The Sentinel Node in Colorectal Carcinoma

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The role of sentinel lymph node identification has been investigated over the past decade in a variety of malignancies. It has become part of standard care for melanoma. Its role in breast cancer is evolving, but with the completion of two large randomized clinical trials, it will probably be added to the surgical armamentarium for the management of most breast cancers. Studies have been proposed or are under way to evaluate sentinel node mapping in head and neck cancer, penile and vulvar cancer, and gastrointestinal cancers.

The Lin/Rodriguez/Ota Article Reviewed

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The advantage of sentinel node mapping in breast cancer and melanoma is clear. An axillary, inguinal, or cervical lymphadenectomy is associated with significant morbidity and appears to provide no benefit to the truly node-negative patient. It is easy to see why sentinel node biopsy will become the strategy of choice for identifying node-negative patients, if general surgeons can perform the procedure with acceptable accuracy.

The role of sentinel lymph node detection in other malignancies has yet to be determined. Currently in North America, many cancer patients present with involved nodes. For many other tumors, the appropriate lymphadenectomy is not associated with undue morbidity, so surgical management need not be modified for node-negative patients. For other patients, either the intraoperative accuracy is currently insufficient to warrant changing the procedure, or the morbidity of intracavitary reoperation is too high to allow a delay in identifying the patient with positive nodes.

Sentinel Node Mapping and Extent of Colon Resection

Appropriate procedures for some colon cancers have been described for more than a century. These procedures are designed not only to clear the proximal and distal margins, but more importantly, to encompass the likely lymphatic drainage of the segment of bowel containing the cancer. As Dr. Lin and coauthors note, aberrant lymphatic drainage (in a small percentage of patients) can be detected using lymphatic mapping. This has allowed surgeons to include such nodes in the resection. If these nodes contain cancer, the patient presumably benefits from their removal. Should additional nodes be removed when aberrant drainage is noted?

Patients in whom the “highest” node is positive have a poor prognosis. If an aberrant sentinel node contains cancer, many surgeons would wish to remove the next echelon of nodes in an effort to remove all tumor. Currently, we do not know how to locate these nodes. How much bowel must be sacrificed in an effort to remove such nodes?

It is likely that the technique, already useful in some colon cancers, will not prove as important in rectal cancer. Identifying the sentinel node in the pelvis will be challenging, and attaining adequate margins around the primary tumor will probably strongly influence the amount of rectum removed. The greatest benefit of sentinel node mapping in rectal cancer may be its role in assessing nodal involvement in patients undergoing transsphincteric or transccocygeal excisions of rectal cancers. Finding involved nodes in such patients will guide management.
Which Technique Should Be Used?
The optimal technique for sentinel node identification has not been established. Vital blue staining is the most widely examined technique for identification of sentinel nodes in gastrointestinal malignancy. As to other methods, there is a learning curve, and it will be difficult to determine their impact on the accuracy of sentinel node mapping before many surgeons have achieved the limits of their technique. Approaches under investigation include the concomitant use of fluorescein with Wood’s lamp scanning and the use of radioactive isotopes with detecting probes. Hopefully, advances in molecular biology will permit real-time detection of only a few cells in the sentinel node.

How Many Nodes Are Enough for Staging?
Even with the many unanswered questions and limitations in technique, sentinel lymph node biopsy should play an important role in the staging of colon cancer. As Dr. Lin and his coauthors observe in this review, the number of nodes that must be examined in order to stage a patient accurately is unknown. We (and others) have reported that the examination of increasing numbers of lymph nodes in a colon cancer specimen is associated with improved survival. Even if issues surrounding the extent of lymphadenectomy are ignored, the assiduousness of the pathologist in examining nodes will influence the detection of regional metastases. The 1990 Working Party of the World Congress of Gastroenterology recommended that at least 12 nodes be examined.[1] Others have found that the incidence of node positivity increases until approximately 14 to 17 nodes have been evaluated.[2] Analyzing the intergroup study (INT-0089) in more than 3,400 patients who underwent colectomy for cancer, we found that at least 20 nodes must be examined to feel confident that a patient with colon cancer does not have involved nodes.[3]

Within the seemingly node-negative group, the median number of nodes examined was 13 (range: 0-60). The 5-year survival in this group varied with the number of nodes examined. It ranged from 73% for < 10 nodes, to 80% for 11-20 nodes, to 87% for > 20 nodes (P = .0001). Similar trends were seen in patients with metastasis in one to three (N1) and four or more (N2) regional lymph nodes. Improved surgical technique and wider lymphadenectomy almost certainly contribute to the improved survival noted when more nodes are removed. Nonetheless, sentinel node identification can be expected to improve staging by increasing the chance that the pathologist will encounter and carefully examine nodes with low-volume disease. As adjuvant therapy improves, it will become increasingly important to identify patients whose tumor has spread to regional nodes.

Conclusions
Sentinel node mapping has become a useful tool in the management of melanoma and breast cancer. Its role in the management of colorectal cancer is less clear. Sentinel node mapping for colon cancer lacks the potential to dramatically reduce the morbidity of colon resections, unlike patients who will benefit substantially if they are spared unnecessary cervical, axillary, or inguinal node dissections.

Sentinel node mapping appears in some cases to influence the extent of surgical resection, but the effect of these changes on the disease overall is uncertain. The impact of sentinel node mapping on the staging of colon cancer should be similar to that documented for melanoma and breast cancer. Perhaps 15% to 20% of patients will have otherwise undetectable nodal metastases. Such findings may prompt the use of adjuvant chemotherapy in some early-stage cancers. If the technique proves accurate in the hands of the general surgeon, sentinel node mapping will probably be incorporated into the management of colon cancer. Its impact on rectal cancer care is likely to be more limited.

References:

