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Preoperative Risk Stratification of Lymph Node Metastasis for Non-Functional Pancreatic Neuroendocrine Neoplasm: An International Dual-Institutional Study

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BACKGROUND: Resection versus observation is still controversial for small non-functional pancreatic neuroendocrine neoplasms (NF-PNEN). Although lymph node metastasis (LNM) is a major indication for resection, preoperative prediction of LNM has not been established. We sought to develop a prediction system using only preoperatively available factors that would stratify the risk of LNM for NF-PNEN.

METHODS: We retrospectively reviewed patients who underwent R0/1 resection of NF-PNEN at Kyoto University (2007-2019) and the University of California, San Francisco (2010-2019). Risk stratification of LNM was developed using preoperative factors by the logistic regression analysis and the classification and regression trees method. Pathological findings and recurrence-free survival (RFS) were compared across the risk groups.

RESULTS: A total of 131 patients were included in this study. Lymph nodes were pathologically examined in 116 patients, 23 (20%) of whom had LNM. Radiological tumor size [1.5-3.5 cm (odds ratio: 13.5, 95% confidence interval: 1.77-398) and >3.5 cm (72.4, 9.06-2257) against ≤1.5 cm], ≥50% cystic component (0.00, 0.00-0.00), and dilatation of main pancreatic duct ≥5 mm (31.2, 3.94-702) were independently associated with LNM. When patients were classified as the low-risk (43 patients), intermediate-risk (44 patients), and high-risk groups (29 patients), proportions of LNM differed significantly across the groups (0%, 14%, and 59%, respectively). The risk stratification was also associated with the proportions of G2-3 (18%, 32%, and 81%) and lymphovascular invasion (2%, 15%, and 61%). RFS of the low- and intermediate-risk groups were significantly better than that of the high-risk group (5-year RFS rates of 92.2%, 85.4%, and 47.1%, respectively).

CONCLUSION: The prediction system using preoperative radiological factors stratifies the risk of LNM for NF-PNEN. This stratification helps to predict malignant potential and determine resection versus observation.

ABSTRACT ID: 12