Cold urticaria: a case report

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Abstract

In the group of skin lesions of the type represented by chronic urticaria, a significant proportion comprises physical urticaria, which may involve even about 15% of patients. Typical skin lesions appear by the tripping of a variety of physical stimuli, so the most recognizable physical urticaria belongs to different groups, such as urticaria from oppression, from the cold and cholinergic urticaria. The underlying mechanisms causing physical urticaria are poorly understood; mainly non-immunological mechanisms have been implicated. Acquired cold urticaria is caused by cooling of the skin or mucous membranes and is considered as the only physical urticaria occurring in children. In the case of strong, sudden cooling (e.g. after consumption of ice cream, cold drinks or contact with cold water) in susceptible individuals skin lesions occur and this may even lead to the anaphylactic shock. Diagnosis of cold-induced urticaria is based on clinical presentation and a helpful exposure test, which involves application of an ice-cube on the surface of the patient's forearm. Treatment consists of supportive systemic corticosteroids, antihistamines and antileukotrienes. It is regarded that first of all prevention is necessary, which consists of proper information for patients, limitation of situations connected with sudden cooling of the body and eating cold food and drinks. Below, we describe a case of a 32-year-old female admitted to the Department of Internal Medicine, Geriatrics and Allergology, Medical University in Wroclaw to undergo diagnostic tests of chronic urticaria. According to information obtained from the clinical presentation and after the allergological diagnostic procedures, acquired cold urticaria was diagnosed.

Key words: chronic urticaria, acquired cold urticaria, ice-cube test.

Introduction

Acquired cold urticaria (ACU) is caused by cooling of the superficial layers of skin or mucous membranes, which usually takes place after consuming cold food (including ice cream, cold drinks), contact with cold air or water (cold baths, swimming pool, household activities). Pathogenesis of the disease is not completely understood, however, it is arbitrarily assumed that the onset of symptoms is associated mainly with non-immunological mechanisms and release of some pro-inflammatory mediators, such as histamine and leukotrienes from mast cells after exposure to cold [1-4].

Usually the symptoms of the disease in the form of typical urticarial itchy rash are localized where the physical factor acts directly. After exposure, skin changes may occur as generalized angioedema of the face, lips, tongue or upper airways, lower blood pressure, bronchospasm, and even loss of consciousness [4-6]. Diagnosis in the direction of the ACU can be made, which is based on a positive test result of exposure to cold. This test is performed by application of the ice cube to the surface of forearm skin for about 10 min (ice-cube test). The appearance of typical changes at the site of the application of the ice cube determines the diagnosis [1, 2, 6]. It is believed that acquired cold urticaria usually affects young people, more often females, and its incidence is about 3% of all types of chronic urticaria. In the literature, there are case reports of physical cold urticaria induced also in children patients where symptoms usually appear at about 5-7 years of age and early onset predicts long duration. In young people the average duration of illness is several years and in some patients the symptoms disappear completely, but in some of them present a milder course of the disease. There has been also reported a coincidence of cold urticaria in patients with atopy and a history of allergy to medicines and foods [3, 7, 8]. In acute cases, in the treatment of ACU, moderate doses of systemic corticosteroids, antileukotrienes and antihistamines are administered. The effectiveness of past attempts to treat

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the disease with anti-IgE antibodies and the so-called "desensitization" through gradual exposure to cold, which gave moderate results, is increased. It is recognized now that for patients with cold urticaria above all prevention is needed, which consists in reducing the body exposure to cold, and also instruction about possible dangers associated with the sudden cooling of the whole body (among other things, during contact with cold water and frosty air), reduction of cold food and drinks consumed, as well as learning how to behave in a life-threatening situations [1, 2, 7, 9].

Case report

A 32-year-old female patient, with no additional internal diseases, not treated so far and with no chronic allergic family history, was admitted on 5 April 2011 to the Department of Internal Medicine, Geriatrics and Allergology, Wroclaw Medical University (file number: 11334/11) to have diagnostic tests performed because of the incidents of urticaria. In the interview, the patient reported that symptoms had been present for several years without any clear relation to the inhaled or nutritional agents and are not accompanied by any difficulties in breathing. Skin changes covered multiple areas of the body (usually the upper limbs and trunk) and what is more, possibly the factor causing the appearance of skin changes can be connected with low temperature and coolness of the skin during bathing, walking in the autumn and winter, or during household activities. When she was admitted to the hospital, the patient's general condition was good and stable. Physical examination showed no significant deviations from the normal condition, and there were no changes of urticaria or angioedema. In peripheral blood tests performed, the leukocyte count, platelet count and also eosinophilia were normal (L 3 k/µl, PLT 180 k/µl, Eos 0.08 k/µl); coagulation rate remained normal (prothrombin index 93%; INR 1.09). There was no increase in the concentration of C-reactive protein (0.22 mg/l). No abnormalities in the biochemical activity of liver enzymes were observed: AST (19 U/l), ALT (11 U/l), GGT (10 U/l), AP (87 U/l). Parameters of renal functions were also within normal limits (urea: 42 mg/dl, creatinine: 0.97 mg/dl, EGFR: 69 ml/min); the analysis of urine showed no major deviations from the normal state. Examination of feces for the presence of worm's eggs came out negative. The total concentration of antibodies in IgE-class marked by ELISA assay was slightly elevated (91.9 IU/ml as compared to standard concentration of 87 IU/ml). Investigations towards systemic connective tissue diseases and autoimmune diseases (antibodies ANA, p-ANCA, c-ANCA indicated by ELISA assay) came out negative; the rheumatoid factor was undetectable. The thyroid hormone function remained normal, there was no increase in the level of anti-TG and anti-TPO. Diagnosis of viral hepatitis B and C came out negative. The rub test in the direction of dermographism carried out by a wooden spatula and irritation of the skin on the back was negative. In the course of further diagnostic tests, the skin prick tests with ubiquitous inhalant and nutritional allergens were performed on the palmar side of the forearm and gave no positive results interpreted after 15 min of exposure. The intracutaneous test with autologous, dense serum found on the palmar side of the forearm and interpreted after 15 min of exposure was negative. The compression test carried out by using a slingshot loaded with a weight 5 kg and established for 30 min on the patient's thigh was negative.

The oral provocation test with acetylsalicylic acid to the total cumulative dose of 600 mg turned out negative. The thermal exposure test with low temperature apparently gave a positive result – after about 10 min of contact with the ice cube on the left forearm skin, the patient experienced itching and merging with each other hives of the diameter of applied ice cubes, which resolved spontaneously (Figure 1). Therefore, taking into account the information obtained from the history and the overall diagnostic studies, the occurrence of incidents of urticaria in a patient without evidence of atopy was associated with exposure to low temperature. This allowed us to recognize the acquired chronic physical urticaria caused by cold and then we released the patient with a recommendation for further outpatient care and to avoid sudden cooling of the body surface, bathing in cold water, exposure to cold air and eating cold food and cold drinks.

Discussion

Skin lesions of the type of chronic urticaria are considered as one of the most common diseases affecting the skin layer – it is estimated that they may affect even about 3% of the adult population. Hives in the form of the erythematous bubble changes lasting for up to 6 weeks are referred to as the acute urticaria, but if that period is

Figure 1. A positive result of the ice cube test

over 6 weeks, this gives rise to the diagnosis of chronic urticaria [10, 11]. Literature data also indicate that these disorders have a significantly negative impact on the quality of life (QoL) of the patients and reduce the comfort of their living to a significantly higher degree in comparison with the comfort of life of patients treated for other conditions based on allergy [12, 13].

Clinical signs of skin reactions correspond to different types of allergic reactions; by the presence of antigen presenting cells, lymphocytes, keratinocytes, mast cells, the skin is somehow predisposed to symptoms of hypersensitivity. It is possible to perform some diagnostic tests to identify a potential etiologic factor causing symptoms of chronic urticaria. Generally, the diagnosis is based on data obtained from the interview and physical examination, which are backed by manufactured-type prick skin tests with inhalant and nutritional allergens, provocation tests with low and high temperature, the test with autologous serum, and provocation tests in suspected cases of allergy to medicines.

The diagnosis in the direction of connective tissue diseases, rheumatoid arthritis, proliferative and endocrine diseases may also play a role. It should be noted that, despite full diagnostic tests of chronic urticaria, in many patients its nature cannot be explained (so called idiopathic urticaria) [8, 10, 14-16]. According to literature data, it is estimated that the chronic acquired cold urticaria affects about 3% of all types of chronic urticaria and occurs in adults with a greater predilection for females (about 2 : 1). There are also reports about the existence of physical urticaria in children caused by cold, where the clinical problem is to establish the appropriate diagnosis, because based on history and physical signs it can be initially diagnosed as a viral infection, mainly infectious mononucleosis. In children and young people the existence of a congenital form of cold urticaria with autosomal dominant inheritance and occurring in two forms as a delayed cold urticaria or familial cold urticaria is also likely [2, 3, 5, 9, 15]. Other forms of the ACU are: atypical cold urticaria, where the immediate reaction after the cold test is negative, delayed cold urticaria appearing up to 24 h after cooling of the skin, cold-induced cholinergic urticaria occurring after exercises in reduced ambient temperature, and dermographism dependent on the cold, where the hives are created only when the chilled skin is rubbed [2, 6-8, 15]. It should be noted that in the clinical case described above, the criteria for distinguishing acquired cold urticaria have been met. The patient had symptoms typical of this disease, as pre-interview information obtained indicated the cause and effect relationship between exposure to cold (cold water, swimming in the pool, cold air) and the appearance of skin lesions of the type of urticaria. In this case, after conducting a conclusive test of a standard ice cube applied to the skin of the forearm, the diagnosis of ACU was established. Analyzing further the presented case, it should be noted that based on research conducted in our unit during the differential diagnosis of other diseases with cutaneous manifestations, the following were excluded, among others: bleeding disorders, systemic connective tissue disease, rheumatoid arthritis, inflammatory viral hepatitis B and C, autoimmune inflammation of the thyroid, where variations on the skin may be their indicator. Due to the recurrent nature of the changes, the patient was given specific information on possible factors determining the appearance of efflorescence and she was advised to limit or avoid them. On an adhoc basis, in situations of acute and massive seeding urticarial changes, the use of oral corticosteroids (prednisone) and antihistamines (clemastinum) is recommended and medical assessment in an outpatient clinic should be performed immediately.

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