

## Ampullary carcinoid tumors diagnosed by endoscopic ultrasound-guided fine needle aspiration in two patients with biliary and pancreatic duct obstruction



**Fig. 1** Endoscopic view of a large ulcerated ampullary subepithelial lesion in case 1.

We present two cases of ampullary carcinoid tumors diagnosed and appropriately staged by EUS-FNA.

In case 1, a 46-year-old man presented with anemia and a 4.5-kg weight loss. Laboratory analysis showed: hemoglobin 11.2 mg/dL, total bilirubin 1.4 mg/dL, alkaline phosphatase 324 U/L, aspartate aminotransferase (AST) 221 U/L, and alanine aminotransferase (ALT) 205 U/L. Colonoscopy was unremarkable.

Upper endoscopy showed an enlarged and ulcerated ampulla (► **Fig. 1**).

Mucosal biopsies showed non-specific inflammatory changes. Abdominal computed tomography (CT) disclosed dilation of the main pancreatic duct and the intrahepatic and extrahepatic biliary ducts. Endo-

scopic ultrasound (EUS) revealed a round hypoechoic 26-mm ampullary subepithelial mass, staged as T2N1Mx (► **Fig. 2**).

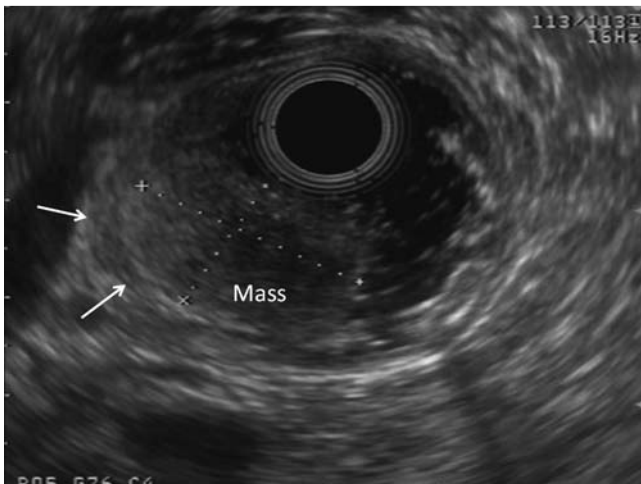
The pancreatic duct and bile duct were dilated up to 4 mm and 8 mm respectively. Fine needle aspiration (FNA) showed atypical cells with round, eccentric nuclei, suggestive of a low grade neuroendocrine tumor. Immunostains for synaptophysin and chromogranin A were positive.

The patient underwent pancreaticoduodenectomy. Surgical pathology confirmed a T2N1M0 carcinoid tumor (► **Fig. 3**).

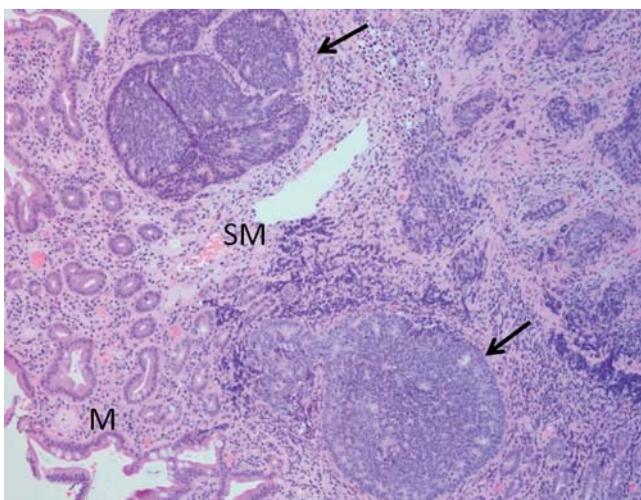
Imaging and clinical follow-up at 6 months were unremarkable. In case 2, a 53-year-old woman presented with painless jaundice and a 9-kg weight loss. Physical examination revealed scleral icterus and mild non-tender hepatomegaly. Laboratory analysis showed: total bilirubin 5.9 mg/dL, alkaline phosphatase 405 U/L, AST 96 U/L, and ALT 190 U/L.

Abdominal CT showed a dilated pancreatic duct and intrahepatic and extrahepatic biliary ducts. Endoscopy revealed an 18-mm ampullary subepithelial lesion, staged on EUS as T3N1Mx (► **Fig. 4** and ► **Fig. 5**).

The pancreatic duct and common bile duct were dilated up to 5 mm and 13 mm



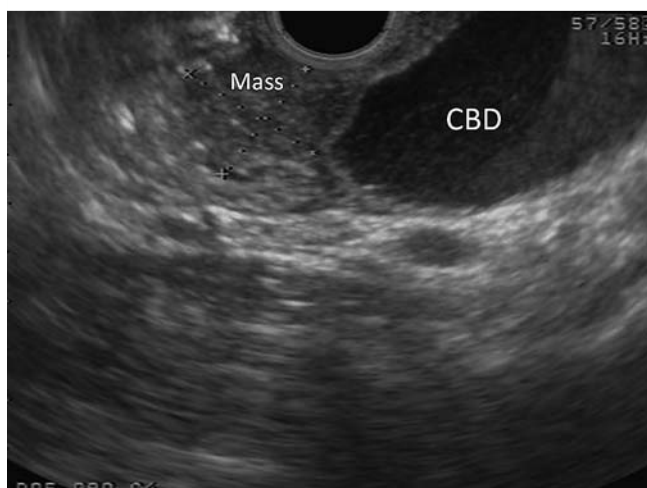
**Fig. 2** Endoscopic ultrasound (EUS) view of the lesion in ► **Fig. 1**. The subepithelial lesion appears to invade the submucosal space, extending to but not invading the muscularis propria (arrows).



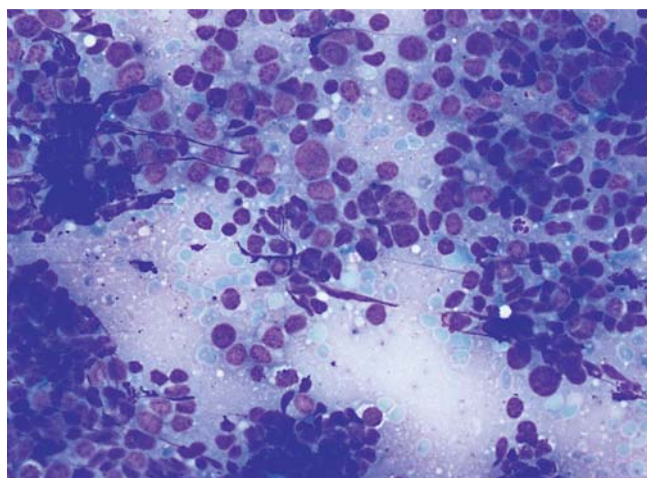
**Fig. 3** Histological photomicrograph from the pancreaticoduodenectomy resection specimen in case 1, demonstrating a low grade neuroendocrine tumor forming nests and rosettes (arrows) in the submucosa (SM). The mucosa (M) appears intact (hematoxylin and eosin, × 100).



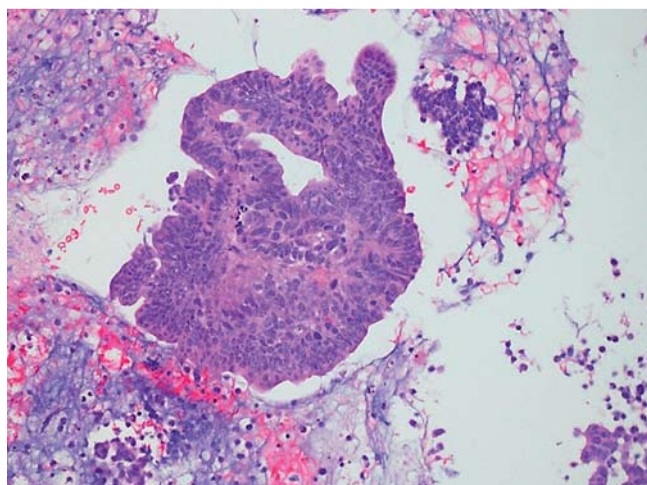
**Fig. 4** Endoscopic view of a smooth, medium-size ampullary subepithelial lesion in case 2. The lesion was friable and demonstrated limited bleeding upon manipulation with a biopsy forceps.



**Fig. 5** Endoscopic ultrasound (EUS) view of the lesion in [Fig. 4](#). The subepithelial lesion obstructs both the common bile duct (CBD) and pancreatic duct, and was staged as T3N1 on this examination.



**Fig. 6** Air-dried fine-needle aspirate specimen from the lesion in [Fig. 5](#), demonstrating loosely cohesive cells with peripheral clumping of chromatin, and exhibiting a high degree of pleomorphism – all features of a high grade neuroendocrine tumor (Diff Quick stain, ×550).



**Fig. 7** Histological photomicrograph from pancreaticoduodenectomy resection specimen in case 2, demonstrating significant cell crowding and overlap with individual cellular features similar to those seen on the fine needle aspiration smears ([Fig. 6](#)) (hematoxylin and eosin, ×200).

respectively. FNA showed malignant pleomorphic cells with round, eccentric nuclei, suggestive of high grade neuroendocrine tumor ([Fig. 6](#)). Immunostains for cytokeratin, synaptophysin, and chromogranin A were positive. The patient underwent pancreaticoduodenectomy. Histological examination confirmed a T3N1M0 high grade carcinoid tumor ([Fig. 7](#)). Imaging and clinical follow-up at 3 months were unremarkable.

Ampullary carcinoid tumors comprise 2% of ampullary malignancies and account for 0.3% of all gastrointestinal neuroendocrine tumors [1]. To date, approximately 100 cases of ampullary carcinoid tumor have been reported in worldwide literature [2]. Endoscopic diagnosis is usually limited by the subepithelial nature of the tumor. EUS-FNA provides accurate diagnosis and staging of ampullary malignancies in general [3]. In a series of 41 pa-

tients with ampullary tumors, the accuracy of EUS was found to be superior to that of CT and equivalent to that of magnetic resonance imaging (MRI) for T staging (EUS 73%, CT 26%, MRI 54%) and N staging (EUS 67%, CT 44%, MRI 77%) [4]. The role of EUS-FNA in the early diagnosis and staging of ampullary carcinoid tumors has been described only once before in the literature in English [5].

Endoscopy\_UCTN\_Code\_CCL\_1AF\_2AD

**Competing interests:** None

**I. I. El Hajj<sup>1</sup>, A. H. El Chafic<sup>2</sup>, H. Cramer<sup>3</sup>, M. Al-Haddad<sup>1</sup>**

<sup>1</sup> Division of Gastroenterology and Hepatology, Department of Internal Medicine, Indiana University Medical Center, Indianapolis, Indiana, USA

<sup>2</sup> Department of Internal Medicine, Indiana University Medical Center, Indianapolis, Indiana, USA

<sup>3</sup> Department of Pathology and Laboratory Services, Indiana University Medical Center, Indianapolis, Indiana, USA

## References

- 1 Godwin JD. Carcinoid tumors. An analysis of 2,837 cases. *Cancer* 1975; 36: 560–569
- 2 Hartel M, Wente MN, Sido B et al. Carcinoid of the ampulla of Vater. *J Gastroenterol Hepatol* 2005; 20: 676–681
- 3 Krishna SG, Lamps LW, Rego RF. Ampullary carcinoid: diagnostic challenges and update on management. *Clinical Gastroenterol Hepatol* 2010; 8: e5–6
- 4 Chen C, Yang C, Yeh Y et al. Reappraisal of endosonography of ampullary tumors: correlation with transabdominal sonography, CT, and MRI. *J Clin Ultrasound* 2009; 37: 18–25
- 5 Defrain C, Chang CY, Srikureja W et al. Cytologic features and diagnostic pitfalls of primary ampullary tumors by endoscopic ultrasound-guided fine-needle aspiration biopsy. *Cancer* 2005; 105: 289–297

## Bibliography

DOI 10.1055/s-0030-1257031

Endoscopy 2011; 43: E422–E423

© Georg Thieme Verlag KG Stuttgart · New York · ISSN 0013-726X

## Corresponding author

**M. Al-Haddad, MD**

Assistant Professor of Clinical Medicine  
Division of Gastroenterology & Hepatology  
Indiana University School of Medicine  
550 N. University Blvd, UH 4100  
Indianapolis  
Indiana 46202  
USA  
Fax: +1-317-278-8145  
moalhadd@iupui.edu