Kounis Syndrome After Lidocaine Use

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Local anesthetics are critical medications for a wide range of procedures. They mainly act by preventing the depolarization of nerve fibers and can be divided into 2 categories: amide-type and ester-type. Systemic toxicity is their most feared associated adverse reaction, and anaphylaxis is a major concern. We present a case of Kounis syndrome (KS) induced by lidocaine injection. Our study confirms this diagnosis and discusses possible alternatives.

A 52-year-old man came to our allergy department because of a reaction to lidocaine before local surgery 6 months previously. He experienced an immediate episode of profuse sweating, severe thoracic pressure, gastric fullness, chest tightness, and pain that spread to the shoulders and the center of the chest and lasted for more than a few minutes. His pulse was irregular, and he developed generalized urticaria and experienced marked discomfort. His condition progressed to severe cardiac arrest, which was fully resolved in the intensive care unit with medical treatment and resuscitation maneuvers. The patient was diagnosed with lower myocardial infarction (electrocardiogram with depressed segment in II, III, and aVF [Figure]). Coronary angiography and ergometry findings were normal. Troponin levels were 9 ng/mL at 4 hours after the lidocaine injection and declined over the following 5 days. The patient reported no previous complications with local anesthetics or allergic reactions to food or medication.

Blood testing revealed a serum tryptase level of 4.5 µg/mL (reference range, 1-11.4) and histamine level of 50 µg/mL (reference range, 25-65). Neither value was recorded in the acute phase. Systemic mastocytosis was ruled out based on hematological parameters.

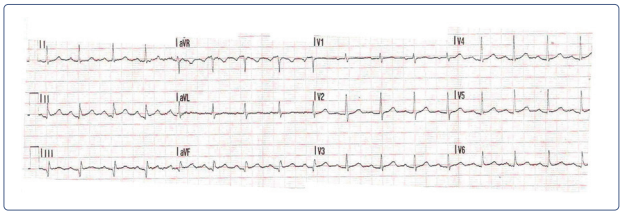

Figure. Electrocardiogram findings.

After obtaining the patient's informed consent, we performed skin prick tests with tetracaine Braun (10 mg/mL), bupivacaine (5, 0.5, and 0.05 mg/mL), and lidocaine (10, 1, and 0.1 mg/mL). A simple-blind, placebo-controlled drug provocation test (DPT) was performed with 5, 2.5, and 5 mg of each drug, respectively (when required). A basophil activation test (BAT) was also carried out.

SPTs are considered positive with a mean wheal diameter ≥3 mm larger than the negative control. A positive result in the intradermal test (IDT) corresponded to an increase of ≥3 mm compared to the initial wheal. A positive BAT result was defined as activation >5% with a stimulation index (SI) >2 in at least 1 concentration.

The patient's results were negative for tetracaine and bupivacaine, but positive in the IDT for 1 mg/mL and 10 mg/mL, with a mild rash on the forearm, which was well controlled with dexchlorpheniramine. The SI was positive to lidocaine (2.6).

The same schedule yielded negative results in 5 healthy patients.

Our diagnosis was based on clinical findings. Symptoms and signs suggestive of an acute allergic reaction with features of angina and autonomic nervous system symptoms after administration of medication should raise the suspicion of KS. Although medications are the first cause of this condition (mainly antibiotics [1]), other causes must not be ignored [2,3], including excipients of lidocaine such as sodium carboxymethylcellulose, methylparaben, and propylparaben, especially in cases with no previous allergic reactions to food or medication. Here, we report the first case of KS after administration of lidocaine, as well as the alternative drugs we proposed. An episode of KS has been reported after IDT with lidocaine and articaine [4].

It was essential to study possible cross-reactivity between lidocaine and other amide anesthetics (bupivacaine) and/or ester anesthetics (tetracaine). In fact, cross-reactivity has previously been demonstrated between amides (mepivacaine and lidocaine) [5]. In the present study, the patient tolerated bupivacaine well, despite previous reports of cross-reactivity between lidocaine and bupivacaine [6]. Cross-reactivity has also been reported between mepivacaine, lidocaine, and ropivacaine [7]. Therefore, we recommend a broad allergology study in these cases to rule out possible cross-reactivity.

Cross-reactivity between lidocaine and tetracaine has been described as cosensitization [8]. In the case we report, the patient tolerated tetracaine well.

It is important to take KS subtypes into account. Several authors have described 3 types of KS with very similar symptoms, albeit with different coronary angiography findings [9,10]. As coronary angiography findings were normal in the present case, the patient was diagnosed with type I KS. Systemic mastocytosis must be considered in all patients who experience a severe reaction. In the present case, this possibility was ruled out by the clinical report and in vitro studies.

To conclude, we report a case of KS after lidocaine injection. Cross-reactivity between local anesthetics remains unclear, and patients who experience these reactions must be assessed and tested so that they can be offered as wide a choice of therapy as possible.

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Conflicts of Interest

The authors declare that they have no conflicts of interest.

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