

Recurrent Wheezing Caused by Milk Protein in Shampoo: A Rare Presentation of Cow's Milk Protein Allergy

Parin N Parmar*

Pediatric Allergy-Immunology Consultant, Niranjanaaya Center for Allergy Diagnosis, Yoga and Lifestyle Medicine, India

***Corresponding Author:** Parin N Parmar, Pediatric Allergy-Immunology Consultant, Niranjanaaya Center for Allergy Diagnosis, Yoga and Lifestyle Medicine, India.

Received: July 22, 2020; **Published:** January 30, 2021

Abstract

Clinical presentation of cow's milk protein allergy in children is highly variable and can include respiratory, gastrointestinal, dermatological, ocular, and generalized symptoms. Most of these symptoms are induced by ingestion of cow's milk protein. Contact with the allergen is known to produce dermatologic symptoms at site of contact. In present case report, the author reports a child with cow's milk protein allergy who developed repeated wheezing episodes following washing hair with shampoos containing milk protein.

Keywords: Cow's Milk Protein Allergy; Wheezing; Shampoo; Contact Allergen; Asthma; Hidden Allergen

Abbreviation

CMPA: Cow's Milk Protein Allergy

Introduction

Cow's milk protein allergy (CMPA) is one of the most common food allergies in children globally and its clinical presentation can be highly variable. Children with CMPA can present with respiratory, gastrointestinal, dermatological, ocular, or generalized symptoms after ingestion of food containing the allergen. Onset of the symptoms can occur immediately or can be delayed after ingestion of the allergen. Some patients with CMPA develop urticaria at site of contact of the allergen.

Case Report

An 8-year-old girl was referred by her pediatrician for allergy evaluation. Her clinical history revealed that she had recurrent cough, wheezing and breathlessness since age of five and the symptoms had gradually increased in frequency and severity over last three years. The symptoms were perennial without seasonal, diurnal, or geographic variations. There was no history of sneezing, rhinorrhea, or nasal congestion. There was no history of any gastrointestinal or dermatological symptom since birth. There was no family history of an allergic disorder.

She was diagnosed as mild persistent childhood asthma by the pediatrician and her medical management included daily 400 µg of inhaled budesonide per day as an asthma controller medication and inhaled levosalbutamol as a rescue medication for relief of intercurrent symptoms. Her respiratory symptoms were partially controlled with the controller medication and she would require use of the rescue medication once or twice every week.

When asked about triggers of her symptoms, her mother reported that she often required rescue inhaler after eating milk products such as milk, curd, buttermilk, and vermicelli kheer (a sweet made from milk, sugar, and vermicelli). Interestingly, she also specifically mentioned that she would develop wheezing within 30 minutes of washing hair with two specific brands of shampoo and at least six such episodes had developed after washing hair with each of the two shampoos. The mother also reported that she would not develop wheezing after washing hair with other brands of shampoo. There was no history of exposure to tobacco smoke or other indoor or outdoor air pollutants.

Her physical examination, including examination of respiratory system did not find any specific abnormality. Her height was 121 centimeters and her weight was 18.5 kilograms. Her peak expiratory flow rate was 190 L/minute. In laboratory evaluation, her complete blood count revealed normal findings. Her serum total IgE was 718 UI/ml. Skin prick testing was performed for relevant aeroallergens and food allergens, which showed sensitization to cow's milk protein, i.e. 6 mm sized wheal formation to cow's milk protein, 0 mm sized wheal formation to negative control (normal saline), and 4 mm sized wheal formation to positive control (histamine dihydrochloride). She tested negative for all other aeroallergens and food allergens she had been tested for.

When ingredients of the two specific brands of shampoo that triggered her respiratory symptoms were checked, both of them contained milk protein as one of several ingredients.

To confirm diagnosis of milk protein allergy, she was advised milk protein elimination as well as to abstain from washing hair from shampoo containing milk protein for four weeks. On follow up, she reported no respiratory symptom during the period of four weeks. With continued milk protein elimination and avoidance of contact with milk protein, dose of inhaled corticosteroid was downgraded gradually over next two months and she was free from all asthma controller medications at end of the two months. She was asked to follow up after three months to confirm her milk protein free diet and milk protein free "hair wash", when she confirmed that she did not develop any respiratory symptom during the milk protein free period and that she had been completely medication free during the period.

Discussion

Food allergy is defined as a clinical and immunological reaction to a food allergen and is broadly classified into IgE-mediated, mixed (IgE-T cell mediated) and non-IgE-mediated types [1]. Animal milk protein allergy, especially cow's milk protein allergy, is the most common food allergy in children, but there is high cross-reactivity between proteins in cow's milk and other animal's milk such as buffalo's milk or goat's milk [2].

Clinical presentation of milk protein allergy is highly variable. IgE-mediated allergy can present with respiratory (allergic rhinitis, allergic rhinoconjunctivitis, allergic asthma, otitis media with effusion), cutaneous (urticaria, angioedema), gastrointestinal symptoms (oral allergy syndrome, nausea, vomiting, colic, diarrhea, abdominal pain), or generalized symptoms (anaphylaxis), mixed IgE-T cell mediated allergy can present with atopic dermatitis and/or gastrointestinal presentations (eosinophilic esophagitis, eosinophilic gastroenteropathies), and non-IgE-mediated allergy can present with respiratory (pulmonary hemosiderosis), cutaneous (contact dermatitis), and/or gastrointestinal symptoms (gastroesophageal reflux, colitis, constipation, failure to thrive, enterocolitis syndrome) [1,2].

Detailed history of symptoms and triggers of the symptoms is very important in diagnosis of allergy. History is especially very useful in diagnosis of IgE-mediated food allergies because onset of symptoms occurs immediately after ingestion of the allergen.

Double-blind placebo-controlled food challenge is gold standard for diagnosis of IgE-mediated food allergy but is frequently not performed due to inherent risk of development of symptoms after the challenge. Skin prick testing has more than 90% sensitivity and approximately 50% specificity for diagnosis of food allergen sensitization and in patients with clinical history of symptoms induced by specific food, a positive skin prick test suggests high likelihood of food allergy [4]. Elimination diet is useful as an adjunctive method for

diagnosis of food allergy, but it is also therapeutic in patients with known food allergy [4].

In patient in the case, CMPA was clinically suspected based on history of triggers of wheezing mentioned by her mother - milk products. The diagnosis was supported by positive skin prick test to cow's milk protein. Elimination of exposure to milk protein exposure resulted in improvement in respiratory symptoms and tapering off of asthma medications, which again supported the diagnosis of milk protein allergy.

Role of milk proteins present in hair shampoo is the interesting aspect of the case report. The mother had clearly mentioned that in addition to milk products, the patient's symptoms were triggered after washing hair with two specific brands of shampoo (that contained milk protein) and not after use of other brands of shampoo.

Although contact urticaria in children with CMPA is known [5], development of respiratory symptoms upon contact with milk protein without local symptoms is not known. In available scientific literature on food allergy, this case is unique in itself that the patient developed recurrent wheezing from exposure of milk proteins in shampoo. Possible mechanism of development of respiratory symptoms could be transcutaneous absorption of milk protein allergens through scalp.

It would have been ideal had the patient been asked to challenge herself with washing hair with milk protein containing shampoo to confirm the diagnosis. However, with clear clinical history of recurrent wheezing episodes triggered by contact with milk protein in shampoo and availability of milk-protein free shampoos, the author did not consider it appropriate to induce wheezing in the child by exposing her again to milk protein.

Conclusion

Cow's milk protein allergy is a common food allergy in children and ingestion of cow's milk protein can trigger respiratory symptoms in patients. However, this case suggests that contact with milk protein can also induce respiratory symptoms in children with milk protein allergy, without causing skin symptoms at site of contact. In this case, milk protein in shampoo was a "hidden" allergen that triggered recurrent wheezing in the child.

Conflict of Interest

None.

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Volume 10 Issue 2 February 2021

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