

Diagnosis and preoperative evaluation of vena cava mass by endoscopic ultrasound: “hunting” for the overlooked lesions

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A 53-year-old woman was admitted to our hospital with right-sided lower abdominal pain lasting for 1 year. Her laboratory tests were unremarkable. Computed tomography (CT) and CT angiography revealed a $4.7 \times 4.0 \times 5.4$ cm mass along the posterior head of the pancreas and invading the inferior vena cava (IVC) (► **Fig. 1**, ► **Video 1**). Endoscopic ultrasound (EUS) found a solid hypoechoic lesion separate from the pancreas, which was growing transmurally and partially protruding outside the IVC wall and encroaching upon the right renal and hepatic veins. For a definitive diagnosis, we performed EUS-guided fine-needle aspiration (EUS-FNA) of the tissue mass through the duodenum, using a 22-gauge needle (► **Fig. 2**).

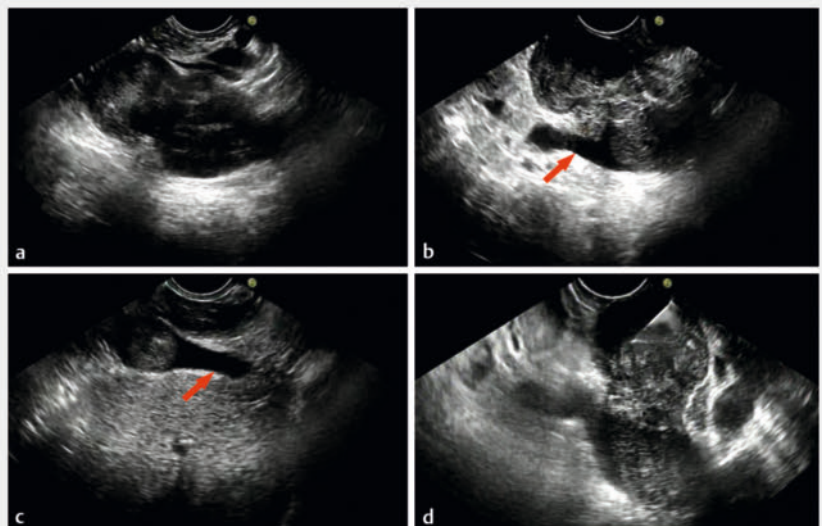
The pathological examination found that the mass was composed of spindle cells, and immunohistochemistry showed that it was positive for vimentin, desmin, SMA, H-caldesmon, and Ki67 (+, 40%), and negative for CD34, CD117, DOG1, S100, SOX11, MDM2, CDK4, and p16, indicating the diagnosis of leiomyosarcoma (► **Fig. 3**). The patient was referred to surgeons for further management.



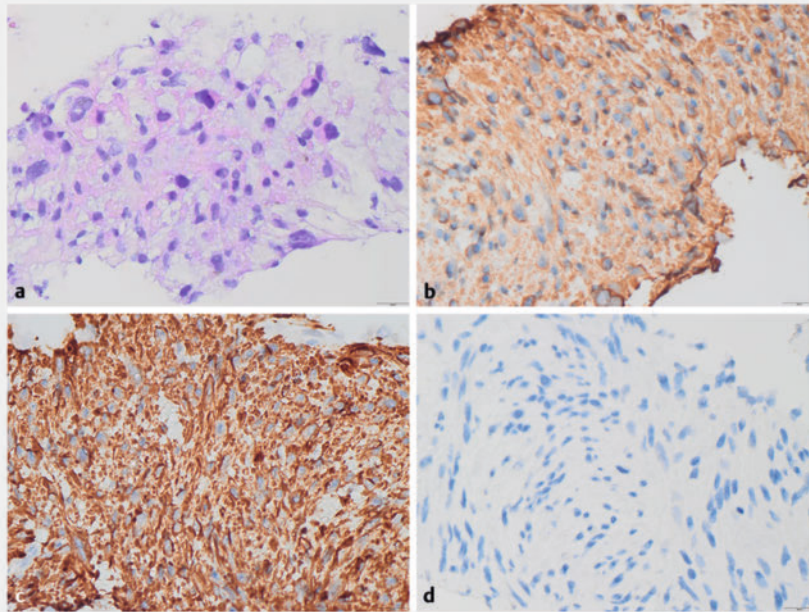
► **Fig. 1** Computed tomography (CT; left) and CT angiography (right) revealed a $4.7 \times 4.0 \times 5.4$ cm mass (arrow) along the posterior head of the pancreas and invading the inferior vena cava.



► **Video 1** Diagnosis and preoperative evaluation of vena cava mass by endoscopic ultrasound.



► **Fig. 2** Endoscopic ultrasound (EUS) images. **a** Inferior vena cava. **b** Right renal vein (arrow). **c** Hepatic vein (arrow). **d** EUS-guided fine-needle aspiration of the tissue mass through the duodenum, using a 22-gauge needle.



► **Fig. 3** Histopathology of tissue mass samples (×400). **a** Hematoxylin and eosin staining showed spindle cells. **b–d** Immunohistochemical staining showed positivity for desmin (**b**) and SMA (**c**), and negativity for CD34 (**d**).

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Leiomyosarcoma of the IVC is a rare cause of unexplained abdominal pain in patients [1]. Biopsy is generally considered challenging due to its deep location and risk of bleeding from the IVC, and pre-operative misdiagnosis and diagnostic delays before surgery are frequent, which means that many patients are initially treated inappropriately [2, 3]. Different surgical resection techniques and approaches are dependent on the level of IVC involvement, the tumor extension, and the presence or absence of collateral veins [4]. In our case, we demonstrated that EUS-FNA may be a simple, safe, and minimally invasive diagnostic method for a vena cava mass. Moreover, EUS could detect invasion of the right renal and hepatic veins more accurately than CT angiography, which is helpful when making a precise plan for surgery.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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