

Case Report

Wheat induced urticaria

Monica Uppal, C. R. Srinivas

Department of Dermatology, PSG Hospitals, Coimbatore, India.

Address for correspondence: Dr. C. R. Srinivas, Professor and Head, Department of Dermatology, PSG Hospitals, Coimbatore, Tamil Nadu, India. E-mail: psghospitals@vsnl.net

ABSTRACT

Wheat is widely consumed all over India in various forms - flour, daliya, maida, suji and wheat bran. Very few cases of wheat induced urticaria have been reported. This may be due to unusual features of wheat related hypersensitivity. A 35 year old female presented to us with history of chronic urticaria and angioedema. History revealed correlation between wheat intake and urticaria episodes. Prick testing was done with wheat antigen in the standard series and derivatives of raw wheat. Normal saline and histamine were used as controls. Prick testing was positive. Oral challenge induced urticaria within half an hour. This report discusses clinical features of wheat related hypersensitivity.

KEY WORDS: Wheat, Prick testing, Allergy

INTRODUCTION

Wheat is a cereal belonging to the genus *Triticum* with over 30,000 species. The kernel consists of three parts: the bran or the outer epidermis, the endosperm (which constitutes 83% of the kernel, mainly composed of starch and protein) and the germ (which gives rise to the embryo). It is rich in proteins, fat and vitamin B complex.

In India, wheat is consumed in various forms. Wheat flour consists of finely ground bran, germ and endosperm. Daliya or samba rava is coarsely ground whole kernel. Maida or mav is derived after removing the bran and germ. The endosperm is finely ground for making white flour or maida. Semolina or suji is coarsely ground endosperm with chemical composition similar to that of maida. Wheat bran is used to increase stool weight and prevents constipation.¹

In spite of such wide consumption, very few cases of wheat allergy have been reported. This may be due to unusual features of wheat related hypersensitivity. We report a rare case of wheat induced urticaria and review the literature.

CASE REPORT

A 35-year-old female presented with a history of chronic urticaria and recurrent angioedema since 8 years. She related the episodes to intake of Samba Rava. At presentation there were no skin lesions or dermographism.

Skin prick testing was done with food series (Creative Drug Industries, 308, Raikar Bhavan, Sector-17, Vashi, Navi Mumbai - 400 705, Tel: 789 0890, 789 0902, E-mail: creativedrug@usa.net) and raw wheat components. Prick testing with normal saline was the

How to cite this article: Uppal M, Srinivas CR. Wheat Induced Urticaria. *Indian J Dermatol Venereol Leprol* 2004;70:298-9.

Received: December, 2003. **Accepted:** August, 2004. **Source of Support:** Nil.

negative control and histamine 0.1% solution was used as positive control. Prick test was positive to Mav, Rava and Samba Rava but negative to whole wheat and wheat antigen in the food series. Also, oral challenge with Samba Rava induced generalized urticaria within half an hour, thus suggesting immediate hypersensitivity to wheat.

DISCUSSION

Wheat has been known to cause various types of allergic reactions. These may be secondary to flour ingestion or inhalation of flour, pollen or grain dust.² Ingestion can induce urticaria, atopic dermatitis,³ irritable bowel syndrome,⁴ or wheat dependent exercise induced anaphylaxis.^{5,6} This is a type I hypersensitivity reaction. IgE antibodies against wheat gliadin,^{3,7} and alpha amylase trypsin inhibitor protein have been demonstrated in the serum of sensitized patients.⁴

The patient is usually not aware of his allergy because the clinical symptoms may either appear after 30-60 minutes or may appear only if the patient exercises at that particular time. This is also known as wheat dependent exercise induced anaphylaxis.^{5,6} Therefore, even in exercise induced anaphylaxis without apparent allergy, wheat hypersensitivity should be considered.

In our patient, prick test was positive to various derivatives of wheat but negative to whole wheat and wheat antigen in prick test series. The whole wheat was tested by soaking in water followed by application of crushed soaked wheat on the skin and pricking through the crushed material. It is possible that our patient tested negative to whole wheat because we were unable to deliver the antigenic substance through this material. Also the negative test to wheat antigen in the food series underscores the point that prick testing should not only be performed with the commercially available antigens but also with the raw material.

The effect of baking and digestion on the allergenicity of wheat flour proteins has been studied. In-vitro enzymatic digestion of unheated wheat flour destroys the allergenic proteins. However, baking, as in bread

manufacture, increases the resistance of potential allergens to proteolytic digestion, thus allowing them to elicit immunological responses.⁹ Attempts are underway to prepare hypoallergenic wheat flour as a substitute for wheat food in AD patients with wheat allergy.¹⁰ Treatment with acidic oxidative potential water has also been shown to lower the allergenicity of wheat proteins.¹¹

Wheat forms a major portion of the Indian diet. Allergy to wheat is usually not suspected. We report this rare case of wheat induced urticaria to emphasize that importance should be given to the patient's impression regarding the etiology of the disease.

REFERENCES

1. Srilakshmi B. Cereals and cereal products. *In*: Srilakshmi B, ed. Food science. 1st Ed. New Delhi: New Age International Publication; 2001. p. 26-61.
2. Walsh BJ, Baldo BA, Bass DJ, Clancy R, Musk AW, Wrigley CW. Insoluble and soluble allergens from wheat grain and wheat dust: Detection of IgE binding in inhalant and ingestion allergy. *N Engl Reg Allergy Proc* 1987;8:27-33.
3. Varjonen E, Vainio E, Kalimo K. Antigliadin IgE – indicator of wheat allergy in atopic dermatitis. *Allergy* 2000;55:386-91.
4. Simonato B, De Lazzari F, Pasini G, Polato F, Giannattasio M, Gemignani C, et al. IgE binding to soluble & insoluble wheat flour proteins in atopic and nonatopic patients suffering from gastrointestinal symptoms after wheat ingestion. *Clin Exp allergy* 2001;31:1771-8.
5. Aunhachoke K, Rojanametin K, Saengapaswiriya A. Food dependent, exercise – induced anaphylaxis: First case report in Thailand. *J Med Assoc Thai* 2002;85:1014-8.
6. Vichyanond P, Visitsuntorn N, Tuchinda M. Wheat induced anaphylaxis. *Asian Pac J Allergy Immunol* 1990;8:49-52.
7. Palosuo K, Varjonen E, Kekki OM, Klemola T, Kalkkinen N, Alenius H, et al. Wheat omega-gliadin is a major allergen in children with immediate allergy to ingested wheat. *J Allergy Clin Immunol* 2001;108:634-8.
8. Aoki T, Kushimoto H. Type I wheat ingestion allergy: A model of masked allergy. *N Engl Reg Allergy Proc* 1987;8:34-6.
9. Simonato B, Pasini G, Giannattasio M, Peruffo AD, Delazzari F, Curioni A. Food allergy to wheat products: the effect of bread baking and in vitro digestion on wheat allergenic proteins. A study with bread dough, crumb, and crust. *J Agric food Chem* 2001;49:5668-73.
10. Ikezawa Z, Tsubaki K, Yokota S. Effect of hypoallergenic wheat (HAW-A1) on atopic dermatitis (AD) with wheat allergy, and its antigenic analysis using sera from patients with AD. *Arerugi* 1994;43:679-88.
11. Matsumoto T. Mitigation of the action of wheat allergen by acidic oxidative potential water. *Allergy* 2002;57:926-30.