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Diagnosis and Treatment of Typical Cold-Induced Urticaria: A Case Reports

Nurul Nisa Ulfa^{1*}

¹Medisina Clinic, Depok, Indonesia

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*Corresponding author:

Nurul Nisa Ulfa

E-mail address:

Nurulnisaulfa15@gmail.com

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ABSTRACT

Background: Urticaria is a common disease in society. 15-25% of individuals must have experienced urticaria at least once in their life. Cold urticaria is included in the type of chronic inducible urticaria and is a type of urticaria that accounts for 3% of cases of all types of chronic urticaria that occur. The age group that most suffers from urticaria is the age 12-25 years. This study was aimed at presenting the diagnosis and treatment of cold urticaria. **Case presentation:** A 29-year-old woman came with complaints of itching and redness on the hands, feet, and neck, starting with a small round reddish rash that widened and the center was paler than the edges, then disappeared within 1-2 hours, there is no a history of infectious or autoimmune diseases but has a family history of the same complaint. Examination of the ice cube test obtained positive results after 7 minutes of contact with ice cubes. Patients were given therapy in the form of cetirizine 10 mg per day for 2 weeks, which was then increased by a dose of 20 mg with a combination of cetirizine 10 mg in the morning and loratadine 10 mg at night. **Conclusion:** Exploration of precipitating factors through detailed anamnesis and supporting examinations with a cold stimulation test can establish a diagnosis of typical cold-induced urticaria.

1. Introduction

Urticaria or often also called hives, nettle rash, and wheals, is a disease that generally occurs in 15-25% of individuals at least once in a lifetime.¹ This disease is characterized by an itching reddish rash, sometimes accompanied by edema on the skin, which will disappear within 1-24 hours.² Urticaria is classified into acute and chronic urticaria. Acute urticaria appears within 0-6 weeks, and about 30% of sufferers will turn into chronic urticaria, whose symptoms continue to occur for more than 6 weeks.^{3,4} Urticaria can occur in almost any age group but is more common in children and young adults.⁵ However, the age group of 40 to 50 years tends to experience cases of chronic urticaria. Cold urticaria is a rare case, and the cause is still uncertain. This disease can be caused by other underlying diseases, such as autoimmune,

lymphoproliferative diseases, viral/bacterial infections, stings of *Hymenoptera sp.*, the use of certain drugs or foods, and hereditary factors.^{3,5,6} This study aimed to present the diagnosis and treatment of cold urticaria.

2. Case Presentation

A woman, Javanese, 29 years old, came to the clinic with complaints of itching and redness on her hands, feet, and neck. These complaints began to appear 2 months before coming to the clinic but came and went every day. Initially, the lesion is a reddish rash in the form of small rounds that widens, and the center is paler than the edges and then disappears within 1-2 hours (Figure 1). Complaints will arise if the patient is exposed to cold objects such as drink bottles, rooms with air conditioners, and the atmosphere during the

rainy season. Recently, the patient has also complained of stress due to work in her office and is increasingly bothered by the sensation of itching and burning. Since childhood, the patient has often experienced it. The patient has also experienced a history of swelling around the eyes and in the lip area without feeling tight. If the eyes and lips start to swell, the patient often takes antihistamines and uses menthol powder on the parts of the body that feel very itchy. The patient's father also experienced the same thing and relapsed during the rainy season but not as often as the patient. The patient is not currently taking any medication. History of food or drug allergies was denied.

Physical examination showed vital signs within normal limits. On dermatological examination, it was found that the urticaria was in the form of small rounds of varying sizes, which were getting wider and wider, and the center was paler and surrounded by erythematous areas. Examination of the ice cube test showed the appearance of a reddish rash after 7 minutes on the part exposed to the ice cubes directly, followed by itching around the skin affected by the ice

cubes (Figure 2). This patient was diagnosed with typical cold-induced urticaria.

During the first visit, the patient was given a second-generation H1 receptor antihistamine, cetirizine 10 mg once a day for 2 weeks, then the patient came back for control and said that his skin condition had not experienced much change, itching and rashes would start to appear again in the morning and at night. The drug dose was increased to 20 mg, namely 2 times a day, morning and evening, with a combination of cetirizine and loratadine, and then the patient was asked to return for control 2 weeks later. Patients are also advised to avoid triggers. The patient's condition is also evaluated at every control visit. If there is no change and emergency signs are felt, such as tightness and swelling in the eyes or lips, then the patient is advised to come to the emergency department (ER). If the skin condition does not improve, it is advisable to consult a dermatologist and carry out the further examination. The prognosis for this patient is *quo ad vitam ad bonam, quo ad sanam ad bonam, and quo ad fungtionam dubia ad bonam*.



Figure 1. The clinical picture of the patient after cold exposure.



Figure 2. Evaluation of the ice cube test in patients.

3. Discussion

Symptoms of urticaria are characterized by itching, a reddish rash, sometimes accompanied by edema on the skin, which will disappear within 24 hours.^{1,2} The disease is classified into acute urticaria occurring ≤ 6 weeks and chronic urticaria. There are two types of chronic urticaria, namely chronic spontaneous urticaria with symptoms that occur ≥ 6 weeks and physical inducible urticaria, which includes cold urticaria.^{7,8} Cold urticaria can be classified into two forms, namely typical cold-induced urticaria with a positive cold stimulation test (CST) and atypical cold-induced urticaria (negative CST).⁹⁻¹¹

In this case, the patient's main complaint was itching and redness, especially on the hands, feet, and neck. This condition fits the classification of chronic urticaria because symptoms last ≥ 6 weeks. Cold urticaria accounts for about 30% of physical urticaria in childhood. Although the prevalence can vary but is more common in young adults, it can also affect young children.^{9,11} The pathogenesis of cold urticaria is not known with certainty, but the presence of IgE autoantibodies that react against specific skin antigens only at low temperatures is the basis for the hypothesis of cold urticaria.¹²⁻¹⁴

Apart from physical factors, the emotional state also influences the occurrence of cold urticaria.¹⁵ In this case, the patient also complained of stress due to work in his office. Patients with cold urticaria generally experience anxiety, depression, and other psychiatric disorders. In addition, comorbid psychiatric disorders are an additional factor in reducing the quality of life in cold urticaria patients.¹⁶

On dermatological examination, pink edematous lesions with central pallor (wheals) were found on the palms and soles and on the neck. Urticarial skin lesions last 1-24 hours, but the overall duration of illness may be longer. In addition, angioedema is often encountered, which is characterized by sudden erythematous swelling of the skin and mucosal parts. Mast cells are the main effector cells in urticaria and, in many cases of angioedema. These cells are widely

distributed in the skin, mucosa, and other areas of the body and have high-affinity immunoglobulin E (IgE) receptors. Mast cell degranulation causes the rapid release of various inflammatory mediators, such as histamine, leukotrienes, and prostaglandins, which then cause vasodilation and plasma leakage in and under the skin.^{17,18}

The results of the examination using the ice cube test showed erythema in the area in contact with the ice cubes after 7 minutes. The test is performed by placing an ice cube in a plastic bag and applying it to the skin of the anterior surface of the forearm for at least 5 minutes and then observing the area for about 10 minutes. In case of a positive result, the exposure time is reduced by 1-minute intervals to find the threshold at which the reaction is triggered. In cases where the result is negative, the test will be repeated with an additional time of up to 10 minutes.

Several treatment options for cold-induced urticaria are avoiding exposure to cold air, using antihistamines, auto-injector epinephrine, and immunotherapy.^{4,18,19} The most effective way to manage cold-induced urticaria is to avoid exposure to cold temperatures. The patient can wear warm clothes, avoid cold water, shower, and swim in cold water. Antihistamines can be used to relieve the symptoms of cold-induced urticaria. These medications block the action of histamine, a chemical released by the body during an allergic reaction. Some examples of antihistamines include loratadine, cetirizine, and fexofenadine. Cetirizine and loratadine are second-generation antihistamine medications used to treat allergies, hay fever, and other respiratory allergies.^{1,11} In severe cases of cold-induced urticaria, an epinephrine auto-injector may be prescribed. Epinephrine is a hormone that can quickly relieve symptoms of anaphylaxis, a severe allergic reaction that can occur in response to cold exposure. Immunotherapy involves a series of injections that can help desensitize the body to cold temperatures over time.²⁰ This treatment can be effective for some people with cold-induced urticaria.

4. Conclusion

Exploration of precipitating factors through detailed anamnesis and supporting examinations with a cold stimulation test can establish a diagnosis of typical cold-induced urticaria.

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