# EUS evaluation of liver lesions

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Metastasis is the most common neoplasm in the adult liver in the United States. The liver is a principle metastatic site for GI malignancies.[1] The most common primary sites for metastatic lesions to the liver are malignancies of the colon, stomach, pancreas, breast, and lung. Multiple liver metastases are common and often vary in size.

The pathologic appearance of metastatic deposits in the liver closely resembles the primary tumor, including the degree of vascularity. Most metastases are hypovascular, but some malignancies characteristically have hypervascular metastases.

Large metastases can outgrow their blood supply, leading to central necrosis, which appears hypoechoic to anechoic on US. Benign hepatic lesions are common[2] and may be difficult to distinguish from metastatic lesions. This differentiation is important because it may significantly change a patient's stage and treatment options.

Transabdominal US, CT scan, and magnetic resonance imaging (MRI) are the diagnostic tests of choice for the detection of hepatic lesions (Figs. 1 and 2).[3] The detection of lesions less than 1 cm remains challenging.[4] EUS is an important tool in the staging of esophageal, gastric, and pancreatic malignancy[5] and is complementary to CT and MRI in the detection and sampling of metastatic lesions. EUS-FNA detected distant metastases in 5% to 20% of cases of pancreaticobiliary and upper-GI cancers, thus

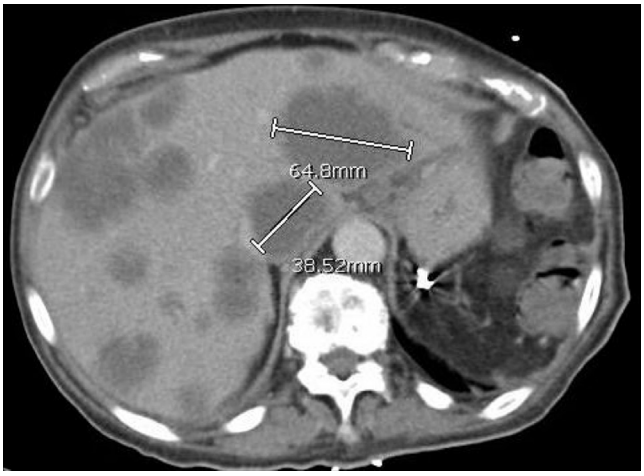


**Figure 2.** CT of the abdomen showing multiple low-attenuating metastatic lesions in both right and left hepatic lobes.

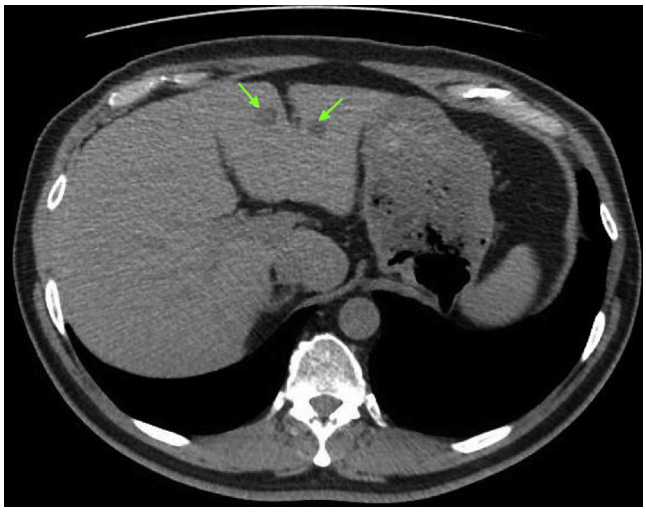

**Figure 1.** CT scan showing 2 well-demarcated hepatic cysts (*green arrows*).

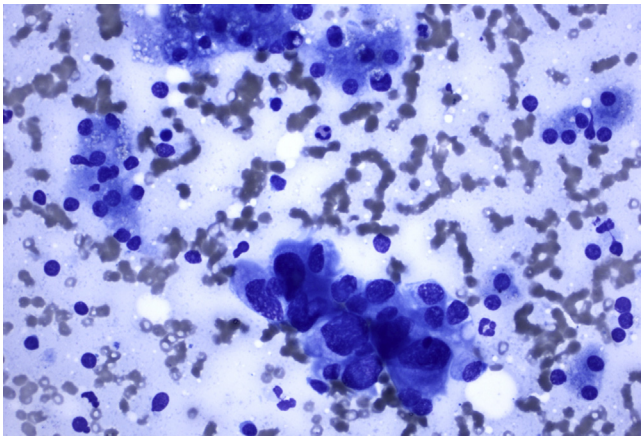

**Figure 3.** FNA sample from liver lesion shows single and loose cohesive clusters of tumor cells with moderate amount of vacuolated cytoplasm, pleomorphic nuclei with irregular nuclear contours, and small nucleolus, characteristic of adenocarcinoma. A few small clusters of benign hepatocytes are present. Diff-Quik stain, orig. mag. × 400.

Written transcript of the video audio is available online at www.VideoGIE.org.

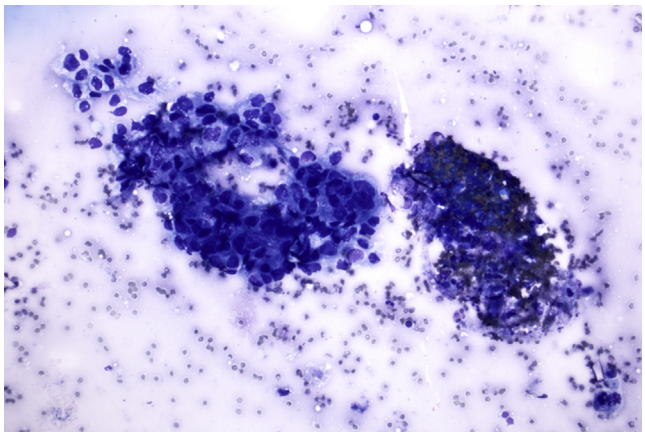

**Figure 4.** FNA sample from pancreas mass showing loose cohesive clusters of tumor cells with moderate amount of vacuolated cytoplasm and pleomorphic nuclei with irregular nuclear contours and small nucleolus, consistent with adenocarcinoma. Single tumor cells are present. Diff-Quik stain, orig. mag. × 200.

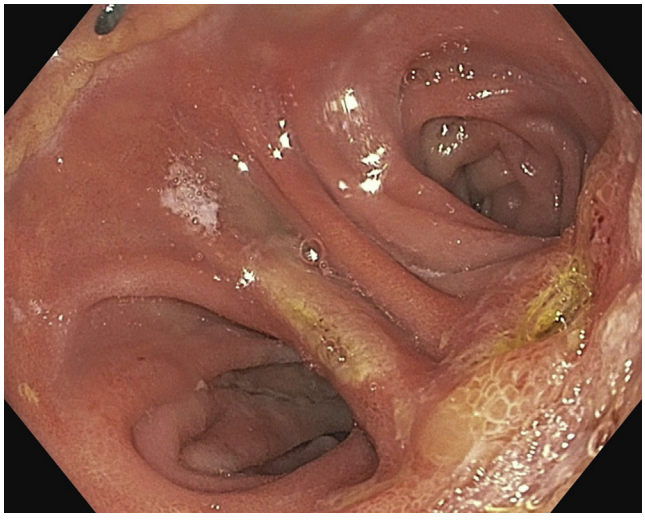

**Figure 5.** Endoscopic view of gastric pouch and anastomosis after gastric bypass surgery.

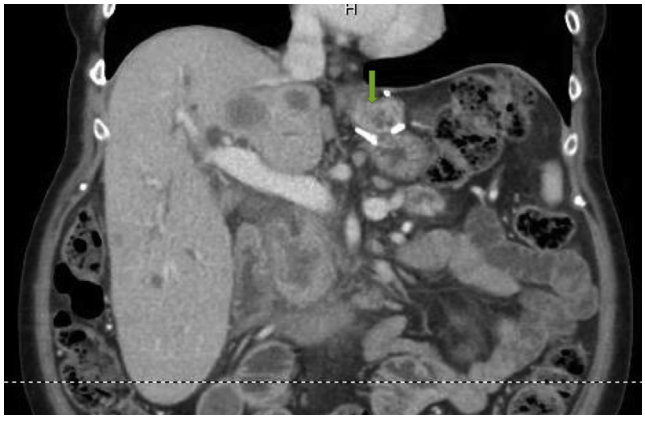

**Figure 6.** CT scan of abdomen, coronal view, showing multiple hepatic metastases and small gastric pouch (*green arrow*).

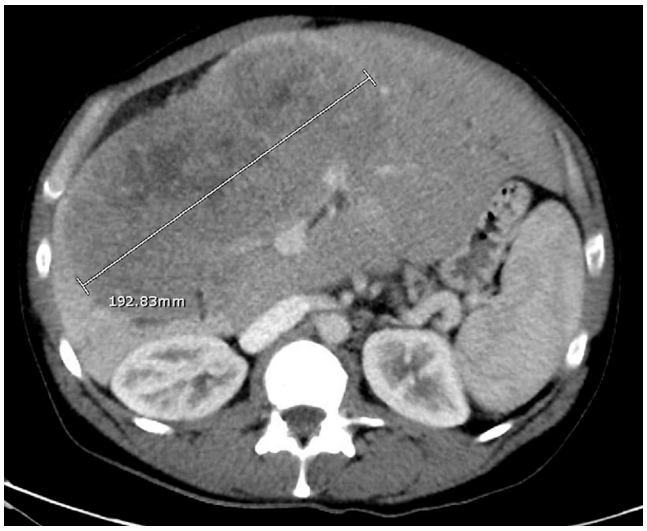


**Figure 7.** CT scan of abdomen showing a heterogenous mass occupying almost the entire right lobe of the liver.

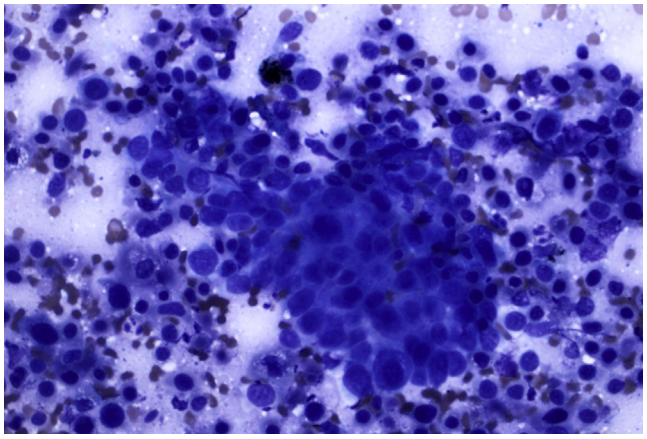

**Figure 8.** FNA sample from liver mass showing single and cohesive clusters of tumor cells in a background of necrosis. The tumor cells have dense cytoplasm, high nuclear-to-cytoplasmic ratios, and hyperchromatic nuclei with irregular nuclear contours, consistent with neuroendocrine tumor. Occasional mitoses are seen. Diff-Quik stain, orig. mag. × 200.

altering the treatment plan (Figs. 3 and 4).[6,7] EUS-FNA can be performed for pancreas and liver lesions along with lymphadenopathy at the same setting.[8]

Detailed visualization of various benign and malignant lesions can be achieved with dynamic transgastric and transduodenal imaging (Figs. 5-7); however, visualization of the far right lobe of the liver, specifically segments 6 and 7, is limited. Dewitt et al[9] evaluated the clinical impact of EUS-FNA of benign and malignant solid liver lesions and identified 82% to 94% sensitivity for the detection of malignant lesions. Anand et al[10] reported EUS to be an effective method of diagnosing hepatobiliary malignancy, with sensitivity and specificity of 94% and 100%, respectively.[11]

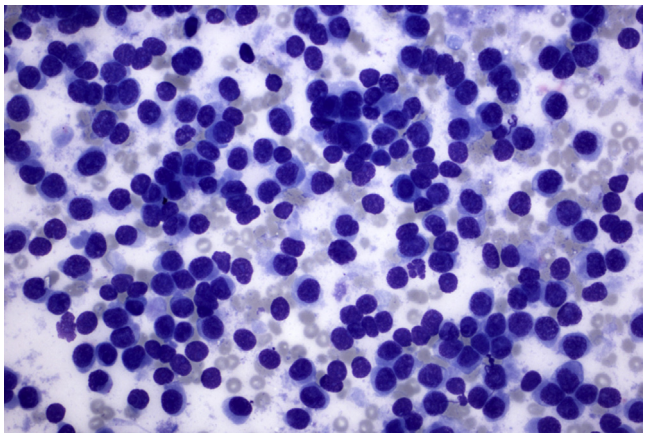

**Figure 9.** FNA sample from liver showing single and dyscohesive clusters of tumor cells in a bloody background. The tumor cells are small and uniform, and have high nuclear-to-cytoplasmic ratios and eccentrically located oval nuclei with inconspicuous nucleolus, consistent with squamous cell carcinoma. Diff-Quik stain, orig. mag. × 400.

## KEY LEARNING POINTS AND ENDOSONOGRAPHIC TECHNIQUES

- Hepatic lesions may be subtle and can be diagnosed endosonographically with repeated back-and-forth scanning through the liver by torqueing the EUS probe.
- Recognition of a disrupted pattern of the normal liver parenchyma, vessels, and bile ducts can identify hepatic lesions.
- Hepatic metastases may be hypoechoic or hyperechoic rounded structures.
- When performing FNA or fine-needle biopsy (FNB), it is helpful to target lesions close to the EUS probe to minimize the amount of liver parenchyma traversed. The trajectory of the needle for distant lesions typically cannot be modified once the needle has been passed into the liver.
- If possible, avoid targeting subcapsular lesions because of an increased risk of bleeding.
- Hepatic metastases are typically very cellular. FNA with 25-gauge needles safely and effectively diagnoses malignancy. The high cellularity of hepatic metastases may provide a cell block with dedicated FNA or FNB sampling (Figs. 8 and 9).

In the accompanying video (Video 1, available online at www.VideoGIE.org), we present several EUS cases demonstrating benign and malignant lesions within the liver.

## CONCLUSION

EUS is an important tool for the evaluation of benign and malignant hepatic lesions.

## DISCLOSURE

*All authors disclosed no financial relationships relevant to this publication.*

*Abbreviations: FNB, fine-needle biopsy; MRI, magnetic resonance imaging.*

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