

# A Rarely Seen Type-I Kounis Syndrome Caused By Tetanus Vaccine



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## ABSTRACT

The pathogenesis mechanism of Kounis syndrome is defined by mast-cell degranulation that has been amplified to induce acute myocardial infarction in susceptible individuals. Here, we report a case of Kounis syndrome presented with acute coronary syndrome after a tetanus vaccine. In addition, all possible other etiologies, especially ischemia, were excluded.

**Key Words:** Allergic myocardial infarction; Kounis syndrome; tetanus vaccine

## Oldukça Nadir Görülen Tetanoz Aşısının Neden Olduğu Tip 1 Kounis Sendromu

### ÖZET

Patolojik mekanizması mast hücrelerinin degranülasyonuna bağlı hassas kişilerde görülen akut miyokardiyal enfarktüsü Kounis sendromu olarak tanımlanır. Biz burada tetanoz aşısı sonrası akut koroner sendrom ile başvuran bir Kounis sendromu bildirdik. Ek olarak, tüm olası sebepler özellikle de iskemi dışlandı.

**Anahtar Kelimeler:** Allerjik kalp krizi; Kounis sendromu; tetanoz aşısı

## INTRODUCTION

Acute coronary syndrome accompanied by activation of mast cells induced by hypersensitivity or allergic and anaphylactic or anaphylactoid reactions has not frequently been reported. First, Kounis explained it as “hypersensitive angina syndrome” advancing to “allergic myocardial infarction.” Hence, it was referred to as “Kounis syndrome” recently<sup>(1,2)</sup>. In this case, we report a patient who developed Kounis syndrome following an allergic reaction to a tetanus vaccine. We also describe clinical implications and possible pathophysiological mechanisms involved.

## CASE REPORT

A 35-year-old man was admitted to our hospital’s emergency department with typical chest pain and moderate pruritic skin rashes. His symptoms had begun roughly half an hour after ingesting a tetanus vaccine for a minor injury. He was admitted to our department for a period of 45 minutes after the onset of the tetanus vaccine’s side effects. Furthermore, he displayed none of the risk factors for coronary artery disease. After the confirmation, his electrocardiogram demonstrated ST elevations in leads d-II, d-III, and aVF and reciprocal changes in anterior leads (V 1-4) reflecting inferior myocardial infarction (Figure 1A). Subsequently, the patient was taken to our coronary angiography unit. The patient was given 300 µg intravenous glycerol trinitrate for chest pain before the coronary angiography. His chest pain was resolved after the administration of glycerol trinitrate. However, the left and right selective coronary angiography was normal (Figure 2A,B). Next, the patient was taken to the hospital’s coronary care unit, and his electrocardiogram was normal (Figure 1B). Despite this, Troponin-I level was 27 ng/mL (reference esteem: 0.015 ng/mL) and peak creatine kinase-MB fraction was 107 U/L at the peak of his subsequent period, individually. In addition, a moderate increase in leukocyte count ( $15.4 \times 10^3/\mu\text{L}$ ) and eosinophils (4.9%) was also observed. The immunoglobulin-E level was significantly higher (180 mg/L) (reference esteem: 150 mg/L). According to these results, the

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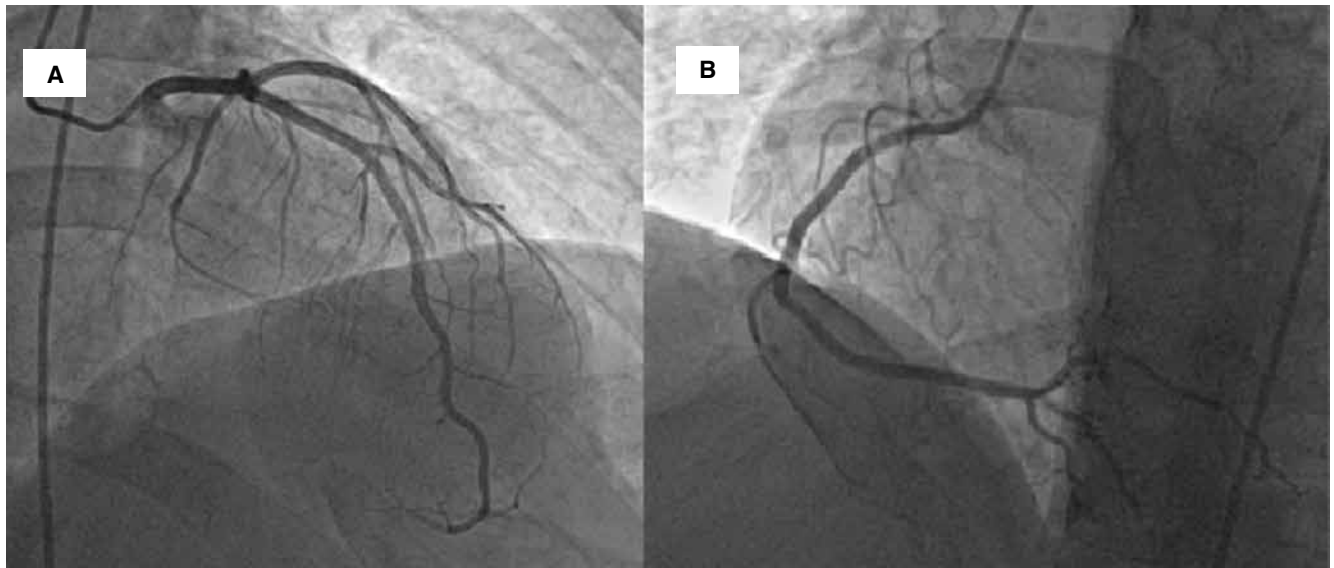
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**Figure 1.** (A) Electrocardiogram demonstrating ST elevations in leads d-II, d-III, and aVF and reciprocal changes in anterior leads (V 1–4), (B) Normal electrocardiogram.



**Figure 2.** Normal coronary arteries, (A) Left selective coronary angiography, (B) Right selective coronary angiography.

diagnosis was an allergic reaction as the chest pain had started immediately after administration of a tetanus vaccine. Therefore, the patient was treated with an oral antihistamine therapy as a measure against allergic reactions. Finally, the patient was discharged on the fourth day of admission.

## DISCUSSION

To the best of our understanding, this seems to be a very rarely encountered case of Kounis syndrome induced by a tetanus vaccine in literature. Kounis syndrome, also known as allergic myocardial infarction, can be classified into three types. In the first category, patients display coronary vasospasms actuated by mediators of allergic reaction, for example, histamine, thromboxane, and leukotrienes without the availability of risk factors that cause atherosclerosis or coronary artery syndrome. In the second type, an acute coronary disorder arises because of coronary vasospasms, plaque disintegration, or rupture of plaque incited by these arbiters in patients with atherosclerotic coronary artery syndrome. It is also a fact that thrombus material contains eosinophils and mast cells extracted from several patients who suffer from stent thrombosis after stent implantation with medication discharge that makes it imperative to consider excessive hypersensitivity responses in these patients individually. Moreover, this circumstance is known as a type-III variation of Kounis Syndrome<sup>(3-5)</sup>. Therefore, based on these findings, our case was diagnosed as type-I Kounis syndrome. Increased degranulation of mast cells that induces coronary artery spasm, as well as myocardial infarction, is defined as the primary pathophysiological mechanism of Kounis syndrome. The degranulation of mast cells, particularly, can have an effect on patients more vulnerable to coronary artery spasms. On the contrary, during mast-cell degranulation, the levels of a few vasoactive molecules such as leukotrienes, serotonin and histamines, and collagen-degrading compounds, such as neutral proteases, are elevated in the peripheral circulation. All these mediators can cause a vasospasm in the coronary arteries. In addition, the platelets that trigger thrombosis are activated by histamine. This mediator can also contribute to the progression of acute coronary syndrome by initiation and provocation of plaque erosion, rupture, or coronary vasospasm

<sup>(6,7)</sup>. In this case, the patient's coronary arteries were completely normal, and a coronary vasospasm could be the reason for the release of mediators owing to the tetanus vaccine. The primary cardiovascular effects of coronary vasoconstriction are plaque erosion, thrombocyte activation, dysrhythmia development, which are induced by various mechanisms and increments in the synthesis of tissue factors<sup>(8)</sup>. However, a patient suffering from Kounis syndrome, in addition to appropriate acute coronary syndrome management needs the determination of specific IgE antibodies, eosinophilia, serum histamine, and complement proteins for the identification of this disease<sup>(9)</sup>. Moreover, eosinophil, total IgE, and leukocyte levels were elevated in our patient. It can be concluded that the tetanus vaccine could be one of the core reasons for acute coronary syndrome. Clinical findings and laboratory tests might provide a suggestion that Kounis syndrome should be taken into consideration during the diagnosis of acute coronary syndromes. This case demonstrates the importance of clinical knowledge of acute coronary syndromes. Physicians need to be aware of this effect and take note of it in the diagnosis of myocardial infarction.

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