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### Case Report

## Vasovagal presyncope response misdiagnosed as an allergic reaction to local anesthesia: A case report

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### ABSTRACT

Presyncope is often defined as a temporary light-headed or dizzy feeling or a transitory reduction but not loss of consciousness. The presyncope vasovagal response can be triggered by stress, prolonged standing, extreme emotions, or severe pain, it occurs due to a reflex bradycardia and peripheral vasodilation (hypotension). A diagnosis of presyncope is often difficult to make, it can quite easily be confused with other conditions. Adverse reactions to local anesthetics (LAs) are widely reported. These include dose-related toxic effects, subjective psychomotor symptoms and true allergic reactions. Although local anesthesia (LA) are well-tolerated drugs, they precipitate adverse reactions. True allergic reaction represents only 1% of adverse reactions to local anesthetics (LAs). The diagnosis of unexpected adverse reactions during local anesthesia is a difficult issue. Nevertheless, Diagnosis may be confirmed with clinical presentation and skin test results. It is common for dental practitioners to misdiagnose a serious adverse event to LAs as an allergic reaction. The aim of this report is to determine knowledge of the dental practitioner about the proper history, symptoms, signs, investigations and how to differentiate between presyncope vasovagal reflex and allergic reaction of dental local anesthesia

**Keywords:** presyncope, vasovagal reflex, Adverse Allergic reaction, local anesthesia, skin tests.

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### INTRODUCTION

A visit to the dentist is a highly stressful event for many people<sup>(1)</sup>. There is a variety of adverse reactions that may occur, with the intensity ranging from clinically insignificant to life-threatening reactions<sup>(2)</sup>. Anxiety, fear, and pain associated with clinical treatment can trigger an intense parasympathetic state leading to bradycardia and hypotension in an awake or sedated patient resulting in a vasovagal reflex<sup>(3)</sup>.

A vasovagal reaction is defined as the development of hypotension and bradycardia associated with the typical clinical manifestations of pallor, sweating and weakness,<sup>(4)</sup> that is caused as a result of vagus nerve stimulation<sup>(5)</sup>.

The adjective presyncope is used to indicate symptoms and signs that occur before unconsciousness in syncope<sup>(6)</sup>. Presyncope is often defined as a temporary light-headed or dizzy feeling or a transitory reduction but not loss of consciousness<sup>(7)</sup>. Children and adolescent have a higher prevalence<sup>(8)</sup>. Females in all age groups are more prone to presyncope or syncope than males<sup>(9)</sup>. However, presyncope is poorly covered in the literatures. There is little information on the definition or prognostic significance of this symptom, or on the diagnostic and therapeutic approach that should be taken when it presents<sup>(10)</sup>.

Suspected presyncope in the emergency department (ED) is a difficult clinical problem and many patients are discharged without a diagnosis<sup>(11)</sup>. Diagnosis is primarily made on the basis of the medical history, physical examination and electrocardiogram (ECG)<sup>(12)</sup>. Furthermore, follow-up procedures included either direct or telephone conversations with patients<sup>(13)</sup>.

Although LAs are well-tolerated drugs, they precipitate adverse reactions which are related to LAs doses,<sup>(14)</sup> toxic reaction or psychogenic factors<sup>(15)</sup>. Most reactions to LAs are not true allergic reaction rather, they are autonomic or toxic adverse effects<sup>(16)</sup>.

It may be difficult to distinguish between immediate allergic reactions and autonomic adverse effects<sup>(17)</sup>.

Frequently, patients present to the dental office labeled as "caine" allergic. While allergic reactions to LAs are rarely reported, less than 1% of the adverse reactions to LAs are true immunologic reactions<sup>(16)</sup>. The overwhelming majority of adverse reactions to LAs are psychogenic in nature and related to fear<sup>(18)</sup>.

The assessment of allergic reaction has to be based mostly on the observation of the clinical signs, their time course and, eventually, their response to antiallergic treatment, and, most importantly, to adequate test results<sup>(19)</sup>. True allergy to LA can be identified with help of skin tests but if the nature of the skin reaction is unclear, challenge test is carried out<sup>(20)</sup>.

Practitioners must be aware that adverse reactions to dental LA and how to differentiate between psycho physiological reflex and allergic action of LAs<sup>(21)</sup>. Furthermore, differential diagnosis of any adverse reaction must consider psychogenic reaction, true allergy to the anesthetic, vasoconstrictor, or preservative; and toxic reactions to the anesthetic, vasoconstrictor, or preservative<sup>(22)</sup>.

## CASE REPORT

A 45-years-old female Libyan patient who weighted 80 kg and 160 cm height was referred to the oral and maxillofacial surgery department, faculty of dentistry, University of Tripoli, Libya, for dental treatment (root canal treatment and extraction of wisdom teeth) with a history of allergy to LA. A thorough medical history including drug and food allergy and any past anesthetic experience and complications was evaluated. The patient gave a history of incomplete loss of consciousness when she received LA for dental treatment and her dentist told her that she is allergic to LA and an extraction of her upper central incisor with implant replacement was done under general anesthesia (GA).

The patient had non-significant past medical history and had not been prescribed any drug. Central nervous system, cardiovascular system, respiratory system, endocrinial and genitourinary systems review was done, where her vital signs showed pulse rate of 70 beats / min., blood pressure of 120/70 mmHg, respiratory rate of 18 breath / min. and temperature of 36.5°C. Her ECG and

echocardiogram (ECHO) were normal. All laboratory values including hemoglobin and serum biochemistry were within the normal range, and the patient had no known drug allergies.

Allergic test was decided and the testing process was explained to the patient and consent obtained from the patient's husband. The patient was informed that, from the history alone, a true allergy could be excluded and the testing procedure would provide a useful information which help with final diagnosis and management.

The testing procedure was carried out in the emergency room at a private hospital which were equipped with full resuscitation facilities and nursing supervision. The direct skin (intra-dermal) challenge test was undertaken in the skin of the flexor surface of the forearm. The test consisted of intra-dermal injections of 0.1 ml of 0.5% lignocaine and 0.5% prilocaine (both plain without vasoconstrictor), and normal saline (as a control). The site of the injections and the patient's general condition were observed closely for the first 15 minutes, and then at 15 minute intervals up to 1 hour and the patient was shown not to be allergic to lignocaine nor to the prilocaine solution and allergy test proved negative. The patient was advised to observe the skin region subjected to tests for a prolonged period of time and to promptly inform the physician of any changes. For more confirmation the patient was referred to an allergist for more advanced tests and the results were proved negative.

The patient is informed that she is not allergic to LA and from the history and the result of the skin test suggestion of the most frequent causes of significant reactions is psychogenic driven by anxiety and another appointment was arranged in the dental clinic near emergency room for root canal treatment (RCT) of the right lower second premolar tooth.

On the day of the appointment, the blood pressure and pulse rate were measured which were within normal rates and the patient was seated in the dental chair in a semi-supine position. Topical LA in the form of spray was applied on the oral mucosa and before injection procedure the patient immediately developed the reaction which was manifested as facial pallor, warm with cold, clammy sweat, dizziness, a slow weak pulse (50 pulse/min) and hyperventilation occurred with a decrease in her BP (85/50 mmHg) without loss of her consciousness. Furthermore, the patient's husband confirmed that the reaction was typical of those experienced previously. Eventually, the second intra-oral (typical dental) challenge test was undertaken under GA after completion of the dental procedures

(RCT of the right lower second premolar & extraction of both lowers and the left upper third molar teeth) where LA was administered as a maxillary buccal infiltration adjacent to the second premolar, The patient was then monitored for a further hour without any change in her pulse and BP and the patient recovered naturally from GA without any adverse events.

At the completion of the observation period, the patient was discharged, and requested for follow-up. So according to the history, clinical examination, investigations and the negative results of direct skin(intra-dermal), intra-oral (typical dental) challenge tests and allergist's negative results, the definite diagnosis of our presented case was a vasovagal presyncope response.

## DISCUSSION

Presyncope occur prior to fainting is commonly reported by pediatrician and physicians, but its prevalence is unknown<sup>(23)</sup>. Females in all age groups are more prone to presyncope or syncope than males<sup>(9)</sup>. In our reported case the patient was female, this finding is in coincide with many previous studies.

Presyncope symptoms before syncope, could include extreme lightheadedness; visual sensations, such as “tunnel vision” or “graying out”; and variable degrees of altered consciousness without complete loss of consciousness<sup>(24)</sup>. Most of these symptoms have been noted clinically in our case. Facial pallor is a typical observation in humans during profound hypotension sufficient to cause presyncope<sup>(25)</sup>. In our presented case, this finding was clearly observed.

The decrease in blood pressure preceded the decrease in heart rate during presyncope in the vast majority of patients<sup>(26)</sup>. The main finding of our case report is that hypotension precedes bradycardia, the blood pressure was 85/50 mmHg. This finding was in consistent with Bloomfield DM., et al in 1999,<sup>(27)</sup> who reported blood pressure reduction following orthostasis over 20/10 mmHg in the first three to five minutes is called orthostatic hypotension. However, our patient developed bradycardia with asystole in 4 minutes. In our patient's case her pulse rate was 50 pulse/min. this finding of bradycardia was reported in most previous studies and in accordance with earlier studies by Christoph S.,et al in 2011<sup>(28)</sup>.

The diagnosis of unexpected adverse reactions of local anesthesia is a difficult issue<sup>(29)</sup>. Misdiagnosing

vasovagal presyncope response as adverse allergic reaction of dental LA as in this reported case, confused our patient and other practitioners. To diagnose and manage these cases of adverse reactions properly,<sup>(30)</sup> a thorough history taking, clinical examination and ECG<sup>(31)</sup>. An ECHO is a helpful screening test if the history, physical examination, and ECG do not provide a diagnosis or if underlying heart disease is suspected<sup>(32)</sup>. In our patient her ECG was normal.

True allergy to LA can be identified with the help of skin tests<sup>(33)</sup>. In our reported case the direct skin (intra-dermal) challenge test was done in the emergency room and proven a negative result.

When no solid diagnostic evidence was provided by the available clinical information or by test results<sup>(13)</sup>. Therefore, a differential diagnoses must be made, that should be eliminated in specific situations were as follows: In our reported case, according to a proper medical history, a thorough clinical examination, regular follow up, blood biochemistry investigations, normal ECG and ECHO which done by cardiologist, and skin tests which done by us and confirmed by allergist were accurately achieved to rule out the adverse allergic reaction of dental LA. However, in our reported case there were enough evidence to make a tentative diagnosis of presyncope vasovagal reflex due to anxiety and fear.

Adverse allergic reaction to dental LA was excluded on the basis of absence of mucocutaneous manifestations that was confirmed with negative skin tests. Furthermore, no severe bradycardia nor arrhythmia is associated with the infiltration of LA into the oral mucosa under GA. In our patient, RCT of the right lower second premolar & extraction of both lowers and the left upper third molars teeth) was done under LA during GA without any change in her pulse and BP and the patient recovered naturally from GA without any adverse event.

Finally, to distinguish between presyncope and allergic reaction, especially, given that vasovagal responses occur much more frequently in dental rooms. Vasovagal responses lack the typical cutaneous manifestations and bronchospasm as in allergic reaction. While the heart rate was characteristically bradycardic in vasovagal presyncope responses but in allergic reaction it is usually tachycardic.

## CONCLUSION

Vasovagal presyncope response in the dental office often is caused by pain, fear and anxiety, which needs to be addressed properly. It is important not to use the

term allergy during conversations with patients until it is finally confirmed.

A diagnosis of vasovagal presyncope response is obtained through a series of evaluations, which including a thorough history, accurate physical examination, clinical examination, investigations, an ECG as well as ECHO follow up. If the ECG and cardiac testing results are normal, performing skin tests are an important part of the diagnostic procedure of adverse allergic reaction of LAs.

Dentists administering LAs should know how to diagnose and differentiate symptoms of vasovagal presyncope response and adverse allergic reaction to LAs in order to be familiar with the symptoms, signs and management that could allow future proper diagnostic evaluation.

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