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Cardiovascular Imaging In-a-Month

●Low Washout Rate During Stress Thallium-201 Myocardial Scintigraphy

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CASE

A 59-year-old man with no history of chest pain had been treated for diabetes by a local doctor. Electrocardiography(ECG)showed QS wave in leads Ⅱ,Ⅲ, aV_F, and echocardiography confirmed hypokinesis of the inferior left ventricular wall, indicating myocardial infarction. Further exercise myocardial scintigraphy was performed(**Fig. 1**).

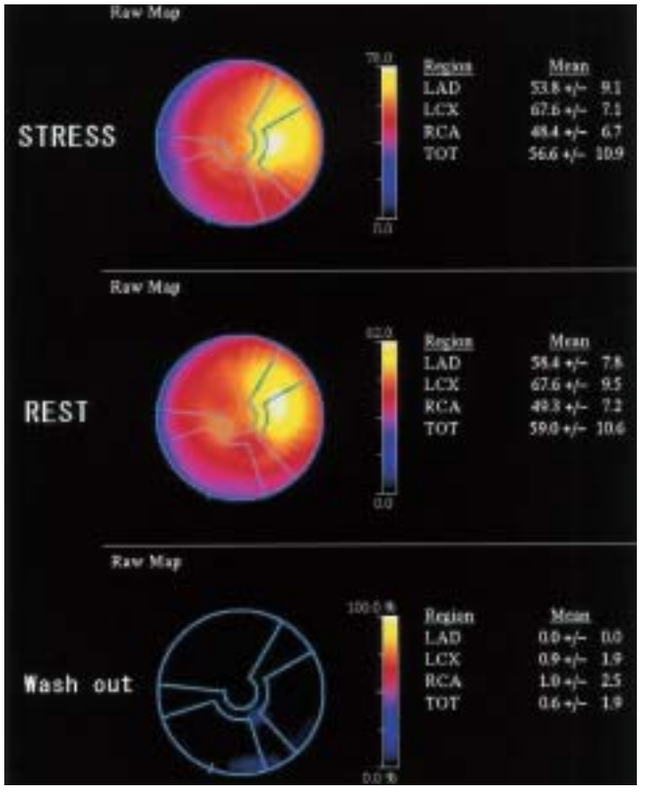

Fig. 1

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Point of Diagnosis

Scintigraphy did not show decreased accumulation or redistribution of thallium-201 as a clear indication of myocardial ischemia, but because of the low washout rate, multiple-vessel disease could not be ruled out, and the patient was admitted to undergo further testing. ECG on admission revealed poor R wave progression in leads II, III, and aV_F, and echocardiography also confirmed improved left ventricular wall movement. Coronary angiography demonstrated a normal coronary artery. Left ventriculography was normal.

Ischemic myocardium is generally identified by decreased accumulation or redistribution of thallium-201. Thallium-201 washout rate is also a useful diagnostic tool, as the normal range for thallium-201 washout is $50 \pm 5\%$, and $< 40\%$ generally indicates myocardial ischemia[1].

Washout rate is affected by factors such as cardiac load, diet, medication or mechanical problems[2]. A markedly low washout rate can indicate multiple-vessel disease except for thallium-201 leakage at the injection site. In the present patient, the maximum heart rate was 150 beats/min and maximum blood pressure was 190 mmHg, so the cardiac load was adequate.

Fig. 2

After admission, the patient was found to have primary polycytemia vera (RBC: $804 \times 10^4/\mu l$, Hb: 20.5 g/d*l*, and Ht: 62.4%) and underwent bloodletting therapy. Abdominal computed tomography showed giant splenomegaly (**Fig. 2**). Myocardial scintigraphy also showed increased thallium-201 accumulation in the spleen (**Fig. 3**). In the present patient, giant splenomegaly caused excessive thallium-201 uptake and recirculation, which affected the thallium-201 count and washout rate.

Hematological diseases should be considered as a factor affecting thallium-201 washout rate.

Diagnosis: Transient left ventricular dysfunction in a patient with giant splenomegaly due to polycytemia vera

Key Words: Radionuclide imaging (stress thallium-201 myocardial scintigraphy); Blood cells (polycytemia vera)

References

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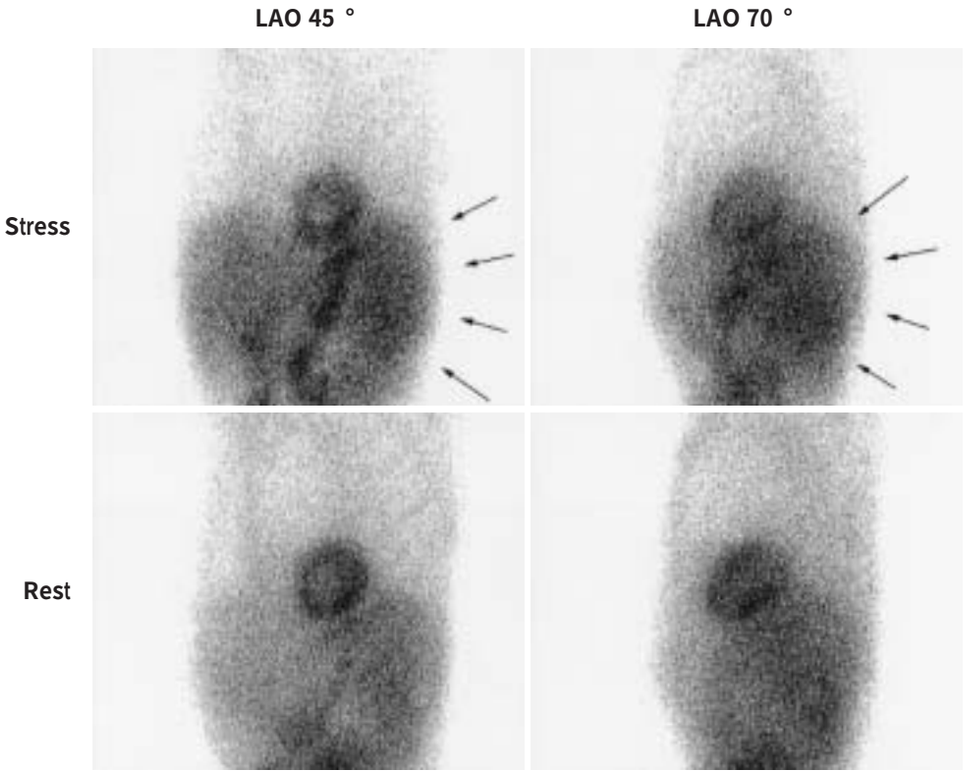

Fig. 3

Fig. 1 Thallium-201 single photon emission computed tomography scans
Thallium-201 uptake was not changed between the stress and rest phases. Thallium-201 washout rate was very low.
LAD = left anterior descending artery; LCX = left circumflex artery; RCA = right coronary artery; TOT = total.

Fig. 2 Computed tomography scan (abdomen)
Giant spleen was detected (*arrows*).

Fig. 3 Planar thallium-201 scintigraphy scans
Thallium-201 uptake was increased in the spleen in the LAO view 45 °and LAO view 70 °.
LAO = left anterior oblique.