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CLINICAL IMAGING

Case reports

Systemic air embolism detected during percutaneous transthoracic needle biopsy: report of two cases and a proposal for a routine postprocedure computed tomography scan of the aorto-cardiac region

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Abstract

Systemic air embolism is a rare but potentially fatal complication of percutaneous transthoracic biopsy. Herein, we report two cases of nonfatal air embolism that occurred during a computed tomography (CT)-guided lung biopsy. It can be concluded that postprocedure CT scans of the aorto-cardiac region and attention focused on systemic air on CT scan images during biopsy procedures can be helpful for early recognition of the complication, a step that is important for successful treatment.
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Keywords: Air embolism; CT-guided needle biopsy; Lung biopsy; Complications

1. Introduction

Computed tomography (CT)-guided percutaneous transthoracic needle biopsy is an established procedure for evaluating pulmonary and mediastinal lesions. However, the procedure is not free from complications even if performed by an experienced operator. Frequent complications include simple pneumothorax and self-limiting hemoptysis. There are also potentially fatal complications, such as severe pulmonary hemorrhage and systemic air embolism. Systemic air embolism is recognized as an extremely rare complication. Its incidence has been reported to be 0.02% to 0.07% [1-3]. We have documented two reported cases of nonfatal systemic air embolism complicating a percutaneous CT-guided transthoracic needle biopsy, one case being a patient with cardiac symptoms and the other case being a patient without cardiac or cerebral symptoms.

2. Case reports

Between September 2004 and August 2008, 741 percutaneous transthoracic needle biopsy procedures were performed at our institution for diagnosis of primary, metastatic, and inflammatory thoracic lesions. All of these procedures were performed on a single-detector helical CT scanner (HiSpeed CT/2.X; GE Medical System) using CT guidance. We encountered two cases of systemic air embolism (0.27%).

2.1. Case 1

A 74-year-old man was admitted to the hospital for evaluation of progressive dyspnea and general weakness during the past 6 months. He had a history of cigarette smoking-related chronic obstructive pulmonary disease and adult-onset diabetes mellitus. His workup included a chest radiograph and a chest CT scan, which showed a 3.2×3.9-cm mass in the right lower lobe. Lung cancer was suspected. A CT-guided percutaneous biopsy was requested to establish a diagnosis. Routine prebiopsy laboratory test results, including a platelet count and coagulation studies, were within normal limits.

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Under CT guidance with the patient in a supine position, an 18-gauge, 16-cm automated cutting needle (Magnum, Bard Biopsy System, Tempe, AZ, USA) was advanced toward the lesion during an inspiratory breath-hold. During the first trial, the needle situated inferior to the lesion (Fig. 1) and the needle tip passed through a pulmonary vein. The needle was repositioned, but its tip was still inferior to the lesion. Before removal of the needle, the patient coughed and had a small amount of hemoptysis. Then, sudden onset of bradycardia was found from the pulse oximeter. He became irritable and hypotensive. A CT scan revealed the presence of air in the ascending aorta, left ventricle, and right coronary artery. We removed the needle immediately, and 100% oxygen was administered. The bradycardia condition lasted for about 10 min and then his heart rate returned to normal. No significant neurological signs were found. The patient was put in the Trendelenburg position to avoid additional migration of air bubbles toward the brain. A follow-up chest CT scan 6 h later showed no more evidence of systemic air embolism but did reveal a progression of pneumothorax. A chest drain for the pneumothorax was performed, and the chest tube was removed 2 days later after the pneumothrax

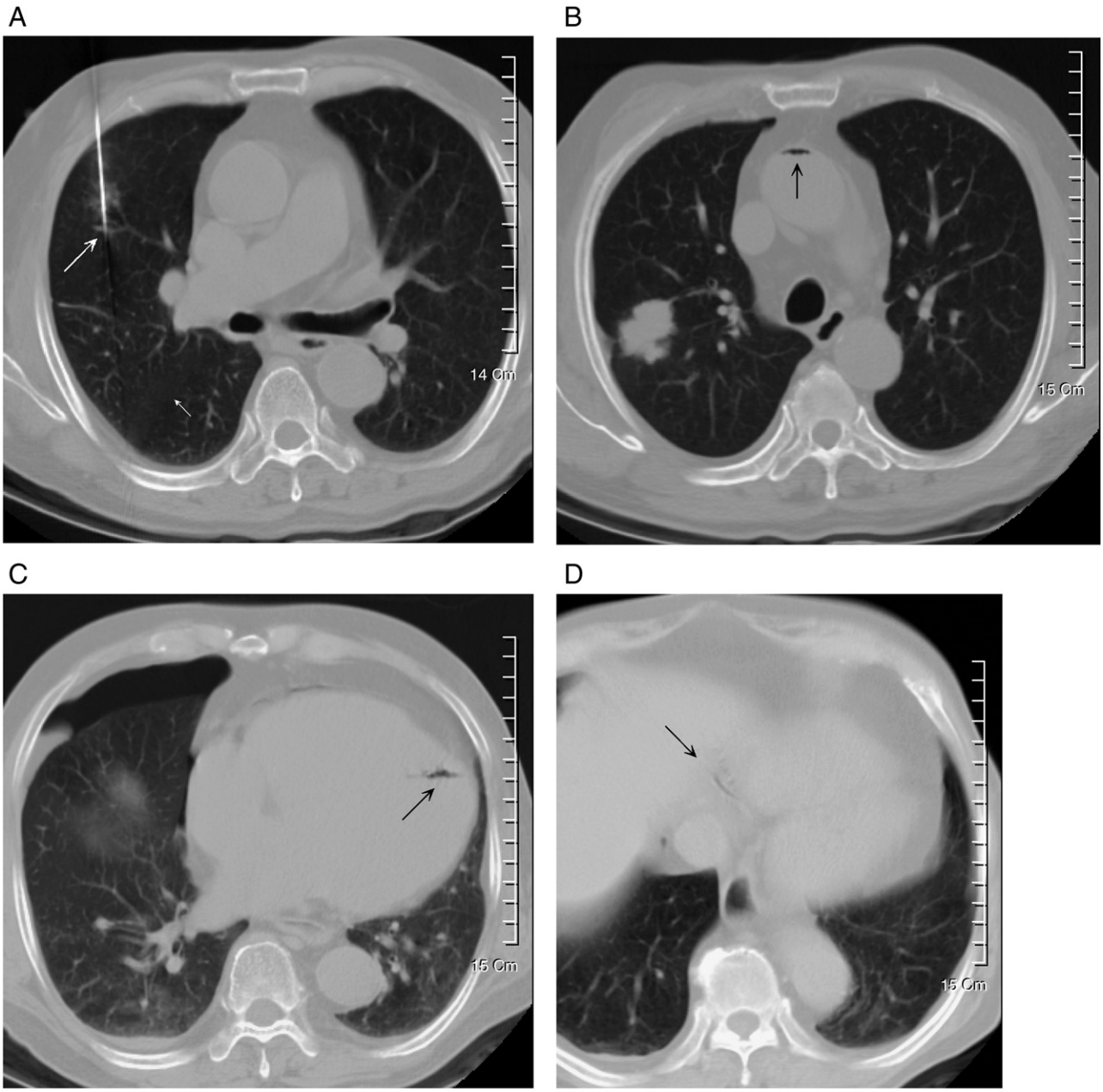

Fig. 1. Case 1. A CT-guided needle biopsy was performed from an anterior approach to avoid puncturing through the major fissure (A, small arrow). Note the needle tip at a pulmonary vein during the procedure (A, large arrow). The postprocedure CT scan revealed mild left pneumothorax; regional pulmonary hemorrhage; and the presence of air in the ascending aorta, left ventricle, and right coronary artery [arrows in (B)–(D)].

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