


Neutrophil to Lymphocyte Ratio is a Predictive Factor of Malignant Potential for Intraductal Papillary Mucinous Neoplasms of the Pancreas

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ABSTRACT: Intraductal papillary mucinous neoplasms (IPMNs) are cystic neoplasms with the potential for progression to pancreatic cancer. Accurate prediction of the malignant potential is challenging and a proper treatment strategy has not been well established. Preoperative neutrophil-to-lymphocyte ratio (NLR) is a biomarker of the malignant potential in patients with several types of malignancy. We explored malignant potential in patients with IPMN. The present study included 56 patients aged of 73 ± 9 years (mean \pm standard deviation) who underwent curative resection for IPMN from 1996 to 2017. We analyzed the relationship between the characteristics including NLR and malignant component for predicting pathological results. The nonmalignant IPMN group ($N=21$) included patients with low-grade dysplasia (LGD) and intermediate-grade dysplasia (IGD), and the malignant IPMN group ($N=35$) included patients with high-grade dysplasia (HGD) and invasive carcinoma. In a univariate analysis, $NLR \geq 2.2$ ($P=.001$), prognostic nutritional index (PNI) < 45 ($P=.016$), CA 19-9 > 37 U/mL ($P=.039$), and cystic diameter ≥ 30 mm ($P=.010$), and mural nodule ($P=.010$) were significantly different between the malignant IPMN and the nonmalignant IPMN groups. Multivariate analysis showed that high NLR (≥ 2.2) (odds ratio 9.79; 95% confidence interval: 2.06–45.6), cystic diameter ≥ 30 mm (4.65; 1.14–18.9), and mural nodule (4.91; 1.20–20.1) were independently predictive of malignant IPMN. These results suggest that preoperative NLR is a useful predictive biomarker for evaluating malignant potential in patients with IPMN.

KEYWORDS: intraductal papillary mucinous neoplasm, malignant potential, neutrophil-to-lymphocyte ratio

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Background

Intraductal papillary mucinous neoplasm (IPMN) of the pancreas that was first defined as a mucous-producing tumor in 1982 by Ohhashi et al¹ has malignant potential and progresses via the adenoma-carcinoma sequence. Revisions of the International Consensus Guideline (ICG) for the Management of IPMN indicated that IPMNs were pathologically classified as low-, intermediate-, to high-grade dysplasia (LGD, IGD, and HGD, respectively) and invasive carcinoma based on the degree of dysplasia.^{2–4} Malignant IPMNs have a poorer prognosis compared with benign IPMNs, and thus, accurate prediction of a malignant potential is of importance at the time of first diagnosis or follow-up.

An invasive carcinoma may lead to impairment of the patient's immune system through systemic inflammation.^{5,6} Previous studies have reported that elevated preoperative neutrophil-to-lymphocyte ratio (NLR) is correlated with a poor prognosis in patients with several types of malignancies.^{6–12} The aim of this study is to explore the significance of preoperative NLR for biomarkers of malignancy in patients with IPMN.

Materials and Methods

Subjects

We retrospectively collected data of 103 consecutive patients with pathologically proven IPMN after surgical resection between May 1996 and December 2017 at the Department of Gastroenterological Surgery, Ehime Prefectural Central Hospital (EPCH). Before the publication of the guidelines, surgical resection was indicated on the base of (1) the presence of symptom, (2) the degree of dilation of the main pancreatic duct, (3) the size of cyst diameters, (4) the presence of mural nodule, and (5) changes over time in cysts. After the publication of the guidelines in 2006 (revised in 2012), the surgery was indicated according to the standards. During this period, 99 patients excluding cases of concomitant pancreatic cancer, bile duct cancer, and gastric cancer underwent curative pancreatectomy. Thirty-seven patients were pathologically diagnosed with nonmalignant IPMN (eg, intraductal papillary mucinous adenoma [IPMA]) and 62 with malignant IPMN (eg, intraductal papillary mucinous adenocarcinoma [IPMC]). Patients who had acute coronary artery disease; myocardial infarction, heart failure; active infection; severe tissue damage; acute



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