Pneumonectomy-related small omega (ω) sign and increased pulmonary uptake in myocardial perfusion imaging

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IMAGES THAT TEACH

A 50-year-old female patient without any major risk factor for coronary artery disease (CAD) was admitted to evaluate long-standing bilateral paresthesia on arms and back pain. On physical examination, left postero-lateral thoracotomy scar was observed due to left-sided pneumonectomy 33 years ago for hydatid cyst causing bronchiectasis. Resting 12-lead electrocardiogram (ECG) revealed left axis deviation, precordial clockwise rotation, and low voltage (Figure 1), and radiography was showing shift of heart and left abdominal structures to the pneumonectomy loge because of fibrosis (Figure 2).

Tc-99m sestamibi myocardium perfusion imaging (MPI) was performed using a 1-day stress/rest protocol. The patient underwent Bruce treadmill protocol. She exercised for 9 minutes and achieved 95% of maximum predicted heart rate without experiencing any chest pain or ischemic ECG changes. The MPI showed that position of the heart had been changed in clockwise rotation in a negative angle shifted upward through the pneumonectomy space (Figure 3, Video 1). However, with cardiac processing, the myocardium perfusion images displayed normal perfusion pattern with prominent pulmonary uptake and right ventricle (RV) visualization, causing small omega ''ω'' sign in the basal short-axis cross sections (Figure 4).

Other than left ventricular dysfunction due to ischemic heart disease,[1] increased RV visualization on MPI is associated with RV pressure overload, size, and functions,[2] and increased pulmonary uptake may be an indicator of valve disorders, cardiomyopathies, and inflammatory pulmonary diseases.[3] Increased pulmonary circulation through remaining right lung instead of 2 lungs might have caused radioactivity

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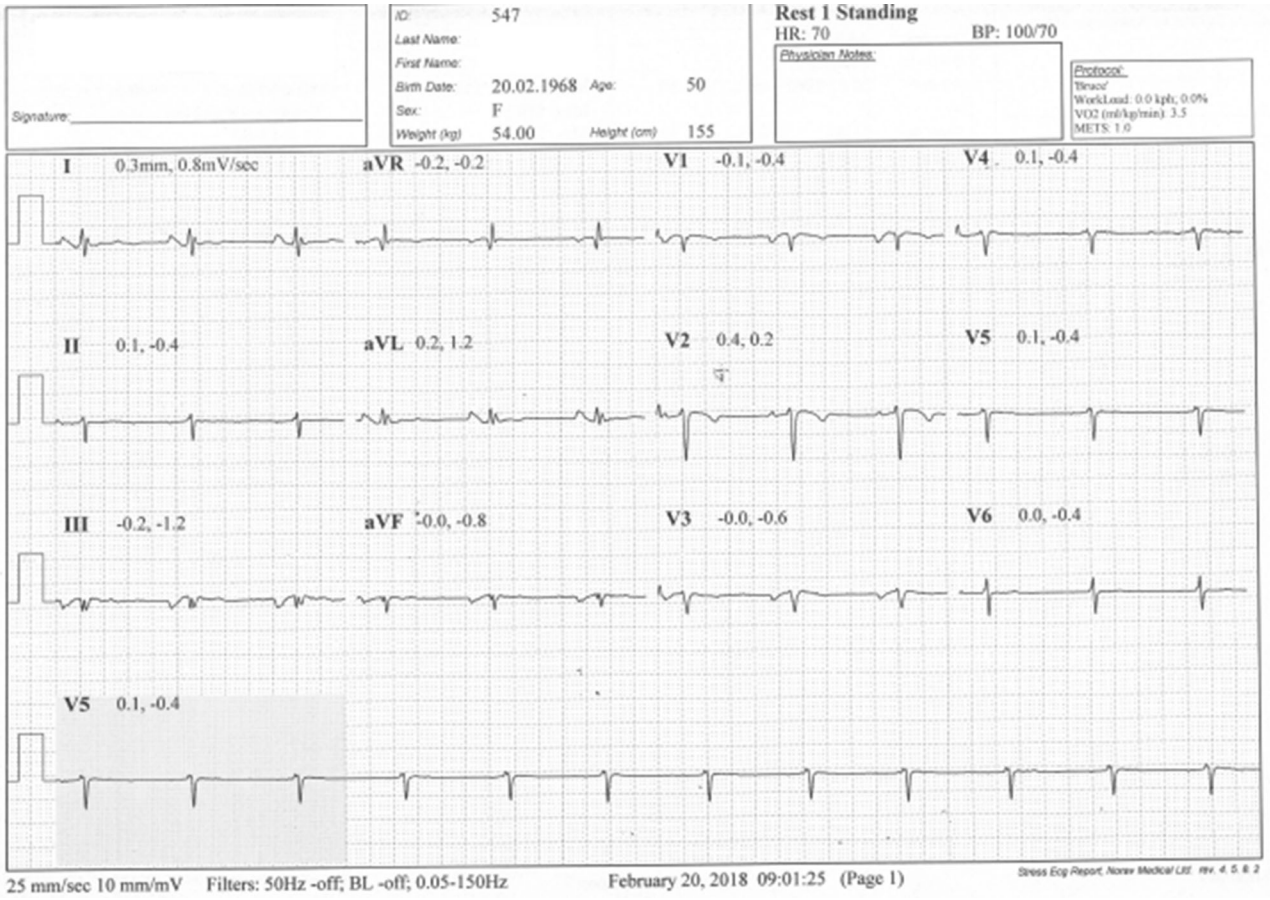

Figure 1. The resting 12-lead electrocardiogram showing left axis deviation, precordial clockwise rotation, and low voltage due to the position of the heart.

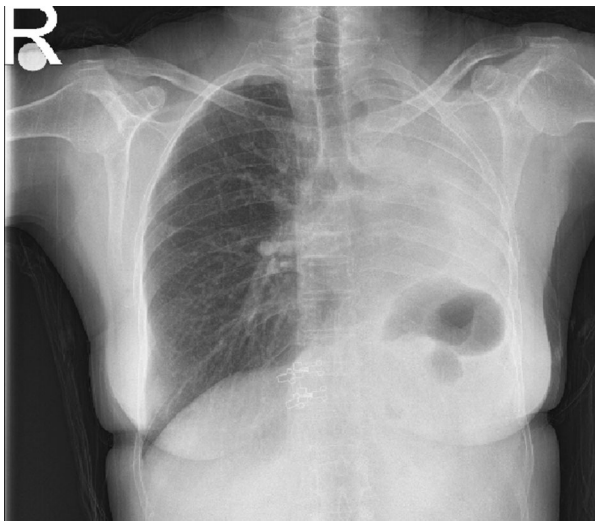

Figure 2. Chest radiograph of the patient with left-sided pneumonectomy.

accumulation due to pulmonary congestion and increased capillary wedge pressure leading to increased passive extravascular diffusion of radioactivity resulting in increased uptakes both at stress and rest. In patients with pneumonectomy, increased pulmonary uptake and small omega sign owing to increased right ventricular output should not be misinterpreted as an indicator of left ventricular dysfunction in MPI.

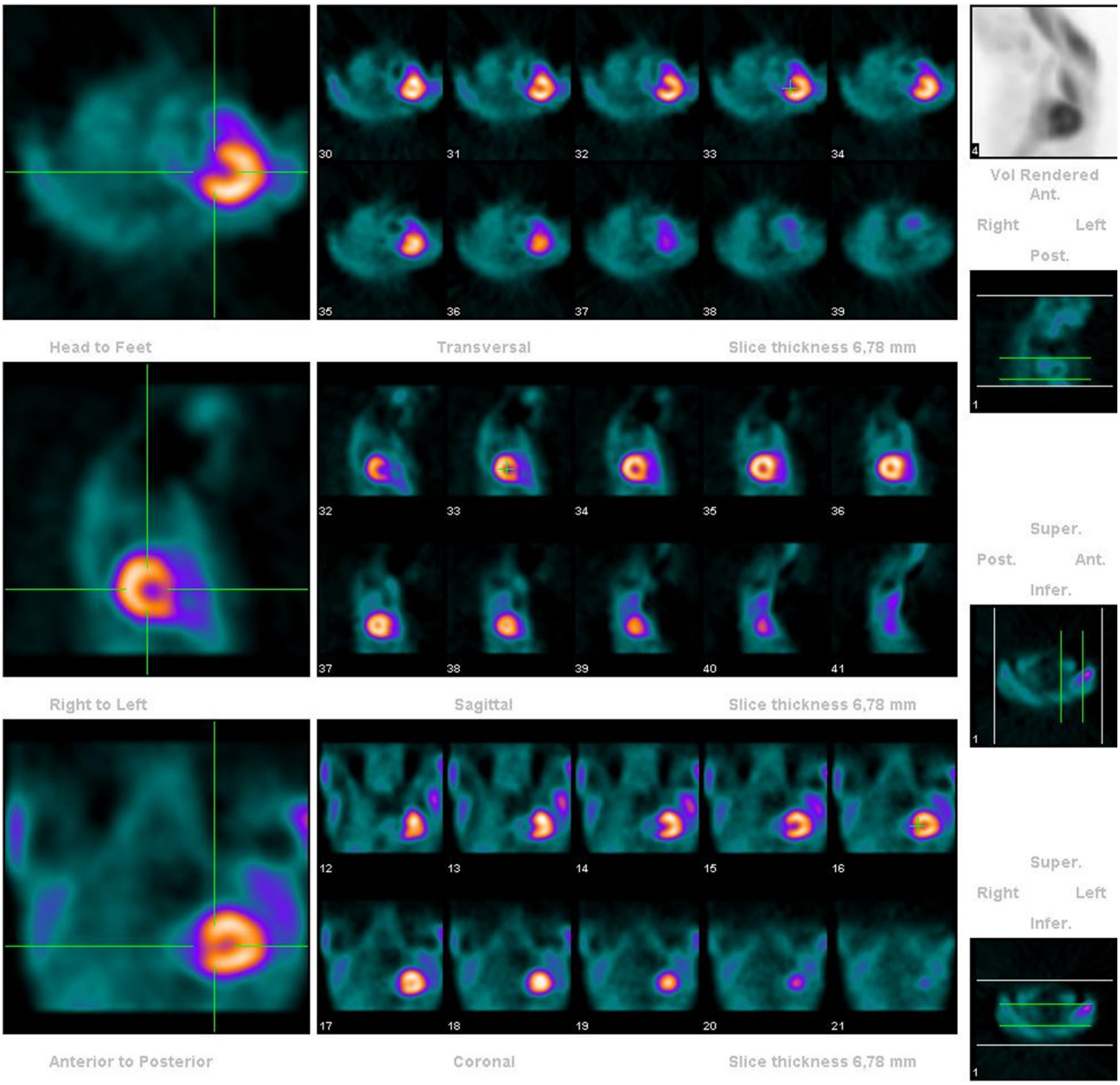

Figure 3. MPI SPECT showing the position of the heart in thorax.

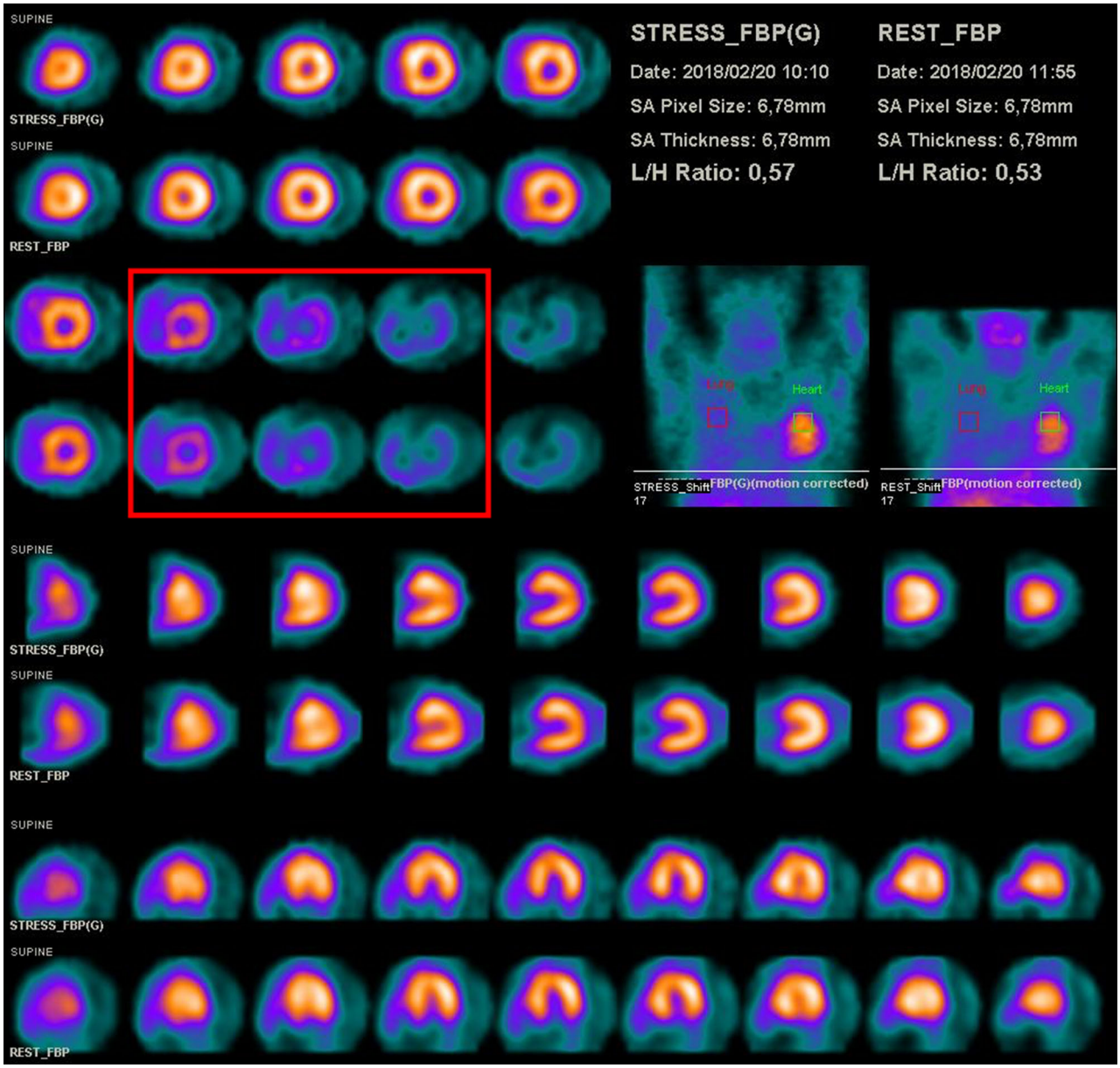

Figure 4. MPI showing small omega ''ω'' sign appearance in the basal short-axis cross sections marked in red rectangle. The ratio of lung-to-heart uptake over the right lung was markedly elevated to 0.57 at stress images and 0.53 at rest images. RV over left ventricle (LV) index calculated from basal short-axis cross sections for stress and rest images were elevated to 0.86 and 0.84, respectively.

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Disclosure

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Informed Consent

Informed consent was obtained from the individual participant included in this case report.

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