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EDITORIAL

Sentinel Node Biopsy in Early Gastric Cancer: Constant Exertion for Clinical Application

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Lymph node status is the most important prognostic factor in gastric cancer. Standard surgery, therefore, is radical subtotal or total gastrectomy with wide dissection of regional lymph nodes. Recently, the proportion of early gastric cancer has increased to more than 60% in Korea and Japan because of screening gastroscopy. The rate of lymph node metastasis in early gastric cancer ranges from 5 to 20%, which means that more than 80% of patients with early gastric cancer undergo unnecessarily wide excision of the stomach with aggressive lymphadenectomy. If there is a tool to predict the exact status of lymph nodes, radical gastrectomy with lymphadenectomy can be substituted with limited resection of stomach without lymph node dissection. However, preoperative endoscopic ultrasound and computed tomography have limited accuracy for nodal staging in gastric cancer patients. The sentinel node (SN) concept has been introduced into various solid tumors, including stomach cancer, to predict lymph node status. Ideally, if the SN has no metastasis, extensive lymphadenectomy can be avoided, the extent of resection of the stomach reduced, function preserved, complications lessened, recovery accelerated, and the quality of life for the patient improved. SN navigation surgery has been widely performed for the treatment of breast cancer and malignant melanoma. Regarding gastric cancer, it seemed that SN concept is difficult to apply because the lymphatic flow is multidirectional. However, many studies reported that SN mapping is feasible in gastric cancer especially in early gastric cancer even though many issues still remain to be solved.

Sensitivity of SN biopsy is highly important in gastric cancer compared with breast cancer and malignant melanoma. When false-negative cases develop in patients with malignant melanoma or breast cancer, other treatment options, such as chemotherapy and radiotherapy exist. Because gastric cancer has no other treatment option except surgery, a gastric cancer patient with false-negative SN loses an opportunity for cure. The detection rate is not as important as sensitivity in gastric cancer SN biopsy. Surgeons should perform just conventional lymphadenectomy for detection failure cases. Sensitivities of SN mapping in gastric cancer reported until now are not adequate for clinical application. Until now, the sensitivities were generally low and even the studies with high sensitivity had small number of cases with lymph node metastasis.

There are several methods to increase the sensitivity of SN biopsy in gastric cancer. As pathologic methods, multiple sections of the SN may raise the rate of detecting lymph node metastases. Immunohistochemistry (IHC) staining with anti-cytokeratin antibody helps to detect micrometastases in SNs in addition to conventional hematoxylin and eosin (HE) staining. Reverse transcription-polymerase chain reaction (RT-PCR) using tumor markers, such as carcinoembryonic antigen, cytokeratin, or CD44, also is good tool for molecular detection of SN micrometastases. Rapid IHC or real-time RT-PCR is needed so that IHC or RT-PCR is applicable to SN biopsy for gastric cancer. Takeuchi et al. [1] introduced a novel real-time multiplex RT-PCR assay that is suitable for intraoperative detection of micrometastasis in SNs for the patients with clinical N0 gastric carcinoma. In the present study, 31% of patients with no metastasis over histological diagnosis were RT-PCR positive and the diagnostic accuracy is significantly higher in their multiplex RT-PCR assay than in intraoperative histopathology. Because the time taken for the assay is just 80 minutes, real-time multiplex RT-PCR is thought to be applicable for use in the intraoperative diagnosis of SN.

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Surgical technique to improve sensitivity of SN biopsy is using dual tracers, such as radioisotope and dye. Dual tracers play a complementary role in SN biopsy. Another technique for better sensitivity is sentinel basin dissection. According to the reported literatures, false-negative lymph nodes tend to be confined to the sentinel basins in early gastric cancer. Takeuchi et al. [1] indicated that all RT-PCR positive non-SNs in the seven patients with SN-negative but non-SN-positive by RT-PCR were present in the same station or same basin as SN. They described that, under conditions of a false-negative result not being completely evaded, SN basin dissection is recommended even in patients with negative SN by RT-PCR. Their results suggest that the SN basin dissection may provide us with an acceptable "safety net" for clinical application.

In practical view of SN biopsy in gastric cancer, laparoscopic SN biopsy has become more important than open SN biopsy, because SN biopsy is indicated mainly for early gastric cancers. The possible laparoscopic gastric surgeries for the early gastric cancer patient with no SN metastasis by laparoscopic sentinel basin dissection are endoscopic submucosal dissection, wedge resection, sleeve resection, proximal gastrectomy, distal gastrectomy, and pylorus-preserving gastrectomy. Well-designed, large-scale feasibility studies of SN mapping in gastric cancer and subsequent prospective, randomized trials demonstrating equivalent survival in clinical T1 gastric cancer patients with negative SN randomized to observation versus completion lymphadenectomy should be performed to be comfortable in not performing wide lymphadenectomy in T1 gastric patients with negative SN.

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