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CASE REPORT

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Cold-induced anaphylaxis triggered by drinking cold water

Abdulaziz S Alrafiaah^{a,b*}, Elena Netchiporouk^c, Moshe Ben-Shoshan^a

^aDivision of Pediatric Allergy and Clinical Immunology, Department of Pediatrics, McGill University Health Center, Quebec, Canada

^bDivision of Pediatric, College of Medicine, Majmaah University, Al Majma'ah, Saudi Arabia

^cDivision of Dermatology, McGill University Health Centre, Montreal, Quebec, Canada

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Abstract

Cold urticaria is an inducible urticaria in which hives and angioedema appear after exposure to cold. The symptoms of cold urticaria often are limited to hives/angioedema. However, in up to 20% of cases, cold exposure may trigger anaphylaxis. We report the case of an 11-year-old boy previously diagnosed with chronic spontaneous urticaria who developed facial swelling, itchy hives, difficulty in breathing, vomiting and abdominal pain within 5 minutes of drinking cold water. He received a standard dose of non-sedating second-generation antihistamines at home. He was observed in the emergency room for 2 hours and discharged with an epinephrin autoinjector. During the subsequent outpatient clinic visit, an ice cube test was performed which confirmed the new diagnosis of comorbid cold-induced chronic urticaria. On further questioning, the parents reported occurrence of hives following swimming in the swimming pool. Cold-induced urticaria should be suspected in cases of anaphylaxis associated with cold exposure. Patients with chronic forms of urticaria who present with new anaphylaxis should be assessed for a potential concomitant cold-induced form.

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Introduction

Cold urticaria is a form of chronic inducible urticaria in which hives and/or angioedema manifest following exposure to cold stimuli.¹ The diagnosis of cold urticaria primarily relies on the patient's medical history and the appearance of urticarial rash after undergoing an ice cube test.² Cold urticaria can be triggered by factors such as

consuming cold food or beverages, immersing body in cold water while swimming or being exposed to cold air.^{3,4} The presentation of cold urticaria ranges from localised pruritic hives to life-threatening anaphylaxis.^{5,6} Among individuals diagnosed with cold-induced urticaria, the pooled prevalence of anaphylaxis is estimated to be 21.5%.⁷ The main culprit of cold-induced anaphylaxis is swimming in cold water, although there have been isolated cases where

*Corresponding author: Abdulaziz S Alrafiaah, Division of Pediatric, College of Medicine, Majmaah University, Al Majma'ah, Saudi Arabia.
Email address: alrafiaah056@gmail.com

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anaphylactic reactions were associated with the consumption of cold foods or beverages.^{8,9} We report the case of an 11-year-old boy with a confirmed diagnosis of chronic spontaneous urticaria, who presented with cold-induced anaphylaxis following drinking cold water. Consent from the patient's guardian for the case publication has been obtained and approved.

Case presentation

An 11-year-old boy with known chronic spontaneous urticaria diagnosed at 5 years of age and well controlled with rupatadine 20 mg (urticaria activity score of 0). He developed facial swelling, itchy hives, difficulty in breathing, cough and abdominal pain within 5 minutes of drinking cold water. He had no known food allergies and had not eaten any new food 6 hours prior to the onset of symptoms. There was no exposure to drugs within that time and no exercise performed. The child presented to the emergency department (ED) 2 hours after the onset of symptoms. In the ED, he had normal vital signs and oxygen saturation. Physical examination revealed mild facial swelling, hives on his face and chest, and mild respiratory distress with decreased breath sounds bilaterally. He was observed in the ED for 3 hours, at which point all symptoms were resolved. No medications were given during his stay in the ED and the patient was discharged home with an epinephrine autoinjector. The patient was assessed 3 weeks later in the allergy clinic. His physical exam was normal apart from dermatographism and the ice cube test was positive (Figure 1). Parents were queried on symptoms related to cold exposure and they reported that in the recent year



Figure 1. Positive ice cube test for the patient.

they noticed hives not only spontaneously but also after swimming in the pool.

Discussion

Cold-induced urticaria is a form of inducible chronic urticaria affecting children and adults¹⁰. Although cold-induced urticaria is usually benign, some patients may develop cold-induced anaphylaxis. Increased eosinophil count and concomitant chronic spontaneous urticaria were identified as risk factors for anaphylaxis in individuals with cold urticaria.^{7,11} Our patient had a history of well-controlled chronic spontaneous urticaria prior to the diagnosis of concomitant cold urticaria. This highlights the significance of ongoing monitoring for individuals with chronic spontaneous urticaria and emphasises the need to query for inducible triggers during follow-up visits.

Once the diagnosis of cold-induced urticaria is made, recommendations to decrease morbidity and potentially mortality include protection of exposed body part from cold weather and avoiding abrupt (and especially, solitary) immersion into cold water such as during swimming or diving.¹² Risks associated with drinking cold drinks and eating cold food must be discussed in detail with patients and caregivers.¹³ Epinephrine is the primary therapy for anaphylaxis and it's crucial for individuals with cold-induced anaphylaxis to have a prescription for an epinephrine autoinjector. However, a study indicated that the rate of epinephrine autoinjector prescriptions for patients diagnosed with cold-induced anaphylaxis was only 37%.¹⁴ In addition, meticulous perioperative management, such as the avoidance of cold fluids and the maintenance of a warm environment, is critical to minimise the risk of anaphylaxis in patients with cold urticaria undergoing general anaesthesia.¹⁵

Conclusion

In cases of anaphylaxis triggered by an unknown culprit, cold should be ruled out as a trigger especially in cases that are known to have chronic spontaneous urticaria. The management of cold-induced urticaria relies heavily on patient education regarding triggers and the prescription of epinephrine autoinjectors.

Conflict of interest

The authors declare no conflict of interest

References

1. Magerl M, Altrichter S, Borzova E, Giménez-Arnau A, Grattan CE, Lawlor F, et al. The definition, diagnostic testing, and management of chronic inducible urticarias - The EAACI/GA(2) LEN/EDF/UNEV consensus recommendations 2016 update and revision. *Allergy*. 2016;71(6):780-802. <https://doi.org/10.1111/all.12884>

2. Diaz VL, Gribbons KB, Yazdi-Nejad K, Kuemmerle-Deschner J, Wanderer AA, Broderick L, et al. Cold Urticaria Syndromes: Diagnosis and Management. *J Allergy Clin Immunol Pract.* 2023;11(8):2275-85. <https://doi.org/10.1016/j.jaip.2023.05.040>
3. Prosty C, Gabrielli S, Mule P, Le Gallee M, Miles LM, Le M, et al. Cold urticaria in a pediatric cohort: Clinical characteristics, management, and natural history. *Pediatr Allergy Immunol.* 2022;33(3):e13751. <https://doi.org/10.1111/pai.13751>
4. Wanderer AA, Grandel KE, Wasserman SI, Farr RS. Clinical characteristics of cold-induced systemic reactions in acquired cold urticaria syndromes: recommendations for prevention of this complication and a proposal for a diagnostic classification of cold urticaria. *J Allergy Clin Immunol.* 1986;78(3 Pt 1):417-423. [https://doi.org/10.1016/0091-6749\(86\)90027-8](https://doi.org/10.1016/0091-6749(86)90027-8)
5. Deza G, Brasileiro A, Bertolín-Colilla M, Curto-Barredo L, Pujol RM, Giménez-Arnau AM. Acquired cold urticaria: Clinical features, particular phenotypes, and disease course in a tertiary care center cohort. *J Am Acad Dermatol.* 2016;75(5):918-24.e2. <https://doi.org/10.1016/j.jaad.2016.06.017>
6. Maltseva N, Borzova E, Fomina D, Bizjak M, Terhorst-Molawi D, Košnik M, et al. Cold urticaria - What we know and what we do not know. *Allergy.* 2021;76(4):1077-94. <https://doi.org/10.1111/all.14674>
7. Prosty C, Gabrielli S, Le M, Ensina LF, Zhang X, Netchiporouk E, et al. Prevalence, Management, and Anaphylaxis Risk of Cold Urticaria: A Systematic Review and Meta-Analysis. *J Allergy Clin Immunol Pract.* 2022;10(2):586-96.e4. <https://doi.org/10.1016/j.jaip.2021.10.012>
8. Yee CSK, El Khoury K, Albuhairei S, Broyles A, Schneider L, Rachid R. Acquired Cold-Induced Urticaria in Pediatric Patients: A 22-Year Experience in a Tertiary Care Center (1996-2017). *J Allergy Clin Immunol Pract.* 2019;7(3):1024-31.e3. <https://doi.org/10.1016/j.jaip.2018.10.025>
9. Tomei L, Saretta F, Arasi S, Sarti L, Licari A, Giovannini M, et al. Cold Anaphylaxis in Children: Italian Case Series and Review of the Literature. *Diseases.* 2023;11(4). <https://doi.org/10.3390/diseases11040143>
10. De Luca E, Guerriero C, Capozio G, Peris K, Rigante D. Cold-Induced Urticaria in Children. *Skinmed.* 2021;19(5):339-348.
11. Bizjak M, Košnik M, Dinevski D, Thomsen SF, Fomina D, Borzova E, et al. Risk factors for systemic reactions in typical cold urticaria: Results from the COLD-CE study. *Allergy.* 2022;77(7):2185-2199. <https://doi.org/10.1111/all.15194>
12. Escher S, Tucker A. Preventing, Diagnosing, and Treating Cold Urticaria. *Phys Sportsmed.* 1992;20(12):73-84. <https://doi.org/10.1080/00913847.1992.11947540>
13. Alangari AA, Twarog FJ, Shih MC, Schneider LC. Clinical features and anaphylaxis in children with cold urticaria. *Pediatrics.* 2004;113(4):e313-317. <https://doi.org/10.1542/peds.113.4.e313>
14. Bizjak M, Košnik M, Dinevski D, Thomsen SF, Fomina D, Borzova E, et al. Adrenaline autoinjector is underprescribed in typical cold urticaria patients. *Allergy.* 2022;77(7):2224-2249. <https://doi.org/10.1111/all.15274>
15. Agbenyefia P, Shilliam LA, Stoicea N, Roth A, Moran KR. Perioperative Management of a Patient with Cold Urticaria. *Front Med (Lausanne).* 2017;4:222. <https://doi.org/10.3389/fmed.2017.00222>