

Small Pancreatic Lesions Detected at Helical CT: Value of Comprehensive MR Imaging with MRCP, Chemical Shift Imaging and Contrast-enhanced Dynamic Imaging

M. Tanabe¹, K. Ito¹, T. Fujita¹, A. Shimizu¹, K. Sasaki¹, M. Hayashida¹, N. Matsunaga¹

¹Radiology, Yamaguchi University School of Medicine, Ube, Yamaguchi, Japan

Purpose: Multiphase contrast-enhanced helical CT has been widely used as a screening modality for patients with pancreatic diseases. In clinical practice, small pancreatic lesions with low attenuation are frequently observed at helical dynamic CT. However, it is sometimes difficult to consequently diagnose these lesions because small cystic (simple cyst or cystic neoplasm) and non-cystic lesion (focal fatty change or solid mass with hypovascularity) can show similar appearance with low attenuation at CT. The purpose of this study was to determine the diagnostic value (confident diagnosis) of comprehensive MR imaging with MRCP, chemical shift imaging and contrast enhanced dynamic imaging for small pancreatic lesions detected at helical CT.

Materials and Methods: CT and MR examinations of 48 patients (27 men, 21 women; age range 41-87 years; mean 69 years) with small pancreatic lesions (benign cystic lesions, n=21; pancreatic cancer, n=18; focal fatty lesions, n=9) which showed low attenuation on multiphase contrast-enhanced helical CT were retrospectively evaluated. Three radiologists independently reviewed CT and MR images, and assigned a confidence level of the lesions (cystic or solid, final diagnosis) to perform ROC analysis and to determine the frequency of a confident diagnosis.

Result: For differentiation of cystic from solid lesions, the area under the receiver operating characteristic curve (Az) was significantly higher ($p < 0.01$) for MR imaging than for CT. The mean sensitivity, specificity and accuracy for differentiation of cystic from solid lesions were significantly higher for MR imaging ($P < 0.001$) than for CT (98.3%, 94%, 96% versus 77.7%, 76.3%, 77%). The mean sensitivity, specificity and accuracy for differentiation of fatty from non-fatty lesions were significantly higher for MR imaging ($P < 0.001$) than for CT (100%, 100%, 100% versus 55.7%, 58.7%, 58.3%). A confident diagnosis (benign cystic lesions, pancreatic cancer, or focal fatty lesions) was rendered in 5 (10.4%) of 48 lesions on the basis of CT while this rate increased to 77.1% (37 of 48) on the basis of comprehensive MR imaging with 100% accuracy.

Conclusion: Comprehensive MR imaging with MRCP, chemical shift imaging and contrast enhanced dynamic imaging can significantly improve diagnostic accuracy, and significantly increase the diagnostic confidence in differential diagnosis of small pancreatic lesions found at helical CT.

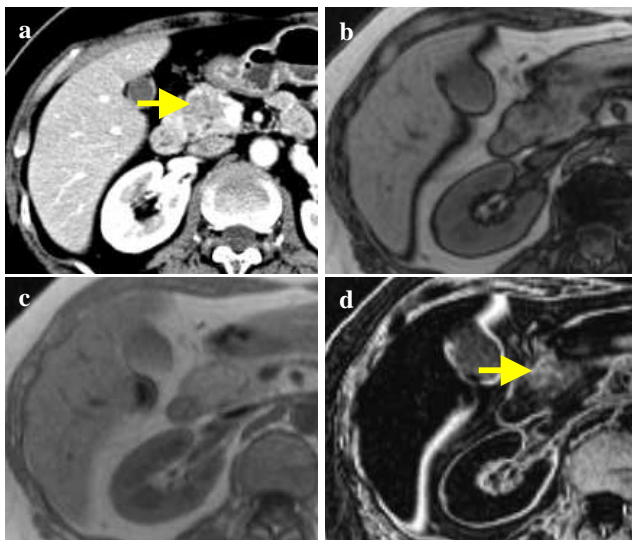


Fig.1. Focal fatty change of the pancreas. (a) Arterial-phase CT shows an equivocal lesion with slightly hypo-attenuation (arrow) in the pancreatic head. (b) Opposed-phase GRE image. (c) In-phase GRE image. (d) Subtracted fat image shows the lesion with high signal intensity (arrow) in the pancreatic head, indicating focal fatty change of the pancreatic head.

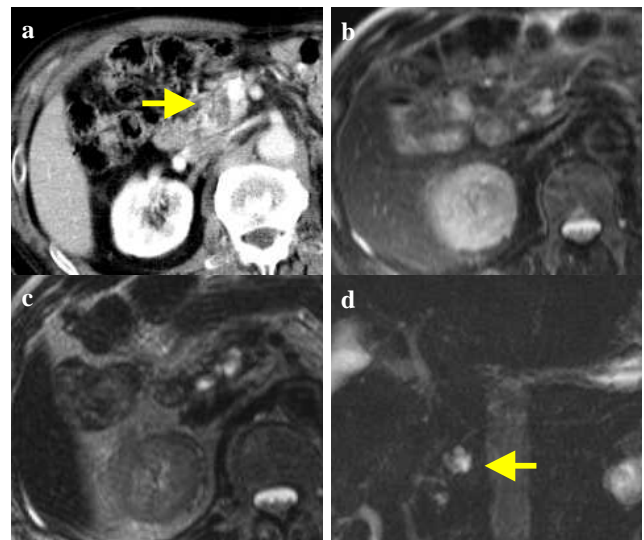


Fig.2 Cystic pancreatic tumor. (a) Arterial-phase CT shows a low-attenuated lesion (arrow) in the pancreatic head. Differential diagnosis (cystic versus non-cystic) may be difficult. (b) T2-weighted image. (c) Heavily T2-weighted image. (d) MRCP. Comprehensive MR images reveal a cystic tumor (arrow) in the pancreatic head with confident diagnosis.