Pharmacological Stress Echocardiography in Patients with Anomalous Origin of Left Coronary Artery in Pulmonary Trunk

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Introduction

The stress echocardiography is today an important non-invasive method for assessment of ischemic patients, since changes in myocardial contractility is an early phenomenon, and easily identifiable by echocardiography [1,9] .

This modality has several techniques (physical stress, pharmacological and electrostimulation)[1], each with indications and contraindications[8].

Dobutamine-atropine stress echocardiography is based on the increase in myocardial consumption, thus providing data for diagnosis of coronary artery diseases[1,9]. Its use in the diagnosis of ischemia in patients with coronary arteries malformation is not common in the literature.

We report a rare case of an adult patient with anomalous origin of left coronary artery (confirmed by angiography) subjected to dobutamine-atropine stress echocardiography for stratification of myocardial ischemia.

Case Report

45-year-old patient, white, without comorbidities, negative family history for arterial coronary disease; on the occasion, she denied arterial hypertension, diabetes, dyslipidemia, smoking, oral contraceptive use, and illicit drugs. For four months, she had been experiencing chest pain in "weight", without irradiation, lasting a few minutes, mostly unrelated to her physical activities, however sometimes associated with great efforts.

She underwent to an ergometric test, and it was suggestive of ischemia. Afterwards, she was referred for a dobutamine-atropine stress echocardiography to continue the research.

After clinical evaluations, electrocardiogram, and transthoracic echocardiogram, the patient received dobutamine infusion with increments every 3 minutes. It required an addition of atropine to achieve the submaximal heart rate estimated for the age, or to demonstrate ischemia. During the examination, the patient was subjected to the segmental and global left ventricular function monitoring with transthoracic echocardiogram, associated with electrocardiogram and clinical control. There were no clinical changes, and ECGs were nonspecific. In the initial echocardiogram, there was no change in the cardiac chambers or left ventricular function, but coronary arteries dilatation was noticed, with considerable flow increase (Figure 1). At the peak of effort, there was an increase deterioration of contractility in a large antero-septo-apical area of the left ventricle (Figure 2), as well as ST segment in ST segment depression to the electrocardiogram, suggesting ischemia in the territory of the anterior descending coronary artery.

An aortography was also performed, and it showed that just the right coronary artery ostium was quite dilated (Figure 3), filling the entire left coronary artery, that dilated also had retrograde flow towards the pulmonary artery trunk (Figure 4).

Discussion

The anomalous origin of the left coronary artery is the congenital malformation, usually diagnosed in childhood[6,7], when this artery usually rises from the side or back wall of the pulmonary artery trunk[1,3,7-9].

The high pulmonary vascular resistance and pulmonary artery pressure promote a desaturated flow of the pulmonary artery to the left coronary artery[2,3,5]. In the first weeks of life, the pulmonary vascular resistance falls and pulmonary pressure lead to the gradual reversal of the left coronary artery flow[1,3,5,7]. As a result, the left coronary artery blood supply will depend on the existence of collaterals from the right coronary artery[1]. With the success of this phenomenon, there is a flow coronary arteries steal and late myocardial ischemia, and the patient may reach the adult stage[4].

As reported, the anomalous origin of the left coronary artery was the cause of myocardial ischemia in a 45-year-old patient, without risk factors for coronary artery disease, which led us to investigate other more rare causes of diseases causing myocardial ischemia.

In this scenario, the pharmacological stress echocardiogram showed that the anomalous origin of the left coronary may have serious consequences, creating extensive areas of myocardial ischemia[6]. This functional information of the echocardiography was important to complement the diagnosis of the patient.

Keywords

Congenital heart disease; Stress echocardiography; Coronary artery disease; Myocardial ischemia.

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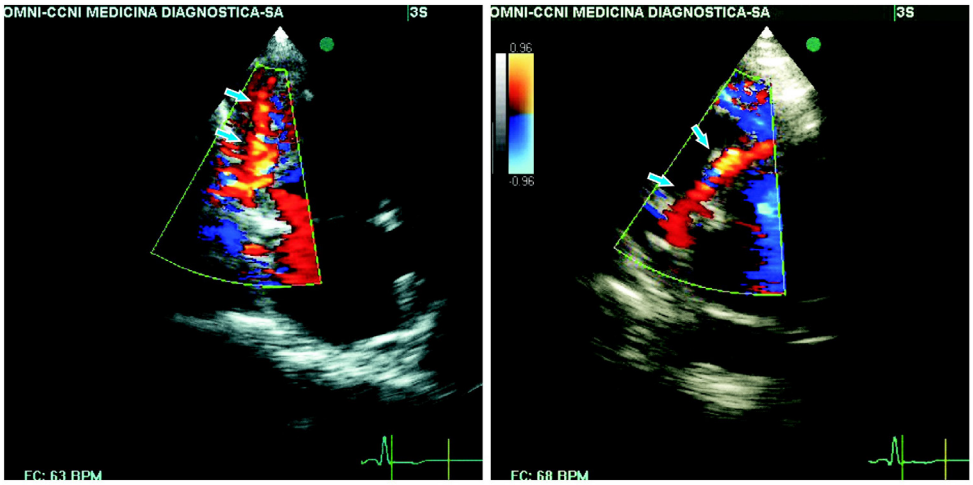

Figure 1 - *Transthoracic echocardiogram with dilated coronary arteries and hyperflow (arrows).*

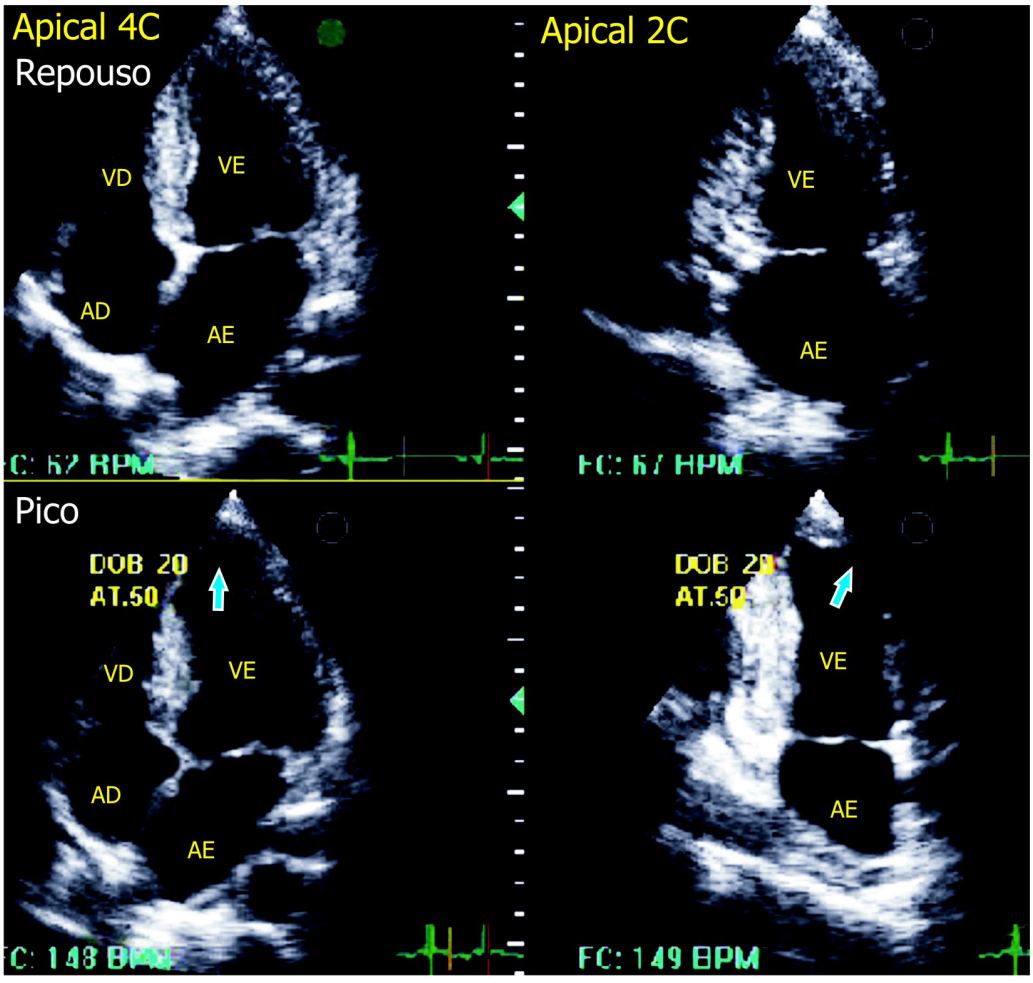

Figure 2 - *Stress echocardiography: contractile deterioration in apical region and anterior wall at peak test (arrows), apical cuts of 4 and 2 chambers. RA = right atrium, LA = left atrium, RV = right ventricle, LV = left ventricle.*

Figure 3 - *Aortography showing only the origin of the right coronary artery.*

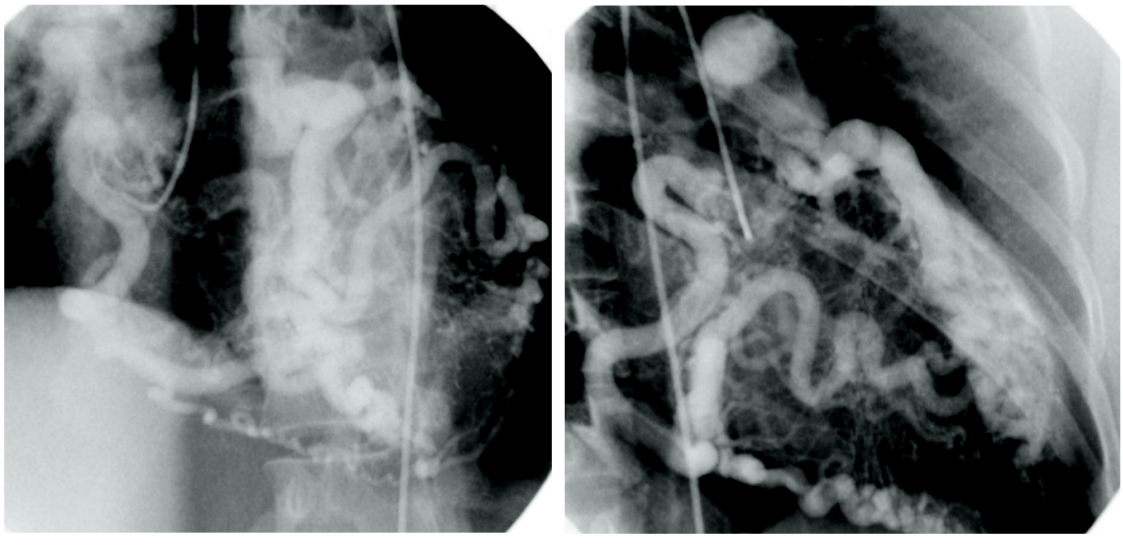

Figure 4 - *Tortuous and dilated coronary arteries with retrograde flow reaching the pulmonary artery trunk.*

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