

Original article

Troponin Elevation in Patients Without Acute Coronary Syndrome

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ABSTRACT

Introduction and objectives: Troponins are specific biomarkers of myocardial injury and are implicated in the diagnosis and prognosis of patients with acute coronary syndrome. Our purpose was to determine the clinical characteristics and prognosis of patients with troponin elevation who are not diagnosed with acute coronary syndrome.**Methods:** A total of 1032 patients with an emergency room troponin measurement were studied retrospectively, dividing them into 3 groups: 681 patients with no troponin elevation and without acute coronary syndrome, 139 with acute coronary syndrome, and 212 with troponin elevation and not diagnosed with acute coronary syndrome. The clinical characteristics and in-hospital and 12-month mortality of these 3 groups were compared.**Results:** Patients with troponin elevation not diagnosed with acute coronary syndrome were older and had greater comorbidity than patients with acute coronary syndrome or no troponin elevation. The 12-month mortality was 30.2%, compared with 15.1% and 4.7% in the other groups (log rank test, $P < .001$). In the Cox logistic regression model adjusted for confounding variables, patients with troponin elevation and no diagnosis of acute coronary syndrome had higher mortality compared with patients with negative troponin without acute coronary syndrome (hazard ratio = 3.99; 95% confidence interval, 2.36-6.75; $P < .001$) and similar prognosis as patients with acute coronary syndrome.**Conclusions:** Troponin elevation is an important predictor of mortality, regardless of the patient's final diagnosis.

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Troponina elevada en pacientes sin síndrome coronario agudo

RESUMEN

Introducción y objetivos: Las troponinas son biomarcadores específicos de daño miocárdico y tienen implicación en el diagnóstico y el pronóstico de pacientes con síndrome coronario agudo. El objetivo es determinar las características clínicas y el pronóstico en pacientes con elevación de troponina no diagnosticados de síndrome coronario agudo.**Métodos:** Se estudió retrospectivamente a 1.032 pacientes con determinación de troponinas en un servicio de urgencias, que quedaron distribuidos en tres grupos: 681 pacientes sin elevación de troponina y sin síndrome coronario agudo, 139 con síndrome coronario agudo y 212 con troponina elevada sin diagnóstico de síndrome coronario agudo. Se compararon las características clínicas de estos tres grupos y su mortalidad hospitalaria y a los 12 meses de seguimiento.**Resultados:** Los pacientes con troponina elevada sin diagnóstico de síndrome coronario agudo eran de mayor edad y tenían mayor comorbilidad que los pacientes con síndrome coronario agudo o sin elevación de troponina. La mortalidad a 12 meses fue del 30,2%, comparada con el 15,1 y el 4,7% de los otros grupos (log rank test $p < 0,001$). En el modelo de regresión logística de Cox ajustado por variables de confusión, los pacientes con troponina elevada sin diagnóstico de síndrome coronario agudo tuvieron un exceso de mortalidad con respecto a los pacientes con troponina negativa sin síndrome coronario agudo (hazard ratio = 3,99; intervalo de confianza del 95%, 2,36-6,75; $p < 0,001$) y similar pronóstico que los pacientes con síndrome coronario agudo.**Conclusiones:** La troponina elevada es un importante predictor de mortalidad, independientemente del diagnóstico definitivo del paciente.

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Palabras clave:

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Abbreviations

ACS: acute coronary syndrome
ECG: electrocardiogram

INTRODUCTION

Troponins are specific markers of myocardial injury and have been used in clinical practice for more than 20 years. They were initially a marker of “unstable angina”¹; later they played a key role in stratification and in guiding the therapy of patients with acute coronary syndrome (ACS).^{2,3} The markers were subsequently included in the definition of myocardial infarction,⁴ and are finally becoming part of a fundamental diagnostic tool in emergency rooms^{5,6} as well as an important prognostic marker even in asymptomatic patients.⁷

The widespread use of troponin assay in emergency rooms is a significant diagnostic challenge when levels of the biomarker are abnormal in patients with symptoms who could have ischemia or ischemia equivalents, but who have concomitant diseases in which troponin elevation has been described.^{8–10} In order to establish that troponin elevation is due to ACS, it has been proposed that percent increases or absolute changes¹¹ be identified through serial measurements.¹² In clinical practice, ACS is usually ruled out in patients with troponin elevation based on the medical history, electrocardiogram (ECG), overall patient context, and other additional examinations performed during the emergency room or hospital stay. Most recent reviews stress the need for a clearer understanding of the daily clinical situations that raise these diagnostic issues.¹²

The purpose of this study is to determine the percentage of patients seen in an emergency room who had troponin elevation but are not diagnosed with ACS, to characterize this population, and to learn their in-hospital and 1-year prognosis.

METHODS

Study Sample

All consecutive patients who came to the medical emergency room at a teaching hospital between 1 January 2012 and 30 June

2012 and had at least 1 troponin determination were retrospectively included (Figure 1). Our hospital has a written protocol agreed with the emergency room to establish that all patients with nontraumatic chest pain will have an ECG on arrival, plus troponin testing at baseline and 8 h after onset of pain.¹³ When the pain occurs 6 h to 8 h before arrival to the emergency room, the troponin assay is not repeated if the first was negative. In practice, the protocol is specifically designed for patients with chest pain (initial ECG and 1 or 2 troponin assays) and is also applied to patients with other symptoms (eg, dyspnea) that, in the emergency room physician's opinion, require a differential diagnosis with an ACS.

Patients were identified from the lists of emergency assays performed by the facility's laboratory. The number of troponin measurements and the maximum value detected were quantitated for each patient. The sample was composed of 1063 patients, 31 of whom were excluded from the analysis: 3 patients due to pediatric age, 9 due to cardiac arrest, 1 due to type 3 myocardial infarction, and another 18 because they resided outside our direct area of reference. The final study cohort was 1032 patients, with no losses to follow-up. These patients were divided into 3 groups: 681 patients with negative troponin and no ACS diagnosis, 139 patients diagnosed with ACS (122 patients with myocardial infarction and 17 with unstable angina), and 212 patients with positive troponin and no ACS diagnosis. In the patients with ACS, myocardial infarction was diagnosed by consensus among 2 or more cardiologists based on clinical and electrocardiographic evidence and at least 1 troponin assay above the maximum reference level; unstable angina was diagnosed by clinical symptoms and evidence of ischemia (transient ST-segment changes in the ECG, positive stress test, or significant lesions on coronary angiography) in the absence of troponin elevation. The local ethics committee gave approval for the project.

Study Variables

The medical records were reviewed to collect demographic variables, medical histories, including all background assessed in the Charlson index (Table 1), key data in the physical examination on arrival to the emergency room, ECG findings, and initial laboratory workup results. The glomerular filtration rate was calculated by the Modification of Diet in Renal Disease-4 formula. In all patients, the main cardiologic examinations (echocardiogram, stress test, and cardiac catheterization) were analyzed. The main diagnoses were

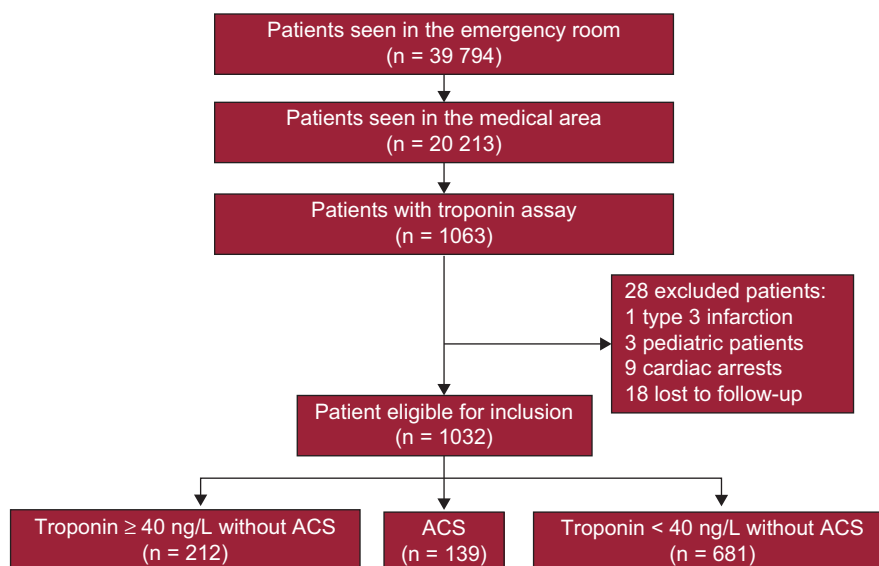


Figure 1. Flow chart of patients included. ACS, acute coronary syndrome.

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