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Amiodarone triggered Kounis syndrome complicated by refractory cardiac arrest rescued with VA-ECMO.

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Abstract: A patient with atrial fibrillation admitted for an elective electrical cardioversion. He was given an amiodarone bolus that triggered Kounis syndrome with cardiac arrest (CA) and refractory shock needing mechanical support with ECMO and refractory hypoxemia that improved with inhaled nitric oxide. Allergy to amiodarone was later confirmed.*Introduction*

Atrial fibrillation is the most common supraventricular arrhythmia. Some studies revealed benefits in maintaining sinus rhythm in patients with AF, especially in young patients (1). Electrical cardioversion is an option when pharmacological cardioversion fails.

Kounis syndrome (2) is a rare disease that consists of an allergic coronary syndrome, it usually presents as an ST-segment elevation acute coronary syndrome. It requires emergent coronary angiography with intracoronary vasodilators infusion and angioplasty if required. We present an unusual form of Kounis Syndrome triggered by endovenous amiodarone that underwent with cardiorespiratory arrest and refractory shock due to the vasospasm. In this situation mechanical circulatory support with ECMO was necessary to ensure tissue perfusion. Specifically, in the in-hospital cardiac arrest, ECMO implantation is an expanding therapy and is showing promising results.

History of presentation

A 60-years-old man with a previous history of persistent atrial fibrillation (AF) treated with oral amiodarone was admitted for an elective electrical cardioversion. A 200 J shock, under sedation with propofol and midazolam, was ineffective and the decision was made to administer a 300 mg bolus of intravenous amiodarone. Immediately after, the patient presented an extensive skin rash associated with pruritus that was shortly followed by cardiac arrest secondary to pulseless electrical activity. Advanced cardiopulmonary resuscitation (CPR) was started but the patient persisted in cardiac arrest. ST-segment elevation was observed on the monitor so the patient was transferred to the cathlab for emergent coronary angiography. A left main coronary artery spasm was observed (figure 1) and complete reversal of spasm was achieved after 5 bolus of intracoronary nitroglycerin. After 19 minutes of advanced CPR with administration of 8 mg of adrenaline, 200 mg of hydrocortisone and 5 mg of dexchlorpheniramine recovery of spontaneous circulation was achieved. Echocardiography revealed biventricular severe dysfunction (video 1). The patient remained in refractory shock despite of high doses of vasoactive drugs so VA-ECMO and intra-aortic balloon pump (IABP) were implanted.

Past medical history

The patient had a history of arterial hypertension, dyslipidemia and sleep apnea-hypoapnea syndrome (SAHS) in treatment with CPAP. Paroxysmal AF was diagnosticated five years ago undergoing electri-

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cal cardioversion with premature recurrence. Dronedarone was initially used as an antiarrhythmic drug, but after the recurrence of AF was changed to amiodarone. Echocardiography showed left atrial enlargement with preserved left ventricular function without valvulopathies.

Despite the treatment with amiodarone the patient persisted in AF so a new electrical cardioversion was programmed followed by pulmonary vein isolation.

Differential diagnosis

Anaphylactic shock, cardiac arrest due to acute myocardial infarction, coronary artery embolism or Kounis syndrome, respiratory arrest due to hypoxemia.

Investigations

Non-significant coronary lesions on the coronary angiography and absence of regional wall motion abnormalities rule out the ischaemic cardiogenic shock and coronary embolism.

No evidence of hypoxemia on initial blood gases and normal oxygen saturation at the beginning of the case exclude hypoxemic cause.

The sudden presentation after drug administration accompanied by erythema and pruritus led to the diagnosis of anaphylaxis. Coronary angiography showed coronary vasospasm and a tentative diagnosis of Kounis syndrome probably due to amiodarone was made. This was confirmed later through determination of blood tryptase and later with positive allergy tests for amiodarone.

Management

The patient was admitted to the intensive cardiac care unit due to refractory shock requiring mechanical circulatory support with VA-ECMO and IABP.

High flow ECMO (3.7-4L) and aggressive fluid resuscitation were needed in the first few hours to keep the patient well perfused. Stress steroids were also given. After 48-72 hours the patient presented progressive hemodynamic improvement until VA-ECMO support could be weaning after five days. Biventricular function was completely recovered.

Another problem during admission was severe respiratory failure. Deep sedation, muscular relaxation, high fraction of oxygen in inspired air (FiO2) and high requirement of positive end-expiratory pressure was needed to achieve normoxemia. There was no response to empiric antibiotic therapy and aggressive negative fluid balance. Suspecting diffuse pulmonary vasoconstriction with ventilation-perfusion mismatch, inhaled nitric oxide (NO) was started. An excellent response was achieved with a rapid improvement of oxygenation allowing to reduce the FiO2 requirements. A bronchoscopy was performed, isolating a methicillin-resistant staphylococcus aureus in the cultures with no evidence of complicated pneumonia in the CT scan. After seven days of target antibiotics the patient remained apyrexial without other signs of infection so treatment was suspended with good evolution.

Neurologically, the patient evolved without sequelae.

To confirm the diagnosis of allergic reaction, tryptase levels were determined at the beginning and 24 hours later. Finally allergy tests were performed resulting positive for amiodarone and confirming the diagnosis.

One year after the event the patient is asymptomatic with functional class-I of NYHA, persisting in AF controlled with beta-blocker treatment and anticoagulated with a direct oral anticoagulant

Discussion

The Kounis syndrome was first describe in 1991 and, as has been described, it consists in a vasospasm due to allergic reaction. In these cases, treatment with adrenaline is controversial because of the eventual worsening of ischemia, vasospasm and increase in the QT segment. However, in our case it was necessary considering

the situation of cardiorespiratory arrest. Vasodilator agents should be contemplated as specific treatment. In our case, intracoronary nitroglycerin was administered (4).

In our case, the most probable trigger of the Kounis syndrome was the intravenous administration of amiodarone. To diagnose anaphylaxis, in addition to pruritus and skin lesions after the drug administration, determination of serum tryptase during the acute phase with subsequent normalization is useful (figure 2). Mast cells are the main inflammatory cells in the allergic reaction. Its degranulation produces the release of inflammatory and vasoactive molecules. Tryptase determination is the main marker of mast cell activity with a 73% sensitivity and 98% specificity (5).

Some drugs have been associated with Kounis syndrome but as far as we know from published evidence, this is the first case with amiodarone. However, there are some cases of anaphylactic shock with intravenous amiodarone in patients who already take it orally, especially in cases of allergy to iodine (6).

The use of VA-ECMO has been previously described in the setting of anaphylactic shock, with few cases being described. This case supports the usefulness of ECMO in refractory shock requiring circulatory support (7).

Another remarkable point to highlight in this case is the usefulness of NO in refractory hypoxemia in a patient with VA-ECMO once initial treatment has failed (deep sedation, pharmacological relaxation and optimized ventilation). In our case it was effective and prevented further aggressive treatments such as pronation or conversion to VAV-ECMO. NO would act as a pulmonary vasodilator, reducing the reflex vasoconstriction that occurs due to hypoxia, improving the pulmonary ventilation/perfusion ratio. And although studies have not shown a reduction in mortality, they have shown a significant improvement of refractory hypoxemia. (8) (9).

Therefore, it is an interesting case, since on one hand, it shows an infrequent cause of cardiorespiratory arrest such as coronary vasospasm due to anaphylactic shock. And on the other hand, it highlights the usefulness of circulatory support with ECMO in the scenario of cardiorespiratory arrest.

Conclusions

Authorship

MS, AS, LR: involved in the writing of the article, design and conceptualization. ER, AB, MT, LS, SA, JM, DB: involved in conceptualization and methodology of the article. All authors approve the final version of the case report for submission to the Clinical Case Reports.

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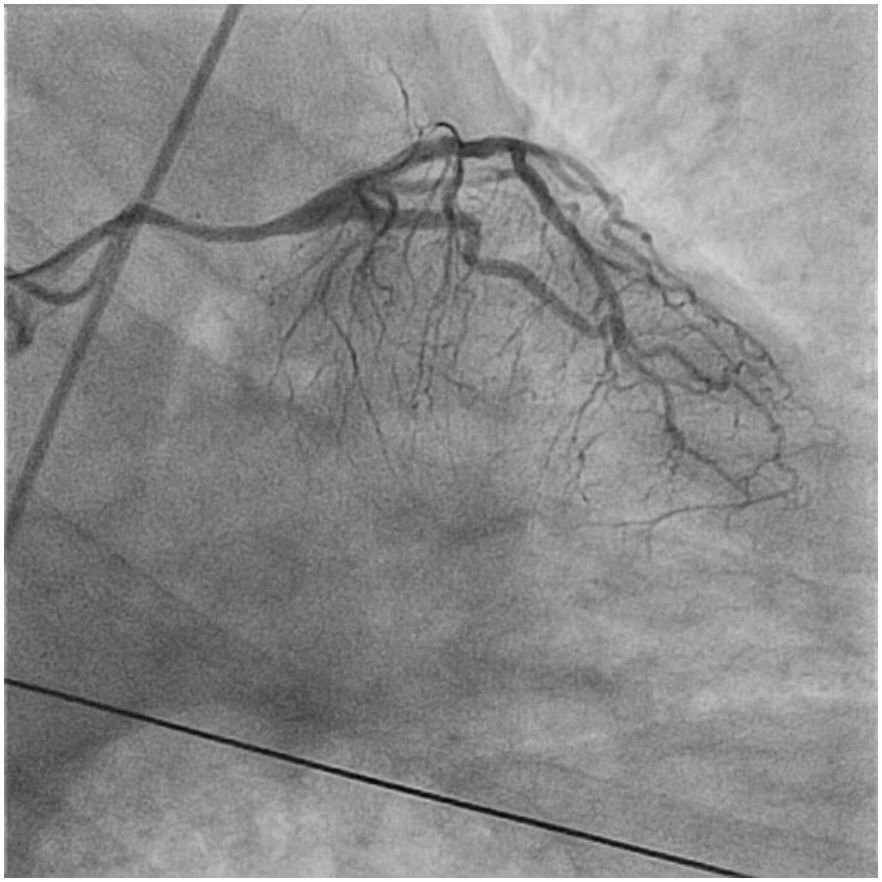

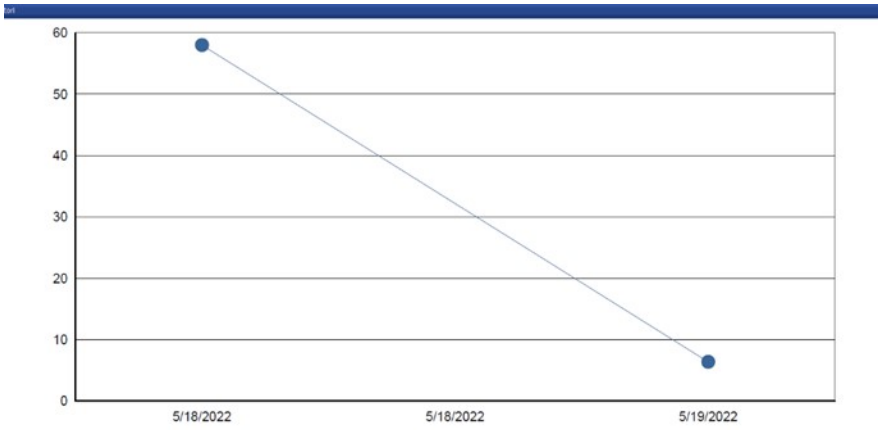

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Mostra no rebuda						
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