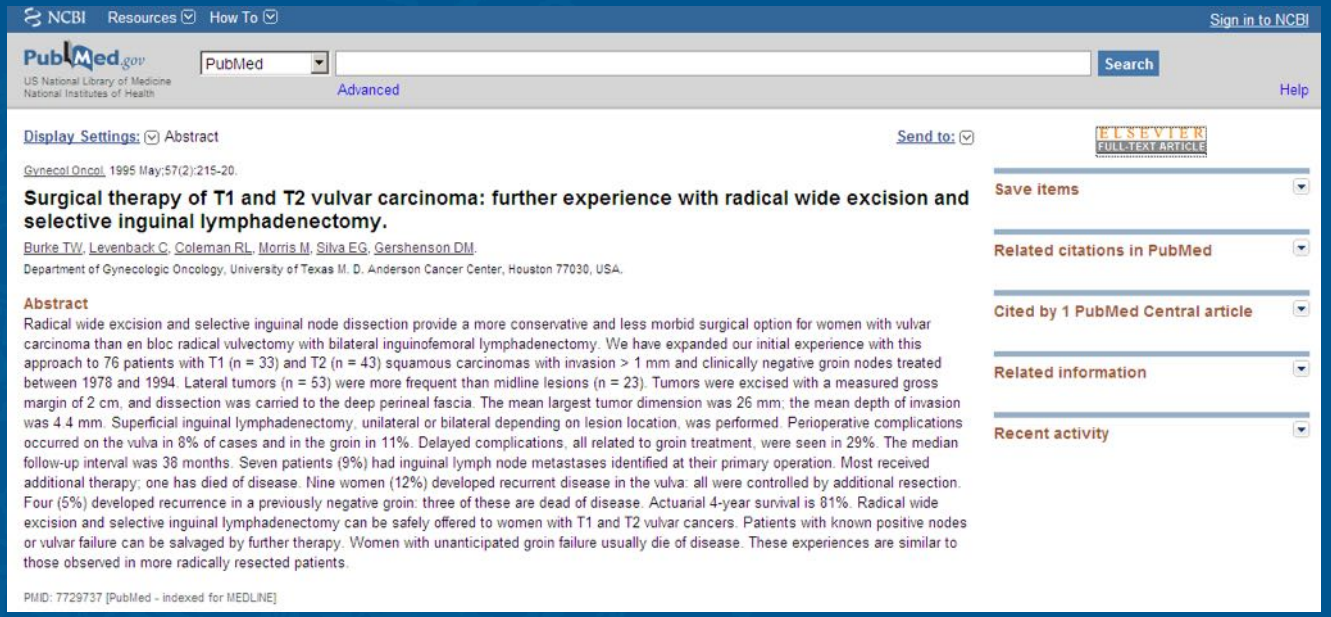
Omission of nodal surgical staging If T stromal invasion < 1 mm

Risk of groin metastasis is negligible

CRITERIA FOR SURGERY

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

MONOLATERAL LYMPHADENECTOMY



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Gynecol Oncol. 1995 May;57(2):215-20.

Surgical therapy of T1 and T2 vulvar carcinoma: further experience with radical wide excision and selective inguinal lymphadenectomy.

Burke TW, Levenback C, Coleman RL, Morris M, Silva EG, Gershenson DM.

Department of Gynecologic Oncology, University of Texas M. D. Anderson Cancer Center, Houston 77030, USA.

Abstract

Radical wide excision and selective inguinal node dissection provide a more conservative and less morbid surgical option for women with vulvar carcinoma than en bloc radical vulvectomy with bilateral inguinofemoral lymphadenectomy. We have expanded our initial experience with this approach to 76 patients with T1 (n = 33) and T2 (n = 43) squamous carcinomas with invasion > 1 mm and clinically negative groin nodes treated between 1978 and 1994. Lateral tumors (n = 53) were more frequent than midline lesions (n = 23). Tumors were excised with a measured gross margin of 2 cm, and dissection was carried to the deep perineal fascia. The mean largest tumor dimension was 26 mm; the mean depth of invasion was 4.4 mm. Superficial inguinal lymphadenectomy, unilateral or bilateral depending on lesion location, was performed. Perioperative complications occurred on the vulva in 8% of cases and in the groin in 11%. Delayed complications, all related to groin treatment, were seen in 29%. The median follow-up interval was 38 months. Seven patients (9%) had inguinal lymph node metastases identified at their primary operation. Most received additional therapy; one has died of disease. Nine women (12%) developed recurrent disease in the vulva: all were controlled by additional resection. Four (5%) developed recurrence in a previously negative groin: three of these are dead of disease. Actuarial 4-year survival is 81%. Radical wide excision and selective inguinal lymphadenectomy can be safely offered to women with T1 and T2 vulvar cancers. Patients with known positive nodes or vulvar failure can be salvaged by further therapy. Women with unanticipated groin failure usually die of disease. These experiences are similar to those observed in more radically resected patients.

PMID: 7729737 [PubMed - indexed for MEDLINE]

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Mono-ipsilateral inguinofemoral lymphadenectomy

- unilateral tumors distant > 1 cm from the median line
- clinically negative groin lymph nodes risk of contralateral metastasis 0.4 %

CRITERIA FOR SURGERY

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

SAPHENOUS VEIN SPARING

Routinary sparing of the saphenous vein

Estimated benefit:
30% of reduction in legs lymphedema and thrombosis

Preservation of the Saphenous Vein during Inguinal Lymphadenectomy Decreases Morbidity in Patients with Carcinoma of the Vulva

Sunny H. Zhang M.D., Ph.D.
Anil K. Sood, M.D.
Joel I. Sorosky, M.D.
Barrie Anderson, M.D.
Richard E. Buller, M.D., Ph.D.

Division of Gynecologic Oncology, Department of Obstetrics and Gynecology, University of Iowa Hospitals and Clinics, Iowa City, Iowa.

BACKGROUND. Traditional inguinal lymphadenectomy includes the removal of a portion of the saphenous vein. The authors hypothesized that preserving the saphenous vein would decrease morbidity without affecting treatment outcome.
METHODS. A retrospective review of 83 patients with carcinoma of the vulva who underwent inguinal lymphadenectomy between 1990–1998 was performed. Postoperative short term and long term complications were evaluated.
RESULTS. A total of 139 inguinal dissections were performed in 83 patients. The saphenous vein was preserved in 62 patients and ligated in 77 patients. The clinical characteristics of the patients, the operating time, and the estimated blood loss were not significantly different between the two groups. The incidence rate of short term complications including fever, seroma, phlebitis, lymphocyst, and deep venous thrombosis also was similar. Cellulitis occurred in 39% of the patients who underwent vein ligation compared with 18% of the patients who underwent a vein-sparing procedure ($P = 0.006$). Short term (< 6 months) lower extremity lymphedema occurred in 70% of the vein-ligated group compared with 32% of the vein-spared group ($P < 0.001$). Chronic edema (≥ 2 years) was present in only 3% of the patients who underwent saphenous vein preservation compared with 32% of those who underwent vein ligation ($P = 0.003$). Chronic lymphedema in the vein-spared group was observed in only one patient who received postoperative radiation. Overall, individuals with preservation of the saphenous vein were less likely to develop complications (56% vs. 23%; $P < 0.001$). There was no difference in the rate of incidence of recurrent disease between the two groups.
CONCLUSIONS. Preservation of the saphenous vein during inguinal lymphadenectomy reduces both the short term and long term postoperative complications without affecting treatment outcome. The saphenous vein should be preserved routinely in patients undergoing inguinal lymphadenectomy. *Cancer* 2000;89:1520–5. © *2000 American Cancer Society.*

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

SENTINEL NODE BIOPSY

Available online at www.sciencedirect.com
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Gynecologic Oncology 111 (2008) 282–288
Gynecologic Oncology
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Validation of the accuracy of the sentinel lymph node procedure in patients with vulvar cancer: Results of a multicenter study in Germany

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German multicenter study group

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[b] Women's Hospital, Regional Hospital of Altötting, Germany
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Received 7 June 2008
Available online 19 September 2008

Adoption of SNB as a reliable nodal staging system avoid bilateral IFL in almost 70% of cases

Methods

- 127 pts cT1-T3, cN0
- SNB Tc99-labeled nanocolloid and/or blu die
- Complete inguinofemoral lymphadenectomy

Aims

- Detection rate of the SLN
- Sensitivity, specificity and NPV of the SLN

Results

- Pathologic positive nodes in one or both groins – 30.7%
- SNB sensitivity – 92.3%
- False negative rate – 7.7%

CRITERIA FOR SURGERY

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

SENTINEL NODE BIOPSY

VOLUME 26 · NUMBER 6 · FEBRUARY 20 2008

JOURNAL OF CLINICAL ONCOLOGY

ORIGINAL REPORT

Sentinel Node Dissection Is Safe in the Treatment of Early-Stage Vulvar Cancer

Ate G.J. Van der Zee, Maaike H. Oonk, Joanne A. De Hullu, Anca C. Ansink, Ignace Vergote, René H. Verheijen, Angelo Maggioni, Katja N. Gaarenstroom, Peter J. Baldwin, Eleonore B. Van Dorst, Jacobus Van der Velden, Ralph H. Hermans, Hans van der Putten, Pierre Drouin, Achim Schneider, and Wim J. Sluiter

Results

- SNB is a vary safe procedure in selected early vulvar cancer:
- T < 4 cm
- Unifocal disease
- Midline disease with bilateral drainage in lymphscintigram
- Using the radiotracer procedure instead of blu-dye

Pros

- Less morbidity
- Ultrastaging with serial sections and IHC (micrometa and ITC detection)
- Possible localization on nodes in atypical positions (radioisotope)
- Overall minor costs

Cons

- Experienced dedicated surgeons
- Nuclear medicine unite
- Specific devices (gamma probe)

The largest observational multicentric study

403 pts and 623 groins
T1-T2 clinically and radiologically N0
SNB Tc99-labeled nanocolloidand/or blu die

127 pts complete IFL

259 unifocal + 17 multifocal no IFL

CRITERIA FOR SURGERY

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

SENTINEL NODE BIOPSY

Review

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EXPERT REVIEWS

Update on the sentinel lymph node procedure in vulvar cancer

Expert Rev. Anticancer Ther. 10(1), 61–69 (2010)

Maaike HM Oonk, Hedwig P van de Nieuwenhof, Ate GJ van der Zee and Joanne A de Hullu†

†Author for correspondence Department of Obstetrics and Gynecology, Radboud University Nijmegen Medical Centre,

Currently, standard treatment for early-stage vulvar cancer typically includes wide local excision of the primary tumor and inguinofemoral lymphadenectomy. The morbidity of this treatment is high. The sentinel lymph node (SLN) procedure provides us with a technique for determining the status of the regional lymph nodes with less treatment-related morbidity. Recently, a large multicenter observational study provided level 3 evidence indicating that it appears safe to omit inguinofemoral lymphadenectomy in case of a negative SLN. This review focuses on the different aspects of the SLN procedure in vulvar cancer.

KEYWORDS: micrometastases • sentinel lymph node • squamous cell cancer • surgery • vulvar cancer

Key issues

- The sentinel lymph node (SLN) procedure is safe in the treatment of early-stage vulvar cancer with clinically negative lymph nodes.
- Application of the SLN procedure should be centralized in oncology centers to keep the experience of surgeons at a sufficient level and to ensure quality control at every step of the multidisciplinary procedure.
- All SLN metastases require adjuvant treatment, independent of their size.
- Treatment-related morbidity is much lower when only a SLN is removed compared with inguinofemoral lymphadenectomy.
- A standard protocol for pathologic examination of SLNs in vulvar cancer should be formulated.
- The Groningen International Study on Sentinel Nodes in Vulvar Cancer (GROINSS-V-II) trial will answer the question of whether radiotherapy alone is sufficient in the treatment of patients with a positive SLN.

CRITERIA FOR SURGERY

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

CRITERIA FOR SURGERY

I. Restricted more than possible

II. Radical and oncologically safe

III. Supported by plastic surgical techniques

IV. Peri-operative management protocols

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

SOME RECOMMENDATIONS FROM LITERATURE

VULVAR SURGERY

- Obtain microscopical tumor free margins measuring > 8 mm, observing about 2 cm of macroscopic resection margins (1)
- Avoid conservative surgery when tumor is bilateral or multifocal, in favor of a radical vulvectomy (2)
- Remove the skin bridge between inguinal regions and perineal area in cases of massive metastatic involvement of the groin lymph nodes (3)

(1) Boonstra 1983
(2) Dittmer 2012
(3) De Hullu 2002

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

SOME RECOMMENDATIONS FROM LITERATURE

INGUINOFEMORAL SURGERY

- IFL should always include the removal of deep LN, located below the cribriform fascia and medial from the femoral vein (1)
- Bilateral radical IFL should be performed in case of positive SN or when the tracer does not reach inguinal regions (2)
- In case of a midline tumor a SLN should be identified in both groins, if not, the SNB procedure shoud be abandoned and lymphadenectomy performed (3)

1) Hacker 2000
2) Van der Zee 2008
3) Recomandation by a panel of Internentional Lymph Node Society - ISNS - 2008

CRITERIA FOR SURGERY

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

CRITERIA FOR SURGERY

I. Restricted more than possible

II. Radical and oncologically safe

III. Supported by oncoplastic surgical techniques

IV. Peri-operative management protocols

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

When disease is locally advanced and surgery is still indicated oncoplastic and reconstructive surgical techniques are necessary, allowing:

- ultraradical extended surgery
- tension free closures
- rehabilitation of the basic functions otherwise compromised (as walking and sitting)
- sometimes the preservation of sensitive facilities
- good long-term results

CRITERIA FOR SURGERY

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

THE MOST IMPORTANT FEATURES OF AN ADEQUATE FLAP

- same thickness of the wound
- preservation of sensitive facilities
- require a single-stage operation
- minimal donor-site effects

ORIGINAL ARTICLE

Flap Algorithm in Vulvar Reconstruction After Radical, Extensive Vulvectomy

Marzia Salgarello, MD, Eugenio Farallo, MD,* Liliana Barone-Adesi, MD,* Daniele Cervelli, MD,* Giovanni Scambia, MD,† Giovanna Salerno, MD,‡ and Pasquale Alessandro Margaritti, MD‡*

Abstract: The objective of this study was to assess the reconstructive options after radical, extensive vulvectomy; relate them to tumor characteristics; and select a choice of flaps able to correct every remaining defect. This study is a retrospective review of a 4-year experience with 31 flaps in 20 consecutive vulvar reconstructions. Three of the 31 flaps presented nonsignificant delayed healing at their tips and 3 other flaps developed a major breakdown related to an infection or an error in flap planning. According to the authors, the size of the defect is the main issue that must be taken into consideration during the establishment of reconstructive needs. Closure of vulvar defects is preferably performed using fasciocutaneous flaps, which are very reliable flaps and can be raised with different techniques to meet different needs. A flap is then chosen with the fewest potential complications. An algorithm has been thus established: Small to medium-size defects are closed with island V-Y flaps, island gluteal fold flaps, or pedicled pudendal thigh flaps. Among them, the island V-Y flap is the workhorse flap for vulvar reconstruction because of its versatility, reliability, and technical simplicity compared with its very low complication rate. If the vulvar defect is large and/or reaches the vulva–crural fold, V-Y flaps are also preferred to close these large and posteriorly extended excisions. If the vulvar defect is very large, extending both anteriorly and posteriorly, the use of a distally based, vertically oriented rectus abdominis muscle flap is recommended. Using this algorithm, immediate vulvar reconstruction with pedicled local or regional flaps can be performed easily and reliably.

Key Words: vulvar reconstruction, radical vulvectomy, fasciocutaneous flap, musculocutaneous flap, algorithm for vulvar reconstruction

(*Ann Plast Surg* 2005;54: 184–190)

Vulvoperineal reconstruction resulting from oncologic extirpative surgery such as radical, extensive vulvectomy is a challenge for the surgeon. The use of flaps is required in the case of large defects. In the case of smaller defects, the use of flaps allows free-tension closure. This can avoid wound diastase and delayed healing.

Many flaps have been used in the search for a reliable, single-stage, technically simple flap to repair the majority of surgical defects. This has led to numerous surgical options, ranging from random to axial, fasciocutaneous, and musculocutaneous flaps.[1–14]

The "ideal" flap should (1) bring to the defect a good vascularized pad of skin and subcutaneous fat the same thickness of the wound, (2) bring a variable amount of tissue able to close both small to wide wounds, (3) reestablish functional needs, (4) minimize negative impacts on both walking and sitting, (5) create a natural aesthetic appearance, (6) possibly be a sensitive flap, and (7) require a single-stage operation.

We think that a single flap cannot meet all these needs. Many local flaps share favorable properties in terms of reliability and versatility, but are not suitable to close every individual defect. This study presents a retrospective review of our past 4 years of experience using 31 flaps in 20 vulvar reconstructions, exploring the needs of vulvar reconstruction in the search for a suitable flap to fit every vulvar defect. Based on our experience, we determined a selection of 4 different flaps, thus establishing an algorithm for vulvar flap reconstruction.

Various reconstructive techniques can be performed to repair the different size and site skin defects

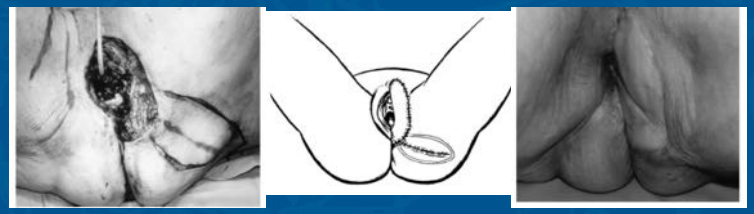
CRITERIA FOR SURGERY

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

- local dermo-hypodermal rotation and transposition flaps
- mio-cutaneous flaps

PUDENDAL TIGHT FLAP.

Vertically oriented small to medium-size defects. It is not suitable if inguinal crural crease,is involved

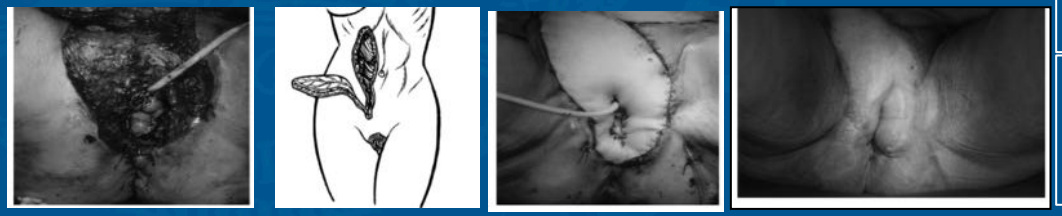


GLUTEAL FOLD FLAP.

Vertically oriented small to medium-size defects and narrow defects along the inguinal– crural fold

V-Y FASCIOCUTANEOUS FLAP

small, medium-size, and extensive defects, especially if they are located posteriorly



VRAM FLAP.

every kind of defect deeper ones extending adjoining areas

CRITERIA FOR SURGERY

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

	Donor site	Blood supply	Sensory innervation	Ref
Grafts				
Split-thickness skin graft	Distant	NA	Recipient site	14,15
Full-thickness skin graft	Distant	NA	Recipient site	16
Buccal mucosa graft	Distant	NA	Recipient site	17
Random skin flaps				
Limberg flaps*	Local	Random	S3,4 dermatomes	18
Pubolabial V-Y amplified advancement flap†	Local	Random	L1,2; S3,4 dermatomes	19
Medial thigh V-Y advancement flap, with or without gracilis muscle	Local	Random	L2; S3,4 dermatomes	20,21
Gluteal V-Y advancement flap, with or without gluteus maximus muscle	Local	Random	S2–4 dermatomes	22,23
Axial pattern skin flaps				
Anterior labial flap‡	Local	Descending branch of superficial external pudendal artery	NA	24
Posterior labial flap‡	Local	Posterior labial artery (terminal branch of internal pudendal artery)	NA	25
Mons pubis flap§	Local	Superficial external pudendal artery	NA	26
Groin flap	Local	Superficial circumflex iliac artery	NA	27,28
Fasciocutaneous flaps				
Pudendal thigh flaps¶	Local	Perineal terminal branches of internal pudendal artery	Superficial perineal branches of pudendal nerve; perineal branches of posterior cutaneus nerve of thigh	29,30
Anterolateral thigh flap	Distant	Lateral circumflex femoral artery	Lateral femoral cutaneous nerve	31
Medial thigh flap	Distant	Branch of superficial femoral artery	Anterior cutaneous branches of femoral nerve	32
Musculocutaneous flaps				
Rectus femoris flap	Distant	Lateral circumflex femoral artery	Anterior cutaneous branches of femoral nerve	33
Tensor fasciae latae flap	Distant	Lateral circumflex femoral artery	Lateral femoral cutaneous nerve	34
Vastus lateralis flap	Distant	Lateral circumflex femoral artery	Lateral femoral cutaneous nerve	35
Gluteal thigh flap‖	Distant	Terminal branches of inferior gluteal artery	Posterior cutaneous nerve of thigh	36
Gracilis flap	Distant	Medial circumflex femoral artery	Anterior cutaneous branches of femoral nerve; cutaneous branch of obturator nerve	37
Short gracilis flap	Distant	Terminal branches of obturator artery	Cutaneous branch of obturator nerve	38
Rectus abdominis flap**	Distant	Deep inferior epigastric artery	NA	39
Deep inferior epigastric perforator flap	Distant	Deep inferior epigastric artery	NA	40,41
Bowel flaps				
Ileum flap	Distant	Ileal artery	NA	42
(Ileo)caecum flap	Distant	Ileocolic artery	NA	43
Sigmoid-colon flap	Distant	Sigmoid-colon artery	NA	44

Michael Höckel, Nadja Dornhöfer Lancet Oncol 2008; 9: 559–68

CRITERIA FOR SURGERY

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

CRITERIA FOR SURGERY

I. Restricted more than possible

II. Radical and oncologically safe

III. Supported by plastic surgical techniques

IV. Peri-operative management protocols

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

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ScienceDirect

Gynecologic Oncology 103 (2006) 467–472

Gynecologic Oncology

www.elsevier.com/locate/ygyno

Advanced vulvar carcinoma: Is it worth operating? A perioperative management protocol for radical and reconstructive surgery

Francesco Fanfani [a], Giorgia Garganese [a], Anna Fagotti [a], Domenica Lorusso [a], Maria Lucia Gagliardi [a], Marco Rossi [b], Marzia Salgarello [c], Giovanni Scambia [a,*]

[a] *Department of Oncology, Division of Gynecologic Oncology, Catholic University of Sacred Heart, Campobasso, Italy*
[b] *Department of Anesthesiology and Intensive Care, Catholic University of Sacred Heart, Campobasso, Italy*
[c] *Department of Plastic Surgery, Catholic University of Sacred Heart, Rome, Italy*

Received 6 December 2005
Available online 2 May 2006

It is cautiously to combine perioperative protocols for local and systemic care and management

CRITERIA FOR SURGERY

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

Pre-operative

- improve preoperatory caloric supply
- administration of probiotics

Intra-operative

- use of dynamic legs compression

Post-operative

- fasting /parenteral nutrition
- antibiotics and anti-diarrhoic drugs
- prophylaxis for thromboembolism
- inflatable mattress and immobilization
- carefull management of the wound
- blood oxygenation by ventimask
- prolonging transurethral catheter

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

NEXT TARGETS

Identification of new ***biologic factors***

- Uptake of natural history
- Identification of prognosis predictors
- Identification of response predictors to drug or physical treatments

Modulation of surgical extent

Scheduling of the non surgical neoadjuvant treatment

A shared and approved ***standard of care***

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

HUMAN PATHOLOGY Volume 32, No. 1 (January 2001)

Original Contributions

Expression of Cell-Cycle–Associated Proteins pRB2/p130 and $p27^{kip1}$ in Vulvar Squamous Cell Carcinomas

ALESSANDRA ZAMPARELLI, BS, VALERIA MASCIULLO, MD, ALESSANDRO BOVICELLI, MD, DONATELLA SANTINI, MD, GABRIELLA FERRANDINA, MD, CORRADO MINIMO, MD, PATRIZIA TERZANO, MD, SILVANO COSTA, MD, CATERINA CINTI, BS, CLAUDIO CECCARELLI, BS, SALVATORE MANCUSO, MD, GIOVANNI SCAMBIA, MD, LUCIANO BOVICELLI, MD, AND ANTONIO GIORDANO, MD, PHD

The significant progressive ***decrease of pRB2/p130*** expression from non-neoplastic epithelial alterations to invasive vulvar carcinomas suggests ***a role for this tumor suppressor gene in vulvar carcinogenesis***

biologic factors

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

Histopathology 2011, **58**, 265–275. DOI: 10.1111/j.1365-2559.2011.03744.x

Changes in the expression of oestrogen receptors and E-cadherin as molecular markers of progression from normal epithelium to invasive cancer in elderly patients with vulvar squamous cell carcinoma

Gian F. Zannoni,[1]* Maria G. Prisco,[2]* Valerio G. Vellone,[1,2] Ilaria De Stefano,[2] Giovanni Scambia[2] and Daniela Gallo[2]

[1]*Department of Histopathology, and* [2]*Department of Obstetrics and Gynaecology, Catholic University of the Sacred Heart, Rome, Italy*

Date of submission 10 September 2009
Accepted for publication 23 March 2010

Results showed that ***changes in both ERa and ERb*** expression characterize the ***transition from normal epithelium to cancer*** in patients with vulvar SCC

biologic factors

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

Histopathology 2011, **59**, 909–917. DOI: 10.1111/j.1365-2559.2011.04029.x

Cytoplasmic expression of oestrogen receptor beta (ERβ) as a prognostic factor in vulvar squamous cell carcinoma in elderly women

Gian F Zannoni,[1,*] Maria G Prisco,[2,*] Valerio G Vellone,[1,2] Ilaria De Stefano,[2] Giuseppe Vizzielli,[2] Lucia Tortorella,[2] Anna Fagotti,[2] Giovanni Scambia[2] & Daniela Gallo[2]

Departments of [1]Histopathology, and [2]Obstetrics and Gynecology, Catholic University of the Sacred Heart, Rome, Italy

Date of Submission 3 September 2010
Accepted for publication 4 January 2011

Zannoni G F, Prisco M G, Vellone V G, De Stefano I, Vizzielli G, Tortorella L, Fagotti A, Scambia G & Gallo D (2011) *Histopathology* **59**, 909–917

Cytoplasmic expression of oestrogen receptor beta (ERβ) as a prognostic factor in vulvar squamous cell carcinoma in elderly women

The assessment of ***cytoplasmic Erb expression*** could be helpful to ***identify poor prognosis*** in elderly patients with non-HPV-related vulvar squamous cell carcinoma (SCC).

biologic factors

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

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Available online at www.sciencedirect.com
SCIENCE DIRECT®

Gynecologic Oncology 92 (2004) 537–544

Gynecologic Oncology
www.elsevier.com/locate/ygyno

Expression of cyclooxygenase-2 (COX-2) in non-neoplastic and neoplastic vulvar epithelial lesions

Gabriella Ferrandina,[a] Franco Oreste Ranelletti,[b] Vanda Salutari,[a] Marco Gessi,[c] Francesco Legge,[a] Gian Franco Zannoni,[c] Giovanni Scambia,[a] and Libero Lauriola[c,*]

[a] *Department of Obstetrics and Gynecology, Catholic University of the Sacred Heart, Rome, Italy*
[b] *Department of Histology, Catholic University of the Sacred Heart, Rome, Italy*
[c] *Department of Pathology, Catholic University of the Sacred Heart, Rome, Italy*

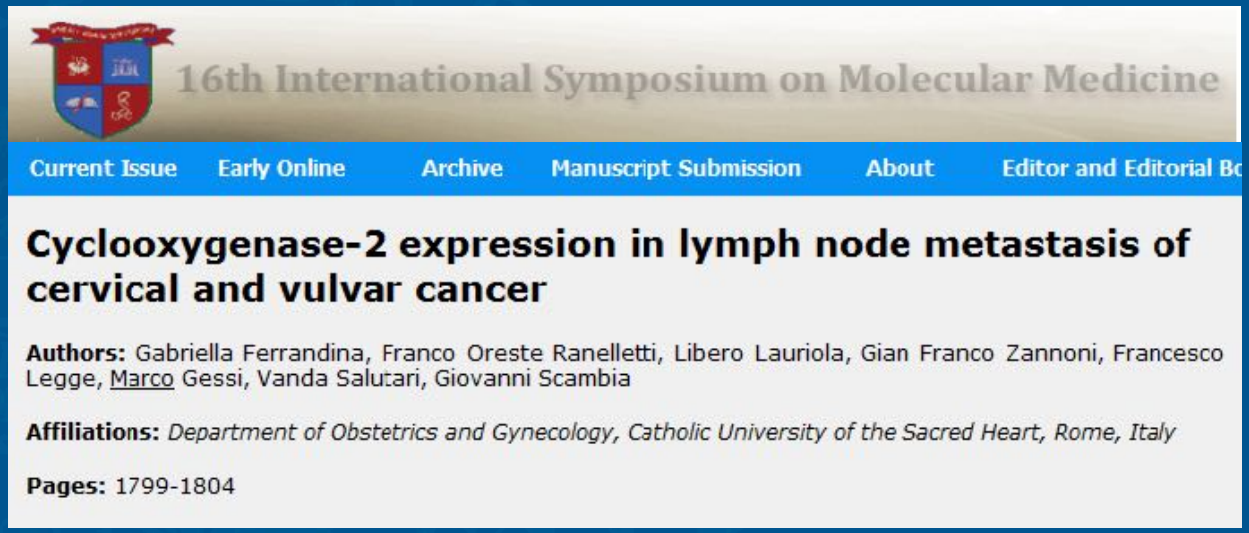
Received 27 March 2003

COX-2 overexpression may contribute to vulvar ***tumorigenesis and progression.***

Tumor/stroma COX-2 IDV ratio could have a prognostic role in vulvar cancer

biologic factors

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**



16th International Symposium on Molecular Medicine

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Cyclooxygenase-2 expression in lymph node metastasis of cervical and vulvar cancer

Authors: Gabriella Ferrandina, Franco Oreste Ranelletti, Libero Lauriola, Gian Franco Zannoni, Francesco Legge, Marco Gessi, Vanda Salutari, Giovanni Scambia

Affiliations: *Department of Obstetrics and Gynecology, Catholic University of the Sacred Heart, Rome, Italy*

Pages: 1799-1804

COX-2 expression is down-regulated in vulvar tumor cells invading the regional lymph nodes with respect to primary tumors

need for deeper insight into the tissue **specific relation between tumor cells and node microenvironment**

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

NEXT TARGETS

Identification of new ***biologic factors*** *for the*

- Uptake of natural history
- Identification of prognosis predictors
- Identification of response predictors to drug or physical treatments

Modulation of surgical extent

Scheduling of the non surgical neoadjuvant treatment

A shared and approved ***standard of care***

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

Almost all existing guidelines were published before 2009 and do not take into account

- revised FIGO staging system (2009)
- new technical tools (e.g. SNB)

January 2006
Royal College Of Obstetricians And Gynaecologists
"Management of vulval cancer"

Published by the RCOG Press at the Royal College of Obstetricians and Gynaecologists, 4RS

Agreed 2009, Review 2012

July 2006
Society of Obstetricians and Gynaecologists of Canada
"Management of Squamous Cell Cancer of the Vulva"

Principal Author: John Jeffrey, Chair, MD, FRCSC, Kingston ON

Last modified: 09/07/12
National Cancer Institute
"Vulvar Cancer Treatment"

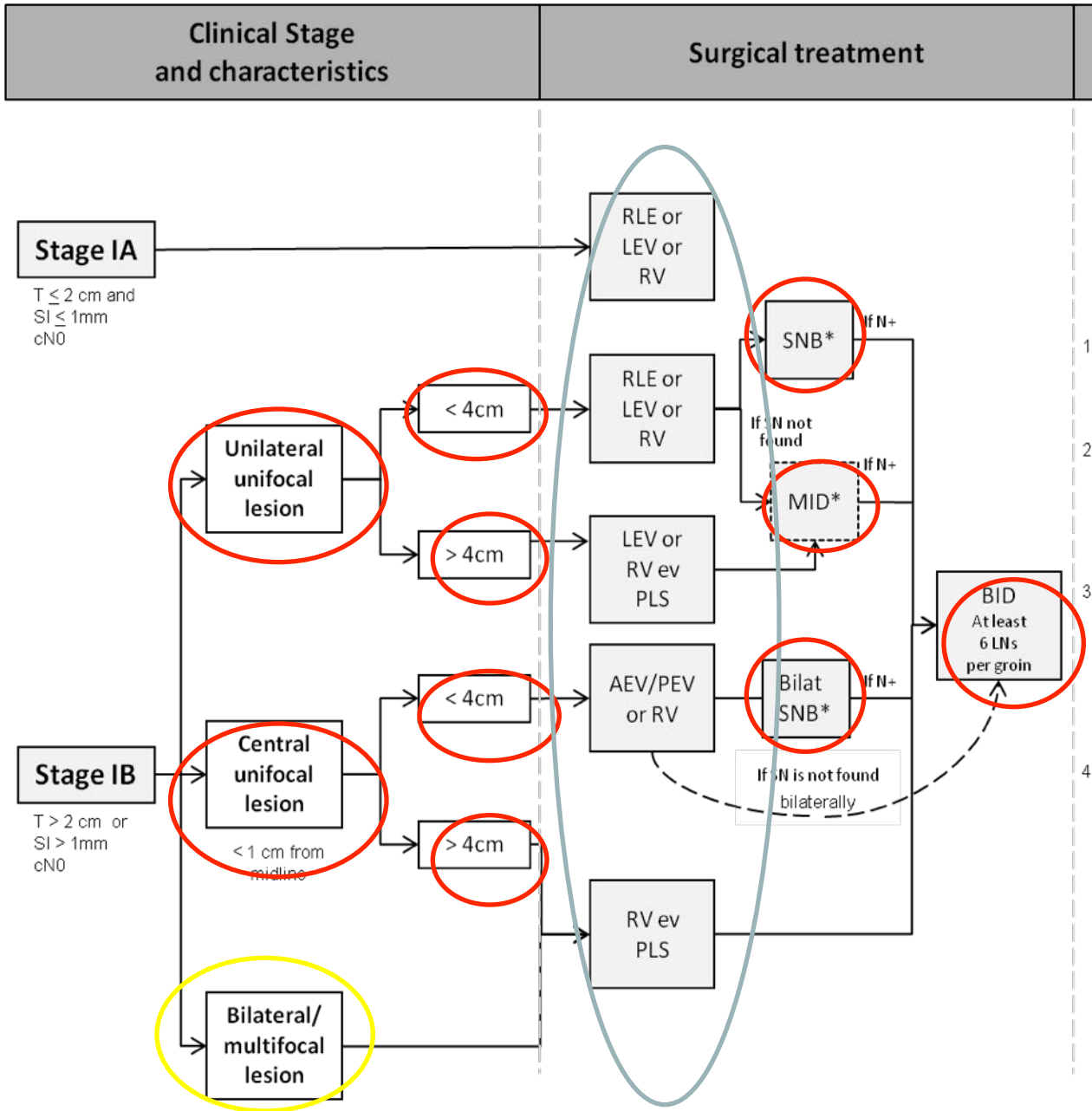
http://www.cancer.gov/cancertopics/pdq/treatment/vulvar/HealthProfessional

NCCN National Comprehensive Cancer Network

...ire – Cancer Network
...gical Management of Vulvar Cancer"

Policlinico Gemelli IMPEGNO PER L'ECCELLENZA

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**



VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

NEO-ADJUVANT TREATMENT

Chemo-radiation therapy

- CRT is mainly used in advanced vulvar cancer involving neighboring structures, where exenteration and/or bone or muscle resection would be necessary to obtain clear margins (1)
- More in general, CRT is an option to reduce tumor volume and the extent of surgery

Chemotherapy

- CT is not a common approach
- It is mainly used in the primary metastatic setting or in pts with recurrence after RT1

(1) Hoffman 2003

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

CHEMOTHERAPY

Gynecol Oncol. 1993 Jul;50(1):49-53.

Cisplatin (P), bleomycin (B), and methotrexate (M) preoperative chemotherapy in locally advanced vulvar carcinoma.

Benedetti-Panici P, Greggi S, Scambia G, Salerno G, Mancuso S.

Department of Gynecology & Obstetrics, Università Cattolica del Sacro Cuore Medical School, Rome, Italy.

Abstract

Based on the encouraging results of neoadjuvant chemotherapy (NACT) and radical surgery (RS) observed in locally advanced cervical cancer, 21 patients with advanced squamous cell carcinoma of the vulva (FIGO stages, IVa, 21; TNM stages, T2N2M0, 6, T3N2M0, 11, T4N2M0, 4) were submitted to two to three cycles of cisplatin (P, 100 mg/m2, Day 1), bleomycin (B, 15 mg, Days 1, 8), and methotrexate (M, 300 mg/m2 + cfr, Day 8) NACT followed by RS in operable patients. Two patients (10%) had a partial response in the primary tumor (T) and 14 (67% CR+PR) in the inguinal nodes (N). The operability rate following NACT was 90% (pathological downstaging rate, 33%) but surgery was really radical in 79% of cases. Pathological N response was significantly related to the pathological T downstaging, and a persistently high N positivity rate was detected (inguinal, 81%; pelvic, 47%). NACT+RS had an acceptable morbidity but the therapeutic results were less encouraging than expected with a 3-year survival of 24% and stage, pathological T downstaging, and N status all significantly affected survival. Sixty-eight percent of the operated patients recurred 3-17 months from the end of treatment and 50% of them had a distant relapse. PBM NACT did not seem to add any substantial benefit to the surgery alone in this subset of patients with extremely advanced disease. Studies on a chemoradiotherapeutic approach are currently in progress in order to confirm the promising preliminary results.

PBM NACT did not seem to add any substantial benefit to the surgery in patients with extremely advanced disease.

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

Int J Gynecol Cancer. 2012 Jun;22(5):865-8. doi: 10.1097/IGC.0b013e31824b4058.

Weekly paclitaxel/carboplatin in the treatment of locally advanced, recurrent, or metastatic vulvar cancer.

Han SN, Vergote I, Amant F.
Division of Gynecologic Oncology, Leuven Cancer Institute, University Hospitals Leuven, Katholieke Universiteit Leuven, Belgium.

Weekly administration of paclitaxel-carboplatin has limited clinical benefit in the treatment of vulvar squamous cell carcinoma

Int J Gynecol Cancer. 2010 Feb;20(2):294-8.

Neoadjuvant chemotherapy in advanced vulvar cancer.

Domingues AP, Mota F, Durão M, Frutuoso C, Amaral N, de Oliveira CF.
Gynecology Department, Coimbra University Hospitals, Coimbra, Portugal. anapatriciadomingues@hotmail.com

25 patients included in NACT protocols:
10 with bleomicine, 5 with paclitaxel and 10 with 5-fluorouracil/cisplatin
The best response and overall survival rates were achieved with the NACT scheme of bleomicine.

Recent studies point to the use of **target** therapy

Chemotherapy

VULVAR CANCER SURGERY: WHY, WHEN AND HOW

CONCLUSIONS

Given the rarity of disease and technical skills required

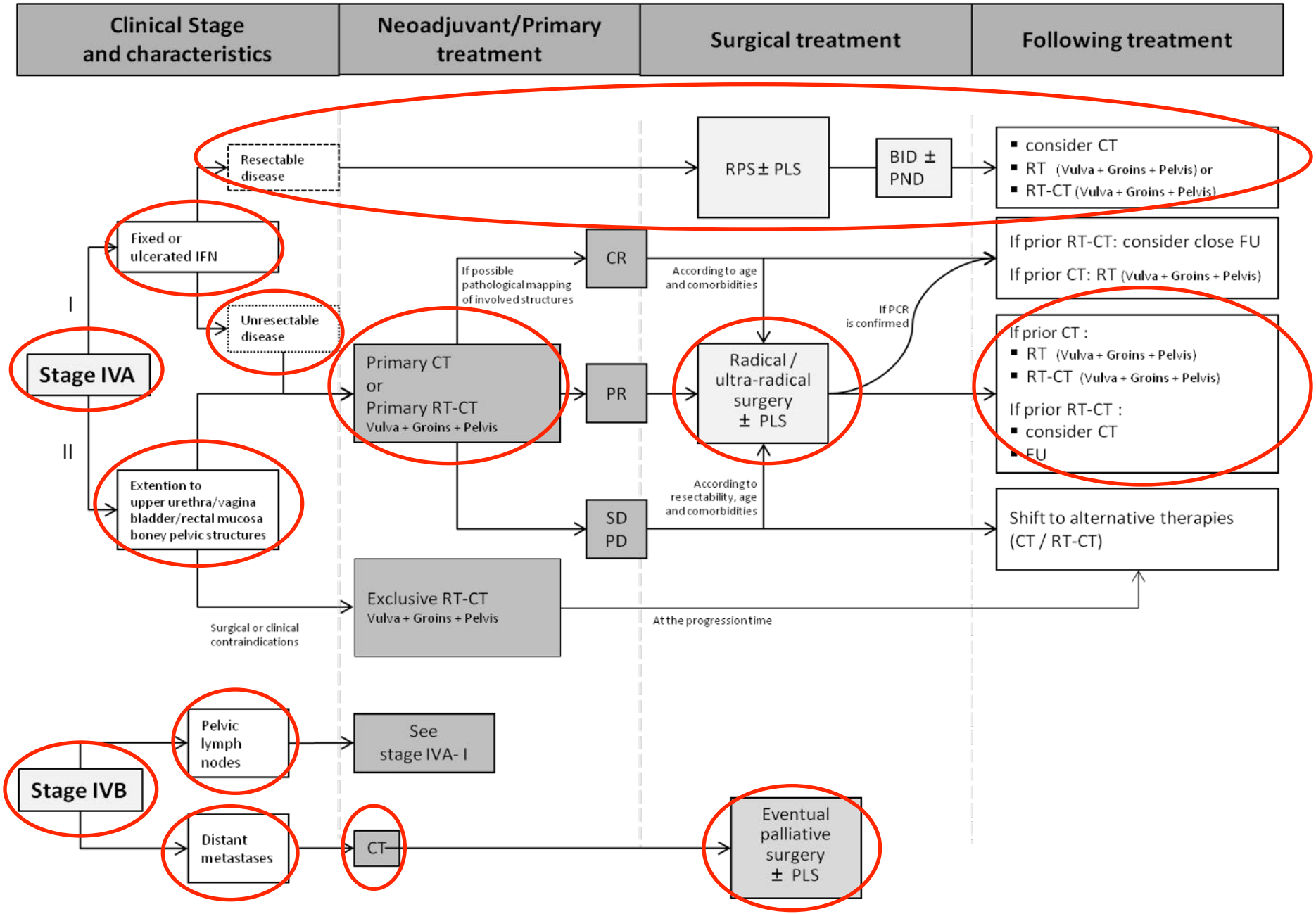
- Address every single vulvar cancer to oncology cancer centers
  - collect experience
  - implement prospective and randomized clinical trials and allow an auditing practice
  - obtaining also a more favorable outcome.
- Multidisciplinary team including dedicated healthcare professionals
  - gynecological oncologist
  - plastic surgeon
  - Radiologist
  - nuclear medicine physician
  - radiotherapist
  - gynecological pathologist
  - Psychologist
  - specialist nurse
  - Physiotherapist
  - palliative care team

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

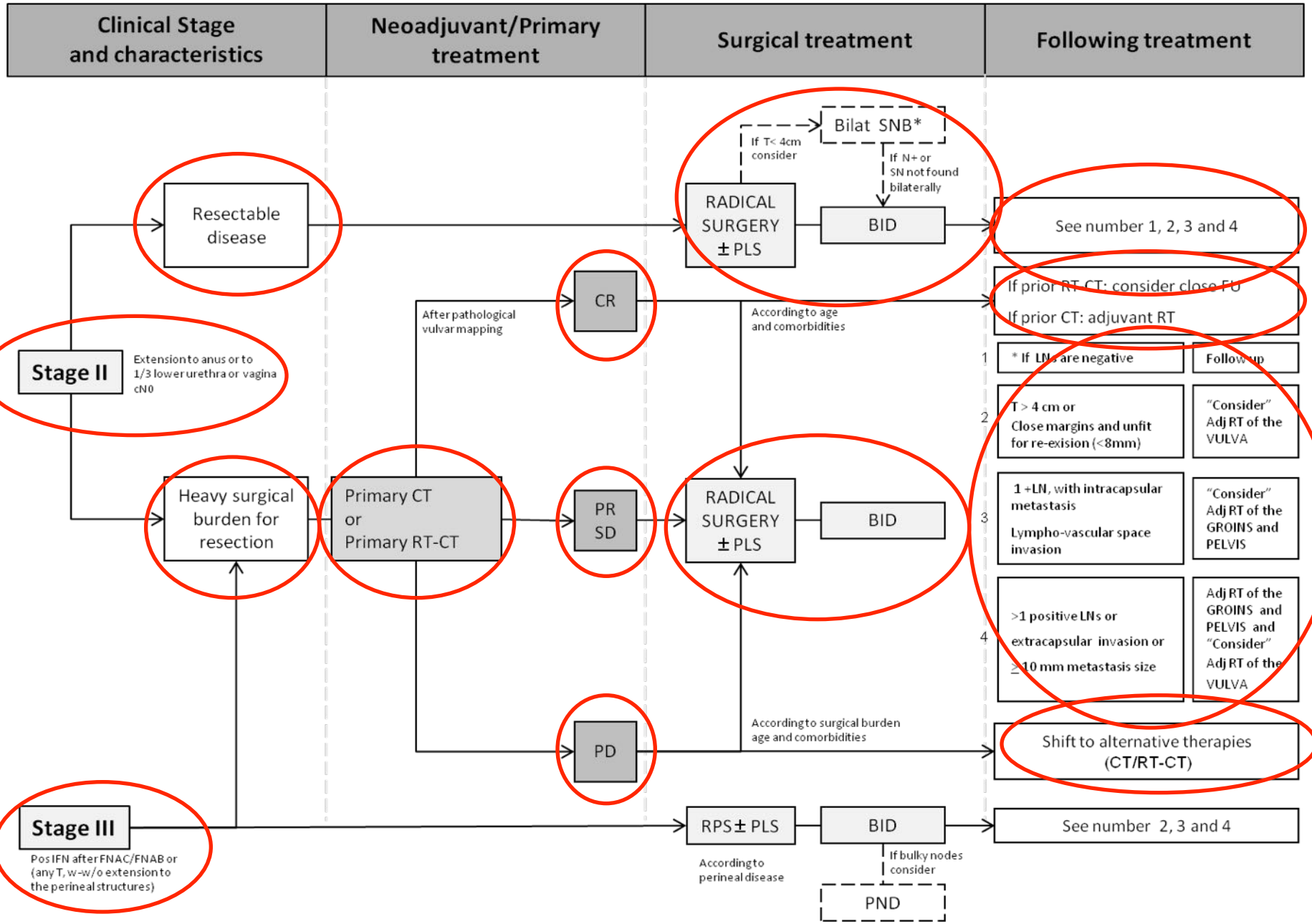
"Well done is better than well said."

Ben Franklin

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**



VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**



VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

CT-RT compared with PRIMARY SURGERY

No significant difference in OS or adverse events
high risk of bias in existing retrospective studies:

1.Entry criteria for primary CT-RT was based on inoperability or tumour requiring exenteration but no standard terminology exist for 'operable and inoperable vulval cancer'

2.The radiochemotherapy regimens widely varied

3.No standard terminology for 'primary and neoadjuvant chemoradiation'.

4.Need of stratification according to unresectability of the primary tumour and/ lymph nodes is needed

5.No data on QoL

Domingues AP, Int J Gynecol Cancer 2010 Feb;20(2):294-8.

Chemo-radiation

VULVAR CANCER SURGERY: WHY, WHEN AND **HOW**

ADJUVANT TREATMENT

Parameters determining adjuvant radiotherapy after groin dissection are still controversial

- The benefit of adjuvant RT was clearly demonstrated in patients with ≥ 2 LN metastasis (1)
- The role of RT in pts with a single intracapsular LN metastasis is still under discussion (2)
- Adjuvant RT of pelvic LN is recommended in pts with metastatic inguino-femoral LN (3)

Criteria for the application of adjuvant radiotherapy to the vulva are not clearly defined

- Lymphangio invasion and large primary tumors are associated with an increased risk of local recurrence but no clear recommendation to RT is drown (4)
- Close margins should be considered a possible indication when surgical enlargement is not feasible

Chemoradiation in pts with LN metastasis has not yet been systematically addressed (5)

1. Homesley 1986
2. Oonk 2010
3. Kunos 2009
4. Burger 1995, Woelber 2009
5. Moore 2005