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Molecular surgical margin analysis and postoperative locoregional cancer recurrences

Oncologic evaluation of surgical margins has long depended on visible histologic diagnosis. Although intraoperative cytology or frozen section diagnosis directs surgery to be performed in a more adequate way, some histologic negative surgical margins still have genetic or epigenetic alterations associated with disease recurrence. This phenomenon may be partly explained by "field cancerization," which is characterized as the presence of clonally related cells with malignant potential containing one or more cancer-associated genetic or epigenetic alterations in the tumor-surrounding mucosal areas. Another issue linked to recurrence is undetected fully developed residual tumor cells especially at the deep surgical margins. Histologically undetected residual cancer cells may be left behind due to the "tumor budding" phenomenon, defined as a single cancer cell or a cluster of <5 cancer cells protruding into the stroma beyond the invasive front. These are hard to detect in intraoperative frozen samples by light microscopy, which depends on the identification of visible clusters of cells having the malignant phenotype. To overcome the problem, we developed the molecular surgical margin analysis using nitrocellulose sheet which can collect invisible tiny cancerous cells on the surface of the surgical specimen. We also utilized rapid quantitative methylation specific PCR (QMSP) and digital QMSP. All included surgical samples were histopathologically margin-negative. Our data indicated the association of molecularly positive margin with postoperative locoregional recurrences. We applied the assay to Head and neck squamous cell carcinoma cases, and try to apply it to other gastroenterological cancers.

Biography

Masamichi Hayashi has completed his MD and PhD from Nagoya University, and Post-doctoral studies from Johns Hopkins University School of Medicine. Now, he is an Assistant Professor of the Department of Gastroenterological Surgery 2, Nagoya University Hospital. He has published more than 20 papers in reputed journals, and he is also a General Surgeon of the hospital.

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