

Letter to the Editor

Cardiac troponin I is increased in patients admitted to the emergency department with severe allergic reactions. A case–control study

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Although the values of immunoglobulin E are frequently increased in patients with ischemic heart disease [1], an acute coronary syndrome caused by allergic reactions is an extremely rare clinical entity, which is conventionally known as “Kounis syndrome” [2]. This paradigmatic condition, characterized by the onset of an allergic reaction followed by chest pain and clinical and laboratory features of angina, is mainly attributable to the release of inflammatory mediators during an allergic event [3].

The pathophysiology and treatment of the Kounis syndrome are now clearly defined [4,5], but the occurrence of cardiac involvement in patients with different forms of acute allergic reaction requiring emergency department (ED) visit or hospital admission remains uncertain. Since cardiac troponins are now regarded as the biochemical gold standards for diagnosing cardiac injury [6], we performed a retrospective study to investigate the values of cardiac troponin I (cTnI) in patients admitted to the ED with acute allergic reactions.

The study population consisted in all consecutive adult patients (i.e., aged 17 years or older) admitted to the ED of the University Hospital of Parma (Italy) for acute allergic reactions, during the entire year 2013, and for whom laboratory testing was available. Information about ED admission was identified from the electronic hospital database using a double extraction key, i.e., ICD-9 codes 999, 995, 716, 708, 477

and 287 (including all the 4th and 5th digits), as well as verbal “strings”, i.e., “allergy”, “anaphylaxis”, “urticaria”, “angioedema”, and “shock”. The control population consisted in 125 healthy blood donors (60 women and 65 men, mean age 42 ± 10 years). The concentration of cTnI was measured in EDTA plasma using Beckman Coulter AccuTnI on Unicl DxI (Beckman Coulter, Brea, CA, USA). The lower limit of detection of this test is 10 ng/L, whereas the upper limit of the reference range (i.e., the 99th percentile of an ostensibly healthy population) is 30 ng/L [7].

The significance of difference of cTnI values between cases and controls was analyzed with the Wilcoxon–Mann–Whitney test (for continuous variables) and Pearson's χ^2 statistics with Yates' correction (for categorical variables). Results of measurements were expressed as median and interquartile range (IQR). The statistical analysis was performed using Analyse-it (Analyse-it Software Ltd, Leeds, UK) and MedCalc Version 12.3.0 (MedCalc Software, Mariakerke, Belgium). The study was carried out in accord with the Declaration of Helsinki, under the terms of relevant local legislation.

A total number of 3237 records were identified and analyzed by two separate physicians. Patients with unavailable laboratory data or those admitted to the ED for allergic rhinitis, asthma and chronic urticaria were excluded, thus limiting the analysis to cases of acute urticaria, acute angioedema, urticaria-angioedema and anaphylaxis.

Overall, the final study population consisted in 31 patients and 125 controls (Table 1). Ten patients met the diagnostic criteria for anaphylaxis, 2 for angioedema, 15 for urticaria and 4 for urticaria-angioedema. The concentration of cTnI was found to be significantly higher in patients with acute allergic reactions requiring ED admission than in controls (Table 1). The percentage of measurable cTnI values (i.e., ≥ 10 ng/L) and of values exceeding the upper limit of the reference range (i.e., ≥ 30 ng/L) was also significantly higher in cases than in controls (Table 1). The relative risk (RR) and 95% confidence interval (95% CI) for cTnI values ≥ 10 ng/L and ≥ 30 ng/L in patients admitted to the ED with acute allergic reactions was 3.02 (95% CI, 1.60–5.72) and 5.38 (95% CI, 1.27–22.80). Interestingly, the cTnI values of patients admitted to the ED with anaphylaxis (15 ng/L, IQR <10 to 20 ng/mL) were significantly higher than those of the control population (<10 ng/L, IQR, <10 to 10 ng/L; $p < 0.001$), but also higher than those of patients with milder allergic reactions (<10 ng/L, IQR, <10 to 10 ng/L; $p = 0.019$) (Fig. 1).

Acute allergic reactions are important causes of ED admission, whose frequency exhibited a remarkable increase in the past decades

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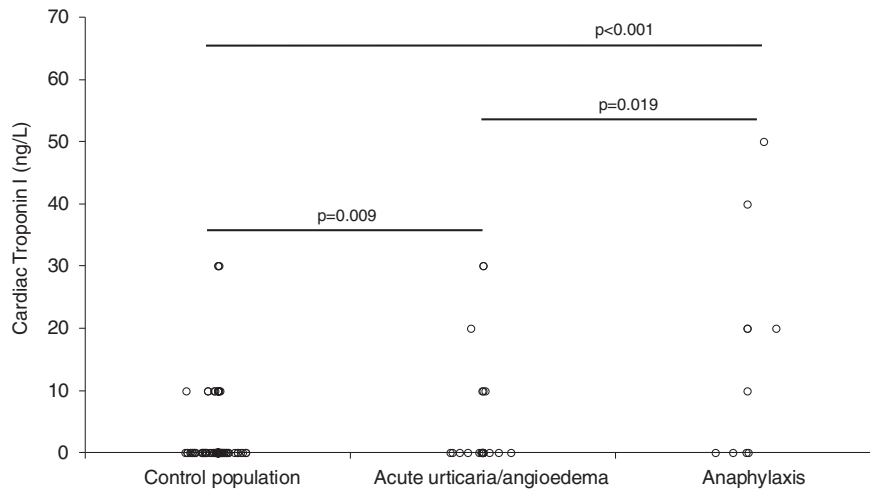


Fig. 1. Values of cardiac troponin I (TnI) in patients with acute allergic reactions requiring emergency department admission compared to those of a control healthy population.

Table 1

Values of cardiac troponin I (TnI) in patients with acute allergic reactions requiring emergency department admission compared to those of a control healthy population. Values are shown as median and interquartile range.

	Allergic reactions	Controls	p
n	31	125	
Age (years)	42 (32–61)	39 (30–48)	0.060
Women	18/31 (58%)	60/125 (48%)	0.211
cTnI (ng/L)			
– Values (ng/L)	<10 (<10 to 15)	<10 (<10 to 10)	<0.001
– Values >10 ng/L	12/31 (38.7%)	16/125 (12.8%)	0.001
– Values >30 ng/L	4/31 (12.9%)	3/125 (2.4%)	0.020

[8]. A certain degree of cardiac involvement due to perturbation of coronary blood flow has been described in patients with allergic reactions, especially in those with anaphylaxis [9,10], but no previous study has investigated the concentration of cardiac biomarkers in patients with acute allergic reactions requiring hospital admission to the best of our knowledge. The results of our investigation demonstrate for the first time that the concentration of cTnI is significantly higher in patients admitted to the ED with acute allergic reactions compared to healthy controls, and that cTnI values are also higher in patients with more severe disease (e.g., anaphylaxis) than in those with milder allergic reactions. According to our findings, it seems hence reasonable to suggest that the systematic measurement of cardiac biomarkers should be performed in all patients admitted to the ED with acute allergic reactions, especially in those with anaphylaxis and even in those lacking

symptoms of myocardial ischemia, in order to timely identify and appropriately manage a potential cardiac injury.

Conflicts of interests

The authors declare that no conflict of interest exists.

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