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Current status of sentinel lymph node dissection in breast cancer

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Sentinel lymph node dissection (SLND) is being used as an alternative to routine axillary lymph node dissection in the management of clinically node-negative women with breast cancer. In 1991, we began to investigate SLND by injecting a vital blue dye, lymphazurin 1%, into the peritumoral tissue of patients with primary breast cancer undergoing axillary dissection (ALND). Three years later we reported our experience with 174 SLNDs in women who underwent concomitant completion ALNDs. This study was a feasibility trial in which all women, regardless of tumor size or nodal status, were injected with blue dye to determine if we could identify axillary sentinel nodes. Even in this preliminary study, the procedure appeared highly effective, predictive of axillary status in over 95% of the cases. In 1995, we evaluated 162 patients who underwent successful SLND followed by completion ALND and compared them with 134 patients who underwent routine ALND alone. In these cases the sentinel node was evaluated with H&E as well as immunohistochemistry chemical staining, whereas non-sentinel nodes in the ALND were evaluated with H&E alone. We detected a significant higher incidence of axillary metastases in the SLND group than in the ALND group (42 versus 28%, $P < 05$). This was due primarily to the detection of more micrometastases. We then examined all non-sentinel nodes in patients whose sentinel node was negative by immunohistochemistry as well as H&E. We found only one involved lymph node in over 1087 non-sentinel lymph nodes, confirming the hypothesis that the sentinel lymph node is the first lymph node to harbor metastases when they are present. Other investigators around the world have confirmed the sentinel node hypothesis using either vital dyes or radiosotope. Each procedure has advantages, and each is equally effective in experienced hands. For those with experience in the technique, lymph node dissection may not be necessary for women whose sentinel node is tumor-free.

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Upper GI tract – Can extensive lymphadenectomy be avoided?

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Lymphnode (LN) dissection may have a diagnostic or a curative impact in surgical resection of primary upper GI tract tumors like cancers of the esophagus (ESO), stomach (GAS), pancreas (PAN), gallbladder (GAL), proximal two-thirds of the choledochus (CHOL), distal choledochus/duodenum/papilla (PERIAMP) or the liver (HEP). Regional fields/lymph LN stations are usually included without extending the radicality but the time of primary tumor resection. Extensive lymphnode clearance may have a curative aspect in GAS, PAN, GAL, CHOL and PERIAMP (proven e.g. in GAS). Ultraradical LN dissections e.g. with splenectomy/left pancreatectomy in GAS or LN clearance left to the superior mesenteric artery in PAN are of no benefit, increase morbidity and should be avoided. Diagnostic dissections should be extensive only if morbidity is not increased and if all lymphnode stations are registered. Extensive lymphnode dissections in case of macroscopical lymphnode metastases (proven in frozen sections) should be included into primary tumor surgery only if R0 LN clearance is possible. In case of HEP with lymphnode metastases, primary tumor removal and thus – lymphnode dissection is not indicated.

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Lymph node surgery in colorectal cancer – Today and tomorrow

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The rationale for lymph node surgery in colorectal cancer today is relying upon the current interpretation of the order of lymphogenic spread from paracolic to intermediate, and further to central nodes in the mesocolon. Turnbull was able to improve the results of surgery for colon cancer substantially and it was probably more due to a wide excision of the draining lymph nodes than to the "no touch" technique. This was later accepted as the method of choice but it means that all patients are resected as if they had dissemination of the cancer to lymph nodes. In stage I and II the nodes are thus removed in spite of not being involved by tumour growth.

The importance of microscopic metastatic disease of nodes regarding prognosis is not yet clarified but some investigations in rather small patient materials imply that the outcome is not significantly affected.

In recent years it has become obvious that in rectal cancer surgery the lateral clearance of the mesorectum is crucial to obtain optimal oncologic results which is probably explained by the fact that the mesorectal fatty package surrounding the rectum contains the critical lymph nodes. In rectal cancer total removal of the mesorectum has led to results regarding local recurrence rate that are significantly better than previously reported. This is comparable to the Turnbull concept of colon cancer. Removal of the lymph nodes along the iliac vessels is controversial but it has more and more become apparent that it should primarily be looked upon as a staging procedure. Metastatic disease in those nodes is usually an expression of generalised disease and excision of them does not improve the prognosis significantly. Lymph node surgery tomorrow may be selective and individualised. Micrometastatic disease should be an excellent target for chemotherapy maybe in combination with radiotherapy. Advanced and reliable imaging will be crucial for such decisions. If imaging in the future can detect metastatic lymph node disease also in small nodes the surgery may be tailored for the individual patient. In some cases a rectal cancer may then be treated with local excision combined with radiotherapy. Radioimmunoguided surgery has not yet made such progress that it can be used in common practice but when it becomes more sensitive and more specific it has a great potential. There is, of course, also a theoretical possibility to use antibodies and irradiation not only for diagnostic but also for therapeutic purposes. The concept of the sentinel node has not been applied in colon and rectal cancer but it should be evaluated.

In summary the surgery for colorectal cancer will probably be more differentiated in the future: in some situations it will be more conservative and combined with radio- and/or chemotherapy, but in some it might be more extensive than today.

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Head and neck cancer: From the radical neck dissection (RND) to the selective (SND) and radical modified neck dissection (RMND)

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Lymphatic metastasis in the neck is the single most important prognostic factor directly linked with the risk of distant metastasis and therefore with the survival. Today a number of different cervical lymph node dissection are being used in order to minimize the morbidity of the RND, RMND is used since the 1960's and SND since the 1970's. These procedures spare different Structures such as SCM muscle, accessory nerve, internal jugular vein, Based on a better knowledge of the sites of nodal invasion by function of the primary the SND remove only the neck area (sentinel area) submitted to the risk of nodal metastase. Both of these procedures appear to be safe with a low rate of neck recurrence (NR). Among 97 cases of RMND (1972–78) the NR were 0/40 for N–, 1/21 for N + R–, 3/36 for N+ R+ (Vandenbrouck, 1984). In a recent study of 564 cases of SND (1980–85) we found 34% (136 N+/399 NO) of occult metastasis. The rate of isolated neck failure was low: 20 (6.6%) out of 302 N- and 16 (6.6%) out of 241 N+ with only 12/543 (2.2%) outside the treated neck. When the protocol of treatment was achieved: SND completed in RMND in case of N+ at frozen section examination and/or postoperative radiotherapy.

The SND and RMND are oncologically appropriate tools with low rate of RN and less morbidity than RND. RND keep all his indications for nodes more than 2–3 cm in diameter and moreover for large neck involvement.

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Controversies in breast lymphatic mapping

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The sentinel lymph node is defined as the first lymph node in a regional lymphatic basin that receives lymph flow from a primary tumour. The current status of lymphatic mapping for breast cancer is associated with the following controversies.

(1) False negative rate: Most series report a 5–10% false negative rate. Is this acceptable in oncological terms? How do we ensure a low false negative rate and what is the correct way of calculating the false negative rate?

(2) The learning curve: There appears to be a longer learning curve for those who use blue dye alone compared to those who use blue dye and isotope in combination.