

# Hypertrophic Obstructive Cardiomyopathy Diagnosed During Regadenoson Stress Test

Salahuddin Siddiqui,<sup>1\*</sup> and Khalid J Manzar<sup>2</sup>

<sup>1</sup>Internal Medicine, Allegheny Health Network Medical Education Consortium, Pittsburgh, PA 15212, USA

<sup>2</sup>St Joseph Hospital, 1001 St Joseph Ln, London, KY 40741, USA

\*Corresponding author: Salahuddin Siddiqui, Internal Medicine, Allegheny Health Network Medical Education Consortium, Pittsburgh, PA 15212, USA. Tel: +1-(412)359-3751, E-mail: medisid@gmail.com

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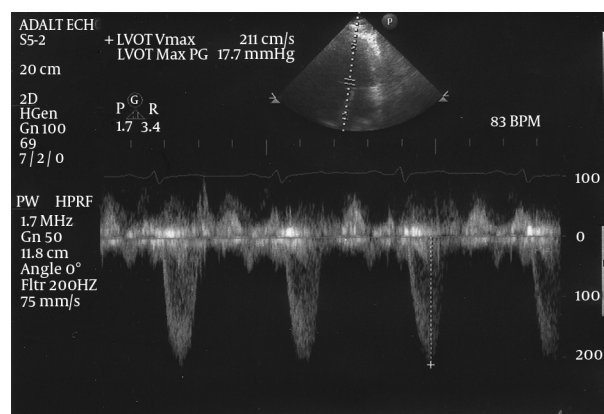
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## Dear Editor,

Regadenoson (REG) is a selective adenosine A2a receptor agonist which is used as an agent to induce vasodilation for the nuclear myocardial perfusion stress test in patients with suspected coronary artery disease (1). Here we report a case where REG infusion caused immediate accentuation of a murmur with an increase in the left ventricular outflow tract (LVOT) gradient, which led to the diagnosis of hypertrophic obstructive cardiomyopathy (HOCM) in this patient.

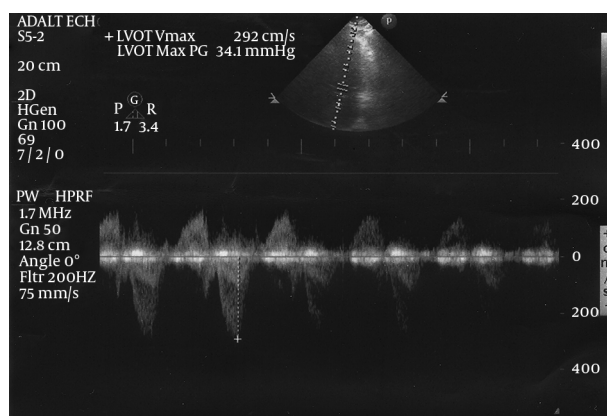
A 41-year-old male patient presented with symptoms of palpitations, chest tightness and shortness of breath. He had undergone coronary angiography eight years previously, which showed normal coronaries and normal left ventricular systolic function. He was not on any medications at home. On examination, he had a mild systolic murmur at the left sternal border, accentuated by the Valsalva maneuver. Echocardiography showed hyperdynamic left ventricular systolic function and concentric left ventricular hypertrophy with asymmetrical septal hypertrophy measuring 18 mm near the LVOT. There was significant systolic anterior motion of the anterior mitral valve leaflet, moderate mitral regurgitation, and a resting peak LVOT gradient of 13 mmHg. Since he could not do adequate exercise on the treadmill, he underwent REG nuclear stress testing with an intravenous infusion of 0.4 mg of REG over 10 seconds. Within one minute after the REG infusion, he developed chest pain without any significant ischemic changes on ECG. His nuclear scan was also negative for ischemia. Chest auscultation immediately following the REG infusion revealed accentuation in his murmur. Immediate echocardiography showed an increase in the peak LVOT gradient, from 17.7 mmHg (Figure 1) to 34.1 mmHg (Figure 2). His blood pressure and heart rate before and after the REG infusion were 140/85 mmHg with 83 bpm and

137/85 mmHg with 100 bpm, respectively. His symptoms disappeared spontaneously after five minutes without any intervention. Based on these findings, he was diagnosed with HOCM and started on beta-blocker therapy. On the follow-up visit after a few months, he reported marked improvement in his symptoms.



**Figure 1.** Resting Left Ventricular Outflow Tract (LVOT) Peak Gradient of 17.7 mmHg

We feel that the augmentation of the LVOT pressure gradient in this patient was mainly due to peripheral vasodilatation by REG infusion (2, 3), although an increase in the heart rate (from 83 to 100 bpm) might have contributed to some increase in the pressure gradient. We are aware of the poor quality of the images that we were able to obtain within a very short window of time which presented to us serendipitously while doing the stress test. Studies have shown a drop of  $7 \pm 7$  (mean  $\pm$  SD) mmHg in mean arterial pressure in patients with HOCM after the use of REG, including an episode of chest pain that was precipitated during the REG scan in a cohort of 29 patients with HOCM



**Figure 2.** Left Ventricular Outflow Tract (LVOT) Peak Gradient was Accentuated to 34.1 mmHg Immediately After the Infusion of Regadenoson Intravenously

(4). An animal-based study also reported an increase in left ventricular pressure by 39% and a decrease in mean arterial pressure by 13 mm Hg after REG infusion (2).

REG has not only a rapid distribution but also a slower elimination in the body. Its coronary vasodilation effects last 2-4 minutes, and it has a terminal half-life of 33 - 108 minutes (5). It is excreted unchanged by both kidneys and the liver, with renal excretion accounting for approximately 58% of the total elimination and the remaining 40% as hepatobiliary excretion in bile (5, 6). The reported adverse effects of REG are nausea (6%), abdominal pain (5%), headache (26%), chest tightness (13%), and rarely atrioventricular block, syncope, and seizure (< 1%) (5)

The current practice for the diagnosis of HOCM is to elicit or unmask the LVOT pressure gradient by the Valsalva maneuver or by the inhalation of amyl nitrate. REG could

also be evaluated for this purpose.

This anecdotal report demonstrates that REG infusion was helpful in the diagnosis of HOCM in our patient and we would like to propose that REG may have some potential use in inducing the transient LVOT gradient for the diagnosis of HOCM in patients where the resting gradient is normal or only mildly elevated. Future studies should be done to compare its efficacy and safety with conventional methods like the Valsalva maneuver and amyl nitrite and also the appropriate dosing for this use.

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