CASE REPORT

Noncoronary chest pain with raised cardiac biomarkers: report of 15 cases consistent with a diagnosis of acute myocarditis

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None.

The patients in this series were brought to the emergency department with noncoronary chest pain but had electrocardiographic abnormalities and/or raised cardiac biomarkers, consistent with a diagnosis of myocarditis. The study period was 20 months, during which we saw 15 such patients (14 men, 1 woman). The mean (SD) age was 32 (12) years; 6 of the patients were smokers. Most (12 patients) had no vascular risk factors, 13 patients had ST segment elevation, and 6 developed heart failure. An electrocardiogram was recorded in 10 cases; the traces were normal in 8 cases. Cardiac catheterization, performed in 4 patients, revealed no coronary lesions. In 3 patients the diagnosis of myocarditis was based on nuclear magnetic resonance imaging. [Emergencias 2011;23:375-377]

Key words: Chest pain. ST segment elevation. Young patient.

Introduction

Non-traumatic chest pain is a frequent cause of visits to the emergency department (ED). Diagnosis is based on history, physical examination and tests. It is essential to rule out coronary syndrome, which requires initial electrocardiography (ECG), chest radiography and biomarkers of myocardial injury. However, it is also necessary to rule out other causes of severe disease, including myocarditis. The present study focused on ED patients with chest pain, ECG abnormalities and elevated cardiac markers, classified as an intermediate coronary risk population[1], without coronary disease, but with a final diagnosis of myocarditis. It describes the clinical profile and complementary test results indicated in the ED, and the diagnostic procedures carried out during ED admission.

Clinical Cases

We included consecutive patients consulting the ED for chest pain, initially suspected of noncoronary origin, but presenting ECG abnormalities and / or elevated cardiac biomarkers, during 20 months from May 2009 to December 2010. We excluded patients with acute coronary syndrome in the previous month. The study was conducted in a secondary hospital whose ED attends about 300 patients per day. We analyzed the following variables: age, sex, presence of vascular risk factors, history of heart disease, ECG findings, myoglobin, creatine kinase (CK) and troponin T on admission, urinary toxins and the development of fever or heart failure during ED stay. Finally we analyzed the results of additional tests required for hospital admission. Dyspnea along with the presence of crackles on lung auscultation were the criteria used to classify patients with heart failure. In these patients, radiological findings and levels of NT-proBNP were also analyzed. Quantitative variables are expressed as mean and standard deviation and qualitative variables as percentages.

A total of 15 patients were studied, 14 men and one woman, mean age 32 ± 12 years (Table 1). Regarding ECG findings on ED admission, 13 patients had elevated ST segment. Two patients had negative lateral T waves. Cardiac biomarkers in blood drawn on ED admission were positive in all cases (Table 2).

Table 1. Clinical characteristics of the15 patients studied

Age in years (mean ± SD)	32 ± 12
Male sex [n (%)]	14 (13.3)
Smoker [n (%)]	6 (40)
Vascular risk factors [n (%)]	
None	12 (80)
Diabetes mellitus	0
Hypertension	1 (6.6)
Dyslipidemia	2 (13.3)

SD: standard deviation

More than one third (6 cases) developed congestive heart failure; plain chest x-ray showed alveolar infiltrates in half the group, and NT-proBNP levels were 4075.3 ± 4913.7. During hospital admission ECG was performed in 10 patients and 80% were normal, while one patient had moderate pericardial effusion, two showed impaired contractility with reduced ejection fraction. Cardiac catheterization was indicated in 26.7% but no cases showed coronary lesions. One patient underwent multi-slice computed tomography (CT) scan of the heart, with no abnormalities being detected. The suspected diagnosis of myocarditis was confirmed in only three cases by external nuclear magnetic resonance imaging (MRI).

Discussion

Chest pain of traumatic origin is a frequent reason for ED visits, estimated at 4 - 12% in different studies[2]. It may present in mild conditions or severe illness associated with considerable morbidity and mortality. A complete history is crucial to rule out certain diseases and guide the clinician to the origin of pain. It is necessary to inquire about the characteristics of pain, location, intensity, time of onset, improvement after medication and associated symptoms. In this regard, Riesgo et al. documented differences in indications for diagnostic procedures and treatment based on gender, which disappeared when the sample was stratified by age and TIMI risk score[1]. Physical examination is useful to identify signs such as hypotension, dyspnea, cyanosis, arrhythmia and decreased awareness, among others.

The incidence of myocarditis is really unknown, but it is probably an under-diagnosed entity because it is sometimes asymptomatic[4]. Conditions other than acute myocardial infarction (AMI) present with ECG changes and ST segment elevation[5]. Surawicz et al. conducted a study on early repolarization in the ECGs of young people (529 males aged 17-24 years), and 93% of these had ST-segment elevation of at least 1 mm in one or more leads between V1 and V46. Early repolarization is a common finding in young people and do not signify clinical disease. ST segment elevation in the acute phase of infarction is indistinguishable from that which occurs in Prinzmetal angina, since both situations reflect the same circumstances from the patho-physiolological point of view, namely transmural ischemia due to occlusion of an epicardial artery, but the transient nature of vasospasm in Prinzmetal angina is accompanied by normalization of the ST segment[7]. In one third of our cases there was not enough evidence of clinical symptoms and initial complementary tests to rule out a non-coronary origin. The symptoms can described as chest pain with typical characteristics, and this fact coupled with ST segment elevation and cardiac markers made for diagnostic uncertainty in which it was necessary to perform specific testing. Certain cases involve great difficulties in the differential diagnosis. ECG is a valuable diagnostic tool that provides a great amount of information. It can be performed at the bedside to avoid unnecessary travel, and the procedure is non-invasive[8] and inexpensive. The main limitation lies in the dependence of the observer on interpretation of the findings. The profile of our patients was characterized by being young adults, predominantly male In our series, with no vascular risk factors. These circumstances guide the clinician to a non-coronary cause, but we would stress that they do not preclude a coronary origin.

Table 2. Cardiac biomarkers on ED admission

	Range	Mean ± SD
Creatine kinase (U / I)	203-1,663	605 ± 377
Myoglobin (ng / ml)	36.3-1,634	224.3 ± 394
Troponin T (ng / ml)	0.01-5.24	1.2 ± 1.35

SD: standard deviation.

In the differential diagnosis between acute coronary syndrome and pericarditis, differences in ECG patterns have been described. Usually ST segment elevation is diffuse in pericarditis, which is rare in acute infarction. In addition, the PR segment is usually depressed in pericarditis. In inferior infarction, caused by occlusion of the right coronary artery, it has been reported that elevated ST segment in lead III is usually associated to a decline in this segment in I and aVL9. The ECG findings of myocarditis can mimic those of AMI[10], hence the difficulty in differential diagnosis on ED arrival. Catheterization, as in 26.7% of our cases, is not an unusual procedure. Recently, Salisbury et al. studied the rate of coronary angiography for suspected AMI performed in patients with a final diagnosis of acute pericarditis[11]. They analyzed

245 patients; urgent coronary angiography was performed in 40 patients (16.8% of all patients); the frequency was 5-fold higher among those with ST-segment elevation (24.7% vs 4.3%).

Only 20% of acute myocarditis diagnoses were performed using MRI. Some authors have proposed the usefulness of this imaging technique, even for the diagnosis of acute phase infarction in the ED[12]. In our department MRI is not available and transfer to another center is required. The cases where MRI was used were not transferred directly from the ED, only after hospital admission and stabilization.

The limitations of this study stem from the low sample size analyzed. Action protocols for these patients are clearly necessary to avoid clinical variability regarding diagnostic and therapeutic management. In any case, faced with typical chest pain and ECG alterations such as ST segment elevation of uncertain origin, we believe it preferable to perform urgent coronary angiography for diagnostic purposes, and leave open the possibility of early therapeutic action, than to take risks with diagnostic assumptions that can lead to inappropriate or sub-optimal treatment.

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Dolor torácico no coronario con biomarcadores cardiacos elevados: presentación de 15 casos compatibles con miocarditis aguda

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El presente estudio revisa una serie de casos atendidos en urgencias ingresados por dolor torácico no coronario pero que presentaban alteraciones en el ECG y/o biomarcadores elevados, compatible todo ello con el diagnóstico de miocarditis. El periodo de estudio fue de 20 meses, durante el cual se incluyeron 15 enfermos: 14 hombres y una mujer. La edad media fue de 32 ± 12 años, 6 eran fumadores. La mayoría de los enfermos (12) no presentaba factores de riesgo vascular, 13 presentaron elevación del segmento ST y 6 enfermos desarrollaron insuficiencia cardiaca. Se realizó ecocardiografía en 10 enfermos y en 8 fue normal. En 4 pacientes se realizó cateterismo cardiaco sin detectarse lesiones coronarias y en 3 el diagnóstico de miocarditis se obtuvo mediante la realización de resonancia nuclear magnética. [Emergencias 2011;23:375-377]

Palabras clave: Dolor torácico. Elevación de ST. Paciente joven.