

## Exercise-induced myocardial perfusion abnormalities in sickle $\beta$ -thalassemia: Tc-99m tetrofosmin gated SPECT imaging study☆

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### Abstract

#### Purpose

To determine the mechanism of myocardial ischemia in patients with sickle  $\beta$ -thalassemia, we performed a scintigraphic evaluation of myocardial perfusion during exercise.

#### Subjects and methods

We studied 30 patients with sickle  $\beta$ -thalassemia, (mean  $\pm$ SD age,  $37 \pm 10$  years) who had no electrocardiographic (ECG), radiographic, or echo-Doppler signs of pulmonary hypertension, left ventricular hypertrophy, or impaired contractility. All patients had a hemoglobin level greater than 7 g/dL. Treadmill exercise test was performed according to the Bruce protocol. Myocardial perfusion was assessed by single-photon emission computed tomography, using Tetrofosmin Tc-99 m Myoview as radiotracer, at peak exercise and again 4 hours later.

#### Results

Eight patients (27%) developed stress-induced scintigraphic perfusion abnormalities that were reversible in all but 1 patient. Subsequent coronary angiograms were normal in all 8 patients. ST segment depression was seen during exercise in 5 of the 7 patients who had reversible perfusion defects. Except for a significantly greater white blood cell count, these 5 patients did not differ from the rest of patients by sex, age, hemoglobin level, percentage hemoglobin F,  $\beta$ -thalassemia genotype, or risk factors for coronary artery disease. Three of the 5 patients with perfusion and ECG abnormalities (and another with only perfusion defects) developed a stress-induced sickling crisis.

#### Conclusion

Physical stress may induce myocardial ischemia in sickle  $\beta$ -thalassemia patients with normal coronary arteries and elicit painful crises. The sickling process, activated by exercise, could be the common underlying mechanism.