Case Report

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Back Pain in Atypical Immediate Hypersensitivity Caused by Exposure to Dust Mites and Molds: A Case Report

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Abstract

Immediate hypersensitivity to inhaled allergens is common in children. Although wheezing and urticaria are well known in immediate hypersensitivity, back pain is unknown. A nine year old boy with a history of asthma presented with back pain, but not wheezing or urticaria, while wiping the floor. The immuno-capsulated hydrophilic carrier polymer (ImmunoCAP) test revealed that dust mites and molds were the specific antigens causing the immediate hypersensitivity. Therefore, back pain can appear in immediate hypersensitivity. The ImmunoCAP test is useful for determining the allergens in atypical immediate hypersensitivity. Risk factors can be hidden in daily cleaning.

Introduction

Immediate hypersensitivity, an allergic reaction provoked by exposure to a specific antigen known as an allergen, is common in children.[1] Immediate hypersensitivity usually presents with wheezing and urticaria.[2] Antigen-specific immunoglobulin E antibodies, induced by the immune response, are involved in immediate hypersensitivity. Although wheezing and urticaria are well known in immediate hypersensitivity, back pain is unknown. Herein we report a nine year old boy who was diagnosed with back pain as an atypical symptom of immediate hypersensitivity induced by exposure to dust mites and molds. The immuno-capsulated hydrophilic carrier polymer (ImmunoCAP) test proved to be useful in determining the specific antigens in this case of atypical immediate hypersensitivity.

Case Report

A nine year old boy with a history of asthma presented with back pain followed by a feeling of suffocation, without wheezing or urticaria, during a cleaning period at his school. Japanese students usually have a cleaning period once a day. The patient had wetted his dustcloth and wiped the floor when he presented with back pain (Figure 1).

On physical examination, he had no significant abnormalities. His blood pressure, pulse rate, saturation of percutaneous oxygen, blood test, and urine test showed no abnormalities. Computed tomography and an electrocardiogram were performed to investigate the intrathoracic organs, and magnetic resonance imaging and ultrasonography were performed to investigate the intraperitoneal organs. None of these examinations detected any abnormalities. The back pain disappeared after oral administration of acetaminophen.

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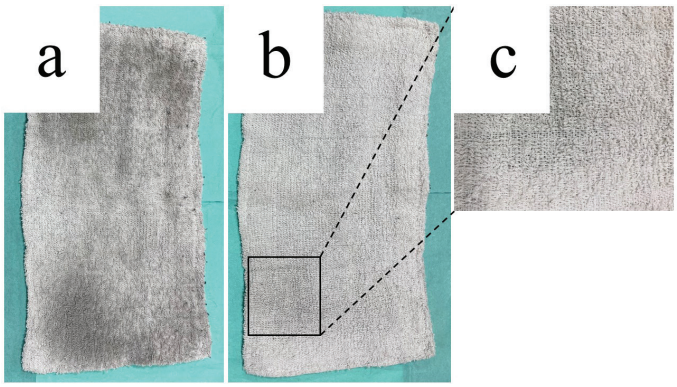
Figure 1. The patient's dust cloth. The white dustcloth was stained by daily cleaning. The pictures show (a) the floor side of the cloth, (b) the palm side of the cloth, and (c) a magnified image of the palm side.



The feeling of suffocation and history of asthma suggested an allergic reaction. The ImmunoCAP test using a serum sample was employed to determine the responsible allergens.[3] The test detected specific immunoglobulin E antibodies against dust mites and Candida representing molds (Table 1).

Table 1. Results of the ImmunoCAP test

Item	Class	Value (UA/mL)
Dust mites	2	1.33
Cedar pollen	0	0.11
Cypress pollen	0	< 0.1
Alder pollen	0	0.27
Orchard grass pollen	0	< 0.1
Ragweed pollen	0	<0.1
Mugwort pollen	0	< 0.1
Candida	2	1.75
Aspergillus	0	< 0.1
Alternaria	0	< 0.1
Cat dandruff	0	< 0.1
Dog dandruff	0	0.17
Hamster epithelia	0	< 0.1
Moth	0	< 0.1
Cockroach	0	< 0.1
Chironomus	0	< 0.1

Since that time, the patient has avoided dampness, which attracts both dust mites and molds, and opened windows to achieve good ventilation during cleaning periods at school. He has not experienced any recurrence of the symptoms.

Discussion

Two important clinical issues were highlighted in the present patient. First, back pain can appear in immediate hypersensitivity caused by exposure to dust mites and molds. Second, the Immuno CAP test is useful for determining the allergens in cases of atypical immediate hypersensitivity.

Regarding the first issue, back pain can appear in immediate hypersensitivity without wheezing or urticaria. Asthma, an allergic disorder, can be related to back pain in children.[4] Allergic inflammation leads to neuropathic pain via glial cell activation.[5] Mice with allergic disorders exhibit severe allodynia with activated astroglia and microglia, and show marked upregulation of endothelin receptor type B (EDNRB) in the spinal cord.[5] Mice with allergic disorders also show elevation of endothelin-1, an EDNRB ligand, in their serum. Meanwhile, increased serum endothelin-1 in atopic patients and activation of spinal astroglia and microglia with EDNRB upregulation in an autopsied case were demonstrated.[5] This mechanism may explain the symptoms in the present patient.

For the second issue, the skin prick test is also useful for investigating allergens. However, it should be noted that the prick test can be harmful for patients with severe sensitization.[6] Furthermore, the reliability of the prick test can be affected by the physician's skill, anti-histamine drugs, and antigen extract stability. In contrast, the Immuno CAP test is a qualified in vitro test based on a fluorescence enzyme immunoassay.[3] It is useful for patients, particularly children, who are uncooperative with the skin prick test, because it avoids an unpleasant localized immune reaction as well as the risk of anaphylaxis. Moreover, this in vitro test is not affected by the physician's skill or anti-histamine drugs. The present patient agreed to the Immuno CAP test, but not to the skin prick test, resulting in the avoidance of unpleasant reactions.

The Immuno CAP test detected specific immunoglobulin E antibodies against dust mites and candida species. Mite allergens can induce allergic diseases such as asthma, allergic rhinitis, and atopic dermatitis.[7] Mite - sensitized patients had greater odds of reporting asthma compared with non-mite-sensitized patients in a previous cohort study.[8] Mold exposure was also associated with childhood asthma development.[9] Dampness attracts both dust mites and molds. Keys for preventing the potential harmful effects of exposure to dust mites and molds include the removal of moisture-rich environments.[10] We instructed the patient to avoid having a wet dust cloth and to open windows for good ventilation during the cleaning period.

Conclusions

Back pain can appear in immediate hypersensitivity caused by exposure to dust mites and molds. The ImmunoCAP test is useful for determining the specific antigens in cases of atypical immediate hypersensitivity. Risk factors can be hidden in daily cleaning.

References

1. Reshma A, Arun KB. Child with allergies or allergic reactions. Indian J Pediatr. 2018;85:60–5.
DOI: 10.1007/s12098-017-2436-8.

2. Khan DA. Hypersensitivity and immunologic reactions to biologics: opportunities for the allergist. Ann Allergy Asthma Immunol. 2016;117:115–20.
DOI: 10.1016/j.anai.2016.05.013.

3. Calabria CW, Dietrich J, Hagan L. Comparison of serum-specific IgE (ImmunoCAP) and skin-prick test results for 53 inhalant allergens in patients with chronic rhinitis. Allergy Asthma Proc. 2009;30:386–96.
DOI: 10.2500/aap.2009.30.3258.

4. Baynon AM, Hebert JJ, Lebouef-Yde C, Walker BF. Potential risk factors and triggers for back pain in children and young adults. A scoping review, part II: unclear or mixed types of back pain. Chiropr Man Therap. 2019;27:61.
DOI: 10.1186/s12998-019-0281-8.

5. Yamasaki R, Fujii T, Wang B, Masaki K, Kido MA, Yoshida M, et al. Allergic inflammation leads to neuropathic pain via glial cell activation.J Neurosci. 2016;36:11929–45.
DOI: 10.1523/JNEUROSCI.1981-16.2016.

6. Hocaoglu AB, Cipe F, Aydogmus C. Are skin prick tests really safe? A case of anaphylaxis caused by skin prick testing with inhalant allergens.Allergol Immunopathol. 2015;43:215–35.
DOI: 10.1016/j.aller.2013.09.011.

7. Sanchez-Borges, Fernandez-Caldas E, Thomas WR, Chapman MD, Lee BW, Caraballo L, et al.International consensus (ICON) on: clinical consequences of mite hypersensitivity, a global problem. World Allergy Organ J. 2017;10:14.
DOI: 10.1186/s40413-017-0145-4.

8. Chew GL. Mite sensitization among Latina women in New York, where dust mite allergen levels are typically low. Indoor Air. 2009;19:193–7.
DOI: 10.1111/j.1600-0668.2008.00578.x.

9. Reponen T, Lockey J, Bernstein DI, Vesper SJ, Levin L, Hershey GKK, et al. Infant origins of childhood asthma associated with specific molds. J Allergy Clin Immunol. 2012;130:639-44.
DOI: 10.1016/j.jaci.2012.05.030.

10. Seguel JM, Merrill R, Seguel D, Campagna AC. Indoor air quality. Am J Lifestyle Med. 2016;11:284–95.
DOI: 10.1177/1559827616653343.