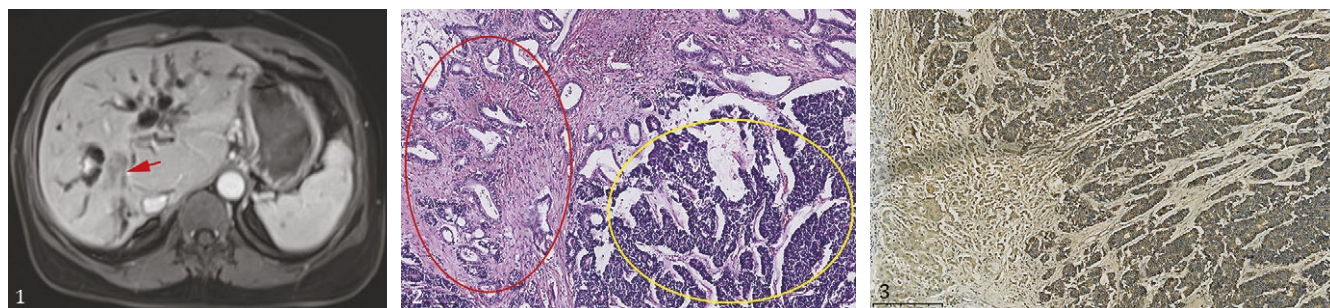


Primary Hepatic Mixed Neuroendocrine-Non-Neuroendocrine Neoplasm

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A 71-year-old woman was admitted for a month of right lower abdominal pain and moderate jaundice. Serologic examinations revealed elevated total bilirubin (65.5 $\mu\text{mol/L}$), cancer antigen 19-9 (206.8 U/mL), carcinoembryonic antigen (4.05 ng/mL) and cancer antigen 125 (98.7 U/mL). Enhanced magnetic resonance imaging (MRI) revealed a patchy abnormal signal measuring about $3.2 \times 3 \text{ cm}^2$ in the right hepatic lobe and hepatic duct confluence and dilated intrahepatic bile ducts (Fig. 1). Intrahepatic cholangiocarcinoma involving the hepatic hilum was considered. The patient underwent a radical surgery. The resected specimen showed a solid tumor measuring $3 \times 3.2 \times 3 \text{ cm}^3$, with the main body of the tumor located inside the liver. Postoperative pathology clarified the diagnosis of hepatic mixed neuroendocrine-non-neuroendocrine neoplasm (MiNEN) composed of a grade 3 (G3) neuroendocrine tumor (50%) (Fig. 2, circled in yellow, H&E staining, 40x) and moderately differentiated adenocarcinoma (50%) (Fig. 2, circled in red, H&E staining, 40x). Immunohistochemical staining demonstrated that the tumor was positive for phosphoenolpyruvate carboxykinase (PCK), cytokeratin (CK)7, CK19, chromogranin A (CgA) (Fig. 3, 40x), mucin-1 (MUC-1) and synaptophysin (SYN), Ki-67 proliferation index 40% and mitotic index of 40/10 high power fields. Synaptophysin and CgA are both important immunohistochemical markers of neuroendocrine differentiation. Meanwhile, expression of CK7, CK19 and MUC-1 confirmed that the adenocarcinoma component originated from the intrahepatic bile duct epithelium. No other primary lesions were identified in the imaging studies. The patient was discharged on the 11th day postoperatively. She remains alive and continues being followed up at our hospital every 3 months.

MiNEN, previously called mixed adeno-neuroendocrine carcinomas, are unusual, their diagnosis being challenging [1]. MiNENs are newly defined as composite neoplasms comprising non-neuroendocrine components and neuroendocrine components, each of which accounts for at least 30% [2].

The occurrence of MiNENs in the hepatobiliary system is extremely rare [3, 4]. The lack of typical clinical symptoms, laboratory and radiological features, makes the preoperative diagnosis difficult and furthermore leads to poor prognosis. Curative resection remains the primary treatment of MiNENs [5]. Meanwhile, definite diagnosis rely on the postoperative pathological examination.

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