CorSalud 2013 Apr-Jun;5(2):207-211

CorSalud

Cuban Society of Cardiology

Case Report

Cardiocentro ERNESTO CHE GUEVARA SANTA CLARA CUBA

Report of a case with cardiac syndrome X or microvascular angina

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ARTICLE INFORMATION

Received: September 7, 2012
Revised version: November 15, 2012
Aceptado: December 21, 2012

Competing interests
Authors have no competing interests

On-Line versions:
Spanish - English

ABSTRACT
The term cardiac syndrome X or microvascular angina is commonly used to describe a group of patients who show a typical chest pain, ST segment depression during exercise and angiographically normal coronary arteries. Many data suggest the symptoms may have an ischemic origin. It is more common in women, and, in almost 50% of them, anginal pain is specifically attributed to changes in the coronary microvasculature. The prognosis is not as benign as it was believed for years; therefore, in patients with angina and a normal epicardial coronary, a clinical and imaging assessment is necessary (including a careful analysis of risk factors) in order to detect a functionally significant ischemia. Therefore, coronary microvascular disease is a condition that requires attention by the attending physician. A patient with this diagnosis is reported in this article, and electrocardiographic, echocardiographic, ergometric and angiographic images are shown.
Key words: Cardiac syndrome X, Microvascular angina, Coronary artery disease

Presentación de un caso con síndrome X o angina microvascular

RESUMEN
El término síndrome X o angina microvascular se emplea habitualmente para definir a un grupo de pacientes que presentan dolor torácico característico, depresión del segmento ST durante el esfuerzo y arterias coronarias angiográficamente normales. Muchos datos apuntan a un posible origen isquémico de los síntomas. Es más frecuente en mujeres y en casi el 50 % de ellas, el dolor anginoso se atribuye específicamente a cambios en la microvasculatura coronaria. Debido a que el pronóstico no es tan benigno como se creía hace años, en pacientes con angina y coronarias epicárdicas normales, se impone una evaluación clínica (incluyendo un cuidadoso análisis de los factores de riesgo) e imagenológica, con el propósito de detectar isquemia funcionalmente significativa. La enfermedad coronaria microvascular es, por tanto, una enfermedad que requiere atención por parte del médico de asistencia. En este artículo se presenta una paciente con este diagnóstico, y se muestran las imágenes electrocardiográficas, ecocardiográfica, ergométricas y angiográficas.
Palabras clave: Síndrome X, Angina microvascular, Cardiopatía isquémica

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INTRODUCTION

In 1973, Kemp introduced the term cardiac syndrome X to describe patients with angina pectoris induced by exercise and normal coronary angiograms. However, the use of this term has not always been limited to this specific meaning[1].

The classic definition implies the presence of exercise-induced angina-like pain in the chest, ST segment depression during exercise testing and normal epicardial coronary arteries. A broader definition in the literature simply includes angina as chest pain with normal epicardial arteries[1,2].

Others have argued for a stricter definition of exercise-induced angina, attributed to coronary microvascular dysfunction[1-4]. Patients with other types of heart disease such as myocardial disease, left ventricular hypertrophy and valvular heart disease, are excluded from this concept. The various definitions of this condition have favored the conflicting reports in the literature with regard to its frequency, risk factors and treatment[2]. For the purposes of this article, a distinction is made, as far as possible, between the broader definition of angina without obstructive coronary artery disease and cardiac syndrome X (angina pectoris, ischemic changes in the stress tests, and normal coronary angiograms)[3,5-8].

The term cardiac syndrome X or microvascular angina is commonly used to define a group of patients with a typical chest pain, ST segment depression during exercise and normal coronary angiography[1,5-8]. It is more common in women, and, in almost 50% of them, anginal pain is specifically attributed to changes in the coronary microvasculature[9, 10].

In the remaining half, the chest pain is not of cardiac origin, but is attributed to causes such as hiatal hernia with gastroesophageal reflux, musculoskeletal conditions or an exaggerated perception of visceral pain, linked to neurophysiological mechanisms[10,11]. When these causes are excluded, there is a diagnosis of microvascular angina.

Coronary microvascular disease is therefore a condition that requires attention by the attending physician. It has been shown that the persistence of chest pain in the absence of obstructive epicardial coronary disease in women is not a benign condition[10,12]. According Peix González[2], Johnson and colleagues found that these female patients would experience serious cardiovascular events about two times more frequently than those without pain. According to Arthur[13], a 2008 report in the American Heart Journal found that 1% of patients with microvascular angina died within a year of their first hospitalization due to the condition, and that 0.6% of them suffered an stroke[4].

The aim of this article is to highlight the importance of anginal pain in those patients, especially in women, who show electrical changes during exercise testing and have angiographically normal epicardial coronary arteries. These patients face a substantial risk of future cardiovascular events.

CASE REPORT

A 47 year old woman with a history of being a long-time smoker and suffer from hypercholesterolemia, palpitations, anxiety disorders, and typical effort angina. She was diagnosed in 2011, and underwent an electrocardiogram that showed a sinus rhythm and small T waves with a negative component in V_4-V_6 (Figure 1). At that time she was not prescribed a drug treatment.

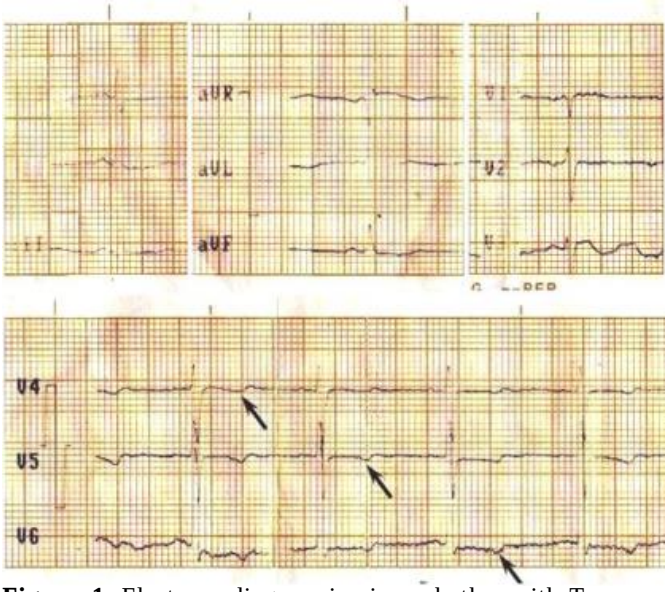

Figure 1. Electrocardiogram in sinus rhythm with T waves with negative component of V_4-V_6 (arrows).

Subsequently, the crises increased in frequency, intensity and duration. The patient was assessed several times by different doctors. Initially, she was prescribed a treatment with atenolol (50 mg/day), aspirin (125 mg/day) and nitropental (60 mg/day). This improved her symptoms for some time. The same pattern was noticed in several evolutionary electrocardiograms

and the patient remained stable until April 2012, when she began to refer the same symptoms and underwent an evaluative exercise test, which showed a horizontal decrease in the ST segment greater than 2 mm, in V_4-V_6, associated with mild chest pain, of oppressive type, which began after 5 minutes of exercise. Energy consumption was 7.2 MET (Figure 2). During the initial phase of the recovery, there was a regression of ST segment to normalcy and pain relief. At that time it was decided to add diltiazem (120 mg/day) and atorvastatin (20 mg/day) to the treatment.

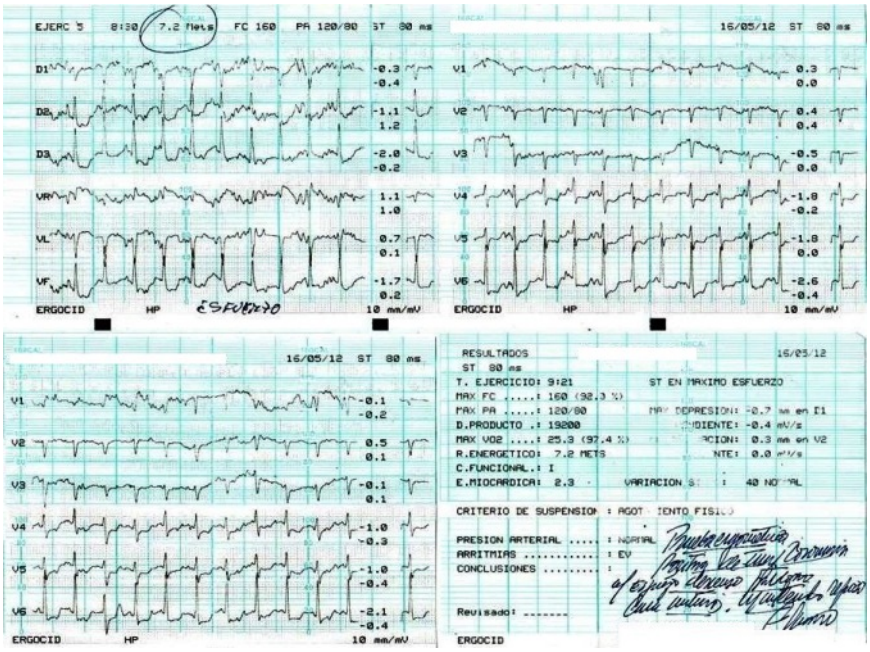

Figure 2. Ergometry test reported as indicative of coronary insufficiency, as there is an ST horizontal drop greater than 2 mm, of V_4-V_6, associated to chest pain.

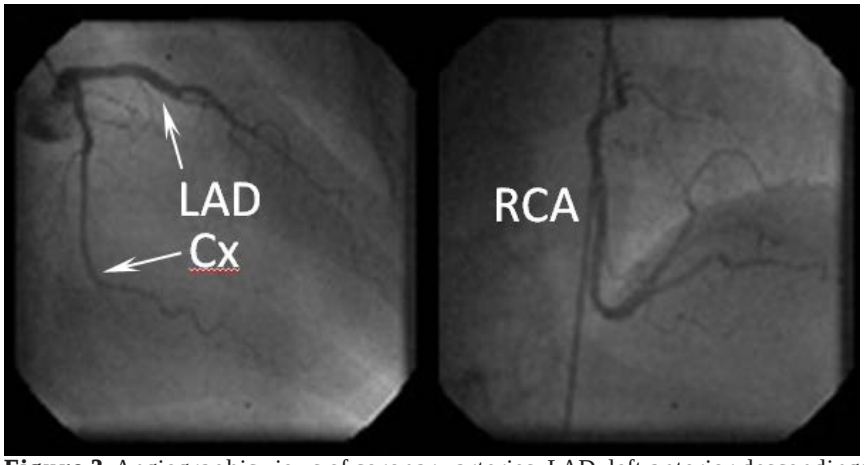

Figure 3. Angiographic views of coronary arteries. LAD, left anterior descending; Cx, circumflex; RCA, right coronary artery.

The following month, the patient was hospitalized for four days with a diagnosis of progressive worsening angina. During admission, several laboratory tests were performed. The results were normal, including total cholesterol and triglycerides. Additionally, an echocardiogram was performed. No regional wall motion abnormalities were found and cavitary diameters were normal. At that time, it was decided to perform an elective coronary angiography. It was scheduled for June 2012, after coordination with the Cardiocentro "Ernesto Che Guevara" of Villa Clara. The absence of coronary artery lesions was determined in the angiographic study performed at the Hemodynamics and Interventional Cardiology Unit (Figure 3).

COMMENT

The disease diagnosed in this patient occurs in both sexes but more often in women, especially in women approaching or past menopause (70%) [10,13]. Several studies have shown that approximately 10-30% of patients undergoing cardiac catheterization to assess angina pectoris have angiographically normal coronary arteries[3-6].

Microvascular angina has many possible causes[5]. The small vessels of the heart may have damages that doctors cannot detect in some imaging studies[2]. The vessels may undergo spasms in times of stress, and generally improve with rest. An important aspect to take into account is the vascular endothelium, which releases chemicals to help vessels dilate and contract, although these may not be working properly in this disease[4, 5,14].

Several investigators have shown that despite epicardial coronary vessels were normal, patients affected with this disease had electrocardiographic alterations and enzymatic elevations [6,7].

Within this syndrome, there are two distinct groups considering the cause: a group of patients in whom

impaired microcirculation is secondary to a known cause (hypertension, diabetes, collagenosis or metabolic disorders), and a small subgroup in which there is not yet a plausible reason to justify the microcirculation disorder and that is known as cardiac syndrome X.

Different pathophysiological hypothesis have been considered to explain this heterogeneous syndrome. Several studies suggest that coronary microvascular dysfunction plays a crucial role in its genesis. The endothelial inflammatory processes have also been considered. In them, there is a release of chemical mediators and an increase of hyperinsulinemia, that is, many of these patients develop insulin resistance. In addition, oestrogenic factors are mentioned, and the abnormal increase in the perception of pain of these patients[5-7,15].

The treatment for microvascular angina, which is similar to that of the angina caused by epicardial artery disease, requires changing the lifestyle and controlling the risk factors (blood pressure, diabetes mellitus, obesity, smoking and stress). Also, some drugs help prevent or relieve symptoms, for instance, nitroglycerin, which improves blood flow, and calcium channel blockers or beta blockers, which reduce oxygen requirements of the heart and its workload[4].

Some studies have strongly suggest that the treatment with inhibitors of angiotensin converting enzyme (ACE) and statins may reduce symptoms[7,8], in addition, imipramine may be beneficial in the treatment, as it is for various types of chronic pain[8]. Both statins and ACE inhibitors have been able to improve repolarization ischemic abnormalities induced by exercise and endothelial dysfunction in patients with cardiac syndrome X. Their effectiveness is probably because they all inhibit the inflammatory mechanisms and increase the bioavailability of nitric oxide. These agents have also shown beneficial effects in terms of the reduction of the thickness of the intima-media complex (effects that are not necessarily in direct relation to their hypolipidemic action)[9].

It is now recognized that the prognosis is not benign, and that a significant proportion of patients are at increased risk of cardiovascular disease. The current definition of cardiac syndrome X is the triad angina, ischemia and normal coronary arteries, which is associated with an increased cardiovascular risk[10].

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