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- Multidetector CT of the Airways: Technique and Normal Results** 185
Catherine Beigelman-Aubry, Pierre-Yves Brillet, and Philippe A. Grenier
- The new generation of multidetector CT (MDCT) has revolutionized noninvasive imaging of proximal and distal airways. Exquisite anatomic details of the airway lumen and airway wall on axial CT images benefit in routine practice from postprocessing tools in adequate orientation. This method ensures an excellent assessment of the morphology and location of any pathology. It may be combined with use of very low dose CT. Airway lumen and airway wall areas may be quantitatively assessed on MDCT images by using specific techniques that are reproducible and accurate.
- Congenital Abnormalities of Intrathoracic Airways** 203
Amandine Desir and Benoît Ghaye
- Multidetector CT has broadened the potential of imaging to demonstrate anomalies of the lung and the tracheobronchial tree with increasing frequency. Two- and three-dimensional reformatting improve the understanding of complex tracheobronchial anomalies. Most congenital tracheobronchial anomalies are rare and almost always nonsymptomatic; however, some may be confused with or even responsible for respiratory disease. Tracheal and accessory cardiac bronchi are among the most frequent anomalies, but other ectopic or supernumerary lung buds, developmental tracheobronchial interruption, obstruction, or compression, communicating bronchopulmonary foregut malformations, and bronchial malformations associated with anomalies of situs can be detected, even late after birth.
- Imaging of Tumors of the Trachea and Central Bronchi** 227
G.R. Ferretti, C. Bithigoffer, C.A. Righini, F. Arbib, S. Lantuejoul, and A. Jankowski
- Tumors of the trachea and central bronchi can be benign or malignant. Clinical presentation may be confusing, particularly in benign tumors that can be misdiagnosed as asthma or chronic bronchitis. Chest radiography has many limitations and is often considered unremarkable in patients with tumors of the central airways; therefore, multidetector CT (MDCT) has become the most useful noninvasive method for diagnosing and assessing the central airways. The purpose of this article is to provide a review of imaging of the tumors of the trachea and central bronchi. We emphasize the crucial role of MDCT and postprocessing techniques in assessing neoplasms of the central airways.
- Nonneoplastic Tracheal and Bronchial Stenoses** 243
Philippe A. Grenier, Catherine Beigelman-Aubry, and Pierre-Yves Brillet
- Nonneoplastic stenosis of proximal airways may result from longstanding intubations or tracheostomy, granulomatous infection, or systemic diseases such as

relapsing polychondritis, amyloidosis, Wegener's granulomatosis, sarcoidosis, and inflammatory bowel disease. It also may be caused by saber sheath trachea, tracheobronchopathia osteoplastica, or broncholithiasis. An early diagnosis of the tracheal and bronchial stenosis has become possible with the advent of routine CT imaging. Multiplanar and volume rendering reformations after thin collimation MDCT acquisition help assess the location and extent of the stenosis and characterize the presence, distribution, and type of airway wall thickening. They also help surgeons and endoscopists to select adequate procedures and assess the response to treatment.

Multidetector CT Evaluation of Tracheobronchomalacia

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Edward Y. Lee, Diana Litmanovich, and Phillip M. Boiselle

Tracheobronchomalacia (TBM) refers to excessive expiratory collapse of the trachea and bronchi as a result of weakening of the airway walls and/or supporting cartilage. This disorder has recently been increasingly recognized as an important cause of chronic respiratory symptoms. Multidetector CT (MDCT) technology allows for non-invasive imaging of TBM with similar accuracy to the historical reference standard of bronchoscopy. Paired end-inspiratory, dynamic expiratory MDCT is the examination of choice for assessing patients with suspected TBM. Radiologists should become familiar with imaging protocols and interpretation techniques to accurately diagnose this condition using MDCT.

Imaging–Bronchoscopic Correlations for Interventional Pulmonology

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Tshering Amdo, Myrna C.B. Godoy, David Ost, and David P. Naidich

The development and rapid advancement of both bronchoscopic, CT and ultrasound imaging technology has had considerable impact on the management of a wide variety of pulmonary diseases. The synergy between these newer imaging modalities and advanced interventional endoscopic procedures has led to a revolution in diagnostic and therapeutic options in patients with both central and peripheral airway disease. Given the broad clinical implications of these technological advances, only the most important areas of interventional pulmonology in which imaging has had a major impact will be selectively reviewed to highlight fundamental principles.

Bronchiectasis

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Cylen Javidan-Nejad and Sanjeev Bhalla

Bronchiectasis is defined as irreversible bronchial dilatation, leading to chronic cough, sputum formation, and recurrent infections. HRCT plays a major role in diagnosis of bronchiectasis. Most bronchiectasis is either idiopathic or a result of prior infections. Cystic fibrosis, allergic bronchopulmonary aspergillosis, and traction bronchiectasis caused by prior tuberculosis, sarcoidosis, and silicosis with progressive massive fibrosis have an upper lobe distribution. A lower lobe distribution is mostly seen in chronic aspiration, hypogammaglobulinemia, Mounier-Kuhn syndrome, primary ciliary dyskinesia, and traction bronchiectasis caused by usual interstitial pneumonitis and nonspecific interstitial pneumonitis. The right middle lobe and lingula are preferentially involved in atypical mycobacterial infections and sometimes in primary ciliary dyskinesia and Kartagener syndrome. A location-based approach may help lead to a specific diagnosis.

Imaging of Small Airway Disease (SAD) 307

Sudhakar N.J. Pipavath and Eric J. Stern

This article comprehensively reviews and illustrates the imaging features of small airway diseases. The authors discuss the imaging findings of small airway diseases in general and how to differentiate them from other findings that can be confused with small airway diseases. The authors also discuss the features that aid in diagnosing specific diseases that affect the small airways.

Asthma: An Imaging Update 317

Alyn Q. Woods and David A. Lynch

Significant advances continue in the subjective and quantifiable imaging features of asthma. Radiologists need to be aware of not only the general features, but also potential asthma mimics as well as complications.

Imaging of Airways: Chronic Obstructive Pulmonary Disease 331

Julia Ley-Zaporozhan and Hans-Ulrich Kauczor

Visualization of airways in chronic obstructive pulmonary disease (COPD) patients is important for understanding the disease and therapeutic management. Today a perpendicular visualization and measurement of airway diameter and wall thickness are possible. Postprocessing software allows for the automatic segmentation and quantification. MR imaging is well suited for gaining functional information on perfusion and ventilation in COPD, while direct visualization and measurement of peripheral airways is not possible up to now.

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