

An 11-Year-Old Girl with Red, Itchy Rash

Urgent message: Urticaria from cold exposure should be considered to prevent future anaphylaxis and angioedema with re-exposure.

KELSEY REED, MSN, APRN, FNP-C

Case Presentation

An 11-year-old girl presents to urgent care with complaints of repetitive episodes of sudden onset of itchy red rash with ill-defined borders which has occurred three times in the past 1.5 weeks following exposure to cold water. Twice, the hives occurred after swimming in a pool and once in a local lake.

The mother states that her daughter is experiencing “giant hives” that are getting progressively worse with each exposure. The patient states that the rash itches and is red, but denies any throat or neck swelling, drooling, wheezing, shortness of breath, vesicles, nausea, vomiting, diarrhea, palpitations. The mother states that the hives spontaneously resolve after the patient gets out of the water and warms up, but immediately reoccur when the patient reenters the water or is exposed to cold objects. The mother states that she did administer 50 mg of Benadryl prior to the urgent care visit. She denies any new household products, personal products, food exposure, animal exposure, medications, or prior episodes.

In taking the history, you learn:

- Past medical history: Seasonal allergies
- Allergies: NKDA
- Medications: None
- Social history: Noncontributory
- Family history: Mother has seasonal allergies

Physical Examination

- Vital signs: 36.4° C, pulse 96, respirations 20, O₂ saturation 99%
- Height: 5 feet
- Weight: 45 kg
- General appearance: Alert and oriented x 3, no



- acute distress, able to have a conversation with provider
- Skin: Warm, dry, pink. No evidence of urticarial lesions, rash, redness, swelling, streaking
- Eyes: PERRL
- ENMT: TM’s clear, oral mucosa moist, no pharyngeal erythema or exudate, no lesions, no Ludwig’s angina, no angioedema
- Neck: supple, midline trachea, no tenderness
- Cardiovascular: regular rate and rhythm, no murmur, normal peripheral perfusion

Kelsey Reed is an APRN for the state of Illinois. The author has no relevant financial relationships with any commercial interests.

Cold Urticaria

Signs and Symptoms

- Temporary reddish, itchy welts (hives) on the area of skin that was exposed to cold
- Worsening of the reaction as the skin warms
- Swelling of hands while holding cold objects
- Swelling of lips from consuming cold food or drink

Severe Reactions

- Whole-body response (anaphylaxis), which can cause fainting, racing heart, swelling of limbs or torso, and shock
- Swelling of the tongue and throat, which can make it difficult to breathe

Adapted from: Cold Urticaria. Mayo Clinic. Available at: <https://www.mayoclinic.org/diseases-conditions/cold-urticaria/symptoms-causes/syc-20371046>. Accessed October 13, 2019.

- Respiratory: Lungs CTA, non-labored respirations, breath sounds equal
- Gastrointestinal: Soft, non-tender, non-distended, normal bowel sounds
- Neurological: Alert and oriented x 3, no focal neuro deficits

Differential Diagnoses

- Allergic reaction (food, medication, household or personal product)
- Viral-induced urticaria
- Irritant contact dermatitis
- Pityriasis rosea
- Urticarial vasculitis
- Other forms of urticaria

Cold Contact Stimulation Test: The Ice Cube Challenge

The provider placed a mixed bag of ice and a small amount of water on the volar aspect of the left lower arm for 5 minutes. After 5 minutes, the patient developed an urticarial wheal, which was not present on the opposite arm. Evaluation at 10 minutes postremoval of the ice cube indicated the hives were still present, but reduced. (This technique is known as a cold contact stimulation test, specifically the "ice cube challenge.")

Diagnosis

The patient was diagnosed with cold urticaria. She was given prescriptions for Loratadine and an epinephrine pen.

“Cold-induced urticaria can easily be reproduced in the office setting. Missing the diagnosis could have deadly consequences due to the possibility of repetitive exposure and increasing chance of anaphylactic reaction.”

Discussion

Epidemiology

Cold-induced urticaria can affect people across the lifespan and can be acquired or follow an autosomal-dominant familial transmission pattern.¹ Commonly adolescents, as well as younger children, are more likely to be affected by sudden onset of cold-induced urticaria. However, this does not exclude adults nor the geriatric population.^{2,3} Gender does not seem to play a role in occurrence. If the reaction occurs in youth and has a genetic component, the condition is likely to last a lifetime (whereas an acquired case may spontaneously resolve in approximately 5 years).¹

When a reaction occurs, a localized response of classic urticaria or wheal and flare pattern may initially present with exposure to cold weather, liquids, foods, or chilled objects due to a systemic histamine, leukotriene, and mast cell response.¹ Severe reactions may also cause systemic response involving angioedema and anaphylaxis.

Escalation of response with each exposure should be expected; therefore, prevention and treatment strategies must be initiated as soon as cold-induced urticaria is suspected, as respiratory shock and failure can occur.

Preventive measures, on which patients should be counseled, include taking an antihistamine before expected cold exposure; taking all medications as directed; protecting skin from cold or sudden changes in temperature; avoiding ice-cold drinks and foods; and keeping an epinephrine pen, if prescribed, close at hand to prevent serious reactions.⁴

History

A diagnosis of cold urticaria should be considered in any patient with sudden onset of wheals or angioedema following exposure to a cold object, fluid, or food should be considered for possible diagnosis of cold urticaria. Patients may present with first-episode responses, or may complain of continued reactions post cold exposure.

Physical Examination

Differential diagnosis

Differential diagnoses must be considered in any case presentation; for cold urticaria, they include, but are not limited to, familial cold autoinflammatory syndrome, cold-induced urticarial vasculitis, serum protein disorders, and differentiation between types of cold-induced urticaria.⁵

Types of cold-induced urticaria include: delayed response, familial atypical cold urticaria, cold-induced cholinergic urticaria, systemic cold urticaria, localized cold urticaria, and food-dependent cold urticaria.

While it's outside the scope of this case, awareness of cold urticaria syndromes may help inform decisions relating to treatment, referral, and patient counseling in the urgent care setting. See **Table 1**.

Diagnosis

Diagnostic pearls include the use of algorithms for diagnosing patients with recurrent wheals or angioedema.⁶ Simple testing such as the “ice cube test” or “cold stimulation challenge” can provide insight as to whether or not the response is reproducible by applying an ice cube to the patient's forearm for 5 minutes, removing, and observing for formation of a wheal approximately 5 minutes after removal.⁷

Management

If the test is positive, then treatment should begin with H₂ antihistamines and nonsedating antihistamines while in the urgent care setting.⁸ These treatments have been shown to reduce the severity of the reaction, but may not prevent future reactions.⁸

Epinephrine auto injectors were also recommended in all cases due to risk of continued worsening with exposure, and risk for anaphylaxis due to cold foods.⁹ While urgent care plays a role in attempting to prevent further episodes, complete management in this setting is not appropriate. Primary care providers should follow the patient and make referral to immunology, allergists, dermatologists, and vascular specialists as needed. Treatment then can be tailored to each individual patient and may include management of acute exacerbations, refractory symptoms, and cold desensitization therapy.

Conclusion

Cold-induced urticaria can be difficult to diagnose. When a patient presents with spontaneous urticaria, a thorough history should be obtained to determine any possible exposures. Cold-induced urticaria can easily be

Table 1. Diagnostic Classification of Cold Urticaria Syndromes

Syndromes with positive cold-contact stimulation test	Atypical syndromes (ie, atypical responses to cold-contact stimulation test)
<ul style="list-style-type: none"> • Primary • Secondary <ul style="list-style-type: none"> – Cryoglobulinemia • Primary • Secondary <ul style="list-style-type: none"> ■ Chronic lymphocytic leukemia ■ Lymphosarcoma ■ Leukocytoclastic vasculitis ■ Angioimmunoblastic lymphadenopathy – Leukocytoclastic vasculitis – Infectious diseases <ul style="list-style-type: none"> • Mononucleosis • Syphilis • Others – Cold agglutinins – Cold hemolysins – Cold fibrinogens – Other factors 	<ul style="list-style-type: none"> • Systemic atypical • Cold-dependent dermatographism • Cold-induced cholinergic urticaria • Delayed cold urticaria • Localized cold-reflex urticaria
<p>Adapted from: Wanderer AA. Cold urticaria syndromes: historical background, diagnostic classification, clinical and laboratory characteristics, pathogenesis, and management. <i>J Allerg Clin Immunol</i>. 1986;85(6):965-981.</p>	

reproduced in the office setting. Missing the diagnosis could have deadly consequences due to the possibility of repetitive exposure and increasing chance of anaphylactic reaction. ■

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