



determine whether the patient may benefit from surgical resection for curative intent or from other treatment modalities such as chemotherapy. Chest CT is useful to delineate the location and size of the primary tumor and to examine for involved mediastinal lymph nodes, pleural disease, and adrenal or liver metastases. However, CT has limited ability to distinguish benign versus malignant lymphadenopathy in the mediastinum. Positron emission tomography (PET) using 18-fluorodeoxyglucose (FDG) is more sensitive and specific than CT for the detection of mediastinal lymph node metastases and may detect unexpected metastases elsewhere in the body. Suspected mediastinal or extrathoracic metastases demonstrated by imaging should be confirmed with tissue sampling before determining whether a patient is an operative candidate. Although rare, multiple primary lung cancers can occur, especially in patients with many cancer risk factors.

Invasive techniques for staging of the mediastinal lymph nodes include endoscopic transbronchial needle aspiration, endoscopic ultrasound-guided needle aspiration, and mediastinoscopy. Mediastinoscopy is frequently performed to exclude mediastinal spread of disease in patients without definite imaging evidence of lymph node involvement before definitive resection of the lung cancer. Head CT with intravenous contrast or magnetic resonance imaging (MRI) is the preferred radiologic study if the clinical history or examination suggests brain metastasis. Bone scans are useful for the investigation of suspected bony metastases if there are corresponding clinical symptoms.

The increased use of CT scan for the work-up of other intrathoracic and extrathoracic conditions has led to a marked increase in the incidental diagnosis of solitary and multiple pulmonary nodules. These nodules may be described by their appearance: solid, partially solid, and ground glass. Radiographically, solid nodules demonstrate a soft tissue density. Ground-glass nodules represent alveolar wall inflammation or thickening, with partial air space filling. Radiographically, the nodules appear hazy but do not obscure underlying bronchial and vascular markings of the lung. Mixed nodules contain some combination of the two patterns. These incidental findings pose a conundrum for practitioners when evaluating patients without any other clinical symptoms who may or may not have a smoking history.

Current recommendations were created in 2005 by the Fleischner Society, a multidisciplinary panel of experts in lung cancer. These recommendations provide guidance for radiologic follow-up of incidentally encountered nodules. Patients with these findings are stratified as low risk (i.e., minimal or no history of smoking and other known risk factors) or high risk (i.e., history of smoking with other known risk factors). The recommendations state that nodules less than 4 mm in the greatest dimension require no follow-up in low-risk patients, and if they remain unchanged on a 12-month follow-up CT scan in high-risk patients, no additional scans are warranted. Nodules 4 to 6 mm in the greatest dimension in low-risk patients require a follow-up CT scan at 12 months, and if unchanged, no additional scans are warranted. However, high-risk patients should have a repeat CT scan 6 to 12 months after discovery and then at 18 to 24 months if the situation remains unchanged. This recommendation applies to low-risk patients with nodules between 6 and 8 mm in the greatest dimension. Closer follow-up is recommended for high-risk patients with 6- to 8-mm nodules and all patients with

nodules greater than 8 mm in diameter. These patients should have CT scans at 3 to 6, 9 to 12, and 24 months, respectively.

Ground-glass nodules 5 mm or larger seen on thin-slice (1-mm section) chest CT do not warrant further follow-up. Although multiple ground-glass nodules are less likely to represent a neoplastic process, they should be followed to ensure resolution. Ground-glass nodules larger than 5 mm in diameter that persist on a 3-month follow-up CT scan should be monitored by CT scans at 12, 24, and 36 months. If there has been no increase in size after 36 months of observation, follow-up CT scans can be discontinued. Mixed solid and ground-glass nodules that persist on a 3-month follow-up CT scan and have a solid component less than 5 mm in diameter should be followed in a similar fashion. However, nodules with a solid component of 5 mm or larger that persist on a 3-month follow-up CT scan should be biopsied or surgically resected. PET scanning is not helpful in characterizing ground-glass nodules because of the wide variation in radiotracer uptake (from nil to positive). The diagnostic yield of needle biopsy for these lesions varies because operator inexperience and sampling error can affect results.

TREATMENT

Evidence-based clinical practice guidelines for lung cancer were published by the American College of Chest Physicians (ACCP) in May 2013. These guidelines are based on a comprehensive review of the literature and systematic interpretation of the data to provide management recommendations in a graded fashion.

Management of lung cancer includes preventive strategies, early detection, and treatment. Of these, the most effective approach is prevention. Smoking prevention and cessation strategies are paramount. Individuals who are successful at quitting smoking have a lower long-term rate of lung cancer death than individuals who continue to smoke. Survival differences are seen as early as 5 to 10 years after removal of tobacco exposure. Although cancer risk remains higher in previous smokers than never-smokers, the survival benefit continues to increase as exposure becomes more remote. A diet rich in fruits and vegetables may protect against the development of lung cancer in smokers. Animal studies have suggested that antioxidants contained in these foods might block free radical-induced cell injury, preventing the development of various cancers. However, high-dose supplemental β -carotene, vitamin E, retinoids, and *N*-acetylcysteine should not be advocated for smokers and former smokers (grade 1A recommendation).

The treatment of lung cancer depends on the stage of disease at the time of presentation. The 7th edition of the International Staging System for Lung Cancer was proposed in 2009 by the International Association for the Study of Lung Cancer and accepted into use in January 2010. Neoplasms of the chest are classified by standardized tumor, node, metastasis (TNM) nomenclature that has been accepted throughout the field of oncology (Table 23-1). The Veterans Administration system of limited-stage versus extensive-stage disease (see Table 23-1) may be used in conjunction with the TNM staging system in the description of SCLC (grade 1B recommendation).

A timely, efficient, multidisciplinary approach using the expertise of a thoracic surgeon, medical and radiation oncologists, and a pulmonologist should be employed to evaluate patients with