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CASE REPORT

# Anaphylaxis to lidocaine with tolerance to articaine in a 12 year old girl



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## KEYWORDS

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**Abstract** True allergic reactions to local anesthetics are extremely rare and constitute less than 1% of all reactions. In addition, many of those allergic reactions are caused by the preservative constituents of the local anesthetics. Here we report a 12 year old girl with anaphylaxis to lidocaine (an amide local anesthetic) on two occasions. The allergy was confirmed by positive skin prick test to the drug. Skin testing and challenge to another amide local anesthetic (articaine) were negative. Subsequently, its use was well tolerated in a dental procedure. Up to our knowledge, this is the first report of a patient who is allergic to lidocaine and tolerant to articaine.

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## 1. Introduction

Local anesthetics (LA) are the most commonly administered drugs in dental practice. Based on their chemical structure, they are classified into two main groups, esters and amides. Occasionally, patients suffer systemic adverse effects after injection of LA solutions (Sambrook et al., 2011). These may range from minor transient vasovagal attacks to life threaten-

ing anaphylaxis. There is a tendency to consider all systemic adverse reactions as being “allergic”. However, true allergic reactions to LA are extremely rare. It has been estimated that only 1% of all reactions occurring during or shortly after administration of LA are allergic in nature (Boren et al., 2007). Since LAs are small molecules they induce allergic reactions by acting as haptens, where they bind to yet an unidentified protein in the serum. LAs may trigger IgE mediated (type I) or delayed (type IV) hypersensitivity reactions. Ester LAs are more likely to cause type IV reactions than amide LAs (Boren et al., 2007). Type I hypersensitivity to lidocaine has been confirmed by demonstrating specific IgE antibodies against the drug and was reported in relatively few cases (Araújo and Amaral, 2004; Caron, 2007; Chih-Yung et al., 2004; Fuzier et al., 2009; Kennedy and Cave, 1986).

We here report anaphylaxis to lidocaine in a 12 year old girl who was able to tolerate another amide local anesthetic (articaine).

**Abbreviations:** LA, local anesthetic; SPT, skin prick test; SQ, subcutaneous.

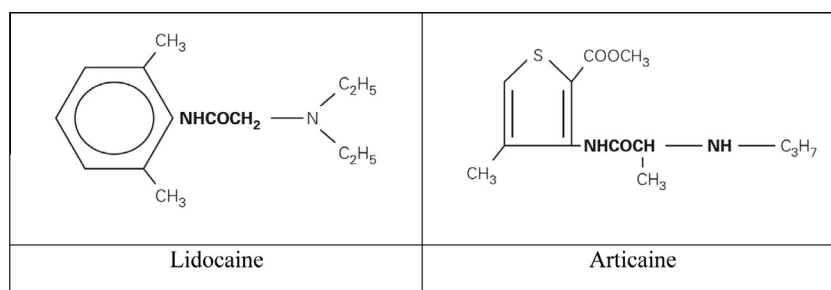
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**Figure 1** The chemical structure of lidocaine and articaine.

## 2. Case report

A previously healthy 12 year old girl received local lidocaine injection for dental procedure. About 1 h later she developed generalized body swelling, itching, and urticaria. Shortly afterward, she started to be drowsy and became hypotensive. She was resuscitated and recovered well. Not aware of the possibility that the reaction may be secondary to lidocaine, she had the same LA administered in another occasion when she developed generalized urticaria and respiratory compromise within 5 min from the drug administration. She was resuscitated successfully. Both events happened at another institution and we, unfortunately, were not able to get all the related clinical details. She has no history of atopy, food, or environmental allergies. No previous history of reactions to drugs.

Skin prick testing (SPT) with a preservative-free and epinephrine-free 2% lidocaine was positive with a 6-mm wheal. She had a positive reaction to histamine control (10 mm wheal) and a negative reaction to normal saline (0 mm wheal). She was then evaluated for hypersensitivity to articaine, as a possible alternative to lidocaine (Fig. 1). Articaine forte 4% (with epinephrine and anhydrous sodium sulfite as a preservative) was the only available preparation to us for testing. SPT was negative with 0 mm wheal as compared to a positive histamine and negative normal saline controls. She was then tested with incremental concentrations of 0.1 ml subcutaneous (SQ) injections as tolerated, starting with 1:100 dilution, 1:10 dilution, and finally full concentration with 15 min interval between each injection and the other. Lastly, she was given 1 ml of full concentration of articaine SQ. She did not react to any of the injections. She later underwent a dental procedure using articaine forte without complications.

## 3. Discussion

Our reported patient had a classical type 1 hypersensitivity reaction to lidocaine in its most severe form “anaphylaxis”. Her second reaction to lidocaine occurred much more quickly than the first. This is typical of type 1 hypersensitivity reactions, where subsequent exposures lead to more rapid and more serious reactions. Most reactions that follow the administration of LA are caused by anxiety, vasovagal episodes or by accidental intravascular injection of the drug. A detailed medical history should give the first clue to the diagnosis. In case this is suggestive or suspicious of IgE mediated reaction to a LA, the patient should be tested before any further exposure

to the drug. For unclear reasons, there seems to be female propensity for allergy to LAs (Fuzier et al., 2009; Sambrook et al., 2011). More often than not preservatives included in LA solutions like sulfites or benzoates are responsible for the allergic reaction (Ring et al., 2010).

Amide and ester LAs rarely cross react (Caron, 2007). On the other hand, amide LAs may cross react with each other occasionally, albeit more frequently than with esters (Calderon et al., 2013; Fuzier et al., 2009). Our experience in this case is consistent with the more common observation of non-cross reactivity. On the reverse situation, patients who were allergic to articaine were able to tolerate lidocaine in few case reports (Davila-Fernández et al., 2012; El-Qutob et al., 2005; Moreno Escobosa et al., 2011). There is no cross reactivity reported between the two drugs.

## 4. Conclusion

Although extremely rare, allergy to lidocaine should be considered seriously in the presence of suggestive history. Articaine could be a suitable alternative, preferably after it is cleared by negative skin testing and challenge. This is the first report, up to our knowledge, of a patient who has true lidocaine allergy but tolerated articaine.

## Contributions

**Khalid Al-Dosary** treated the patient from the dental point as the primary physician and partly wrote the manuscript, **Ahmad Al-Qahtani**: Treated the patient from the dental point and partly wrote the manuscript, **Abdullah Alangari**: Managed the patient from the allergic point and partly wrote the manuscript and supervised the whole process of writing.

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