# Case 47
# Esophageal Adenocarcinoma

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## History

A 71-year-old male with esophageal adenocarcinoma and an esophageal stent (Fig. 47.1).

## Diagnosis

Esophageal adenocarcinoma with lymph node metastasis

## Findings

- Distal esophagus shows wall thickening that is isointense on T1-weighted image and mildly hyperintense on T2-weighted image (arrowheads).
- PET/MR fusion image shows abnormal hypermetabolic activity corresponding to the distal esophagus.
- More inferior slices show an enlarged T1 hypointense gastrohepatic lymph node that has high signal on DWI and low signal on ADC maps compatible with metastasis (arrows).

## Discussion

Esophageal cancer represents 1% of all cancers in the United States, but is much more common in parts of China, India, and southern Africa. The two major types of esophageal cancer are adenocarcinoma that occurs in the distal esophagus, and squamous cell carcinoma that is found in the upper and middle portions of the esophagus. The initial diagnosis of esophageal cancer is made by upper endoscopy and biopsy. Afterward, endoscopic ultrasonography (EUS) is used to determine primary tumor depth involvement by identifying layers of the esophageal wall. Cross-sectional imaging with CT, MRI, and PET is performed for advanced esophageal cancer to aid in the detection of local spread of disease and distant metastases. FDG PET/MRI is rapidly demonstrating advantages in initial staging of esophageal cancer due to its superior soft tissue resolution and FDG avidity.

Up until about 8 years ago, MRI had difficulty imaging esophageal cancer due to normal peristaltic movement. With newer, faster sequences, MRI has shown to be able to identify esophageal wall layers. On T2-weighted images, the submucosa has high signal intensity compared to the mucosal and muscularis propria layers. With malignancy high-resolution T2-weighted images demonstrates esophageal wall thickening with mildly increased signal at the location of the lesion. Diffusion-weighted images aid in the detection of malignancy which show restricted diffusion. Esophageal cancer is isointense to the wall of the esophagus on T1-weighted images and shows enhancement following the administration of gadolinium contrast.



R. Gupta et al., *PET/MR Imaging*, https://doi.org/10.1007/978-3-319-65106-4_47

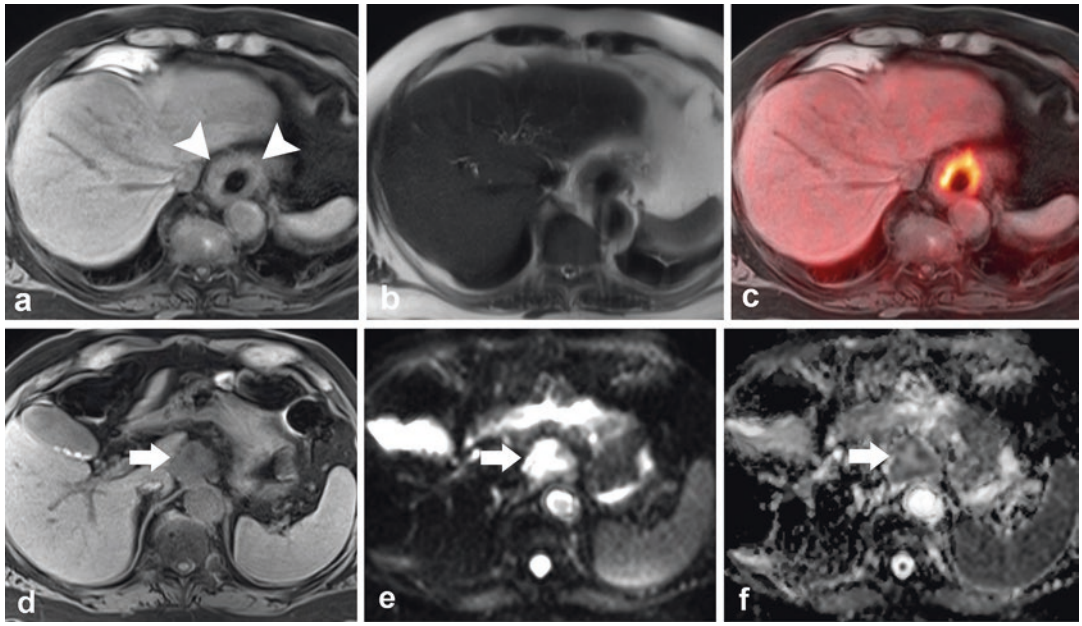


**Fig. 47.1** T1 VIBE with fat suppression axial (**a**), T2 HASTE axial (**b**), PET/MR T1 VIBE with fat suppression axial fusion (**c**), T1 VIBE with fat suppression axial, at more inferior level (**d**), Diffusion-weighted image axial, at more inferior level (**e**), and apparent diffusion coefficient axial, at more inferior level (**f**)

Esophageal cancer demonstrates intense metabolic activity on PET imaging. However, PET has a limited role in making the initial diagnosis of esophageal cancer since many benign etiologies in the same anatomic location also have increased FDG uptake including leiomyomas, esophageal spasm, candida infection, radiation inflammation, swallowed secretions, and reflux disease. Although PET/CT has a limited ability to detect regional lymph nodes, PET/MRI demonstrates superiority at paraesophageal lymph node detection compared to EUS, contrast enhanced CT, or PET/CT. The addition of diffusion-weighted images and contrast enhancement on MRI improves metastatic detection. PET/MRI is also advantageous in detecting regional spread and distant metastatic disease.

## Suggested Reading

Kim TJ, Kim HY, Lee KW, Kim MS. Multimodality assessment of esophageal cancer: preoperative staging and monitoring of response to therapy. Radiographics. 2009;29(2):403–21.

Lee G, Hoseok I, Kim SJ, Jeong YJ, Kim IJ, Pak K, et al. Clinical implication of PET/MR imaging in preoperative esophageal cancer staging: comparison with PET/CT, endoscopic ultrasonography, and CT. J Nucl Med. 2014;55(8):1242–7.

van Rossum PS, van Lier AL, Lips IM, Meijer GJ, Reerink O, van Vulpen M, et al. Imaging of oesophageal cancer with FDG-PET/CT and MRI. Clin Radiol. 2015;70(1):81–95.