

Imaging of Thoracic Cavity Tumors



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KEYWORDS

- Computed tomography (CT)
- Fluorine-18–fluorodeoxyglucose positron emission tomography (¹⁸F-FDG PET/CT)
- Magnetic resonance imaging (MRI) • Lung cancer • Mediastinal mass
- Pleural tumor

KEY POINTS

- Computed tomography (CT) is the primary imaging modality used in the diagnosis, staging, and follow-up of most thoracic cavity tumors.
- Fluorine-18–fluorodeoxyglucose positron emission tomography (¹⁸F-FDG PET)/CT has established itself as a supplementary tool to CT in lung cancer staging and in the assessment for distant metastases of many thoracic tumors.
- Magnetic resonance imaging is an important adjunctive imaging modality in thoracic oncologic imaging and is used as a problem-solving tool to assess for chest wall invasion, intraspinal extension, and cardiac/vascular invasion.

INTRODUCTION

Thoracic tumors, of which lung cancer is the most common, are an important global health issue. Lung cancer is the most common cancer worldwide, with an estimated 1.8 million cases diagnosed in 2012, of which more than half (58%) were in the developing world.¹ Globally, lung cancer is the most common cause of death from cancer, accounting for almost 1 in 5 cancer deaths (1.59 million deaths, 19.4% of total). Although the 1-year relative survival for this malignancy has increased from 37% in 1975 to 1979 to 44% in 2005 to 2008, the overall 5-year survival rate for all stages of lung cancer remains low at 16%.¹ Worldwide, lung cancer rates have peaked for men; but rates for women continue to increase and are closely linked to smoking rates.²

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Primary mediastinal neoplasms, with the exception of lymphoma, are rare tumors that can arise from any cell precursor. Because of their low incidence and heterogeneity, diagnosis can be difficult. Staging and treatment pathways are often not well defined.³ This point is particularly true for thymic epithelial tumors, the most common tumor of the anterior mediastinum.⁴⁻⁶

Tumors involving the pleura are largely caused by metastatic disease, whereas only 10% are considered true primary pleural tumors.⁷ The most common primary neoplasms include fibrous tumor of the pleura and malignant pleural mesothelioma. These disease processes can manifest as pleural effusion, pleural thickening, or mass, which can be detected on computed tomography (CT) or magnetic resonance imaging (MRI). In particular, the incidence of malignant pleural mesothelioma (MPM) is increasing worldwide and is expected to peak in industrialized countries in 2010 to 2020.⁸

LUNG CANCER

Diagnosis

Many advances have been made in recent decades in the imaging of lung cancer and molecular diagnostics; however, most new patients with lung cancer still have advanced stage disease at the time of presentation. The 5-year survival rate for localized disease is 53%; but only 15% of lung cancers are diagnosed at this early, potentially resectable stage. New targeted treatments of lung cancer have failed to achieve a significant reduction in mortality; therefore, early diagnosis will remain a crucial aim in the battle against this disease.

Histologic subtypes

Non-small cell lung cancer (NSCLC) represents 85% of cases, and small cell lung cancer (SCLC) accounts for approximately 15%. Adenocarcinoma is the most prevalent subtype of lung cancer in the United States, having replaced squamous cell carcinoma as the most common cell type in recent years.^{2,9} The typical appearance of adenocarcinoma of the lung is that of a solitary pulmonary nodule or mass, often peripheral (**Fig. 1**). Peripheral adenocarcinomas can invade the pleura and grow in a

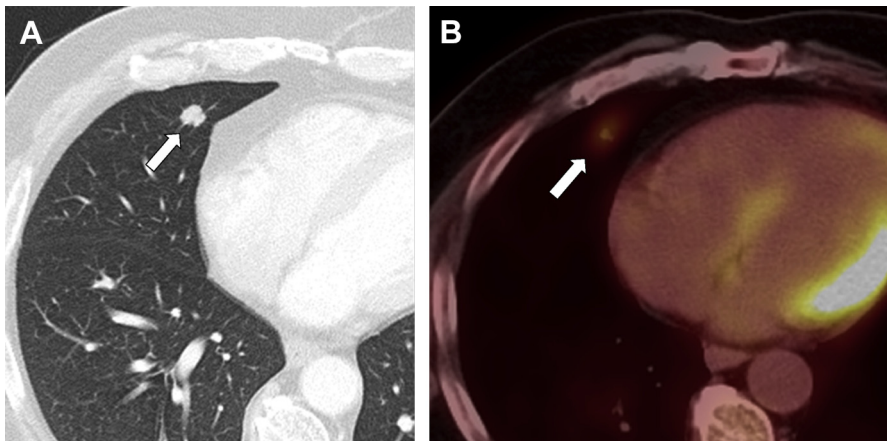


Fig. 1. A 74-year-old male former smoker. Incidental finding of 1.3-cm right middle lobe nodule on CT (**A**, axial CT [arrow]). Fluorine-18-fluorodeoxyglucose positron emission tomography (¹⁸F-FDG PET)/CT showed mild FDG uptake with the nodule (**B**, axial fused PET/CT [arrow]). Pathology demonstrated adenocarcinoma with lymphovascular invasion.

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