Editorial

^{18}F-fluorodeoxyglucose positron emission tomography/computed tomography in intrahepatic cholangiocarcinoma: could it be a new paradigm?

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Intrahepatic cholangiocarcinoma (iCCA) is the second most common type of liver cancer after hepatocellular carcinoma, accounting for 15% of all primary liver neoplasms. In particular, iCCA is the most lethal tumor of these types, with the greatest increase in incidence in Western countries over the last decade (1,2). Local resection is the only treatment that can achieve cure, but resection rates remain low and survival is still limited to less than 1 year in the presence of locally unresectable or distant metastases (3). Its incidence and mortality have increased in recent years, and the total number of new cases is expected to increase up to 10-fold over the next two to three decades. In recent years, new treatments for iCCA have been developed and overall survival has improved. Cisplatin and gemcitabine have been effective regimens for the treatment of advanced iCCA (4,5).

Currently, magnetic resonance imaging (MRI) including magnetic resonance cholangiopancreatography (MRCP), ultrasonography (US), computed tomography (CT), endoscopic retrograde cholangiopancreatography (ERCP), and endoscopic ultrasound (EUS) are performed as preoperative imaging modalities for iCCA. Overall, the prognosis for this tumor is poor, with a low 5-year survival rate of 17%; however, a 5-year survival rate of 22–32% has been reported with portal vein or arterial embolization followed by trisection (6,7). Thus, preoperative evaluation of extrahepatic metastases may be prognostically useful.

^{18}F-fluorodeoxyglucose positron emission tomography (^{18}F-FDG PET) is a radiological technique that identifies tumor tissue according to glucose utilization. This technique is inadequate to provide anatomical data on lesion localization. To overcome this limitation, PET-CT, which combines a full-ring PET scanner with multidetector-low CT (MD-CT), has been developed. PET-CT has limited utility in the identification of primary sites of liver tumors, especially hepatocellular carcinoma, but it is more sensitive than CT or MRI in identifying metastatic lymph nodes. This method is used in cases of potentially resectable disease on CT or MRI because it can help determine the feasibility of surgery by refining lymph node and distant metastasis staging (6,8). In the case of recurrent or metastatic iCCA, PET (with or without CT) has a sensitivity of 94% and a specificity of 100%, compared to 82% and 43%,

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respectively, for CT alone (9).

Lin *et al.* reported that ^{18}F-FDG PET/CT is more effective than CT/MRI in identifying lymph node and distant metastases (10). They first identified several points of interest for ^{18}F-FDG PET/CT in the initial staging of iCCA: the detection ability of ^{18}F-FDG PET has a clinically important impact on tumor-node-metastasis (TNM) staging and treatment planning for iCCA (11), and the ability of ^{18}F-FDG PET/CT to detect distant metastases in the early stages of iCCA is of great importance in the staging of iCCA. Detected distant metastases may be missed by CT/MRI, but can be accurately identified by ^{18}F-FDG PET/CT. Thus, ^{18}F-FDG PET/CT is important to avoid unnecessary laparoscopic surgery in patients with advanced disease and disseminated peritoneal metastases and may also accurately identify lymph node metastases and guide surgeons. Such observations may help to reconsider the role of ^{18}F-FDG-PET/CT in future guidelines, but more data are needed. It should be noted, however, that ^{18}F-FDG-PET/CT may erroneously contraindicate surgery because of false-positive findings.

Some studies have reported that lymph node status is highly related to the prognosis of iCCA (11,12). Lin *et al.* also reported that treatment allocation was significantly different, with 83.6% of patients treated curatively with conventional imaging and 90.5% of patients treated with both PET/CT and conventional imaging (P=0.033), establishing the influence of PET/CT on clinical treatment strategy (P=0.033), demonstrating the impact of PET/CT on clinical treatment strategies. Indeed, propensity score matching showed that patients who received both PET/CT and conventional imaging had significantly longer overall survival than those who received only conventional imaging [hazard ratio (HR) =0.74; 95% confidence interval (CI): 0.58–0.93; P=0.011].

According to both European Association for the Study of the Liver (EASL) and American Association for the Study of Liver Diseases (AASLD) guidelines, PET-CT is inappropriate for primary staging due to its low accuracy, but it clearly has an important role in detecting iCCA lymph node metastases and distant metastases compared to CT and MRI (PET/CT is more sensitive but less satisfactory for lymph node metastases <1 cm in diameter) and should be routine examination in all patients with resectable disease (13,14). In the future, prospective comparative studies may evaluate the importance of ^{18}F-FDG PET/CT in iCCA and make it a cornerstone of preoperative evaluation.

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