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Sentinel node biopsy in melanoma

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Lymphatic mapping and sentinel node biopsy have improved staging of patients with melanoma through:

(1) Identification of sentinel nodes outside the traditional regional lymph node basins (in 5.8% of the cases, own series),
(2) Facilitation of the pathologist in microscopical scrutinizing by offering him the very lymph node that reflects the prognostic information of the whole regional basin.

It has been shown that the status of the sentinel node is the strongest prognostic factor in patients with melanoma. In our series of 200 patients with cutaneous melanoma of at least 1.0 mm Breslow thickness, overall survival at three years was 93% if the sentinel node was free of disease and 66% if it was tumour-positive. The definition of a node-negative homogeneous group with a good prognosis who may be spared – experimental – burdensome adjuvant treatment, is one of the most prominent achievements of this novel technique. In this regard the biological relevance of RT-PCR diagnosed 'submicroscopic' disease in the sentinel node is an intriguing issue that needs to be clarified.

The question whether sentinel node biopsy with early removal of involved regional nodes improves survival will probably be answered in the near future by ongoing prospective trials.

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Sentinel node in colorectal cancer

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Intraoperative lymphatic mapping and sentinel node (SLN) biopsy has been accepted as an accurate method to stage melanoma and breast cancer and prevent unnecessary node dissections in these patients. This technology is now being investigated for colon and rectal cancer.

The technique has not as yet been standardized. Some inject blue dye to the colonic serosa either intraoperatively (1) or laparoscopically (2). There are also reports of colonosccopic injection with radiolabeled colloid (3) and even an ex-vivo blue dye injection has been described.

Results have shown a 98.8% success rate of SLN identification with the dye and 83% with the colloid injection, with a false-negative rate of about 9%. In 5% of the patients extraregional drainage was identified. A pilot pathologic study using immunohistochemistry (IMH) and RT-PCR identified micrometastasis in an additional 10% of the patients by IMH and an additional 40% by RT-PCR.

Two important questions yet to be answered in order to assess the possible benefit of the technique are (i) whether SLN can increase staging by conventional pathology and (ii) whether micrometastasis identified by IMH has clinical significance and what exactly is the clinical role of RT-PCR.

The technique and results will be presented, the controversy discussed and future studies will be suggested.

References

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Sentinel nodes in gynecology

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In recent years there has been intense interest amongst gynecologic oncologists in developing lymphatic mapping procedures in patients with vulvar and cervix cancer. Squamous carcinoma of the vulva and cervix are good targets for the lymphatic mapping strategy. Most node positive patients have regional disease and chemoradiation has improved the outcome for these patients. There have been several published series regarding lymphatic mapping in patients with vulvar cancer. Investigators have described the use of blue dye alone, radiolocalization alone, as well as combining these two techniques. The consensus appears to be that the combined technique is ideal since it requires the shortest learning period, can help select patients for unilateral versus bilateral dissection, and has a very high sentinel node identification rate. In published series the false negative rate has been very low in patients undergoing the combined procedure. At present, there is a large validation study going on in North America sponsored by the Gynecologic Oncology Group and a prospective observational study going on in the Netherlands for patients undergoing sentinel node biopsy alone.

Cervix cancer is a much more common disease; however, the benefits of lymphatic mapping are not quite as clear as with vulvar cancer. Lower extremity lymphedema is common in patients who undergo full groin dissection. Lymphedema of the lower extremities in patients undergoing radical hysterectomy occurs much less commonly. Nevertheless, investigators have sought ways of identifying sentinel nodes in patients with cervix cancer in part with the goal of selecting node positive patients for a combined modality treatment. There has been a handful of clinical trials describing lymphatic mapping in patients with cervix cancer; all of these have used combined techniques. Investigators in France and Germany have both emphasized the utility of combining operative laparoscopy with sentinel node biopsy. The recent development of laparoscopic gamma probes is aiding in this effort. The published experience with sentinel node identification in patients with cervix cancer is small, however it is anticipated in the next few years this will change and investigators will seek ways of incorporating sentinel node biopsy into the management in patients with cervix cancer.

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Sentinel node in breast cancer

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The concept of the the sentinel node (SN) in breast cancer being the first lymph node on a direct drainage pathway from the tumour site has been widely accepted.The node can be localized and the suggestion that the SN is representative for the nodal status has been confirmed by a number of studies across the world.

The end-points of evaluation of the method will be locoregional axillary relapse as well as overall and disease-free survival compared to patients with routine axillary clearance. Studies with a follow up of 5-10 years have not been reported yet.

Patients with unifocal tumour less than 3 cm and clinically normal axilla are eligible for sentinel node biopsy (SNB).

It is to prefer a combination of injection of radioactive tracer, preoperative lymphoscintigraphy, dye injection and intraoperative identification by gamma-probe and visualization of blue nodes. Intra- or peritumoural injection seems the best, because it gives more complete mapping with extra-axillary nodes as well. In order to prevent reoperations intraoperative frozen section examination of SN should be accurate to minimize the number of nodes being positive in the postoperative evaluation.

Cost-benefit aspects indicate also that SNB is most valuable in patients with low risk of positive nodes due to small non-palpable tumours.

In hospitals starting SNB the team should perform and audit study. A widely accepted number of cases is 30 with over 90% success rate and less than 5% false negatives. However, this design os not founded on principles of statistical power.Audit studies may be avoided in the future by tutoring surgeons in centres with documented quality.

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Sentinel node in prostate and bladder cancer

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In prostate and bladder cancer, as in most cancer forms, lymph node metastasis is considered a sign of systemic disease. Curative treatment is most often impossible in such cases, and major ablative surgery or full-dose irradiation may be contraindicated if the patient has no local symptoms of his malignant disease. An adequate lymph node staging prior to undertaking the curative treatment is thus mandatory.

In prostate and bladder cancer, the standard lymph node staging procedure is performed either as an open procedure or laparoscopically, and comprises the excision of the obturator and sometimes internal iliac nodes for histopathologic examination. These nodes are considered as the regional nodes of those organs and the most common locale for metastasis.

However, the knowledge on the lymphatic drainage of this area is largely based on older anatomical studies and some reports do point out that, in fact, from 10 to 30% of cases may have metastasis-free obturator nodes and later are diagnosed with node metastasis more cranially, i. e. common iliac and paraaortic nodes.

More recent studies with isotope scans combined with intraoperative scintillation-counter and colour dye detection of suspicious nodes verify the