

Clinical practice

Kounis syndrome: allergic acute coronary syndrome

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Kounis syndrome is defined as a group of acute coronary syndromes that manifests as unstable vasospastic or nonvasospastic angina, and even as acute myocardial infarction triggered by the release of inflammatory mediators following an allergic insult.¹ Kounis syndrome is a rare and complex syndrome. Instant treatment decisions need to be made once it happens. Here, we defined a case of severe Kounis syndrome, culminating in acute coronary syndrome, as a result of an acute allergic reaction, which was likely related to iodinated contrast media or dextran-40 use.

A 71-year-old male patient, with a history of hypertension, no history of coronary heart disease and diabetes, was admitted to our hospital because of intermittent claudication for one year. On admission, his temperature was 36.4°C, pulse was 80 beats/min, respiratory rate was 18 beats/min and blood pressure was 105/80 mmHg (1 mmHg=0.133 kPa). Physical examination did not show any sign of heart disease, but the lower extremity arterial pulsation was weak. His artery angiography of abdominal aorta and lower limbs showed that the left iliac artery was completely obstructed. A total of 400 U iodinated contrast media was used during the operation. The patient was back to ward safely. Ten minutes after taking the dextran-40 as a postoperative treatment, he began to present sudden hyperspasmia, transient unconsciousness, skin flushes, excessive sweating and sinus tachycardia (approximately 140 beats/min). At the same time, his skin temperature decreased and his blood pressure collapsed quickly. He accepted oxygen therapy, fluid replacement, dexamethasone and dopamine immediately. After that the ECG revealed ST elevation of 0.3–0.7 mV in leads II, III, avF, V₃₋₆, and frequent premature ventricular (Figure 1A). Following the therapy of promethazine, glycerin trinitrate and lidocaine, the shock symptoms was gradually relieved: consciousness was recovered, ST segment gradually went back to normal in half an hour (Figure 1B) and blood pressure increased to 50/40 mmHg. However, the skin appeared in pattern and urticaria. The patient was transferred to CCU ward for observation, with dopamine used constantly for a few hours.

The patient's general state was stable after a few hours. His skin rash vanished gradually and his blood pressure was back to 90/60 mmHg. The ECG had no specific changes in the next day. The infarction graphics had only a one-time change, so we did not take further examinations for

cardiac markers because it disappeared quickly. The patient accepted a short-term anti-platelet aggregation therapy after he was stable. He was discharged from the hospital after he successfully accepted femoral artery endarterectomy in half month. The discharge diagnosis was left lower extremity arteriosclerosis obliterans. The patient was followed up for several years after discharge. He did not complain any symptoms of angina pectoris or heart failure.

The most common symptoms of Kounis syndrome, include fainting, dyspnea, palpitation, serious weakness, nausea, vomiting, urticaria, itching, profuse sweating, paleness, hypotonia and sometimes arrhythmia. The patient described here developed signs of anaphylaxis in an hour after using iodinated contrast media and dextran-40. The diagnosis of this case mainly relies on the patient's typical symptoms and ECG (ischemic ST-T changes). The symptoms of hypotension caused by the release of vascular active substances expand capillaries widely in allergic reactions. During the reaction, peripheral resistance decreases as vascular permeability and capillary capacity increase, so blood pressure dropped rapidly. Furthermore, hypotension can aggravate the myocardial hypoperfusion. After taking the H1 blocker, corticosteroids, rehydration, and so on, the

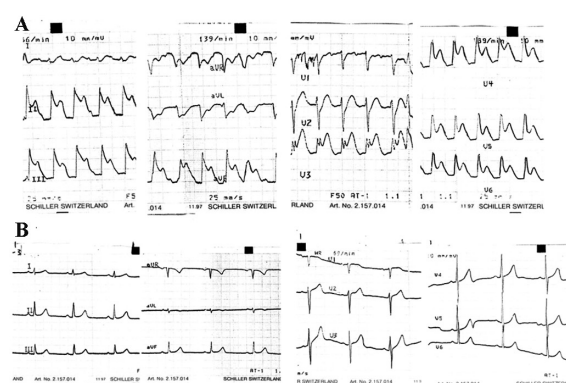


Figure 1. A: Prominent ST segment elevation in leads II, III, avF, V₃₋₆. **B:** Resolution of ST-segment elevations after treatment.

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symptoms were relieved quickly, so we did not take further tests for myocardial enzymes or coronary angiography instantly. However, it will be better if we get myocardial enzymes' result at that time. Considering the allergic constitution of this patient may be caused by iodinated contrast media, coronary arteriography was still not suggested after he was stable. The several year follow-up results also confirmed this diagnosis because the patient had no symptoms of coronary heart disease. It was necessary to give the short-term antiplatelet therapy when the patient's condition was stable.

There are two variants of Kounis syndrome. Type I is observed in patients with no cardiovascular risk factors and with healthy coronary arteries in which the inflammatory cascades triggered by the allergic insults cause a coronary vasospasm accompanied by elevated levels of markers of myocardial damage. Type II is observed in patients with pre-existing atheromatous disease in whom the release of these mediators would also produce a coronary vasospasm, which occurs with normal cardiac enzymes or rupture of the atheromatous plaque.² The pathophysiologic mechanisms described by more reports were the existence of mastocytes in heart tissue and their participation in the anaphylactic reaction that triggers tachycardia, coronary vasoconstriction, dysfunctional ventricular contractility, and blockade of atrioventricular conduction.

The evaluation and treatment of Kounis syndrome need to consider both cardiac and allergic syndromes simultaneously. Below are the recommendations for the treatment of Kounis syndrome. They are ranked in order of recommendation level. (1) Oxygen administration is beneficial for all the Kounis syndrome patients. (2) Intravascular volume replacement is an essential treatment of anaphylaxis. Patients with Kounis syndrome may require additional hemodynamic monitor and early assessment of left ventricular systolic functions with echocardiography. (3) Corticosteroids are safe and useful in the treatment of Kounis syndrome. (4) H1 and H2 blockers were recommended to use in patients with Kounis syndrome after achieving hemodynamic stability. Moreover, H2 blockers may prevent gastrointestinal bleeding in patients with acute coronary syndromes who will receive antiplatelet and antithrombotic drugs. (5) Dopamine should be continuously used under the condition of lower blood pressure, because the ascension of blood pressure is the

key for successful rescue. (6) Epinephrine can aggravate the ischemia, prolong QTc interval, and induce coronary vasospasm and arrhythmias. It should be used for Kounis syndrome patients carefully by choosing the appropriate dose and the right route of administration according to the patients' condition. (7) Calcium channel blockers are not recommended for this syndrome. But they may be considered as initial anti-ischemic drugs in Kounis syndrome patients. (8) Nitroglycerin is safe in patients with Kounis syndrome if the blood pressure is satisfactory. But intravenous nitroglycerin can cause hypotension and tachycardia which may further complicate anaphylactic reaction.³

Above all, both dilating coronary vessels and suppressing the anaphylaxis should be considered in the treatment of the disease. Oxygen administration, intravascular volume replacement and glucocorticoid are applicable for all Kounis syndrome patients. Vasodilator drugs should be considered the first-line therapy in young or type I patients since vasospasm is the primary mechanism. For type II patients, acute coronary syndrome protocol should be followed. Antiplatelet drug and β -blockers should be given after the initial treatment has been finished. Considering that the patients are in allergic condition, it is suggested that the patients should take treadmill exercise or nuclear myocardial imaging to identify the lesion of coronary artery according to patient's condition.⁴ The electrocardiogram should be used in the anaphylactic shock patients and allergen detection should be taken to prevent the shock happening again.

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