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Material and method: We have performed gamma-probe guided SLNE in 400 patients with malignant melanoma of the skin. In all cases the SLN was removed intraoperatively by gamma-probe guidance after radioactive labelling and lymphoscintigraphy the day before the surgical intervention. After formalinfixation the SLN was completely cut into 1 mm thin slices and stained, besides routine HE, with HMB 45 and S-100. In case of the detection of tumor cells, a radical dissection of the involved lymph node region followed. Patients without melanoma cells in their SLN were only clinically, sonographically and radiologically followed-up.

Results: The present data of our 5-year follow-up confirm, that SLNE is a low morbidity surgical procedure, that very exactly reflects the lymph node status concerning the invasion of metastases (false-negative rate of 0.3%). According to the Breslow tumor thickness, however, up to now no significant differences can be seen between SLN-positive and -negative patients with regard to the development of metastases and overall survival.

Conclusions: Summarizing it can be said, that the removal of the SLN is a valid diagnostic procedure concerning the lymph node status. Unfortunately it seems not to influence the natural history of malignant melanoma.

The cost of sentinel node biopsy (SNB) for melanoma

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Introduction: SNB has become an important tool for regional staging of melanoma. The technical aspects of the procedure have been well described, but its costs in terms of operation time, morbidity and financial resources are not well documented.

Methods: The time taken for SNB and the morbidity of the procedure were analysed in 43 patients treated between January and June 2000. The casemix database at Royal Prince Alfred Hospital was queried for costs of relevant Melanoma Unit procedures over the period 1997–1998.

Results: The average time in minutes (range) to dissect the first sentinel lymph node, and the average time for the whole procedure (incision to closure) were: 11 (1–28) and 24 (9–47) for the axilla, 8 (5–12) and 30 (10–55) for the groin, and 18 (6–31) and 34 (10–63) for the neck. One of the axillary procedures was complicated by wound breakdown (morbidity 4%), and 4 of the 12 (30%) inguinal procedures were complicated by lymphocele / infection, with one wound breakdown. Sentinel node biopsies in the neck region had no morbidity. All complications were treated out of hospital.

Cost for SNB was calculated from the average cost of 75 SNBs and 483 wide excisions. Wide excision costed on an average EUR 1565, wide excision and skin graft EUR 1866, and wide excision and SNB EUR 2270. SNB results in EUR 416 additional cost when compared to treatment of the primary only. Breakdown of this additional cost includes lymphoscintigraphy at a cost of EUR 161 + EUR 71 for delayed planar views for a total of EUR 232. Consumables in theatre include EUR 27 per ampoule of patent blue dye and some additional minor items. It is our routine to do wide excision only as a day case, whereas with sentinel node biopsy, an overnight stay is the norm. Assessment of the cost-benefit requires inclusion of the proportion of patients with positive sentinel nodes (estimated 10% of all SNB) that proceed to regional node dissection (45% groin, 45% axilla, 10% neck). The average cost for a radical axillary dissection were EUR 5197, for a radical groin dissection EUR 6860, and for a radical neck dissection EUR 4828.

Conclusion: SNB for melanoma takes on an average less than 30 min, and is associated with low morbidity, except for the inguinal procedures, that have increased risk of lymphocele. There is a clear cost advantage of sentinel node based management compared to elective node dissection.

Sentinel node biopsy for malignant melanoma: Clinical results, technical details and pitfalls

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Purpose: The purpose of this paper is to present our five years experience with sentinel node biopsy for the treatment of malignant melanoma. We will present technical details and pitfalls of the procedure and we will discuss its clinical, therapeutic and prognostic advantages.

Materials and Methods: A total of 342 consecutive patients with primary skin melanoma (T2-3, N0, M0) underwent sentinel node biopsy between March 1996 and October 2000.

All patients underwent previous excisional biopsy of the primary lesion and clinical and radiographic examination to exclude lymphatic or systemic macroscopic spreading of the disease.

Preoperative lymphoscintigraphy (TC-99m nanocoll) was routinely performed in the last 305 patients. Intraoperative detection of the sentinel nodes was performed by perilesional, intradermal, injection of blue dye associated with a gamma probe (Neoprobe® 2000) in the last 225 patients.
For each anatomical site of dissection (inguinal, axillary, head and neck) detection rates with or without gamma probe were compared focusing on the main reasons of failure.

Sentinel nodes, serially sectioned, were all Haematoxylin-Eosin and immunohistochemically stained.

All patients positive for micro-metastasis underwent radical lymphadenectomy.

A comparative analysis between the incidence of metastasis in sentinel and non-sentinel nodes, according to the clinical stage of the disease, was performed.

**Results:** The overall detection rate of sentinel nodes was about 97%. Relevant differences were found according to the site of dissection and the use of a gamma probe.

The gamma-probe makes the procedure more effective, less invasive and less expensive.

Timing and accuracy of the preoperative lymphoscintigraphy is a basic step of the procedure and the visualisation of the main lymphatic channels resulted essential for a correct evaluation of the number of the sentinel nodes.

The overall incidence of positive sentinel node was 14.6% with differences correlated with thickness of primary lesion (T2: 7.3%; T3: 14.9%; T4: 30.5%).

Metastasis in other non-sentinel nodes was found only with primary tumor thickness exceeding 2.3 mm. Correlation between sentinel node metastasis and prognosis as well as adjuvant therapy will be discussed.

**Conclusions:** Sentinel node biopsy is a procedure requiring a multidisciplinary approach (surgery, nuclear medicine and pathology). A specific learning phase (> 30 patients) is recommended for reliable results.

Improvement of survival rates by sentinel node biopsy has not been demonstrated yet, but this more accurate N-staging procedure offers clear advantages in terms of patients’ quality of life, prognosis and indication to adjuvant therapy.

**Sentinel node biopsy in melanoma: Three years experience**

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**Introduction:** Melanoma is mostly a localized disease with no clinical evidence of lymph node metastases. Nevertheless, tumours with intermediate or high thickness (Breslow > 1 mm.) may have microscopic lymph node involvement and in such cases have a worse prognosis. Here we summarize the clinical experience obtained with Selective biopsy of the sentinel node (SN) by the Multidisciplinary Melanoma Unit of the Spedali Civili of Brescia.

**Materials and methods:** Between November 1997 and October 2000 we performed 127 consecutive selective lymphadenectomies (sentinel node biopsy) on patients with cutaneous melanoma with Breslow > 1 mm. or regression. Age, sex, tumor location and histology were recorded.

SN detection was performed by lymphoscintigraphy with 99mTc-colloid (20–30 MBq). Images of the lymphatic drainage were registered after 5–10 min and 1 and 2 h. The following day the patients underwent SN excision. The SN was identified by portable Gamma probe and blue dye injection. The SN was evaluated by standard hematoxylin-eosin staining and by immunostaining with S-100 and HMB45.

**Results:** 238 sentinel nodes were identified by lymphoscintigraphy in 167 lymphnode stations, 235 of them were identified intraoperative using a gamma probe and patient blue V injection (98.7%). Twenty patients had sentinel nodes with metastases of melanoma (13.7%), 8 in the axilla, 11 at the groin and 1 in the neck. After therapeutic lymphadenectomy 8 more lymphnodes with metastases of melanoma were found in the specimens of 3 patients (1 in the axilla and 2 in the groin). After a mean follow-up of 18 months (1–36 months), 115 patients are free of disease. Among the 20 patients with positive SNs 1 was lost to follow-up, 15 are still alive (3 of them with recurrence) and 4 are dead. One patient with a melanoma of the scalp (Breslow 6.2 mm.) who had negative sentinel node biopsies in the neck, developed one year after the excision of the tumor a cervical nodes metastases at a different location as that identified lymphoscintigraphically as a sentinel node and died 6 months for visceral metastases; 2 more patients with negative sentinel nodes have a recurrence but are still alive (false negative 2.36%).

**Discussion:** The association of lymphoscintigraphy and intraoperative SN detection by portable gamma probe is successful in almost 100% in our experience in agreement with previous reports. Lymphoscintigraphy is particularly useful in trunk melanoma, especially if located near the median line. The rate of metastases was 15.7% and in 85% of cases the SN was the only metastatic site. In patients with Breslow < 2 mm. we did not observe positive SNs, and the percentage of positivity increased with melanoma thickness.

**Conclusion:** Our data confirm the clinical reliability of the SN technique in melanoma; for optimization of the therapeutic strategy, this technique should be considered a standard tool in the evaluation of melanoma patients.