



Original Contribution

Evaluation of myocardial injury through serum troponin I and echocardiography in anaphylaxis



Yong Sung Cha, MD, Hyun Kim, MD, PhD*, Min Hyuk Bang, MD, Oh Hyun Kim, MD, PhD, Hyung Il Kim, MD, KyoungChul Cha, MD, Kang Hyun Lee, MD, PhD, Sung Oh Hwang, MD, PhD

Department of Emergency Medicine, Yonsei University, Wonju College of Medicine, Wonju, Republic of Korea

ARTICLE INFO

Article history:

Received 11 August 2015

Received in revised form 25 September 2015

Accepted 26 September 2015

ABSTRACT

Background: Anaphylaxis is an acute, lethal, multisystem syndrome that results from the sudden release of mast cell- and basophil-derived mediators. Although anaphylaxis can cause cardiac complications, the incidence of myocardial injury using troponin I (TnI) has not been characterized. In addition, patterns of cardiomyopathy have not been evaluated in patients with elevated TnI. Therefore, we studied the occurrence and patterns of myocardial injury with TnI and echocardiography in anaphylaxis.

Methods: We conducted a retrospective review of 300 consecutive anaphylaxis cases that were diagnosed in the emergency department (ED) over 53 months (2011–2015). Myocardial injury was defined as elevation of TnI within 24hrs after arrival at the ED. We investigated systolic function and regional wall motion abnormality (RWMA) through echocardiography within 5 hours after arrival at the ED in patients with myocardial injury.

Results: Among 300 patients (median age, 55 years), 22 patients demonstrated myocardial injury (7.3%). The median TnI was 0.222 ng/mL with a range from 0.057 ng/mL to 19.4 ng/mL. Three patients presented reduced systolic function and 4 patients showed RWMA. One patient showed reverse Takotsubo cardiomyopathy and other 2 patients had RWMA discordant to the distribution of coronary arteries. Another patient showed RWMA (inferior wall) with ST elevation of II, III, and aVF. All 4 patients were discharge after recovery of cardiomyopathy without any specific intervention for cardiomyopathy.

Conclusions: Myocardial injury developed in 7.3% of patients with anaphylaxis. Various cardiomyopathy, including Kounis syndrome and Takotsubo cardiomyopathy, has been observed in patients with myocardial injury.

© 2015 Elsevier Inc. All rights reserved.

1. Introduction

Anaphylaxis is an acute, potentially lethal, multisystem syndrome resulting from the sudden release of mast cell- and basophil-derived mediators into blood circulation [1]. Anaphylaxis frequently results from immunologic reactions to foods, medications, and insect stings, although it can also be induced through nonimmunologic mechanisms by any agent capable of producing a sudden, systemic degranulation of mast cells or basophils [2].

Anaphylaxis can cause cardiac complications, which has been associated clinically with myocardial ischemia, as well as conduction defects, including atrial and ventricular arrhythmias and T-wave abnormalities [3]. In 1991, Kounis and colleagues reported the “syndrome of allergic angina or Kounis syndrome” as the co-incident occurrence of chest pain and allergic reactions accompanied by clinical and laboratory findings in classic angina pectoris caused by inflammatory mediators released during allergic reactions [4]. There are also some case reports

that discuss cardiomyopathy related to anaphylaxis [5–10]. One report described 2 previously healthy patients, without apparent underlying heart disease, who developed profound myocardial depression during anaphylaxis [6]. However, little is known about the occurrence of myocardial injury using serum troponin I (TnI), which is expressed in cardio-specific isoforms [11], and patterns of cardiomyopathy through cardiac function evaluation, using echocardiography in patients with elevated TnI.

Therefore, we studied the incidence and patterns of myocardial injury, which was defined as elevated TnI levels when checked within 24 hours after emergency department (ED) arrival, through serum TnI and echocardiography in anaphylaxis.

2. Methods

2.1. Study design and data

This study was retrospectively performed on consecutive adult ED patients with anaphylaxis over 53 months since serum TnI checks were implemented in anaphylaxis (2011 to 2015). Single urban, tertiary-care hospital (Wonju Severance Christian Hospital, in Wonju,

* Corresponding author at: Department of Emergency Medicine, Wonju College of Medicine, Yonsei University, 162 Ilsandong, Wonju, Republic of Korea 220-701. Tel.: +82 33 741 1614; fax: +82 33 742 3030.

E-mail address: khyun@yonsei.ac.kr (H. Kim).

Republic of Korea) was used for enrollment with ED that has an annual visit volume in excess of 43,000 and is staffed 24 hours per day with board-certified emergency physicians.

Anaphylaxis was confirmed by emergency physicians in the ED. Diagnostic criteria of anaphylaxis included rapid occurrence of 2 or more of the following after exposure to a likely allergen (minutes to several hours): (1) skin and/or mucosal tissue involvement (urticaria, itchiness, flushing, or swelling), (2) respiratory compromise (shortness of breath, wheezes, or stridor), (3) reduced blood pressure or shock (systolic blood pressure <90 mmHg), (4) persistent gastrointestinal symptoms (diarrhea, crampy abdominal pain, or vomiting) [1]. All patients complaining of anaphylaxis upon arrival to the ED were done with fluid resuscitation and treated with antihistamine and steroid, and, if needed, epinephrine was used. The study exclusion criteria were: an age less than 18 years, absence of serum TnI level within 24 hrs of arrival at the ED, end-stage renal disease, and cardiac arrest when the patient arrived at the ED, as these can affect serum TnI levels.

Data was collected by retrospectively reviewing electronic medical records. Data collection was conducted by 2 emergency physicians blinded to the study objectives and hypothesis and if there was inter-observer disagreement in the interpretation of clinical data, the 2 emergency physicians reviewed the case together to come to a conclusion. Training of abstractors was conducted before data collection to reduce bias. The following were obtained from the patients' medical records: age, gender, causes of anaphylaxis, cardiovascular risk factors, initial symptoms and signs, initial Glasgow Coma Scale (GCS) score, initial vital signs including systolic blood pressure (SBP) and pulse rate (PR), use of epinephrine, and mortality. Electrocardiography (ECG) was performed in the ED and a cardiologist (SOH), who specializes in both emergency medicine and cardiology, interpreted the ischemic change on the ECG, including ST elevation, ST depression, and T-wave inversion. Ischemic changes were classified as new ST-segment elevation (≥ 1 mm) or depression (≥ 0.5 mm) or T wave inversion (≥ 2 mm) in 2 consecutive leads [12]. Serum cardiac biochemical markers, including TnI and β -type natriuretic peptide (BNP), were investigated in the ED. A serum high-sensitivity TnI (hs-TnI) (Siemens Healthcare Diagnostics Inc, Newark, DE) was used to determine blood TnI levels (reference range <0.046 ng/mL). Myocardial injury was defined as elevation of hs-TnI within 24 hours after arrival at the ED because we wanted to minimize the possibility of myocardial injury secondary to malfunctions of other organs or systems. Echocardiography was investigated in patients with an elevated hs-TnI within 5 hours after arrival at the ED to measure cardiac functions including systolic function and regional wall motion abnormality (RWMA). Transthoracic echocardiography was performed with Vivid E9 (General Electrical Medical System, Horton, Norway) using a 2.5-MHz probe. Ejection fraction (EF) was measured using the modified Simpson's technique. Normal systolic function was defined as an EF greater than 50%, while an EF of 50% or less was defined as reduced systolic function. An experienced cardiologist (SOH) interpreted the echocardiographic findings and was blinded to the patients' clinical information. This study was approved by the institutional review board of the Wonju College of Medicine, Yonsei University.

2.2. Statistical analysis

Categorical variables were presented as frequencies and percentages, and continuous variables as medians and interquartile ranges after assessments for normality using the Shapiro-Wilk test. The χ^2 test or Fisher exact test was used to compare nominal variables and the Mann-Whitney *U* test was used to compare continuous variables. $P < .05$ was considered statistically significant. Statistical analyses were performed using IBM SPSS 20 Ver. (IBM, Aramark, NY).

3. Results

3.1. Characteristics of study subjects

A total 300 consecutive patients older than 18 years were identified with anaphylaxis during study period. The following patients were excluded: cardiac arrest when they arrived at the ED (9 patients), absence of serum hs-TnI levels within 24 hours after arriving at the ED (6 patients), transfer out to other hospital (4 patients), and discharge against medical advice (3 patients) (Figure).

General characteristics are shown in Table 1. One hundred sixty eight of the patients were male (56.0%) and the median age of the study subjects was 55 years. Most frequent causes of anaphylaxis included food, drug, and insect bite. Hypertension was the most common cardiovascular risk factor. The common symptoms and signs at initial presentation were urticaria (163 patients, 54.5%), dyspnea (158 patients, 52.8%), chest pain (56 patients, 18.8%), and swollen oropharynx (42 patients, 14.0%), respectively. One patient (0.3%) died of multiple organ failure (Table 1).

3.2. Myocardial injury

Myocardial injury was observed in 22 patients (7.3%). The median hs-TnI was 0.222 ng/mL with a range from 0.057 ng/mL to 19.4 ng/mL. In the myocardial injury group ($n = 22$), there were ischemic changes on the ECG in 12 patients. Two patients had ST elevation, 7 patients had ST depression, and 3 patients had T-wave inversion. Echocardiography was performed on 15 of 22 patients with myocardial injury to analyze cardiac function in the ED. Three patients (case 2, 19, and 22) exhibited reduced systolic function, and 4 patients showed RWMA (cases 2, 9, 19, and 22). One patient (case 2) showed reverse Takotsubo cardiomyopathy and other 2 patients (cases 9 and 19) had RWMA discordant to the distribution of coronary arteries. Another patient (case 22) showed RWMA (inferior wall) with ST elevation of II, III, and aVF. Four patients with cardiomyopathy were discharged after recovery from RWMA and reduced systolic function without any specific intervention for cardiomyopathy. Wall motion score index ranged from 1.026 to 2.25 (Tables 2, 3). The case 22 patient was followed up in the cardiology outpatient department after discharge. Echocardiography performed 10 days after discharge revealed that new RWMA, which was hypokinesia in all segments mid LV with EF 54%, had developed.

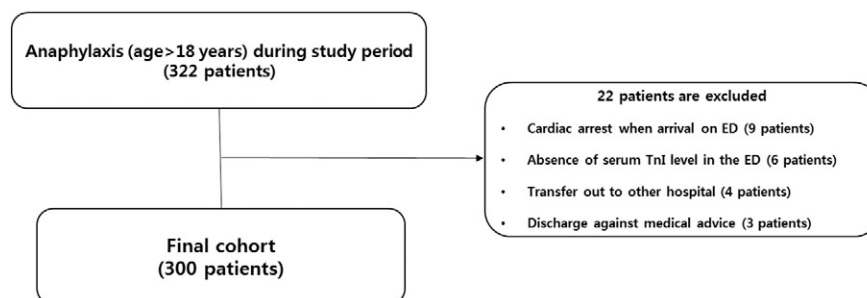


Figure. Study flow chart.

Download English Version:

<https://daneshyari.com/en/article/3223196>

Download Persian Version:

<https://daneshyari.com/article/3223196>

[Daneshyari.com](https://daneshyari.com)