Diagnostic accuracy of CT in assessing extra regional lymphadenopathy in pancreatic cancer and Perimaginal Cancer: Systematic review and meta-analysis.

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Abstract

Objectives: Computed tomography (CT) is the most widely used method to assess respectability of pancreatic and peri-ampullary cancer. One of the contraindications for curative resection is the presence of extra regional lymph node metastases. This meta-analysis investigates the accuracy of CT in assessing extra regional lymph node metastases in pancreatic and peri-ampullary cancer. Methods: We systematically reviewed the literature according to the PRISMA guidelines. Studies reporting on CT assessment of extra regional lymph nodes in patients undergoing pancreas to duo denectomy were included. Data on baseline characteristics, CT investigations and histopathological outcomes were extracted. Diagnostic accuracy, positive predictive value (PPV), negative predictive value (NPV), sensitivity and specificity were calculated for individual studies and pooled data. Results: After screening, 4 cohort studies reporting on CT findings and histopathological outcome in 157 patients with pancreatic or peri-ampullary cancer were included. Overall, diagnostic accuracy, specificity and NPV varied from 63 to 81, 80100% and 6790% respectively. However, PPV and sensitivity ranged from 0 to 100% and 038%. The pooled sensitivity, specificity, PPV, and NPV were 25%, 86%, 28%, and 84%, respectively. Conclusion: CT has poor diagnostic accuracy in assessing extra regional lymph node metastases in pancreatic cancer and perimaginal cancer. Therefore, suspicion of extra regional lymph node metastasis on CT alone should not be considered a contraindication to exploration.

Keywords: PRISMA, CT, PPV, Perimaginal cancer.

Introduction

Pancreaticoduodenectomy is the only treatment for patients with per bulbar or malignant pancreatic tumours. Preoperative staging is essential to rule out distant metastases and assess potential resection potential. In addition to local resection, staging of extra regional lymph node metastases is important, especially in the current era of neo-adjuvant therapy. CT is the most widely used diagnostic method for staging pancreatic cancer and peri-mass cancer. However, the diagnostic accuracy of CT for proper evaluation of perilymph nodes is unknown [1]. In pre-meta-analyses, diagnostic accuracy varied widely between studies, and the included studies were of moderate quality. Nevertheless, suspicion of extra regional lymph node metastasis can have major therapeutic consequences. In most western countries, extensive extra regional lymph node metastases (i.e, lymph node metastases beyond standard lymph node dissection) are formally considered contraindicated for curative resection. However, in clinical practice, extraterritorial involvement (e.g., aortic vena cava window) or ambiguous CT findings are not contraindicated in themselves and often lead to resection. As neoadjuvant therapy becomes the standard of care, proper preoperative staging of lymph nodes is essential to optimize individualized treatment strategies. Data from a recent retrospective analysis suggest that the positive predictive value (PPV) of enlarged lymph nodes for local regional nodal involvement decreases after neoadjuvant therapy, with a PPV of 42.9 ter neoadjuvant therapy and 77.3% in patients without neoadjuvant therapy [2].

We have developed and validated a diagnostic radiomics signature-based nomogram for preoperative individual prediction of LN metastases in PDAC patients. The nomogram contains two items: radscore and LN status reported on CT. including these two factors in an easy-to-use nomogram facilitates preoperative individual prediction of LN metastases. PDAC is characterized by a very high mortality rate and a poor prognosis, mainly due to the difficulty of early detection and limited treatment options. The number of positive LNs has been shown to be an important and independent prognostic factor for the overall survival of PDAC. Pancreatectomy is the most effective way to improve a patient's long-term survival. Whether standard lymph node dissection and dilated lymph

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node dissection should be included in pancreatic resection is still debated. Accurate preoperative LN staging of PDAC is essential to adequately advise patients regarding surgical decisions and prognosis. However, this is difficult with the methods currently available [3].

If LN metastases are confirmed by endoscopic ultrasound-guided FNA (EUSFNA), high-risk TH patients should consider neoadjuvant therapy. EUSFNA is considered to be very sensitive to the detection of pancreatic lesions and provides diagnostic value for both primary tumor and LN metastases. EUSFNA can be used to obtain tissue pieces that provide sufficient histological information to facilitate the diagnosis of LN lesions around the pancreatobiliary duct. Inhalation is not recommended for LN FNA to reduce blood contamination. In addition, EUSFNA is affected by a variety of factors, including: B. Endoscopic location, lesion characteristics, lesion surroundings, and pathologists assessing. Positron emission tomography Computer tomography (PET / CT) has limited assessment of small lesions and cannot distinguish between inflammatory and metastatic lymphadenopathy. Similarly, MRI has several limiting factors associated with determining LN status in clinical settings: spatial resolution issues, motion artefacts, and dose-dependent supersaturated artefacts. The most widely used preoperative staging method for pancreatic cancer is CT, which can accurately assess tumor size and vascular lesions, but diagnoses to adequately assess LN lesions. Accuracy is limited. Many studies have reported diagnostic sensitivity of only 20-38%. In the current study, the AUC of LN status reported on CT was only 0.59 (95% CI, 0.51 to 0.67) in the training cohort and 0.63 (95% CI, 0.46 to 0.80) in the validation cohort [4].

There are several main limitations of preoperative imaging studies of LNs. First, LN imaging findings are difficult to correlate onetoone with pathological evidence of LN metastasis. Second, CT has limited visualization ability to identify metastatic LNs. Finally, there is no significant correlation between LN metastasis and the clinical and pathologic characteristics of PDAC patients. In addition, local inflammation secondary to malignant biliary obstruction may independently result in enlarged LNs. In the current study, we found no significant correlation between LN metastasis and CT reported tumor size or vascular or organ invasion. Thus, improved predictive tools for preoperative LN staging are urgently needed. In our study, the arterial radiomics signature was significantly associated with LN status ($p < 0.05$ for both the training and validation cohorts).

At present, there are few studies on predicting LN metastasis using radiomics developed and validated a radiomics nomogram that incorporated the radiomics signature and CT reported LN status and showed good calibration and discrimination in a training set (AUC, 0.9262; 95% CI, 0.8657–0.9868) and in a validation set (AUC, 0.8986; 95% CI, 0.7613–0.9901). Developed and validated a radio mix nomogram containing radio mix signatures, carcinoembryonic antigen (CEA) levels, and LN status reported on CT, with a predictive model of 0.736 (95% CI, 0.730) in the training cohort. ~ 0.742) brought the C index. 0.778 (95% CI, 0.769-0.787) in the validation cohort. A nomogram containing several clinical and pathological factors for predicting the prognosis of PDAC has been reported. However, it was difficult to incorporate radiomics signatures, imaging findings, and clinical factors to predict LN metastases from PDAC. In the current study, the LN status reported by Radsco and CT has been integrated into an easy-to-use nomogram, facilitating individual prediction of preoperative LN metastases. Nomogram were cut in both training (AUC, 0.75; 95% CI, 0.68-0.82) and validation cohort (AUC, 0.81; 95% CI, 0.69-0.94). Our nomogram also showed good calibration in both the training cohort and the validation cohort [5].

To go beyond purely mathematical performance measurements such as AUC, DCA is used to estimate the expected net profit of the model across all possible risk thresholds and to influence the impact of various risk thresholds. Made it easy to evaluate. DCA has shown that current radio mix nomogram is more useful than Treat all or Treat none regimens in predicting LN metastases when the threshold probability is 0.25 to 0.75.

Current research has some limitations. ROC values were lower in the training cohort than in the validation cohort. This study was a lack of external validation of the model. Obtaining a high level of evidence for clinical use requires multicentre validation with a larger sample size. In addition, the genetic marker is not yet included in the nomogram. Previous studies have shown that mRNA expression levels of Smad4 / DPDAC4 and MTA1 may be involved in PDAC progression, especially LN metastasis. The combination of the genetic marker panel and the radio mix signature may improve the ability of PDAC patients to predict LN metastases.

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