

Preliminary experiences with sentinel lymph node detection in cases of vulvar malignancy

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Abstract. Lymph node status is the most important prognostic factor in vulvar malignancy. The aim of this pilot study was to explore the clinical significance of radionuclide lymphoscintigraphy in the management of vulvar neoplasms. Eight patients with squamous cell carcinoma and two patients with malignant melanoma of the vulva were studied with 100 MBq technetium-99m nanocolloid (Sentiscint, OSSKI, Budapest) 1 day before surgery. The location of the sentinel lymph node was checked by a single-head gamma camera-computer system (MB 9200, Mediso, Budapest). Vulvectomy with bilateral inguinofemoral lymphadenectomy was performed in each case. At lymphadenectomy, the sentinel lymph node was separately removed and histologically studied. Three of the ten patients had positive sentinel lymph nodes (micrometastasis). Five months later one of them had local recurrence of the vulvar cancer, and another had inguinal recurrence of the tumour 6 months postoperatively; the third patient was operated on only recently. Our preliminary results are impressive and suggest that lymphoscintigraphy is an easy and reliable method for detection of the sentinel lymph node in vulvar malignancy.

Keywords: Vulvar malignancy – Sentinel lymph node – Radionuclide lymphoscintigraphy

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Introduction

Vulvar malignancies are frequently painful ulcers or flat non-ulcerative lesions. Ninety percent of lesions are of squamous origin, 3.5% being melanoma. The status of regional lymph nodes is a powerful predictor of survival in patients with early cancers of the vulva, cervix and uterus [1]. Radical resection of vulvar cancer with extensive lymphadenectomy remains the standard therapeutic intervention in this disease; however, the concept of the sentinel lymph node provides a major new opportunity to stratify cancer patients requiring surgery. The procedure is minimally invasive and has the potential to permit accurate preoperative staging of the lymph node status. Initial studies in breast carcinoma, conducted with vital blue dye, showed that the concept was biologically valid, although the sentinel lymph node was missed in up to 30%–40% of cases. If radioactive tracer is injected close to the tumour, then the sentinel lymph node can be identified by lymphoscintigraphy [2].

Radionuclide lymphoscintigraphy is increasingly used to localise the first draining lymph node from a tumour, the sentinel lymph node, in malignant melanoma and breast cancer [3]. de Hullu et al. [4] reported that identification of sentinel lymph nodes in squamous cell carcinoma of the vulva is feasible with preoperatively administered technetium-99m labelled nanocolloid. Cutaneous lymphoscintigraphy with ^{99m}Tc-human serum albumin (HSA) is easily performed and may be useful in defining lymphatic basins at risk in vulvar cancer [5]. Lymphoscintigraphy and sentinel lymph node biopsy under gamma camera detecting probe guidance has proved to be an easy and reliable method for detection of sentinel lymph nodes in vulvar cancer.

The aim of this pilot study was to explore the clinical significance of preoperative lymph node detection using radionuclide lymphoscintigraphy in patients with vulvar malignancy.

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Table 1. Patients' characteristics

Patient no.	Age (yrs)	Size of tumour	Radionuclide examination ^a	Time of surgery and recurrence	Histology	Staging
1	56	10 mm, left side	SN bilateral	16.04.1999 No R	Squamous cell carcinoma	FIGO stage Ia T1N0M0
2	66	80 mm, bilateral	SN mainly left side	06.11.1999 No R	Malignant melanoma	Clark level II No M
3	77	20 mm, left side	SN mainly left side	19.11.1999 R: 05.2000	Squamous cell carcinoma M, left side	FIGO stage III T3N1M0
4	50	4–5 mm (multi focal), bilateral	SN mainly right side	31.05.2000 No R	Squamous cell carcinoma	FIGO stage Ia T1N0M0
5	63	50 mm, left side 30 mm, right side	SN bilateral	12.09.2000 No R	Squamous cell carcinoma	FIGO stage II T2N0M0
6	70	20 mm, right side	SN mainly right side	09.07.2001 R: 12.2001	Squamous cell carcinoma M, right side	FIGO stage III T3N1M0
7	51	10 mm, right side	SN mainly right side	24.07.2001 No R	Squamous cell carcinoma	FIGO stage Ia T1N0M0
8	75	30 mm, left side	SN mainly left side	31.01.2002 No R	Squamous cell cancer M, left side	FIGO stage III T3N1M0
9	32	10 mm, middle	SN mainly left side	13.03.2002 No R	Malignant melanoma	Clark level I No M
10	37	18 mm, left side	SN mainly left side	26.03.2002 No R	Squamous cell carcinoma	FIGO stage Ia T1N0M0

SN, Sentinel lymph node; M, metastasis in the lymph node; RN, radionuclide; R, recurrence

^a"SN bilateral" indicates that sentinel nodes were seen in the inguinal region on both the left and right side and with similar activ-

ity; "SN mainly left/right side" indicates that sentinel nodes were seen in the inguinal region on both the left and the right side, but that the activity was higher on the left or right side, as stated

Materials and methods

Between April 1999 and March 2002, ten patients with vulvar malignancy were investigated by radionuclide lymphoscintigraphy after they had given informed consent to the procedure. None of them had palpable inguinal lymph nodes at physical examination. Detailed patients' characteristics are listed in Table 1. One day before the surgery, an average of 100 MBq ^{99m}Tc-nanocolloid (Sentiscint, OSSKI, Budapest) in 1.0 ml saline, divided into four equal portions, was injected intracutaneously around the tumour. Static images of both inguinal areas were obtained in the anterior view after 1, 3 and 24 h. The localisation of the sentinel lymph node was checked by a single-head gamma camera-computer system (MB 9200, Mediso, Budapest) equipped with a low-energy, high-resolution collimator. Images were obtained with a symmetrical 20% window over the 140-keV ^{99m}Tc energy peak. The sentinel node was marked on the skin with paint fuchsin.

The next day, during general anaesthesia, blue patent dye was injected intradermally at the same locations around the tumour. Radical vulvectomy with bilateral inguino-femoral lymphadenectomy was performed in every case using standard operative methods. At lymphadenectomy, the marked sentinel lymph nodes were removed and their radioactivity counted using a gamma counter before histological examination. Histology of the removed tissues was checked by standard histopathological methods including haematoxylin and eosin-stained sections (minimum of five sections/node). Patients were released on 5–7 days postoperatively without any complications; control investigation was performed 4 weeks and 3 months later.

Results

Ten patients with vulvar tumours were investigated with radioactive lymphoscintigraphy. Using this method, sentinel lymph nodes were detected in the inguino-femoral region and the histology of removed tissues, particularly the separately removed sentinel lymph nodes, was evaluated. Eight patients had squamous cell carcinoma of the vulva (Fig. 1), and two had malignant melanoma of the vulva. Three of the ten patients had positive sentinel lymph nodes, which were determined as micrometastases (Fig. 2). Three months later one of them had local recurrence of the vulvar cancer, and another had inguinal recurrence of the tumour 6 months postoperatively. The last patient with a positive sentinel lymph node was operated on recently and as yet has had a very short postoperative period.

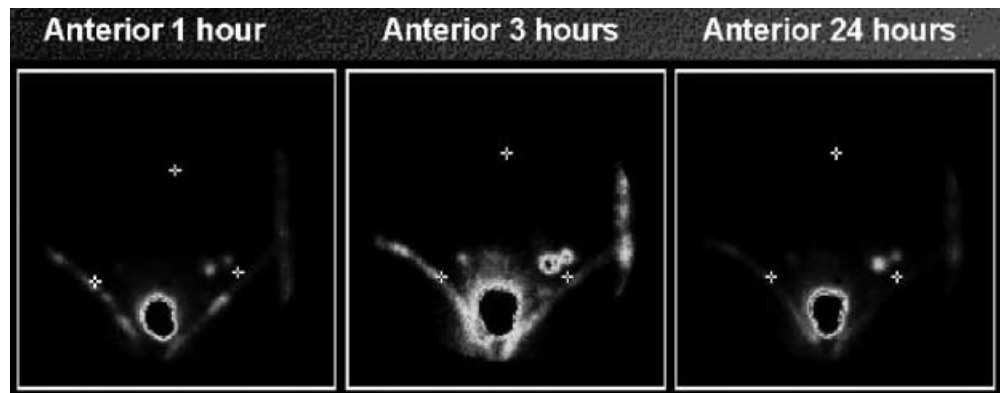
Discussion

Lymphoscintigraphy is based on the important observations of Morton et al. [6] concerning the functional anatomy of regional lymph nodes. The validation of the sentinel node concept in oncology has led to the rediscovery of lymphoscintigraphy. The sensitivity of the technique has been optimized by injecting a radioactive tracer as well as vital blue dye, and by using a gamma detector intraoperatively to facilitate localisation of the sentinel

Fig. 1. A 66-year-old patient with malignant melanoma of the vulva. Summed images of the pelvis (anterior view) at three different times following intracutaneous injection of ^{99m}Tc -nanocolloid. The highest uptake (excluding the site of injection) was in one of the left inguinal lymph nodes. Metastasis was not found in the sentinel node



Fig. 2. A 77-year-old patient with squamous cell cancer of the vulva. Summed images of the pelvis (anterior view) at three different times following intracutaneous injection of ^{99m}Tc -nanocolloid. The highest uptake (excluding the site of injection) was in one of the left inguinal lymph nodes. Metastasis was found in the sentinel node. Recurrence was shown 6 months later



lymph nodes [7]. Based on the combination of preoperative lymphatic mapping and intraoperative probe detection, this nuclear medicine procedure is increasingly being used to identify sentinel lymph nodes in melanoma, breast cancer and other malignancies such as penile cancer and vulvar cancer [8].

The sentinel lymph node procedure enables selective targeting of the first draining lymph node, where the initial metastasis will form. A negative sentinel node predicts the absence of tumour metastasis in the regional lymph nodes with high accuracy [9]. Cascinelli et al. [10] reported that the dissection of clinically undetectable nodal metastasis leads to higher long-term survival in patients with melanoma.

In this study, sentinel lymph nodes were detected with high sensitivity by using a gamma camera and radioactive tracer in patients with vulvar cancer or malignant melanoma. Micrometastasis in the sentinel lymph node was predictive of recurrence of disease. On the basis of our preliminary results we suggest that detection of the sentinel lymph node by lymphoscintigraphy is highly successful in the management of patients with vulvar cancer.

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