

## Cardiovascular Imaging In-a-Month

### Low Washout Rate During Stress Thallium-201 Myocardial Scintigraphy

Naoyuki SATA, MD  
 Yasuhiro TANAKA, MD\*  
 Katsunori TOUFUKU, MD\*  
 Katsurou KASHIMA, MD\*  
 Kenkichi MIYAHARA, MD

#### 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  $V_1$ ,  $V_2$ , a F, and echocardiography confirmed hypokinesis of the inferior left ventricular wall, indicating myocardial infarction. Further exercise myocardial scintigraphy was performed (Fig. 1)

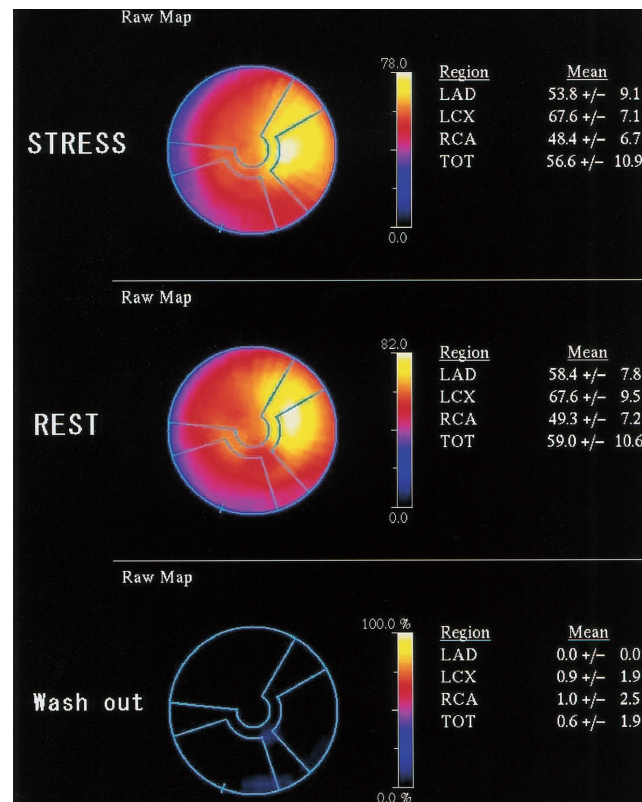


Fig. 1

新杏病院 循環器科(佐多直幸, 宮原健吉): 〒890-0073 鹿児島県鹿児島市宇宿 3-41-1; \*鹿児島大学大学院医歯学総合研究科 人間環境学講座生活習慣病学(田中康博, 東福勝徳, 鹿島克郎), 鹿児島

Division of Cardiology, Shinkyō Hospital, Kagoshima; \* Life-style related Disease, Health Research Human and Environmental Science, Kagoshima University Graduate School of Medical and Dental Sciences, Kagoshima

Address for correspondence: SATA N, MD, Division of Cardiology, Shinkyō Hospital, Usuki 3-41-1, Kagoshima, Kagoshima 890-0073

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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  $V_1$ ,  $V_2$ , and  $V_3$ , and a  $VF$ , 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<sup>1)</sup>.

Washout rate is affected by factors such as cardiac load, diet, medication or mechanical problems<sup>2)</sup>. 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.

After admission, the patient was found to have primary polycythemia vera (RBC:  $804 \times 10^4/\mu\text{l}$ , Hb: 20.5 g/dl, 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 polycythemia vera

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

#### References

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- 2) Pohost GM, Alpert NM, Ingwall JS, Strauss HW: Thallium redistribution: Mechanisms and clinical utility. *Semin Nucl Med* 1980; **10**: 70 - 93

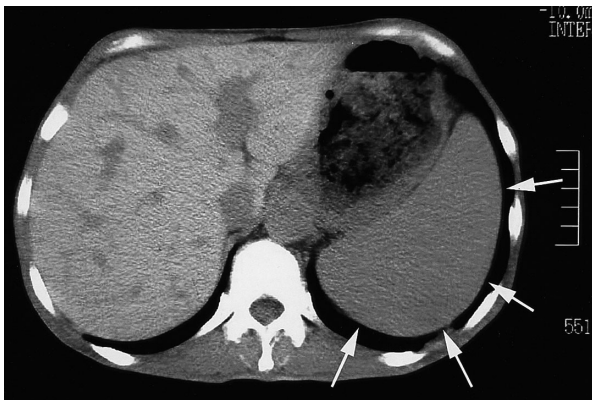


Fig. 2

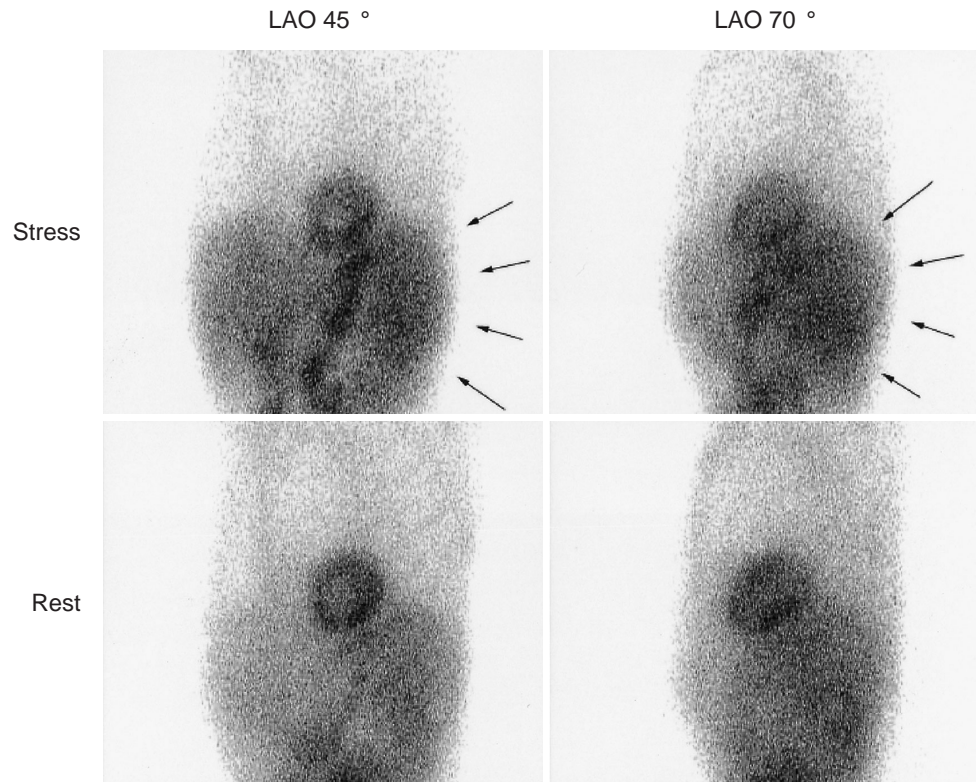


Fig. 3

**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.