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Case Report

Cutaneous Allergic reactions to pine processionary caterpillar (Thaumetopoea Pityocampa): a complicated cutaneous reaction in an infant and review of the literature

Nilüfer Galip[1], Burçin Şanlıdağ[2], Arzu Babayiğit[1,3], Nerin Nadir Bahçeciler[3]

[1]Division of Pediatric Allergy & Immunology, Universıty of Kyrenia, Faculty of Medicine, Kyrenia, North Cyprus; [3]Division of Pediatric Allergy & Immunology, [2]Department of Pediatrics, Near East University, Faculty of Medicine, Nicosia, North Cyprus.

ABSTRACT

Background. Thaumetopoea Pityocampa (TP) are frequent in the Mediterranean region especially affecting forest workers in pinewood areas. The common symptoms include swelling, rash or burns like any form of dermatitis. The reactions can be triggered by mechanical, chemical or allergic factors and the "allergic" reaction is caused by sensitization to a hair protein named "thaumetopoein". This protein triggers the IgE mediated reaction resulting in the mast cell degranulation causing urticaria. Different kinds of allergic reactions like urticaria or anaphylaxis have been reported previously commonly in adults, especially in forest workers while severe reactions without direct contact are rare in pediatric population.

Case. A 28 month old healthy boy was admitted to Near East University Pediatric Allergy and Immunology Outpatient Clinic in March with complaints of pain, hyperemia and swelling on the left hand. His complaints had started the day before his admission just after walking around in their garden which is surrounded by pine trees. On admission, his physical examination revealed serious edema and hyperemia on his left hand limiting his finger movements with a few bullae on the skin. His temperature was 38 C and the other vital parameters were normal. Based on hyperemia, swelling and high acute phase reactants he was hospitalized with the differential diagnosis of soft tissue inflammation and cellulitis. The case was treated with iv antihistamines, systemic steroids and antibiotics.

Conclusions. Pine processionary (PP) is an important irritant and allergen especially in endemic areas like Cyprus which is a Mediterranean Country. It must be kept in mind in case of local or generalized urticaria, dermatitis, bullae and other allergic reactions even if there had been no direct contact with PP. Systemic involvement with fever and elevated acute phase reactants in infancy may necessitate hospitalization and intravenous treatment. Hereby, we reported an infant who presented with fever in addition to severe cutaneous lesions following the exposure to TP without direct contact. This is the first case reported from North Cyprus.

Key words: allergy, cutaneous reaction, pine caterpillar.

Processionary moths include many different species in Europe, the Middle East and African countries and their mature larvae are urticating for humans and many other mammalians. Several forms of cutaneous or less frequent ocular lesions caused by pine processionary caterpillar, named as Thaumetopoea Pityocampa (TP) are frequent in the Mediterranean region especially affecting forest workers in pinewood areas. The common symptoms include swelling, rash or burns like any forms of dermatitis. The first descriptions were made by Reaumur[1] in 1736 and since then, many studies have been performed to identify the pathogenesis of the reactions caused by TP. Nowadays, knowledge on the reactions is that they can be triggered by mechanical, chemical or allergic factors.[2-4] Mechanical way of the

✉ Nilufer Galip
dr_ngalip@yahoo.com

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damage occurs when the hairs of the caterpillar penetrate the skin. In the chemical reaction, there is a discharge of a toxic substance coming from the caterpillar and causing the irritation on the skin. The third and the "allergic" reaction is caused by sensitization to a hair protein named "thaumetopoein". This protein triggers the IgE mediated reaction resulting in the mast cell degranulation causing urticaria.[5] Different kinds of allergic reactions like urticaria or anaphylaxis have been reported previously commonly in adults, especially in forest workers.[6,7] In 2006, Aparicio et al.[8] from Spain, documented the largest group of pediatric patients having several types of allergic reactions to TP. This report demonstrated IgE mediated allergic reactions proven by either skin prick test (SPT) or specific IgE measurements including urticaria, angioedema, anaphylaxis, rhinitis, asthma and conjunctivitis in children between 6-14 years of age. Hereby, we reported an infant who presented with fever in addition to severe cutaneous lesions following the exposure to TP without direct contact. This is the first case reported from North Cyprus.

Fig. 1. Bullea, vesicles and edema on his left hand.

Case Report

A twenty-eight- month-old healthy boy was admitted to Near East University Pediatric Allergy and Immunology Outpatient Clinic with complaints of pain, hyperemia and swelling on the left hand. His complaints had started the day before his admission just after walking around in their garden which was surrounded by pine trees. Hyperemia and urticarial rash with intense itching were the first signs on his first and the second fingers of the left hand, then, swelling spread through his whole hand. He also had some urticarial rash on his trunk. The father also developed urticarial lesions located at the back of the neck. (Fig. 1 and Fig. 2) The next morning, he had a fever of 38.2 C and he was unable to use his hand because of intense pain. On admission, his physical examination revealed serious edema and hyperemia on his left hand limiting his finger movements with a few bullae on the skin.

Fig. 2. Urticarial rashes on his neck.

His temperature was 38 C and the other vital parameters were normal. On his laboratory tests, white blood cell count was 19600/µl, neutrophils: 9380/µl, hemoglobin level: 12.3 gr/dl, platelet count: 332000/µl and C-reactive protein: 6.04 mg/dl. Based on hyperemia, swelling and high acute phase reactants he was hospitalized with the differential diagnosis of soft tissue inflammation and cellulitis. The patient was treated with intravenous 150mg/kg/day amoxicillin sulbactam, 1mg/kg/day methyl prednisolone and feniramin maleat. In addition, his left hand was elevated and cold compress was performed in order to prevent further swelling. On the 48th hour of his hospitalization the fever subsided, edema regressed, the pain was resolved and the patient was able to move his fingers. He was discharged from the hospital with oral antibiotics and antihistamine treatment. Informed consent was received from the family of the patient for publishing the patient data and pictures.

Discussion

Processionary caterpillar is one of Lepidoptera species that can cause damage to human skin.[9] Pine processionary (PP) is commonly seen in the Mediterranean coast and European countries.[10] Contaminations are usually in pine forests and rarely in urban areas.[11,12]

Urticant hairs appear in the third stage of the caterpillars' development (L3) around September and increase up to the last stage (L5) which can be seen from January to May according to climate conditions.[13] There are two pathogenic mechanisms that PP can cause harmful effects, the first being direct contact with nests or caterpillars which can result in dermatitis. The second is aero-mediated contact that can result in skin, ocular and respiratory effects.[14]

Thaumetopoein is the protein that is isolated from processionary hairs. This protein acts directly on mast cells triggering degranulation which results in nonspecific urticarial lesions.[5] Beside toxic-irritant mechanisms; an Ig E mediated mechanism of hypersensitivity has been demonstrated in studies especially in adults.[3,6,7] Moneo et al.[15] described an IgE binding protein as the major allergen of PP that is named as Tha p 1. Less commonly delayed cutaneous reactions lasting several days, that is presented as small papules, papulo-vesicles and pustules are observed.[1,3,9,13] The responsible mechanism is thought to be toxic- irritant.[1,2,5,13,16] In the presented case, skin reaction was severe with bullae formation, severe edema and hyperemia with loss of function of the hand. In addition, the patient had systemic involvement signs such as fever and elevated acute phase reactants. This reaction was probably airborne, as the patient did not touch the caterpillars. PP setae can be released into the air and can penetrate the skin causing symptoms without touching like in the presented case.[5,17] On the other hand, as we did not test the patient for Tha p1 specific IgE, the pathogenesis of our case cannot be defined clearly.

In a study of the pediatric population; IgE mediated cutaneous reactions due to PP caterpillar were only 6.7%.[9] On the other hand, studies on adults revealed a rate of 50% of Ig E mediated cases.[3,4]

In the pediatric population, the most common symptomatology is contact urticaria.[9] Processionary dermatitis can be seen in every age, especially in children who tend to play with larvae. Involved body areas are forearms, digits, hand dorsum, face and neck.[3,9,18,19] In the pediatric age group, mostly extremities are found to be affected, followed by trunk, neck and head.[9] If direct contact is present the lesions may be limited to the contact region. If the exposure is aero-mediated multiple lesions may be seen, as in our case.[14]

In general, lesions cause intense and continuous itching, with pink to bright red macules and papules overlapping the urticarial base. Papules can be surrounded by vesicles or may sometimes accompany by bullous lesions.[12] Dermatitis resolves in 3-4 days and leaves a

brownish macule resolving in 1-2 weeks.[14] To date, no cases with fever and elevated acute phase reactants have been reported. Systemic involvement of our case may be due to secondary infection of the lesions.

For the diagnosis, direct contact with caterpillars or history of residing, passing through or nearby pine forest are important clues. Similar lesions can be detected in the accompanying family members or friends. In the presented case, the father also had lesions at the same time. Caterpillar hairs can be seen in microscopic examination like in our case.[14,20] Both our patient and his father were examined by magnifying glass but nothing was seen as they came after showering. We found irritant hairs on the father's clothes on microscopic examination. Diagnosis of IgE mediated reactions can be made by means of skin prick testing or detection of specific IgE in sensitized cases. Unfortunately, due to the lack of the material specific for the major allergen in our hospital, we could not perform those tests.

Approximately 10% of cases develop early or late ocular involvement and rarely respiratory involvement and anaphylaxis.[1,2,6,14,21]

Treatment includes systemic antihistamines, antipruritic lotions and topical steroids for persistent cutaneous reactions. For severe cases, systemic steroids are used.[21] Immediate epinephrine treatment is essential in case of anaphylaxis.[21] Our case was treated with IV antihistamines, systemic steroids and antibiotics.

PP is an important irritant and allergen especially in endemic areas like Cyprus which is a Mediterranean Country. It must be kept in mind in case of local or generalized urticaria, dermatitis, bullae and other allergic reactions even if there had been no direct contact with PP. Systemic involvement with fever and elevated acute phase reactants in infancy may necessitate hospitalization and intravenous treatment.

Author contribution

The authors confirm contribution to the paper as follows: study conception and design: NG, NNB; data collection: BŞ; analysis and interpretation of results: AB; draft manuscript preparation: NG, BŞ. All authors reviewed the results and approved the final version of the manuscript.

Conflict of interest

The authors declare that there is no conflict of interest.

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