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 V1, V2, aVR, and echocardiography confirmed hypokinesis of the inferior left ventricular wall, indicating myocardial infarction. Further exercise myocardial scintigraphy was performed (Fig. 1).

Fig. 1
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 -Ta, Ta, and aTaF, 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 ± 5%, and < 40% generally indicates myocardial ischemia1).

Washout rate is affected by factors such as cardiac load, diet, medication or mechanical problems2). 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 polycytemia vera (RBC: 804 × 10^12/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**

1) Kasabali B, Woodard ML, Bekerman C, Pinsky S, Blend MJ: &OIBODFETFOTJUJWJUZBOETQFDJ fi DJUZPGUIBMMJVN JNBHJOHGPSUIFEFUFDUJPOPGSFHJPOBMJTDIFNJDDPSPOBSZ EJTFBTFCZDPNCJOJOH41&$5XJUIʠCVMM_lTFZFBOBMZTJT $MJO/VDM.FE 89 ; 14 : 484 - 491

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;

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.

TOT = total.