

Cardiovascular Imaging In-a-Month

Adenosine Stress Thallium-201 Myocardial Scintigraphy

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CASE

A 75-year-old man with angina pectoris underwent two-vessel coronary bypass surgery [left internal thoracic artery(LITA) segment 9 segment 8, aorta(saphenous vein graft) segment 12 segment 14]. Postoperative course was favorable. Adenosine stress thallium-201(²⁰¹Tl) myocardial scintigraphy was performed at 10 days after surgery (Fig. 1). During adenosine stress ²⁰¹Tl myocardial scintigraphy, the patient experienced severe chest pain, and agent injection was thus discontinued after 5 min. No changes in electrocardiography were observed during the onset of symptoms, and the symptoms disappeared 5 min after discontinuation of agent injection.

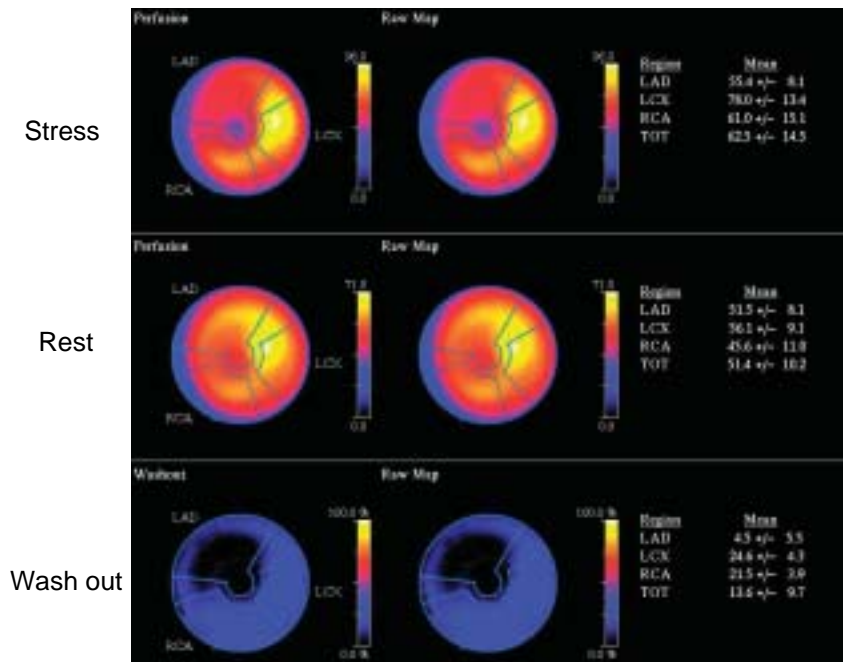


Fig. 1

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Point of Diagnosis

Markedly low thallium accumulation was observed on the stress image from the anterior septum to the cardiac apex, and complete redistribution was confirmed in the same area 4 hr later. Washout rate for the left anterior descending artery (LAD) region was markedly lower than that for the other two coronary regions. These findings suggested ischemia and reduced blood flow to the bypass graft in the LAD region.

However, coronary angiography confirmed LITA

LAD and bypass graft patency (Fig. 2). Given the contradictory findings with adenosine stress ²⁰¹Tl myocardial scintigraphy, exercise thallium myocardial scintigraphy was performed. Ischemia and low thallium accumulation were not seen on the stress image (Fig. 3). No marked differences in washout rate were identified between the three vessel regions, and double product was adequate at 23,000.

Adenosine stress ²⁰¹Tl myocardial scintigraphy is an established diagnostic technique for myocardial ischemia in terms of sensitivity and specificity.¹⁾

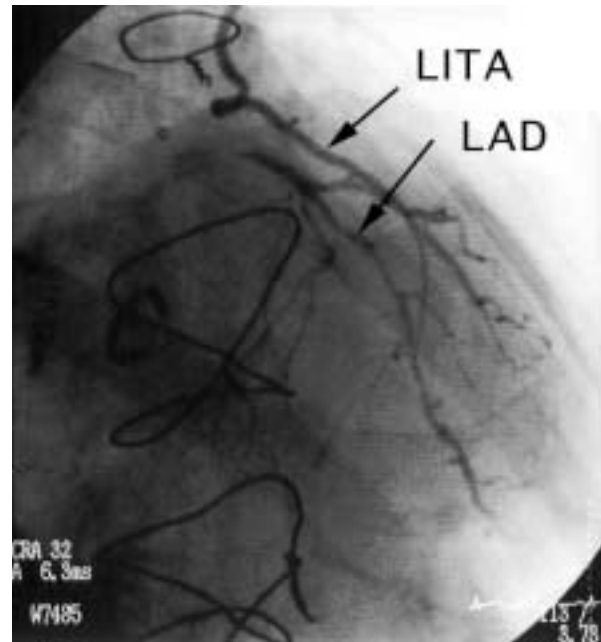


Fig. 2

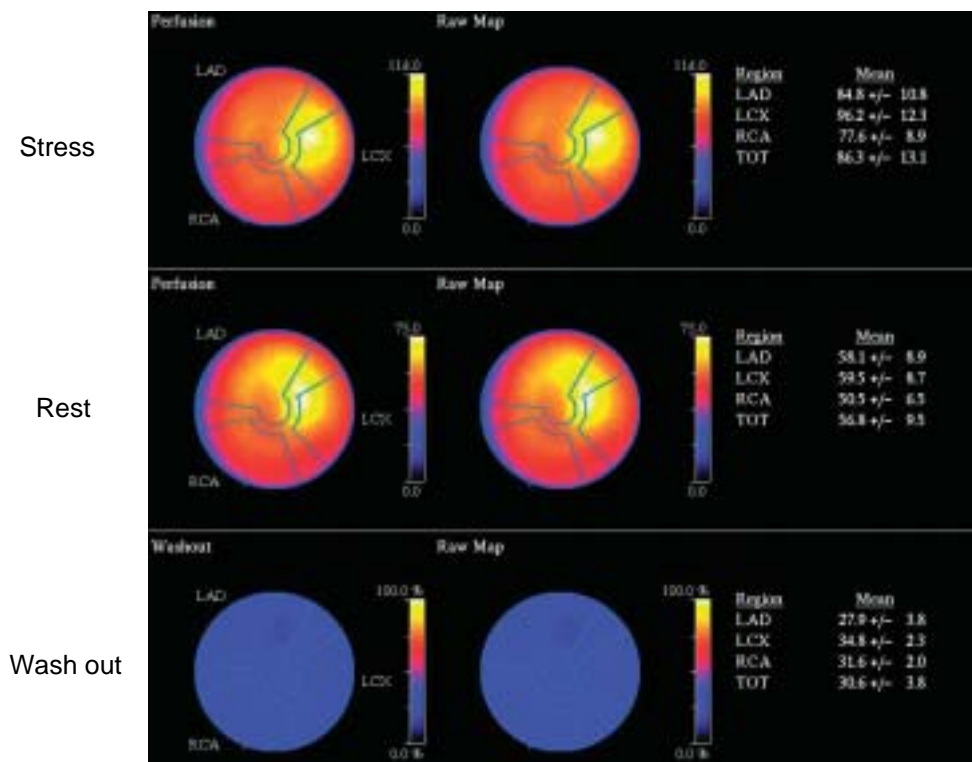


Fig. 3

The major adverse events associated with adenosine stress ^{201}Tl myocardial scintigraphy are chest pain and dyspnea, whereas coronary spasm and marked ST-segment elevation are rare.²⁾ The present patient did not exhibit electrocardiographic changes, but experienced chest pain that was sufficient to stop the test during adenosine injection. However, blood flow through the graft remained favorable. Exercise thallium myocardial scintigraphy suggested that the ischemic findings confirmed by adenosine stress ^{201}Tl myocardial scintigraphy were caused by coronary spasm due to adenosine injection. Caution must be exercised as emergency coronary angiography has been performed due to coronary spasm caused by adenosine injection. In some cases, chest symptoms caused by adenosine injection are mild and are resolved simply by discontinuing drug injection, but in others, ST-segment elevation and myocardial ischemia can occur.³⁾ As a result, close attention must be given to chest symptoms and stress myocardial scintigraphy is warranted while preparing to perform emergency coronary angiography.

Diagnosis: Vasospastic angina due to adenosine stress thallium-201 myocardial scintigraphy

Key Words: Angina pectoris; Adenosine

References

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Fig. 1 Adenosine stress thallium-201 single photon emission computed tomographic images

LAD = left anterior descending artery; RCA = right coronary artery; LCX = left circumflex artery; TOT = total.

Fig. 2 Bypass graft angiogram(right anterior oblique: 30 °;cranial: 30 °)

LITA segment 9 segment 8: patent.
LITA = left internal thoracic artery. Other abbreviation as in Fig. 1.

Fig. 3 Exercise stress thallium-201 single photon emission computed tomographic images

Abbreviations as in Fig. 1.