



CASE REPORT

Anaphylaxis to Water Caltrop (Singoda Flour): A Case Report

Omar E Mohamed^{1*}, Toni Osborne^{1,2}, Jane Heslegrave¹ and Mamidipudi Thirumala Krishna^{1,3}

¹Department of Allergy and Clinical Immunology, Heartlands Hospital, Birmingham, UK

²Nutrition & Dietetics Department, Heartlands Hospital, Birmingham, UK

³Institute of Immunology & Immunotherapy, University of Birmingham, UK



*Corresponding author: Omar E Mohamed, Department of Allergy and Immunology, Birmingham Heartlands Hospital, Bordesley Green East, Birmingham B9 5SS, UK, Tel: +44-1214241807, Fax: +44-121-4243229

Abstract

Introduction: Water caltrop flour (also known as water chestnut) is a commonly consumed Asian food. There are no data on the prevalence of IgE-mediated hypersensitivity reactions to water caltrop but it is believed to be very rare.

Case description: A 57-year-old gentleman of an Asian background developed generalised urticaria, breathlessness and loss of consciousness following ingestion of Singoda flour (water caltrop flour). He was successfully resuscitated with adrenaline, chlorpheniramine and hydrocortisone. Acute mast cell tryptase was elevated and the skin prick test to water caltrop seed was positive. Symptomatology, temporal association, elevated acute serum tryptase and a positive skin test were in keeping with a type 1 hypersensitivity reaction to water caltrop.

Conclusion: To the best of our knowledge, this is the first published case report on water caltrop-induced anaphylaxis. Further studies are needed to characterise the allergenic components in water caltrop and to identify possible cross-reactivities.

Keywords

Water caltrop, Chestnut, Anaphylaxis, Hypersensitivity

nutritionally rich flour has been widely used in religious rituals such as the Hindu fasting days (the Navratas).

Water caltrop is often referred to as water chestnut which can potentially lead to confusion with the Chinese water chestnut (*Eleocharis dulcis*) [5]. Other names for water caltrop include singhada, singhara, water chestnut, buffalo nut, ling nut, devil pod and bat nut [2,6]. Because Singoda flour has been found to be gluten-free; the public mistakenly believe that it does not cause allergic reactions and can be regarded as "allergy friendly".

Case Description

We here in report a 57-year-old gentleman of Asian background who was referred to our regional Allergy centre in Heartlands Hospital, Birmingham, UK. Following a period of fasting, he consumed a meal containing Singoda flour, almond and cashew. Twenty minutes later he developed generalised urticaria, breathlessness and lost consciousness. The paramedics were summoned and he was resuscitated with 0.5 mg of intra-muscular adrenaline 1:1000 and subsequently transferred to the local Emergency department where intravenous chlorpheniramine and hydrocortisone were administered. His symptoms resolved within a few hours and was discharged after being issued with an adrenaline auto-injector. The acute total mast cell tryptase taken within 2 hours of presentation was elevated at 18.1 ug/L (normal range: 2.00 - 14.00 ug/L). His baseline tryptase was 3.5 ug/L.

A few weeks later, the patient accidentally con-

Introduction

Water caltrop is a fruit that has a large, starch-rich seed. It is harvested from aquatic plants that exist in the form of three species *Trapanatans*, *T. bicornis* and *T. rossica* [1,2]. The seed is edible and has been consumed by people in the Indian subcontinent and south-east Asia for thousands of years [3,4]. The seed can be eaten raw or, more commonly, can be dried and ground to a flour that is known as Singoda flour (also known as Singhara ka atta). The flour can be used to make batter, breads, dosas, snacks such as pakoras and sweet desserts. This



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sumed another singhare ka atta meal and within 60 minutes of ingestion, started to feel unwell and developed a generalised urticarial rash. He self-administered adrenaline and was transferred to his local Emergency department where he received antihistamines and was kept under observation. There was no cardio-respiratory compromise and he was discharged after a few hours.

There were no co-factors involved in both reactions. He confirmed clinical tolerance to almonds since the second reaction; however, he had not eaten cashew nuts since the first reaction. There is no previous clinical history suggestive of spontaneous urticaria/angioedema or idiopathic anaphylaxis. His past medical history includes type 2 diabetes, hypertension and previous venous thrombo-embolism. He has no atopic history and his current medications include amlodipine, simvastatin and warfarin. There is no history of drug allergy and specifically, he is clinically tolerant to non-steroidal anti-inflammatory drugs.

Skin prick test (SPT) to normal saline (negative control) was negative (0 mm) and positive (5 mm wheal) to histamine. 'Prick to prick' skin test to water caltrop seed produced a 6 mm wheal. To further validate this, we showed a negative SPT with the same water caltrop seed on a healthcare professional to exclude an irritant response. Cashew nut allergy was excluded with negative SPT, sIgE and an open oral challenge test to cashew nuts.

In presence of the strongly suggestive clinical history and demonstrable sensitisation, we concluded that the patient had an IgE mediated HSR to water caltrop. He has been advised to strictly avoid all foods containing water caltrop and to carry an emergency treatment kit consisting of chlorpheniramine and adrenaline auto-injector device.

Conclusion

In this case; the patient developed anaphylactic reaction (as defined by the World Health Organisation (WAO) criteria) [7] to water caltrop. IgE mediated HSR to water caltrop is believed to be extremely rare and, to our knowledge, has not been described in the literature. Water caltrop is in a different botanical category to tree nuts. Hence, we believe that patients with water chestnut allergy are not at higher risk of IgE mediated hypersensitivity to tree nuts compared to the general population. However, this needs to be taken with caution as there is limited data on cross-reactivity *between water caltrop and other plant* foods and pollens.

Water caltrop should not be confused with the unrelated Chinese tree nut (*Eleocharis dulcis*) and sweet chestnut (*Castanea sativa*). Further studies are needed to characterise the allergenic components in water caltrop and to identify possible cross-reactivities.

Declarations

Conflict of interest

All authors have no conflict of interest to declare.

Data sharing statement

All data generated are included in this manuscript.

Consent

Written informed consent was obtained from the patient for publication of this case report. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Contributors

All authors were involved in the patient's care. JH performed skin testing and collected the data and OEM, TO and MTK wrote the manuscript. All authors read and approved the final version of the manuscript.

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Take Home Messages

- Water caltrop is also commonly known as water chestnut, singhare, singoda and many other names.
- Water caltrop should not be confused with the unrelated Chinese water chestnut- (*Eleocharis dulcis*) or the sweet chestnut (*Castanea sativa*).
- The fact that water caltrop is gluten free and believed to be "allergy friendly" does not mean that it will not cause an allergic reaction.

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