Patients and Methods

Image Interpretation

The following CT scanners were used: Aquilion 64, Aquilion ONE (Toshiba Medical Systems, Tokyo, Japan), Somatom Sensation Cardiac 16 (Siemens Medical Solutions, Erlangen, Germany), and HiSpeed CT/i (GE, Milwaukee, USA). All image data were reconstructed at a 1-2 mm slice thickness.

The window level was -550 HU, and the window width was 1600 HU for the lung window. The window level was 30 HU, and the window width was 300 HU for the mediastinal window. A contrast agent was used unless contraindicated. The image review was performed on a Picture Archiving and Communication System station.

Polygonal shape was defined as the entire lesion surface surrounded by concave margins [9]. The margins were classified as well-defined when a lesion was clearly and distinctly separated from the surrounding lung parenchyma. Hazy or indistinct margins were classified as ill-defined [10]. Internal density was defined as non-homogeneous when the lesion had small and scattered areas of low attenuation inside [10]. The central lesion was defined as that involving a segmental or larger bronchus. Subsegmental bronchial involvement and tumor surrounded by lung parenchyma without direct airway involvement was defined as a peripheral lesion [11]. Pleural indentation was defined as a linear area of high attenuation that was surrounded by aerated lung, originated from the margin of the lesion, and extended peripherally to contact the pleural surface [10]. Areas of high attenuation that appear visually as
opaque as bony structures were defined as calcification. We also defined a very small spot of high attenuation in the tumor as micro-calcification. Cavity was defined as a gas-filled space, seen as a low-attenuation area within a lesion [12]. An air bronchogram was defined as a pattern of air-filled bronchi on a background of opaque airless lung [12]. Spiculation was defined as the presence of thicker strands extending from the margins of a lesion into the lung parenchyma without reaching the pleural surface [13]. Atelectasis was defined as a reduced volume seen as an increased attenuation in the affected part of the lung [12]. GGO was defined as a hazy increased opacity of the lung, with preservation of bronchial and vascular margins [12]. A part-solid lesion with a solid component in the center and a surrounding GGO on HRCT was also categorized in the GGO group, in addition to a lesion with only GGO.

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