

Evaluation of myocardial viability

Pesquisa de viabilidade miocárdica

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The assessment of myocardial viability in patients with left ventricular dysfunction has a great impact on the decision making process regarding therapy for such patients, as it allows the identification of those who will benefit the most from a revascularization procedure, be it through surgical approach or through percutaneous angioplasty. Additionally, it also has an economic impact, as it selects those patients for whom the revascularization will not improve their prognosis, as demonstrated by the meta-analysis developed by Allman et al.⁽¹⁾

The identification of the viable muscle can be achieved by resorting to different technologies, the most important ones being myocardial scintigraphy, stress echocardiography, positron emission tomography and magnetic resonance imaging.

As a potassium analog, thallium-201 uptake by the myocyte is dependent on the presence of cellular membrane integrity. For this reason, this radiotracer allows the identification of myocardial viability even with small amounts of living muscle. Such fact possibly explains the high sensitivity of myocardial scintigraphy, particularly when utilizing Thallium-201 in the identification of myocardial contractility recovery after revascularization. However, its specificity is lower than that of dobutamine stress echocardiography, particularly in cases where a biphasic response is observed, i.e., when there is an initial improvement in contractility of hypokinetic or akinetic segments with a low dobutamine dose, but worsens again under higher doses of this drug.

With the introduction of gated SPECT, myocardial scintigraphy, particularly when utilizing ^{99m}Tc radiopharmaceuticals, may simultaneously evaluate perfusion, global and segmental contractility and systolic and diastolic

left ventricle volumes. Thus, the opportunity to associate the greater sensitivity to identify myocardial viability through the cellular integrity detected by perfusion scintigraphy with the higher specificity of low-dose dobutamine gated SPECT in the evaluation of the contractile reserve was identified.

Based on the results reported by Kumita et al.⁽²⁾, several studies have demonstrated the feasibility, safety and diagnostic usefulness of this protocol. Yoshibaga et al.⁽³⁾ have demonstrated that the acquisition with low-dose dobutamine increased specificity of the method as compared with echocardiography and positron emission tomography. Leoncini et al.⁽⁴⁾ have reported similar findings in revascularized patients.

In the present issue of **Radiologia Brasileira**, Moraes et al.⁽⁵⁾ also demonstrate similar results, achieving a specificity of 84% in the prediction of contractile reserve recovery after revascularization. This is a very relevant aspect, considering that 58 segments evaluated as viable by perfusion scintigraphy did not present improvement in contractility and, by a large majority, there was no contractile reserve indicated by low-dose dobutamine infusion. In this study the utilized dobutamine dose was greater than that in previous studies^(3,4,6), starting at 5 µg/kg/min, with image acquisition at 15 µg/kg/min. In patients with severe coronary disease, such a dose may induce ischemia and worsen the function in certain segments, as described in the biphasic response at echocardiography⁽⁷⁾. For that reason, although less frequently, the contractility in 34 segments (13%) worsened with the stimulus of dobutamine.

In some previous studies^(3,4) the adopted protocol utilized gated ^{99m}Tc SPECT, both at rest and under stress. Thus, the evaluation of the ventricular function was made at rest and with low-dose dobutamine in the post-stress acquisition. In the study developed by Moraes et al.⁽⁵⁾, as the rest images were acquired with thallium-201 and the evaluation of the function was performed after stress, two acquisitions were necessary: one basal acquisition, and

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another with dobutamine. As demonstrated by Johnson et al.⁽⁸⁾, even after one hour, particularly in patients presenting with severe coronariopathies, the contractile alterations may persist because of ischemic stunning, which may impair the basal segmental contractility analysis and, consequently, the response to the dobutamine stimulus.

The findings of the relevant study developed by Moraes et al.⁽⁵⁾ confirm that the addition of data regarding the contractile reserve assessment by *gated* SPECT with low-dose dobutamine was relatively safe and allowed the identification with greater accuracy of viable muscle areas with a potential for functional recovery.

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