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IMAGES IN CARDIOVASCULAR INTERVENTION

Coronary air embolism following transbronchial lung biopsy

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An 80-year-old man with IgG4-related kidney disease underwent bronchoscopy for evaluation of a right middle lobe nodule. Immediately after the transbronchial lung biopsy (TBLB) from the right lateral segment (B4), his heart rate suddenly dropped to < 20 bpm, and an electrocardiogram showed complete atrioventricular block and ST elevation in leads II, III, and aVF (Fig. 1a). Emergency coronary angiography, following temporary transvenous pacemaker insertion, revealed total occlusion at the distal portion of the left anterior descending (LAD) artery, and the right coronary artery (RCA) was filled with embolized air (Fig. 1b, c, Online Video 1). Manual aspiration was performed using a 4Fr diagnostic catheter in both the RCA and LAD, and a final angiogram showed excellent results with complete recanalization (Fig. 1d, e). Thereafter, we performed whole-body computed tomography (CT) imaging, which revealed multiple foci of air embolism observed in the ascending aorta, left ventricle, and cerebral vessels, as well as pneumothorax in the right lung and pneumomediastinum (Fig. 1f–j). Next, we attempted to evacuate as much residual air as possible in the ascending aorta using a 4Fr multi-orifice pigtail catheter. After completion of the procedure, he was hemodynamically stable with clear consciousness, demonstrating only minor neurological mobility impairment. However, we maintained the patient in a supine position under administration of oxygen until we had confirmed elimination of all residual air using a follow-up CT. Hyperbaric oxygen therapy was not used in this case to prevent further entry of gas due to positive ventilation pressure. Peak creatine kinase level was 1615 IU/l and echocardiogram showed only mild hypokinesis of inferior wall. The patient was discharged after rehabilitation following an uneventful course.

Systemic air embolism following TBLB is an extremely rare complication, and only a few reports have described cerebral infarction induced by air embolism [1]. Although its mechanism has not been fully elucidated, high bronchial pressure and venous trauma induced by a biopsy can explain this complication. Mechanical tissue destruction might

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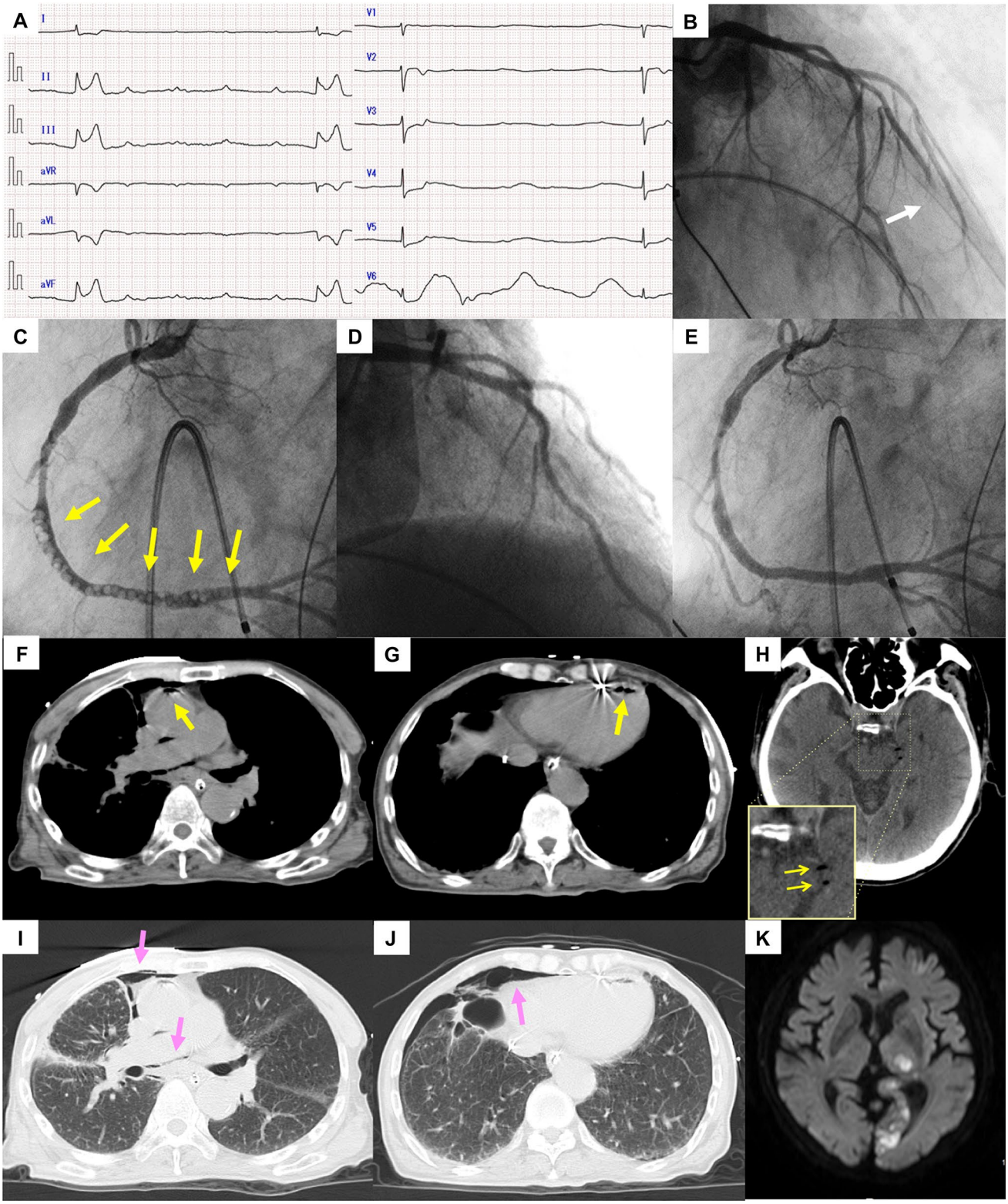
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◂**Fig. 1** Electrocardiogram immediately after bronchoscopy (**a**), Emergency coronary angiogram before and after manual aspiration (**b**–**e**), and whole-body computed tomography (CT) images and magnetic resonance imaging (MRI) of the head after bronchoscopy (**f**–**k**). **a** Electrocardiogram showing complete atrioventricular block and ST elevation in II, III, and aVF. **b** Baseline angiogram of the left coronary artery showing total occlusion at the distal portion of the left anterior descending artery (white arrow). **c** Baseline angiogram of the right coronary artery showing that the vessel is filled with embolized air (yellow arrows). **d** Final angiogram of the left coronary artery showing complete recanalization of the left anterior descending artery. **e** Final angiogram of the right coronary artery showing good results without residual air. Multiple foci of air embolism in the ascending aorta (**f**), left ventricle (**g**), and cerebral vessels (**h**) (yellow arrows). **i**, **j** Pneumothorax in the right lung and pneumomediastinum (pink arrows). **k** Diffusion-weighted MRI images on day 2 after bronchoscopy showing areas of high signal intensity, suggesting multiple areas of cerebral infarction due to air embolism

form broncho-vascular fistulas, and high bronchial pressure pushes air into the fistulas, leading to systemic embolism through the pulmonary vasculature (veins/arteries) [2]. To the best of our knowledge, this is the first reported coronary air embolism following a TBLB.

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