Visualization of the Pulmonary Artery on ^{99m}Tc-MIBI Myocardial Perfusion Scintigraphy: A Cause for Focal Uptake in the Lung

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MYOCARDIAL IMAGING techniques allow clinicians to diagnose obstructive coronary artery disease, infer diagnostic information, and serially assess the results of angioplasty or atherectomy. Perfusion imaging allows inference of myocardial viability following infarction and thrombolytic therapy. It has a critical role in the assessment of the operative and perioperative risk of noncardiac surgery in patients with coronary artery disease too.[1,2]

We report a case in which myocardial perfusion scintigraphy was performed, and the pulmonary artery was visualized unexpectedly. The causes of ^{99m}Tc-sestamibi lung uptake are reviewed.

CASE REPORT

A 78-year-old woman with suspected cardiac chest pain and a history of pulmonary hypertension, which had been previously confirmed echocardiographically (systolic pressure of pulmonary artery had been 40 mm Hg), was referred for myocardial perfusion scintigraphy because her baseline electrocardiogram was normal. A stress myocardial SPECT study with bicycle exercise was performed after an intravenous injection of 740 Mbq ^{99m}Tc-methoxyisobutyl isonitrile (MIBI). Stress images showed no perfusion abnormality. However, we noticed excellent uptake of ^{99m}Tc-MIBI corresponding to the configuration of the pulmonary artery adjacent to right ventricular activity on the 20th minute stress images (Fig 1A and B). A delayed, anterior thorax image was obtained 4 hours after the stress SPECT study, and it indicated the persistence of this pulmonary activity (Fig 1C). Chest x-ray showed an opacity in the corresponding region, and it was interpreted as the pulmonary artery by an experienced radiologist (Fig 2). The patient was then evaluated under fluoroscopy and arterial pulsation confirming that localization of the pulmonary artery was observed in the same region of ^{99m}Tc-MIBI uptake.

A chest CT was performed to assess the lung parenchyma. No lesions, including neoplasms or inflammation, were determined, but dilatation of the pulmonary artery was noticed. Axial CT images confirmed that the structure was truly the pulmonary artery (Fig 3). All inflammatory laboratory data as well as several tumor markers were also found in the range of normal.

To our knowledge, this is the first case that presented with ^{99m}Tc-MIBI uptake on the pulmonary artery. Because we do not usually perform myocardial perfusion scintigraphy for patients with pulmonary hypertension in our department, we have not previously experienced this finding. The exact mechanism of this uptake remains unclear. However, because the patient had pulmonary hypertension, ^{99m}Tc-MIBI uptake by the pulmonary artery might be explained by associated muscular hypertrophy and inflammation in the vessel wall.

In conclusion, if a significant uptake adjacent to right ventricular activity on ^{99m}Tc-MIBI myocardial perfusion scintigraphy is observed in a patient with pulmonary hypertension, it might be due to the pulmonary artery. However, other factors that may cause ^{99m}Tc-MIBI accumulation in the lung parenchyma should be excluded (Table 1).

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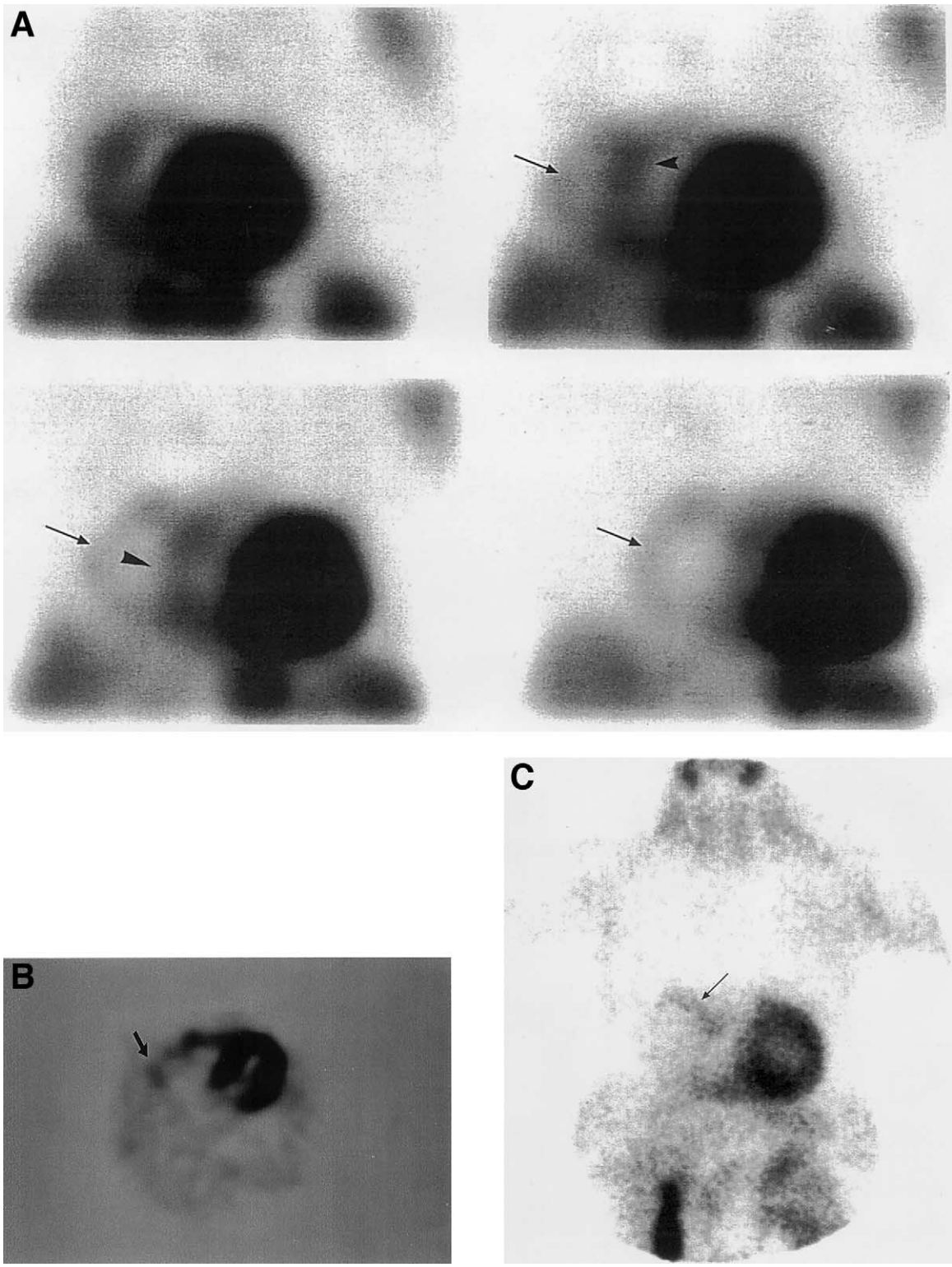

Fig 1. Scintigraphic images show ^{99m}Tc-methoxyisobutyl isonitrile (MIBI) uptake on the configuration of the pulmonary artery adjacent to the right ventricular activity. Short axis section (A) (arrowhead: right ventricular uptake; arrow: pulmonary artery) and horizontal long axis sections (B) of the scintigraphic study at 20th min. (arrow: pulmonary artery). Planar scintigraphic study at fourth hour (C) (arrow: pulmonary artery).

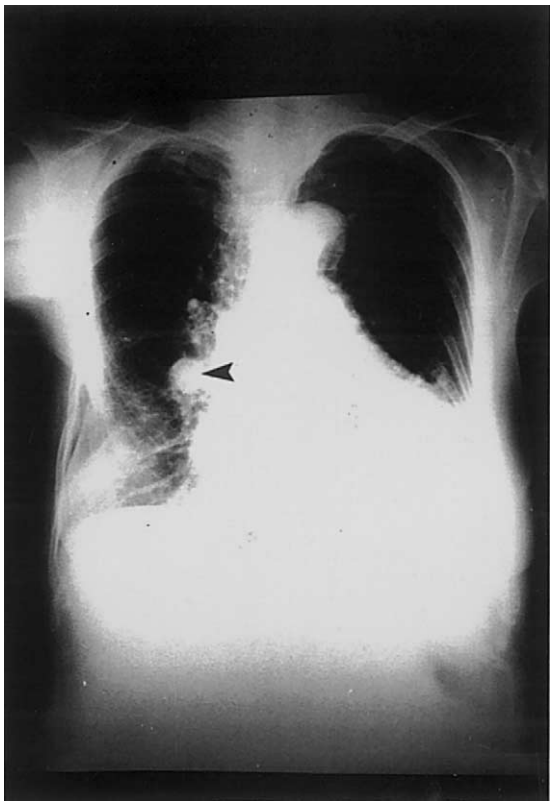

Fig 2. Chest radiogram shows opacity suggesting the pulmonary artery (arrowhead).

Common:

1. Primary lung carcinomas[4-7]
2. Metastases to lungs from other tumors[8-11]
3. Effects of smoking (diffusely increased uptake)[12]
4. Pneumionia[10,11]
5. Sarcoidosis[10]
6. Pulmonary tuberculosis (focal uptake or diffusely increased uptake in miliary tuberculosis)[13]
7. Mediastinal parathyroid adenoma[14]

Uncommon:

1. Atelectatic lung[15]
2. Fibrosing alveolitis in diseases like systemic sclerosis[16,17]
3. Granuloma[10]
4. Pulmonary hematoma[18]
5. Lymphangitic carcinomatosis[19]
6. Pulmonary artery (current case)

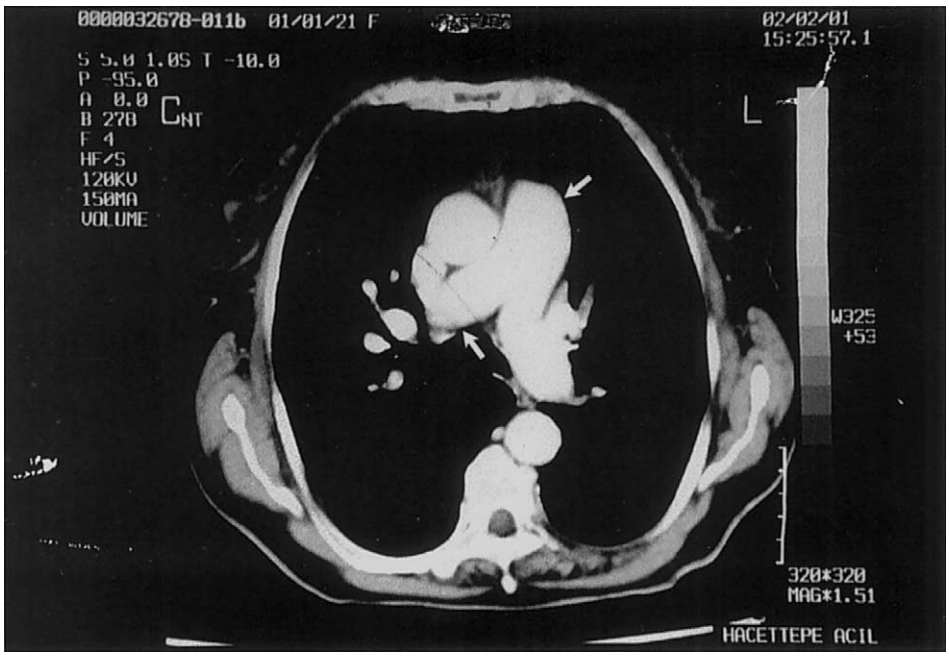

Fig 3. Axial CT image displays no parenchymal abnormality but shows the pulmonary arterial dilatation (arrows).

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